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THE EVALUATION OF
PILOT JUDGEMENT TRAINING

A thesis presented in partial fulfilment of
the requirements for the degree of
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at Massey University

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ABSTRACT.

This study evaluates the effectiveness of a pilot judgement training programme, based upon methods and materials developed by the Embry-Riddle Aeronautical University. The study involved; modifying the training programme to apply to the New Zealand General Aviation environment; modifying the student training material to be self-explanatory; assessing how training affected the subjects knowledge, skills, and attitudes; and examining the relationship between personality and hazardous thought patterns. Using 56 student pilots enrolled at the Massey University School of Aviation, a small scale experiment was conducted using pre- and post-test measures. Subjects were divided into two groups, one received pilot judgement training (the experimental group), the other did not (the control group). The results showed training improved pilot judgement in a number of areas, and altered the subjects cognitive thought processes. Trainees supported the training method of instruction, and reported the training topics were relevant to judgement. No relationship was found between the hazardous thought patterns, and the subjects personality. Suggestions are made for future training, and research.

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INTRODUCTION.

"Human beings engaged in a human enterprise are subject to human failures. Pilots and controllers and maintenance people err and cause accidents because they are human, and we imperfect humans are all prone to make such mistakes. Discovering that a human error - pilot error or otherwise - has occurred is merely the starting point. To have any hope of preventing such an error from causing such an accident again and again, the reason the error was made in the first place must be discovered, and the underlying cause of that human failure must be revealed and addressed in future operations."

(Nance, 1986, p.73).

Accidents do not happen, they are caused. Recent aviation accident reviews report human error as causing between 65% and 85% of aviation accidents (Jensen, 1982; Feggetter, 1982; Hill & Pile, 1982; Graeber, Fouschee, & Lauber, 1984; Underwood Ground, 1984).

Human error in aviation accidents can result from poor aeronautical knowledge, skill, and judgement. Deficiencies in knowledge and skill can generally be attributed to poor pilot training. Judgement however, is often described as a trait that pilots innately possess, or an ability that is acquired with flight experience (Hawkins, 1987).

Recognizing the significance of human error in aviation accidents, the Federal Aviation Administration (FAA) commissioned Jensen and Benel at the University of Illinois to examine the psychology of pilot judgement. This research concluded that pilot judgement could be taught and evaluated (Jensen & Benel, 1977). Based upon these findings the FAA in 1978 commissioned the Embry-Riddle Aeronautical University (ERAU) to design, optimize, and evaluate a training programme that would improve pilot judgement. The results from this evaluation, measured in a knowledge and flight test, indicated training had a positive affect on the pilot's judgement making abilities. The researchers hypothesized that similar results would be obtained if the pilot judgement training was administered to the general aviation population (Berlin, Gruder, Holmes, Jensen, Lau, Mills, & O'Kane, 1982).

Further research based on this material has produced somewhat inconclusive results (Buch & Diehl, 1984; Lester, Diehl, & Buch, 1985; Telfer & Ashman, 1986). The most recent of these studies reported that judgement training led to an 8% difference between the experimental and control groups' judgement responses in a post-course flight test (Telfer & Ashman, 1986). Although this result was significant, it was not as large as the 16% difference reported in the ERAU research.

A number of questions still remain in relation to the effectiveness of the ERAU pilot judgement training material. These factors, must be addressed before generalizations can be made in terms of the general aviation population. In the past, problems have been confronted in areas relating to the difficulty of testing and evaluating pilot decision making. On a more fundamental level, the training design and content may lack adequate research and validity.

The present research focuses on establishing a refined methodology upon which to evaluate the effectiveness of the ERAU pilot judgement training material. Careful attention is given to investigating the difficulties associated with conducting evaluations within a social, or field setting. Based upon this information, an evaluative model is selected to guide and direct the research. As with past research in this area, this study has not been designed as a full scale validation of pilot judgement training. It is designed to assist programme organizers at the Massey University School of Aviation to determine the benefits related to administering judgement training to a specific group of student pilots.

The conclusions of this research summarize the effects of judgement training, and present suggestions for future research.

CHAPTER 1.

CONDUCTING AN EVALUATION WITHIN A SOCIAL SETTING.

"Designing an evaluative investigation is an art. The design must be chosen afresh in each new undertaking, and the choices to be made are most vulnerable. Each feature of a design offers particular sacrifices. Further merits and limitations come from the various features combined. A broad theory of validity and utility is thus required to provide a base both for judging research plans and for generating more satisfactory results" (Cronbach, 1982, p.1).

1.1 THE CURRENT STATE OF PROGRAMME EVALUATION: AN OVERVIEW.

The earliest known evaluation study was a nutrition quasi-experiment conducted by Daniel, Shadrach, Meshach, and Abednego (Mostellor, 1981). The results of this study, reported in the Old Testament, showed a vegetarian diet to be equally as effective as one containing meat. Despite having its roots in antiquity, evaluation as an applied science is a relatively young discipline which is still developing (Wortman, 1983).

Suchman (1967) presents the most complete monograph of the history of programme evaluation prior to the 1960's. More recent reviews, have been presented by; Perloff, Perloff, and Sussna (1976); Freeman (1977); Cronbach, Ambron,

Dornbusch, Hess, Horrick, Philips, Decker, and Weiner (1980); and Bulmer (1982). Highlighted in each of these reports is the diffuse, and multi-disciplinary nature of programme evaluation. Evaluations are being conducted in areas of accounting, aviation, economics, education, management, psychology, sociology, statistics, and many other fields of discipline (Perloff et al., 1976).

Programme Evaluation, perhaps more than any other science, is "what people say it is" (Glass & Ellett, 1980, p.211). As a result there is an over abundance of definitions, and a scarcity of consensus. As a field of study it is yet to achieve the cohesion expected in a multi-disciplinary field, let alone that of a unitary discipline (Perloff et al., 1976). Glass and Ellett (1980, p.221) also note this point, stating that "evaluative research is a set of theoretical and practical activities without a widely accepted paradigm". Despite the lack of consensus, each evaluator is able to define the field of their study and the nature of their task.

Definitions of programme evaluation tend to be based on the disciplinary backgrounds of their definers, or the distinct nature of the research (Franklin & Thrasher, 1976). A psychologist may develop a programme theory based upon individual cognitions and attitudes; a sociologist may prefer to use organizational variables; and an economist,

will probably use a micro-economic theory (Bickman, 1987). The approach that is taken will influence how an evaluation is conducted, and how the results are utilized.

1.2 DEFINING EVALUATION FOR SOCIAL RESEARCH.

Defining evaluation within the context of a social setting is more complex than simply being lexicographical (Glass & Ellett, 1980). Consideration should be given to the contributions which have been made by various disciplines, and a critical assessment should be made of the factors that prevail within the proposed evaluative study (Cook & Shadish, 1986). The product of this appraisal must identify the boundaries within which to work, and the different areas to evaluate.

An important distinction can be made between the concepts of evaluation and evaluative research (Suchman, 1967). An evaluation will involve making judgements about the worth of a particular intervention. While this implies some logical or rational basis for making such judgements, it does not require any systematic procedures for grouping and presenting objective evidence to support the judgement. Evaluative research on the other hand, utilizes the methods and techniques of classical experimentation for the purpose of making an evaluation. Under these constraints, an evaluator will increase the possibility of "proving" rather than "asserting" the worth of a social activity.

By adopting experimental techniques and methods within an evaluative study, an evaluator will confront questions pertaining to the evaluations utility and validity. To address these factors, an evaluator will need to carefully assess the situation being investigated, and select an appropriate research design.

Suchman (1967), outlines a logical and structured approach for conducting evaluative research. This includes the following systematic pattern of analysis;

1. Establish the goals of the evaluation.
2. Develop a measurable criteria for each of the goals.
3. Analyse the problems associated with the goals.
4. Describe and standardize the intervention procedure.
5. Set up a controlled situation to measure if the objectives are achieved.
6. Determine the causation of the observable changes.
7. Indicate the durability of the changes.

While this structured approach appears to offer a well-ordered method for conducting an evaluation, it is probably best suited to research conducted within a laboratory setting. Research conducted outside of this setting cannot ensure control, and will not operate as rationally as the decision model suggests.

Cook and Shadish (1986, p.197), provide a concise picture of the nature of evaluative studies within a social

setting: "In the real world, problems are ill defined and stakeholders disagree about the priority each definition deserves; programme objectives can be vague or contradictory; the change attempts actually implemented may be marginal; programme structures involve long chains of communication that hinder the accurate dissemination of information between programme and project staff; and sources of authority for local decision making are typically diffuse, with directives from a programme central office often playing only a minor role in determining the decisions made." Such factors, act to enhance the differences that exist between evaluations conducted within a controlled laboratory, and those conducted within a social setting. Within a social setting evaluators will be forced to consider factors that go beyond the concerns of pure analysis, and address the confounding effects of political, and administrative demands. If a definition of evaluation is to be of any use, it must address each of these factors.

Rossi and Freeman (1985), present a definition that addresses the problems associated with conducting an evaluation within a social setting;

"Evaluation research is the systematic application of social research procedures in assessing the conceptualization and design, implementation, and utility of social intervention programs... Evaluation research

involves the use of social research methodologies to judge and to improve the planning, monitoring, effectiveness, and efficacy of health, education, welfare, and other human service programs." (Rossi & Freeman, 1985, p.19).

This definition identifies the boundaries for conducting an evaluation within a social setting. It carefully outlines the different areas to be considered when designing an evaluation, and notes the purposes for which evaluative research is conducted. Although no direct attention is given to the political and pragmatic environment in which an evaluator works, such an approach will include the consideration of these factors during an evaluation's conceptualization.

1.3 RESEARCH DESIGN.

Underlying any evaluation, be it explicitly stated or otherwise, will be some form of research design. Evaluators will select this design based on their conceptualization of the problem and use it to guide the experimentation within an evaluation. Kerlinger (1979) notes, that the design of a research study refers to the plan and structure of an investigation conceived so as to obtain answers to research questions. At a more detailed level an evaluative experiment is a research study that has been designed to determine the relationship between variables. This will

involve the manipulation of one or more independent variable while controlling the influence of all other variables not pertinent to the problem being investigated (Crozy, 1985).

While experimental designs have been variously categorized by many different writers, Campbell and Stanley (1966), are usually referred to as the forefathers of modern experimental design. This material was reviewed and extended by Cook and Campbell (1979), and classifies the design of a research study based upon the assignment of experimental treatments. Under this classification a "true" experiment involves the random assignment of subjects or experimental units to the experimental and control groups. Consequently, this research design gives a researcher a great deal of control over the experimental situation. In contrast, a quasi-experiment assigns the treatments of a study in a nonrandom fashion. This type of design will fabricate a nonequivalent experimental and control group at the outset of a study, and give less control to the experimenter than a random design (Mark & Cook, 1984).

Obviously, the ability to make confident causal inferences is enhanced when the assignment of a treatment occurs randomly within an evaluative study. However, evaluative studies are not dictated purely by the casual inferences they aim to investigate. Other factors can make randomization either not possible or practical within a

social setting. Because of these difficulties researchers must aim to make a quasi-experiment valid.

Cook and Campbell (1979), describe four types of validity and a series of quasi-experimental designs which can help to overcome the threats caused when random sampling procedures are not used to assign subjects to experimental and control groups. Furthermore, Wortman (1983) notes that the order of importance placed on the validity types will be different for the theoretician and the applied evaluator when constructing an experiment. For the theoretician the order in which validity is stressed centres firstly upon internal validity, and is followed by construct, conclusion, and external validity. For the applied evaluator this order of importance alters to, internal, external, conclusion, and construct validity.

Wortman (1983), is adamant that the logical basis for conducting a higher quality evaluation can be found within the validity framework detailed for the applied evaluator. The consideration of validity within this framework, and validities contribution within an evaluation, are outlined in Chapter Two (See section 2.1, 2.2.3, & 2.2.5).

1.4 QUANTITATIVE VERSUS QUALITATIVE METHODS.

Evaluators and Social Scientists must address the general presumption that within scientific disciplines the 'objective' nature of quantitative methods is viewed

favourably, and the 'subjective' nature of qualitative research is viewed unfavourably. To work within the constraints of this view, and to collect primarily quantitative data, an evaluator must examine a limited, and often biased set of outcomes. This information will probably not include the views, reactions, and feelings of the programme participants. The scientific measurements employed within such an approach will ensure the programme can be precisely repeated and under this strict control will enable a replication of causal inferences.

In reality, evaluative studies can rarely be perfectly replicated within a social setting and an evaluator is forced to address factors that extend beyond the causal inferences being investigated. The nature of these conditions means that the dominant quantitative paradigm is inadequate to address the multiple factors which infringe upon an evaluative study (Partlett & Hamilton, 1976). Just as evaluators have had to change from the conservative approach of true experiments to the less rigorous quasi-experiments and address its problems, they must change from purely examining what happens within a study and explore the contextual and process issues of how and why outcomes occur (Wortman, 1983).

Reichardt and Cook (1979), see the combination of quantitative and qualitative methods within an evaluation as yielding new insights not accessible by either method

alone. The potential benefits of this approach are noted by Wortman (1983, p.233), who states that, "qualitative data can play an essential role in providing memorable and powerful images of the major points and findings of the quantitative results." For an evaluator this leaves open the challenge to provide a complete picture of the objective and subjective outcomes of a training programme.

1.5 FORMATIVE AND SUMMATIVE EVALUATION.

The nature of evaluative research provides an opportunity to assess the goals of a defined programme. A researcher can use these goals as a comparative tool to assess whether the programme gets implemented according to plan, and whether the programme produces any change (Freeman, 1977). The emphasis placed upon evaluating the constructs of a programme or its outcomes will make a distinct difference to the nature of the evaluation. Scriven (1972) defines evaluative studies centred upon the constructs of a programme as "formative evaluations", and research centred upon a programme's outcomes as "summative evaluations". Others have defined the concept of a formative evaluation as, process evaluations (Freeman, 1977); and means-ends analysis (Williamson, Prost, & George, 1978). These same researchers refer to the concept of a summative evaluation as, outcome evaluations (Freeman, 1977); and goal-outcome congruence (Williamson et al., 1978). No matter how they

are termed, formative and summative evaluations each have a number of distinct characteristics.

Early evaluative research was biased toward summative evaluations (Cook & Shadish, 1986). These involved operationally defining the goals of a programme, and assessing performance against these measures (Brook, Shouksmith, & Brook, 1983). Figure 1.5 (A), presents a graphical representation of the direction of this analysis. Within these evaluations, the evaluator focuses on measuring changes within the dependent variable(s), and establishing the extent to which a programme achieves its stated goals. Clearly this evaluative style is suited to the application of experimental and quasi-experimental designs (see section, 1.3). The weakness of this approach is that by evaluating only the programme outcomes an evaluator will be left unable to address and rule out rival hypotheses, describe unanticipated consequences or side effects, and establish the conditions under which the programme is most efficient (Rossi & Freeman, 1985).

What seems important to reiterate is that controlling the external biases within an experiment, especially within a social setting, is no simple task. Many programmes are not implemented and executed in the way originally designed. Problems will arise from the unavailability of resources, ethical and political constraints, poorly motivated and trained staff, and inappropriate programme recipients

(Freeman, 1977). Measuring the effects of these factors will require the assessment of a programme's constructs.

Quay (1977), criticized evaluators for assessing research design and outcome measurements, at the expense of programme integrity. He advocated the importance of assessing the quality and quantity of a programme's treatment variables, and considered a formative evaluation to be the prerequisite to any summative evaluation.

Formative evaluations focus specifically upon the degree of match between the implemented programme, and its identified goals (Brook et al., 1983). Figure 1.5 (B), graphically illustrates the direction of this analysis. The aim of this evaluation is to provide on-going feedback to the programme organizers relating to any changes in the programme goals, or the programme's designed treatment. The results from this evaluation will provide an assessment of the effectiveness of a programme's independent variables. To psychologists, this activity is known as "pilot testing an experiment" (Wortman, 1975, p.564).

Prior to conducting a formative evaluation, and assessing the processes that prevail within a programme, an evaluator must address a number of ethical considerations, assess any invasion of privacy, and ensure the confidentiality of any results (see section 1.7). Over and above these concerns, there are a number of factors which may make a formative

evaluation harder to implement than a summative evaluation. In particular, an explicit model must be formulated prior to gathering process relevant data, and unfortunately, such a model may not be able to be generated prior to demonstrating an effect. In addition, such elaborate procedures may be inefficient and costly if one's primary goal is simply to demonstrate a treatment effect (Judd, 1987). These factors may lead to the formative evaluation being disregarded when compared with the alternative of a summative evaluation.

It is however, the benefits of a formative evaluation that challenge any question of it being a poor alternative, or less important than a summative evaluation. A formative evaluation will provide an evaluator with the basis upon which to assess the construct validity of a programme, and to establish any unintended treatment effects. The nature of this information will increase the interpretability of a summative evaluation, and provide a basis for building general theories about what causes the subjects outcome behaviours (Judd, 1987).

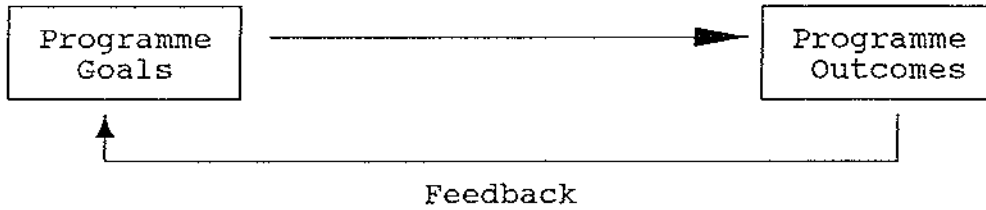


Figure A: A Summative Evaluation

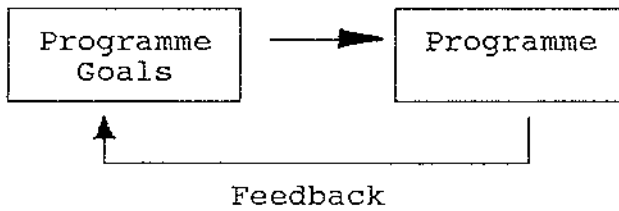


Figure B: A Formative Evaluation

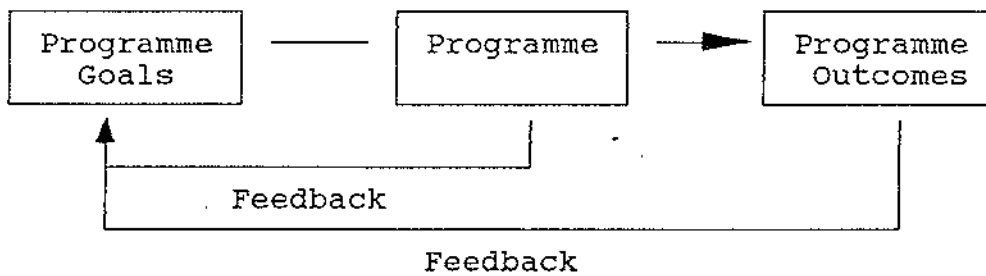


Figure C: A Comprehensive Evaluation

Figure 1.5 : Three Approaches to Evaluation.

Ideally, all evaluative studies should include both formative and summative evaluations. These studies are referred to as "comprehensive evaluations", and employ both formative and summative techniques and ideas (See Figure 1.5 (C)). The benefit of this approach, over and above those of the individual techniques, is the potential to analyse how the treatment effects the programmes outcomes. This analysis can identify what kind of intervening factors might mediate the effect of the treatment, and will substantiate the evaluative results (Chen, 1990).

Prior to proceeding with a comprehensive evaluation, certain considerations must be made. An evaluator must assess the appropriateness of each evaluative technique, and satisfy questions relating to the studies ethics, design, effectiveness, and cost. Having satisfied these factors, the facilitation of an integrated model should begin by establishing a programme's goals. Based upon these factors an evaluator should proceed with the routine planning of a formative, and summative evaluation. A more intricate explanation of the methodological pattern for combining formative and summative evaluative strategies is provided in the evaluative models of Wortman (1975), and Williamson et al., (1978), outlined in Chapter 2 (See section 2.1, & 2.2).

1.6 PROGRAMME THEORY AND CRITERIA DEVELOPMENT.

The outcomes of any evaluative study will be primarily determined by an underlying programme theory, and the formation of a programme's goals. On these grounds it is important that an evaluator understands the different directions which can be taken in theory construction, and the systematic procedures for operationally defining a programme's goals.

In its simplest form, the theoretical basis of an evaluative programme can be described in either "descriptive", or "prescriptive" terms. Descriptive theories will be centred on the causal relationships among programme treatments, processes, and outcomes. These theories will be directed at analyzing events as they actually are, and centre upon questions of a summative nature. Prescriptive theories, on the other hand, do not view research in such 'cut and dry' terms. The possibility for evaluating numerous factors, for selecting different treatment formats, and for deciding on different outcome criteria, directs this evaluative approach to speculating how a programme can achieve its best results (Chen, 1990). The nature of this theoretical approach, will centre upon questions of a formative nature.

Given that formative and summative evaluations can be combined, a researcher in constructing a theoretical basis for an evaluation, may combine the descriptive and

prescriptive theoretical approaches. This unified approach will firstly address the prescriptive questions of what goals are desired, and what impacts are anticipated. Secondly, it will address the descriptive questions of how these goals are to be generated. Ultimately, the combination of these theoretical approaches will provide a more complete programme theory, and provide a basis for assessing both causality and reform.

Evaluators, having established their theoretical orientation, will then decide what variables are to be evaluated, and what methodological approach is to be used. Establishing answers to these questions will bring to light a debate on whether to emphasize the viewpoints of the programme's sponsors, or to stress social science theory and knowledge. Each of these approaches has its strengths and weaknesses. The 'sponsors approach' responds to the sponsors values. Unfortunately this approach is not always plausible as it is based upon the belief that theory should emerge from the data, rather than from prior structures or hypotheses. Alternatively, the 'social sciences' approach, perceives a programme based entirely on the sponsors perspectives and may fail to grasp the complicated processes underlying a programme. This approach establishes a programme theory from an existing body of knowledge, and from conducting direct observations. The major weakness of such an approach, is that it may fail to represent the sponsors position (Chen, 1990).

Again, the combination of theoretical perspectives may establish a dual theorizing process that will overcome the weaknesses of the individual content format perspectives, and will utilize the strengths of both approaches. Such a method will use the 'sponsors approach' to clarify and refine sponsors perspectives, and use the 'social science approach' to construct an alternative programme theory. The product of this joint approach will enhance communication between programme sponsors and evaluators, and will establish the fundamental characteristics of the evaluative research. This will include, detailing the material to be evaluated, presenting a blueprint of the behavioural objectives to be achieved, and outlining the research methods and success criteria of the evaluation (Goldstein, 1980).

The complexity of most evaluative programmes will mean that there are a considerable number of factors which should be considered, and assessed. In measuring a programmes outcomes some evaluators will employ an "ultimate criterion" model for their evaluation. This approach will combine all outcome measures into one linear composite measure of success, and evaluate all programme participants against this evaluative standard.

Alternatively, other evaluators will stress the need to collect "multiple criteria". This approach will be directed at identifying the individual characteristics which

underlie, and are related to the ultimate criteria. The use of this approach, although more time consuming, will provide a broader knowledge of performance, and provide the grounds for identifying unintended outcomes (James, 1973).

There are a number of factors which the design of a success criteria will need to satisfy prior to being included within an evaluation. The objectives of a programme must be expressed in measurable terms, be plausible in how they link programme activities to programme outcomes, be reliable, and be acceptable. In relation to these factors, it is important that the programme administrators have the motivation, ability, and authority to manage the programme's implementation, and measure its outcomes (Rossi & Freeman, 1985).

Finally, no assessment of performance will be independent of time, and evaluators will have to give consideration to its effects on performance assessment. The fact that a person can achieve a certain level of proficiency at one point in time does not mean they will achieve the same standard at a later date. For this reason, what might be an appropriate measure of accomplishment for one moment, may in turn be an entirely inappropriate measure at a later date. As a result, an evaluator may have to design different predictive standards for different times during an evaluative study. These may include, "immediate criteria" to assess performance during the implementation

of a programme, "proximal criteria" for assessments close to the programmes administration, and "distal criteria" for assessments made at a later date (a year or more after obtaining the original predictor measures) (Blum & Naylor, 1968).

1.7 POLITICAL AND ETHICAL EVALUATIVE CONSIDERATIONS.

Conducting an evaluative study within a social setting will involve a wide variety of interest groups. These groups may include programme sponsors, the evaluator(s), administrators, and programme recipients. Given these factors, and the resulting value judgements which will be drawn from an evaluative study, evaluations automatically claim the role of a 'political act' (Wortman, 1975).

In acknowledging an evaluation as a political process, a successful evaluation will involve an interaction of methodology, bureaucracy, and politics (Franklin & Thrasher, 1976).

The planning of an evaluation will begin initially with a proposal from the programme sponsors. An evaluator, having accepted to conduct an evaluation, should assess the needs of the programme sponsors, and determine the nature of the political system (Chelimsky, 1987).

Inevitably, an evaluator will confront some form of 'power structure', operating either for or against the

evaluation. This power will have the force to determine the pace at which the evaluations activities proceed, influence decisions about the evaluations design, and determine the final use of the evaluations results (Riecken, 1977).

Evaluators will typically accept the power structure within an evaluation as given, and thus come to align themselves unwittingly or otherwise with the dominant groups in the system (Sjoberg, 1975).

Given that an evaluation will serve the predominant view of the programme organizers, there is the possibility that the views and beliefs of others will either be neglected or compromised. The result of this discontent, and the resulting evaluative direction, may provide the basis for confounding effects. The evaluative study may bring about changes in the daily routine of programme staff, and add additional stress to their jobs. They may fail to see the value of conducting the evaluation, and lack the motivation to follow evaluative procedures. In addition to these factors, the direction taken by an evaluator may result in environmental constraints, which will add to the difficulty of maintaining control over the experimental situation. The nature of these problems may be overcome by working in collaboration with programme staff during the early stages of programme development. This will involve placing a considerable amount of effort on the formative function of improving the programme, and providing feedback during the

evaluation. Furthermore, the final results should be presented in clear and simple language, and an opportunity provided to respond to any criticism relating to the evaluation.

Closely connected with the political considerations of an evaluation, and arising from the selection of a target population, are a number of ethical considerations. Perhaps the overriding ethical consideration for all intervention programmes is that the treatments proposed do not harm the participants in any way. When a treatment or the omission of a treatment, is anticipated as damaging it should be ruled out no matter how desirable the results (Riecken, 1977).

Having satisfied this criteria, the evaluator's most important responsibility will be to protect the privacy of the evaluation's participants, and the confidentiality of the results. By giving subjects an explanation of the evaluation's purpose, most ethical concerns will be satisfied (Riecken, 1977). There will however be circumstances where a full disclosure of the evaluations purpose will bias the participants responses. Under such conditions, evaluators must rely on their own ethical sense of judgement, and be prepared to be held accountable to it. What is often beneficial under these conditions (and also when a full explanation is provided), is some form of intermittent face to face contact between the evaluator and

the subjects. This will provide an opportunity to debrief, and address any questions which the programme participants may have.

As a final comment, Anastasi (1976), provides a general guide-line for addressing ethical concerns. Having addressed the nature of the study, an evaluator must maintain the dignity and worth of all programme participants, provide freedom for enquiry and communication, and in no way misuse their professional position or relationship with the programme participants.

1.8 SUMMARY.

While addressing numerous questions and taking many different forms, evaluative studies conducted within a social setting will be affected by factors outside of the casual inferences being investigated. As a result of these conditions, an evaluator must go beyond the simple framework of a research question, and the constraints of their disciplinary background. Evaluators must endeavour to consider, and address the factors that will finally determine the validity and utility of their results.

These factors, form the common ground between all evaluations conducted within a social setting. They include, taking time to select an appropriate research design; collecting both quantitative and qualitative data; and combining formative and summative evaluative

techniques if possible. Furthermore, an evaluator should establish a solid programme theory, a criterion for measuring success, and consider the political system and ethics behind the research.

While it may seem as if there are a multitude of areas to consider within an evaluation, various models have been developed to address each of these factors in a systematic fashion. Chapter 2 outlines two of these models. The first is presented by Wortman (1975), and the second by Williamson, Prost, and George (1978). These models provide the theoretical foundation, and direction, upon which the evaluation of the pilot judgement training programme has been based.

CHAPTER 2.

A THEORETICAL FRAMEWORK FOR PROGRAMME EVALUATION.

2.1 THE WORTMAN MODEL.

Following the structure of a general systems theory, Wortman (1975), presents an evaluative model designed to address the problems associated with conducting research within a social setting. Utilizing both experimental and nonexperimental strategies, this model is organized along three major dimensions (See Figure 2.1). The first, organizational components, outlines the persons involved at the different stages in a programme; the second, theoretical concepts, details the programme's design; and the third, evaluative processes, outlines the methods for determining a programme's effectiveness, and the direction of feedback.

As illustrated in Figure 2.1, Wortman considers six evaluative processes relevant to assessing the effectiveness of a programme. The formative evaluation examines whether the programme was implemented as planned (See Section 1.5), the summative evaluation examines the match between the programme's goals and its outcomes (See Section 1.5), and the remaining four evaluative processes examine the programme's validity.

As has already been stated by Wortman (1975), (See Section 1.3), the quality of an evaluation will be dependent upon the order of importance placed upon validity. Attention should firstly centre on determining whether the observed effects are related to the programme's treatment (internal validity). Secondly, on whether the evaluations findings can be generalized to other populations, settings, and times (external validity). Thirdly, on whether the data analysis procedures reliably report the programme's impact (conclusion validity), and finally determine if the theoretical assumptions are accurately translated into operational terms (construct validity). The different threats related to each type of validity, and the methods for overcoming these threats, are recorded by; Campbell and Stanley (1966); Dunnette (1975); Wortman (1983); and, Mark and Cook (1984).

Within Wortman's (1975) evaluative model, the four types of validity, should not be considered as individual concepts. Statistical conclusive validity is a subcategory of internal validity, and required for establishing any kind of causal inference. In addition, construct and external validity both focus on making generalizations. A relationship between the four types of validity also becomes apparent when valuing one type of validity over another. For example, statistical conclusion validity can be increased by applying rigidly standardized treatments to a homogeneous sample, but this may reduce construct and

external validity (Mark & Cook, 1984). These, and other trade-offs among the different validity types are considered within the design of Wortman's (1975) model. In many cases the problems arising from trade-offs will be simply avoided by conducting a programme of research, rather than a single study.

Figure 2.1, illustrates Wortman's (1975) evaluative model. If one views the model as a procedure for establishing a cause-effect relationship, the various components achieve a measure of logical unity (Wortman, 1975).

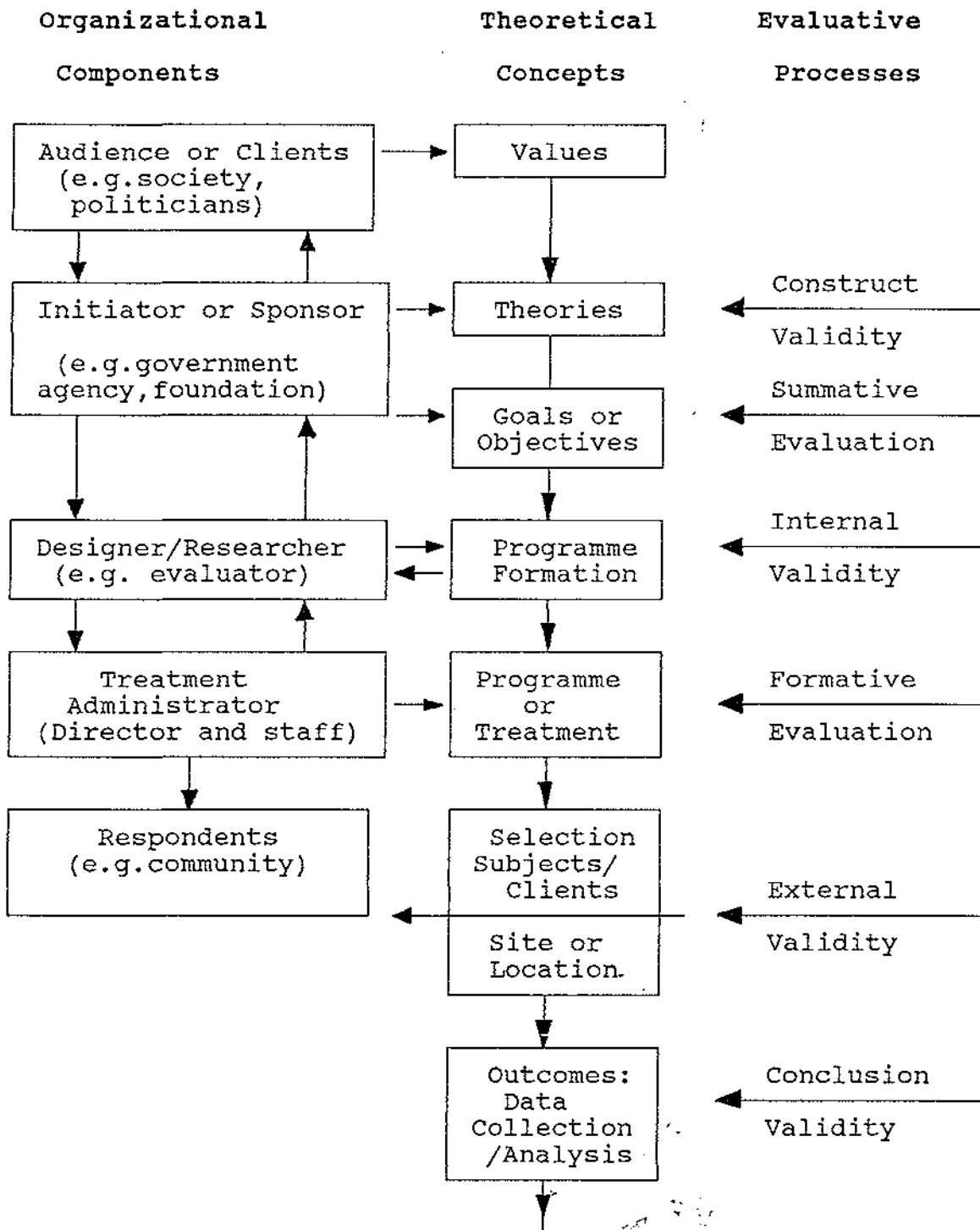


Figure 2.1 The Wortman Model.

(Source: Wortman 1975).

While Wortman's (1975) article has been cited by a large number of writers, (including; Wittrock & Lumsdaine, 1977; Stokols, 1978; Goldstein, 1980; Brook, 1982; Shouksmith, 1983; Feinberg & Rowid, 1983; Barnes, Brook, Hesketh & Johnson, 1985; Russell, 1987), none use the model in its designed form, and the majority refer primarily to his written text.

As stated in Chapter 1, evaluators will confront numerous opposing factors when conducting evaluations within a social setting. Evaluators must adopt an evaluative model that will control these factors. Against this criteria, the complexity of the Wortman model may supersede the needs of a small scale evaluation where there is no assurance that the research design will be strictly adhered to. As a result, evaluators may leave redundant a number of factors within the model, or present a lot of detailed information of little interest to the parties requesting the evaluation. This view was also held by Brook (1982), and Russell (1987), who found it necessary to use a simplified adaptation of the Wortman model, in their evaluative research.

2.2 THE WILLIAMSON, PROST, AND GEORGE EVALUATIVE MODEL.

Williamson, Prost, and George (1978), presented an evaluative model aimed to detail the factors an evaluator should address when assessing, and providing feedback on a programmes functioning. Prompted by Wortman's (1975) article, the model is simpler, and better suited to the demands associated with conducting a small scale evaluation within a social setting.

The model (See Figure 2.2), simplifies the "organizational components" and "theoretical concepts" outlined in the Wortman model, into the stages of a programme's formation (inputs); implementation (process); and outputs. As with the "evaluative processes", the feedback stage of this model provides the basis upon which a programme is evaluated.

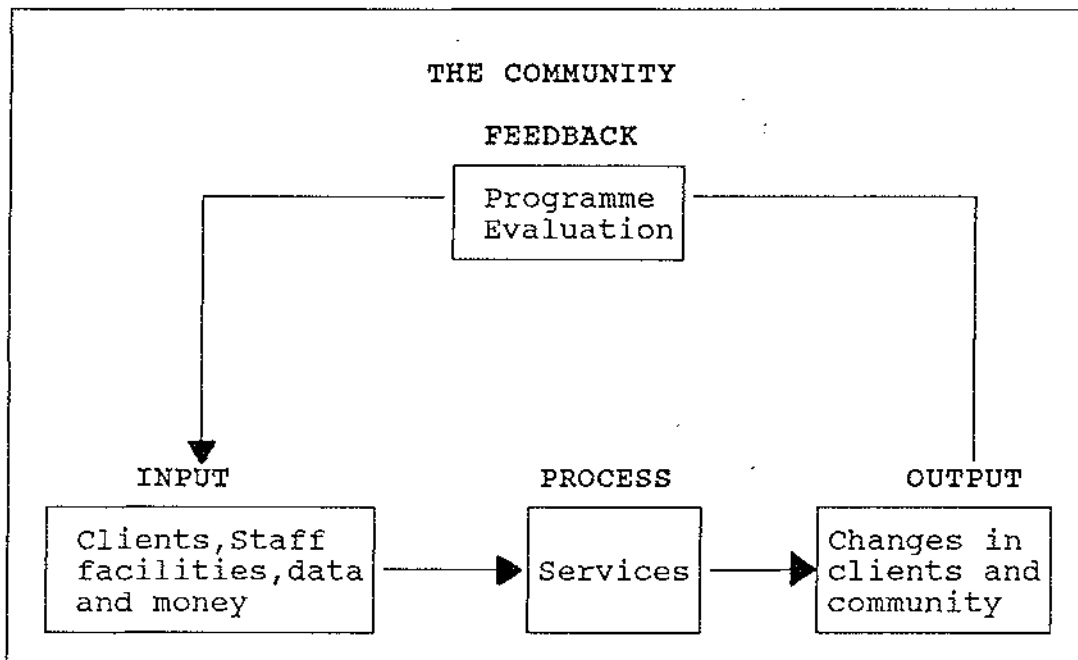


Figure 2.2 Programme evaluation as a system feedback loop:
Williamson, Prost, and George (1978).

Williamson, Prost, and George (1978), have translated Wortman's "evaluative processes" into six stages of evaluation:

- General Effectiveness
- Means-Ends Analysis
- Internal Validity
- Goal-Outcome Congruence
- External Validity
- Construct Validity

2.2.1 General Effectiveness.

As the first stage of an evaluation (and as a form of summative evaluation), the question of general effectiveness is directed at investigating whether the programme has had any effect. Unrelated to the direction of this change, or to the programme's goals, the simple concern is whether the subjects differ after the introduction of the programme.

In gauging the general effectiveness of a programme, evaluators will benefit from employing a number of dependent variables. Using these, as multiple measures of programme performance, evaluators will find it easier to establish whether a programme has had any effect. If no effects are observed, an evaluator will need to question the nature of the study, and the methodology employed for gauging a programmes outcomes.

2.2.2 Means-Ends Analysis.

Having established that the programme had an affect, an evaluator should consider whether the implemented programme matches its goals (See Section 1.5: formative evaluation). While there are a number of different views on what questions to address during this stage of analysis (see: Freeman, 1977; and Birnbrauer, 1987); an acceptable means-ends analysis will be achieved when the programme's inputs are proportionally distributed with respect to the

programme's goals. This will mean that the greatest amount of resources are administered to the most important goals, and a proportionally smaller amount to less important goals.

In circumstances where the goals of a programme are not well established, Williamson et al., (1978) provide a simple four step method for ranking a programme's goals, and for achieving consensus;

1. Interview the relevant parties involved in the programme, and obtain their impressions of the programme's goals.
2. List their opinions.
3. Return to the relevant parties interviewed in 1, and have them rank order the list established in 2.
4. Construct the final rank order of goals using simple statistics to summarize the responses.

Once these goals have been ranked, and the programme implemented, an evaluator can use simple nonparametric statistics to assess the total resources assigned to each goal.

Having completed this analysis, an evaluator will be able to assess a programme's integrity, and decide whether the programme's treatment is of sufficient quality and quantity to meet the programme's requirements.

An unsatisfactory means-ends analysis will require the reassessment of the programme's goals, and a close inspection of the programme's implementation. A satisfactory analysis will enable an evaluator to proceed with an evaluation of the programme's internal validity.

2.2.3 Internal Validity.

Assessing the internal validity of a programme is centred upon whether or not the outcomes of an intervention are attributed to the programme itself, or to other factors associated with the programme. (See Section 2.1 for references on the threats to this type of validity, and the methods for overcoming them).

Williamson et al., (1978) note that the most common errors that threaten the internal validity of a programme occur during its development, and include; the omission of control groups; non-random assignment of the programme's treatment; inappropriate dependent measures; the use of a non-representative sample; and finally, unmonitored follow-up periods. It is important that evaluators note these threats and attempt to minimize them. This will strengthen the internal validity of a programme's results.

2.2.4 Goal-Outcome Congruence.

In considering the goal-outcome congruence of a programme, an evaluator will need to consider the match between the programme's goals and its outcomes. An acceptable

evaluation of these factors will require that the programme's results reflect the attainment of the programme's goals.

As has already been stated, the evaluation of goal-outcome congruence is clearly suited to the use of experimental, and quasi-experimental research methods (See Section 1.5; summative evaluation). Using these methods to structure an evaluation, Williamson et al., (1978), detail five steps for evaluating the goal-outcome congruence of a programme:

1. Define the programme's goals following the same systematic pattern as the means-ends analysis (see Section 2.2.2).
2. Operationally define these goals in quantifiable terms.
3. Collect outcome data.
4. Statistically analyse whether the programme's outcomes and programme's goals match.
5. Provide feedback and recommendations about the programme.

If the goal-outcome congruence is unsatisfactory, changes should be made to either the programme's goals, the method of intervention, or possibly the dependent variables. Having initiated these changes, the evaluation should begin again, by evaluating the programme's general effectiveness.

The outcomes of a programme may relate to immediate, intermediate, or ultimate objectives. While the outcomes of these objectives may not be assessed for every programme, goal-outcome congruence will be strengthened if a programme manages to evaluate the fulfilment of short and long term goals (Warr, Bird, & Rackham, 1976).

2.2.5 External Validity.

Evaluating the external validity of a programme centres on whether the results of a programme can be generalized to other populations, settings, and times. (See Section 2.1 for references on the threats to this type of validity, and the methods for overcoming them).

Williamson et al., (1978), outline a five step process for assessing external validity;

1. group programme recipients on the basis of their demographic identity.
2. measure the treatment effects for each of these groups.
3. assess the generalizability of the results.
4. establish what fraction of the target population is underserved.
5. consider the factors that contribute to this underservice.

An unsatisfactory assessment of external validity, may require the redefining of the target population, or changes to the content of the programme.

2.2.6 Construct Validity.

The final stage of this evaluative strategy is directed at assessing the programme's rationale. Williamson et al., (1978), suggest that a satisfactory evaluation in the five preceding stages will provide the basis for verifying the rationale upon which the programme is based. Unsatisfactory evaluations within any of these stages will lead to the modification of the programme's goals, the independent variables, the dependent variables, and possibly the programme recipients. When these circumstances occur, and the procedures fail to support the programme's rationale, a new rationale should be constructed in line with the changes, and the evaluation should begin again with the assessment of the programme's general effectiveness.

When the programme's rationale is supported the programme's theory is also supported. When this occurs an important contribution has been made either in support of an old theory, or in the discovery of a new theory. Whatever the case, an evaluator should make the findings available to others so that the study can be replicated, or further developed.

2.3 THE EVALUATIVE PROCESS.

Williamson et al., (1978), provide a simplified version of the Wortman Model. Although there are a number of differences between these models, the nature of their evaluative process is very similar. While Wortman (1975), does not include the assessment of general effectiveness, a match can be made between the models remaining evaluative processes; means-ends analysis, and formative evaluation; internal validity, and internal and conclusion validity; goal-outcome congruence and summative evaluation; external validity; and construct validity.

Based on the match between these models, it is possible to conclude that Williamson et al., (1978), fulfil their aim to establish a model of evaluation that is clear and sensitive to the needs, and resources typical of small scale evaluations conducted within a social setting.

Figure 2.3, graphically illustrates the systematic pattern of analysis used by Williamson et al., (1978). Illustrated firstly, is the three individual components of a programme, and secondly, the six procedures of evaluation. For each of these procedures, the programme components assessed are highlighted, and the direction of analysis indicated with the use of arrows. In addition, there is a brief description of each evaluative procedure, and a short summary of the steps taken to address areas of deficiency.

THE PROGRAMME (See Section 2.2):

1. Inputs.



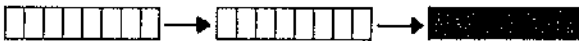
Description:
Programme Formation

2. Processes.



Description:
Programme Implementation

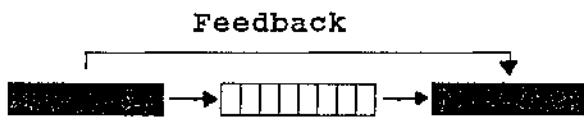
3. Output.



Description:
Programme Outcomes

THE EVALUATION (See Section 2.2.1 to 2.2.6):

4. General Effectiveness:



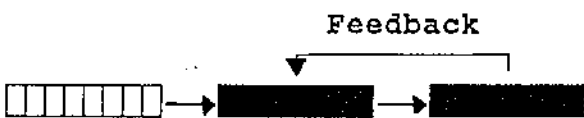
Question:
Does the programme have any effect (whatever)?
Corrective Procedures:
Select other dependent measures.

5. Means-Ends Analysis:



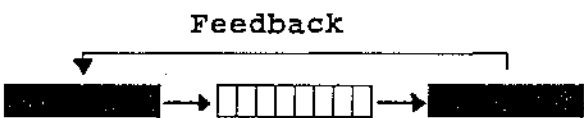
Question:
Does the programme match its goals?
Corrective Procedures:
Redefine goals or reallocate resources.

6. Internal Validity:



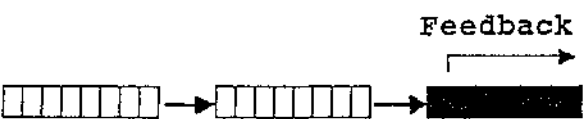
Question:
Are outcomes, attributed to the processes?
Corrective Procedures:
Change recruiting, and dependent measures.

7. Goal-Outcome Congruence:



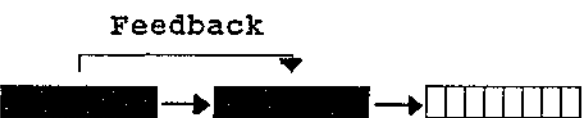
Question:
Do the programme's outcomes and goals match?
Corrective Procedures:
Change goals, treatments, or dependent measures.

8. External Validity:



Question:
Can the programme's outcomes be generalized?
Corrective Procedures:
Change programme recipients, or treatment.

9. Construct Validity:



Question:
Are the programme goals defined in rational terms?
Corrective Procedures:
Change programme rational.

Figure 2.3: A Systematic Pattern to Evaluative Research.

2.4 THE PRESENTATION OF EVALUATION RESULTS.

A far too frequent criticism of evaluative studies is that their results are seldom acted upon (Raizen and Rossi, 1982). Many evaluations, in fact, indicate their direct utility as falling somewhat short of the mark (Rossi and Freeman, 1985).

An evaluation's results may not be acted upon by programme managers because the final reports cannot be read and understood, and they fail to report on the items of interest. This indicates the evaluator does not understand the practitioners problems, values, and the importance of different factors (Franklin & Thrasher, 1976).

Evaluators, on the other hand, state that their results get misinterpreted, manipulated, ignored, and rejected (Franklin & Thrasher, 1976).

These different opinions reinforce again the clear limits, and political constraints under which evaluations are conducted (See Section 1.6). The interests of the programme's managers, and evaluators, may be totally different. Programme managers may dread receiving feedback from an evaluation, as it will require changes in behaviour, and programme design. Evaluative results may be inappropriate, inconclusive, or indicate directions of change that are not feasible (Raizen & Rossi, 1982). Alternatively, given the methodological complexity of many

evaluations, and their appearance of having scientific accuracy, practitioners may over-value and over-react to evaluation findings. In other cases, evaluations will be conducted purely for the purpose of maintaining internal and external funding, by giving a programme professional or scientific prestige (Lumsdaine & Bennett, 1975). Under each of these conditions, the results and feedback from an evaluative study will not be utilized, and the predominant views of the programme's managers will supersede whatever empirical data the evaluator presents (Raizen & Rossi, 1982).

Because the ultimate use of an evaluation's results will be dictated by a specific audience, evaluators should carefully examine this groups needs at the programme's inception, and not just prior to dissemination. By taking time to understand the cognitive styles of the programme decision makers, evaluators will have a basis upon which to construct a relevant research direction; establish what issues to address; what information to collect; and in what form to present the results. Utilization and dissemination planning should for these reasons, occur at the preliminary stages of the research. This will ensure that the results are communicated in an intelligible way; that decision makers are educated on the strengths and limitations of the evaluation; and informed on how this information should be communicated by decision makers to their constituencies (Solomon & Shortell, 1981).

Rossi and Freeman (1985), make a number of important points in reference to the dissemination of an evaluation's results. They note that "primary dissemination" is in most cases a technical report, extending far beyond the needs of what is deemed functional by programme decision makers. These provide a detailed and complete description of the evaluation, its results, its limitations, and suggestions for future research. Decision makers may not have the time to read voluminous documents, and further more may not understand their content. For these reasons, evaluators must focus on "secondary dissemination". This refers to communicating the results and any recommendations in a form that will meet the needs of the programme stakeholders. These can take many different forms, including; abbreviated versions of technical reports (generally called executive summaries), memos, oral and audio-visual presentations. The principle aim of "secondary dissemination" is to ensure the utilization of results, using understandable vocabulary, and simplistic statistics.

It should be noted that evaluators responsibilities do not end with the presentation of results. Recommendations relating to programme modifications, areas of concern, and suggestions for future research should be made.

As a final step in the evaluative process, evaluators should assess the utilization of their results, and determine whether the criteria for a successful utilization

has been fulfilled. From this assessment, an evaluator can determine whether the evaluation served any useful purpose.

2.5 SUMMARY.

When conducting an evaluation within a social setting, evaluators may choose a systematic pattern of analysis that considers the perplexity of evaluative research (eg. Wortman, 1975), or they may choose a less complex model that is sensitive to the needs, and resources of a small scale study (eg. Williamson et al., 1978).

This present research works within the guide-lines of the Williamson et al., (1978) evaluative model. In selecting this model, attention is also given to the many points noted in Chapter 1, and the parameters set for conducting evaluative research within a social setting.

The following chapter details the goals of this evaluation. It outlines how they were formed, how they are related to the evaluative model of Williamson et al., (1978), and what factors are addressed in the remaining chapters of this dissertation.

CHAPTER 3:

INTRODUCTION TO THE PRESENT RESEARCH.

3.1 BACKGROUND TO THE EVALUATIVE STUDY.

Plans to implement this research programme came about from discussions held at the Massey University School of Aviation during March, 1991. As with many pilot training programmes, judgement training was implied within the school's course, but not taught as an individual unit of training, or formally evaluated. Centred upon these factors, came the initial proposal to evaluate a pilot judgement training programme, based upon the original ERAU training material. This evaluation however, was not intended to be a full scale validation of the training material. It was to assist programme organizers at the Massey University School of Aviation to determine the benefits related to administering judgement training to a specific group of student pilots.

In developing this goal, a number of research objectives were discussed with instructors from the School of Aviation, and lecturers from the Massey University Department of Psychology. These discussions determined the factors to address within the evaluation, and ensured the evaluative study would be relevant. A written proposal was then established, summarizing the history of pilot judgement training, the objectives of the current

evaluation, the role of students and instructors, and the time estimates for each of the evaluative tasks. This proposal was then presented, and approved by the Massey University Human Ethics Committee, and Directors from the Massey University School of Aviation. With this approval gained, the evaluation commenced with the following objectives;

1. Modify the ERAU training material so that it applies to the New Zealand General Aviation environment.
2. Modify the ERAU training material, so that the Student Training Manual is self-explanatory.
3. Evaluate the effectiveness of this training material in a small scale experiment, assessing the subject's knowledge, skill, and attitudes.
4. Examine the relationship between pilot judgement, and personality.
5. Suggest changes that may improve future pilot judgement training.

3.2 EVALUATING PILOT JUDGEMENT TRAINING USING THE WILLIAMSON, PROST, AND GEORGE (1978) EVALUATIVE MODEL.

As has been detailed in Chapter 2, Williamson et al., (1978), provided an evaluative model that is clear, and sensitive to the needs and resources typical of small scale evaluations conducted within a social setting. Having selected this model for these reasons, it can be applied to the programme's objectives, and establish a procedural pattern for conducting this evaluation.

Table 3.2, details how the objectives of this study relate to the individual phases of the Williamson et al., (1978) evaluative model. This includes the evaluation inputs, processes, outputs, and feedback. The focus of each phase, is defined, along with its aims, the individual participants, the methods of analysis, and the anticipated finished products.

Table 3.2 The Four Phases of the Present Evaluation Study.

Phase 1: Programme Inputs.

Defined:

This phase is directed at the formation, and planning of an evaluation. It involves establishing the evaluations goals, the method of analysis, and the data collection tools.

For the present study, this will involve the following factors:

- a. Establish the programme's goals - (Section 3.1).
- b. Establish the experimental approach - (Section 6.1).
- c. Determine who will participate in the evaluation -
(Section 6.2 & 6.3).
- d. Analyse the ERAU pilot judgement training programme -
(Chapter 4).
- e. Modify the ERAU training literature - (Section 6.4).
- f. Examine the relationship between pilot judgement and
personality - (Chapter 5).
- g. Design and select data collection instruments -
(Section 6.5).
- h. Gain ethical approval - (Section 3.1 & 6.1).
- i. Gain research approval, from the Massey University
School of Aviation - (Section 3.1).

Phase 1: (Continued).

Individuals Participating:

- The evaluator.
- Instructors at the Massey University School of Aviation.
- Directors at the Massey University School of Aviation.
- Lecturers at Massey University Psychology Department.
- The Massey University Human Ethics Committee.

Methods:

1. Structured and unstructured interviews.
2. Conferences and group discussions.
3. Written proposal.

Finished Product:

At the conclusion of this phase, the evaluation will have been designed, and approved. This will include, modifications to the ERAU training material, the selection and design of appropriate data collection instruments, and approval from the Massey University School of Aviation, and Massey University Human Ethics Committee.

Phase 2: Programme Processes.

Defined:

This phase involves the administration of the treatment programme, and the evaluative measures.

For the present study, this will involve the following factors:

- a. Brief the instructors -
- b. Brief the students -
- c. Administer the pre-course measures -
- d. Administer the modified pilot judgement training programme -
- e. Administer the during-course measures -
- f. Implement changes resulting from the formative evaluation -
- g. Administer post-course measures -

(See Section 6.6).

Individuals Participating:

- The evaluator.
- Instructors at the Massey University School of Aviation.
- Student pilots at the Massey University School of Aviation.

Phase 2: (Continued).

Method:

1. Structured, and unstructured interviews with the instructors.
2. Brief the instructors.
3. Brief the students.
4. Administer pre-course measures;
 - a. California Psychological Inventory
 - b. The Pilot Judgement Test
 - c. Observation Flight One
 - d. Pre-Course Evaluative Questionnaire
5. Administer the redesigned pilot judgement training programme.
6. Administer the during-course measures;
 - Lesson 13 Tests.
7. Administer the post-course measures;
 - a. The Pilot Judgement Test
 - b. Observation Flight Two
 - c. Post-Course Evaluative Questionnaire

Finished Product:

At the end of this phase the evaluative study should have been implemented, and any changes resulting from the formative evaluation recorded, implemented, and evaluated.

Phase 3: Programme Outputs.

Defined:

This phase analyses the evaluations results.

For the present study, this will involve the following factors:

Record any changes, and relationships between the results from pre-course, during-course, and post-course measures.

Individuals Participating:

-The evaluator.

Method:

-Analyse data using SPSSPC+.

Finished Product:

At the end of this phase, the evaluation's results should be analysed, and any significant relationships or interactions documented.

Phase 4: Programme Feedback and Evaluation.

Defined:

This phase evaluates the research results, provides feedback on the programme's functioning, establishes suggestions for future research and training, and assesses the utilization of the results.

For the present study this will involve the following factors:

- a. Assess the six stages of evaluation in the Williamson et al. (1978) model;
 - (1). General effectiveness - (Section 8.1).
 - (2). Means-ends analysis - (Section 8.2).
 - (3). Internal validity - (Section 8.3).
 - (4). Goal-outcome congruence - (Section 8.4).
 - (5). External validity - (Section 8.5).
 - (6). Construct validity - (Section 8.6).
- b. Assess the utilization of the evaluation's results - (Section 8.7).
- c. Suggest changes for future training - (Section 8.7).

Phase 4: (Continued).

Individuals Participating:

- The evaluator.
- Instructors at the Massey University School of Aviation.
- Programme sponsors.

Method:

1. Evaluate the results.
2. Compare the results with previous research findings.
3. Suggest changes for future research and evaluations.

Finished Product:

At the end of this phase the effectiveness of pilot judgement training will have been assessed, an assessment will have been made on how the evaluation's results will be utilized, and suggestions will have been made for improving future training, and evaluative studies.

3.3 SUMMARY.

This chapter outlines how the objectives for this evaluation were formulated, and how they are applied to the Williamson et al., (1978), evaluative model.

The subsequent chapters outline the factors considered within each phase of this evaluation (See Table 3.2). Chapter 4 details the theoretical constructs included within the ERAU pilot judgement training material. Chapter 5 examines the relationship between pilot judgement and

personality. Chapter 6 outlines the research method, and procedure. Chapter 7 presents the evaluations results. Chapter 8 discusses the evaluation's findings, assesses how the results will be utilized, and provides suggestions for future research.

CHAPTER 4.

PILOT JUDGEMENT TRAINING EXPLAINED.

The foundation for any evaluative study should begin with a close examination of the intervention or treatment. This chapter examines the theoretical, conceptual, and behaviour aspects of the ERAU pilot judgement training programme. The results from this analysis will be carefully considered when modifying the training material, and will provide the basis for designing appropriate data collection instruments.

4.1 CATEGORIZING PILOT JUDGEMENT WITHIN THE DECISION-MAKING LITERATURE.

"Locating pilot judgement in a unitary (even unified) body of theory is not an easy task" (Telfer & Ashman, 1986, p.16). All the same, it is a worthwhile endeavour to establish a place for pilot judgement within the existing decision making literature.

At the broadest level, literature on judgement and decision making can be classified into two distinct approaches. The first is referred to as normative theories, the second as descriptive theories (Slovic, Fischhoff, & Lichtenstein, 1977).

Normative theories focus upon prescribing courses of

action that resemble the beliefs and actions of decision makers. This involves identifying and weighting the individual factors that prevail within a decision, and formulating mathematical models that will predict the best decision. In contrast, descriptive theories focus on the cognitive complexity of a decision, and the limitations of the thinker. This information is then used to simplify the judgement tasks by breaking them down into learnt rules and strategies.

The suitability of these theories to explain pilot judgement training, is unfortunately very restrictive. While their aim centres on explaining judgement, they are unable to account for the ubiquity of decision making. Addressing this fact, Telfer and Ashman (1986) conducted a review and summary of the extensive literature relating to human decision-making. Focusing only on the theories and models that related to pilot judgement, they concluded that there were two clear theoretical perspectives for classifying pilot judgement and decision-making. Detailed by Jungermann (1983), these perspectives were labelled, the 'pessimistic' approach to decision making, and the 'optimistic' approach to decision making.

4.1.1 The Pessimistic Approach to Decision-Making.

This group proposes that the decisional ability and capacity of humans is limited, and given the chance, they

will remain detached and objective when decisions are needed. While rational behaviour is the ideal, when confronted by stressful conditions pilot behaviour may fall somewhat short of this. For example, when making a decision in-flight, pilots may be confronted with numerous factors that affect or bias their ability to implement the most appropriate decision. At the extreme, pilots may resort to a coping behaviour known as defensive avoidance. Under these circumstances, pilots may be seen to procrastinate in an attempt to shift responsibility, or rationalize their behaviour (Mann & Janis, 1982).

Based on the very nature of flying, this theoretical perspective outlines that pilots will often receive little forewarning that a decision is required. When a decision is made, time will always act as a constraint upon a decision maker. The pilot who believes in prior warnings, will be viewed as an optimist.

4.1.2 The Optimistic Approach to Decision-Making.

In contrast to the previous theoretical perspective, this group tends to have a more positive view of pilot decision-making. They perceive that separate decisions viewed in isolation will almost certainly be viewed as biased, but when viewed as a continuous process, pilots can be seen as responding to an underlying logic. Based upon this pretence, Payne (1982) presented the view that there is a

certain meta-rationality under which people make judgements, and assess the 'cognitive cost' of their actions.

A second, associated theory within this same school of thought is the perspective that a pilot's judgement is the direct response to an internal representation of the problem (Telfer & Ashman, 1986).

4.2 PILOT JUDGEMENT TRAINING.

The focus of the ERAU pilot judgement training material has been drawn from the pessimistic school of thought. While this provides a rational basis for addressing questions related to pilot judgement, descriptive accuracy in itself does not sufficiently describe the nature of the training. The principal consideration of design is focused upon ensuring the material is practical. As a result, training is representative of general aviation conditions, and there is a clear means for testing pilot performance.

4.2.1 Training Objectives.

Nowhere more clearly is the emphasis of training practicality stressed, than in the terminal objectives of the training programme. These factors, outlined by Berlin et al., (1982, p.2), concentrated on the following factors:

- "1. To produce a programme that was practical, easily applied, and effective in producing the desired response from the students.
2. To design the programme so that it would achieve meaningful integration into the present FAA approved ground and flight school curriculum and that it would not significantly impact the amount of training time required to obtain a private pilot license.
3. To increase the student pilot's knowledge and understanding of himself by teaching him to better recognize and identify hazardous human behaviour patterns.
4. To teach the student pilot to recognize, analyze and evaluate factors that influence judgement in regard to safe flight.
5. To train the student pilot to recognize and to cope with potentially hazardous conditions such as the presence of hazardous thinking, poor judgement chains and high stress.
6. To introduce positive changes into flight instructor's own teaching behaviour and attitudes."

4.2.2 Defining Pilot Judgement.

Just as practicality was carefully considered in the formation of the training programmes objectives, it was also considered in the formation of a definition for 'pilot judgement'.

The aim of this definition, centred upon detailing the prominent factors that prevailed within pilot judgement. This did not centre upon the perceptual nature of judgement, rather it was focused upon the actions that resulted from judgement, and in particular the actions representative of poor judgements. Allnut (1982), described this analysis of pilot error, as changing the focus from examining what had happened, to examining why it had happened.

The basis for this new recognition, can be attributed to Jensen and Benel (1977), whose research examined the cognitive and psychomotor processes that determine the quality of a pilot's performance in controlling an aircraft, and their response to critical incidents. Commissioned by the Federal Aviation Administration (FAA) to examine the psychology of pilot judgement, Jensen and Benel (1977), conducted an in-depth analysis of all general aviation accidents occurring in United States between 1970 and 1974. Using a tripartite ranking system, they classified all accidents statistics from the National Transportation Safety Board (NTSB) Automated Aircraft Accident and Incident Information System, into one of three behaviour categories. This information (Table 4.2.2), outlined the fatal and non-fatal accidents relating to procedural (eg. management of power plant, fuel, displays, and communication), perceptual-motor (eg. vehicle control, judgement of distance, speed, and altitude), and decisional

activities (eg. assessment of self, aircraft, hazards, and flight priorities).

The results from this study found the majority of non-fatal accidents related to errors in perceptual-motor activities, and the majority of fatal accidents related to decisional activities. These decisional activities then became the focus for pilot judgement training, and identified what factors to consider when defining pilot judgement.

Table 4.2.2: Number, and percentage of the total General Aviation accidents in which the pilot is listed as a cause factor (1970-1974).

	Fatal	Non-Fatal
Procedural	264 (4.6%)	2 230 (8.6%)
Perceptual-Motor	2 496 (43.8%)	14 561 (56.3%)
Decisional	2 940 (51.6%)	9 087 (35.1%)

(Table 4.2.2 from: Jensen, 1982).

Appraising different dictionary definitions of judgement, Berlin et al., (1982) took guidance from Hayakawa (1968) 'Guide to Synonyms'. This defined judgement as; "sense applied to the making of decisions, especially correct decisions" (p.69), and defined sense as: "...rational perception accompanied by feeling. Used this way it suggests an intense awareness and realization of the

stimuli to which it is responding The word is commonly applied to the ability to act effectively in any given situation" (p.690).

Based on these considerations, and the findings of Jensen and Benel (1977), Berlin et al., (1982), defined pilot judgement in the following way;

"Pilot judgement is the mental process by which the pilot recognizes, analyzes, and evaluates information regarding himself, the aircraft, and the outside environment. The final step in the process is to make a decision pertaining to the safe operation of the aircraft and to implement the decision in a timely manner" (Berlin et al., 1982, p.4).

Using this definition, to differentiate between good and bad judgement, Berlin et al., (1982) had established the grounds for constructing a pilot judgement training programme. Operationalizing this definition to pilot behaviour, 'good judgement', and subsequently the "proper decision" will occur if a pilot properly recognizes, analyzes, and evaluates information regarding himself/herself in a timely manner. Conversely, a 'poor judgement' will occur if a pilot fails to recognize, analyze, or evaluate any of these factors (Berlin et al., 1982).

4.2.3 Training Material.

Before detailing the contents included within the pilot judgement training programme, it is important to understand the distinction that exists between decisions that are related to judgement, and decisions that are related to training. Poor training decisions result when the necessary knowledge and skills were never taught, or when they were never sufficiently learnt for effective recall. Poor judgement decisions on the other hand, are those in which the desired knowledge and skills were learnt, but were not used, or used correctly (Berlin et al., 1982).

Basic flight instruction is designed to give a student pilot the opportunity to acquire the resources necessary to make good pilot judgements. This is provided through aviation knowledge, flying skills, and experience at performing within a variety of environmental situations. Judgement training develops the pilot's ability to effectively use all of these resources as a basis for making safe, legal, responsible, and timely decisions about the aircraft's operation (Berlin et al., 1982). The material designed to achieve this is detailed within two manuals; one for students (containing three units of training), and the other for instructors (summarizing the content of the student manual, explaining the method of instruction, and outlining two units of in-flight training) (See Figure 4.2.3).

PILOT JUDGEMENT TRAINING

STUDENT MANUAL:
SUMMARIZED IN INSTRUCTORS MANUAL:

IN-FLIGHT INSTRUCTION:
IN INSTRUCTORS MANUAL:

UNIT 1:

Lesson 1:

- a. Subject Areas;
Pilot, Aircraft, Environment
- b. Action Ways;
Do, No Do, Under Do, Over Do,
Early Do, Late Do.

Lesson 2:

- a. Poor Judgment Chain.
- b. Breaking the PJ Chain.

Lesson 3:

- a. Three Mental Processes of
Safe Flight; Automatic
Reaction, Problem Resolving,
Repeated Reviewing.

Unit II:

Lesson 4:

- a. Self assessment inventory
of hazardous thought
patterns.

Lesson 5-9:

Identify and understand
Hazardous Thoughts.

Lesson 10:

Antidotes for five
Hazardous Thoughts.

Lesson 11:

Exercises for replacing
Hazardous Thoughts with
antidotes.

Lesson 12:

- a. Stress.
- b. Reducing Stress.

Lesson 13:

- a. Check mastery of learning
Lesson 4 to 11.

Unit III:

Lesson 14 - 18:

Practice Exercises relating
to Unit I and II.

UNIT IV:

CONCEPT LESSONS:

Develop Student's
Learning of Three
Mental Processes of
Safe Flight. See
UNIT I, Lesson 3.

UNIT V:

BEHAVIOURAL SITUATION:

Students are placed in
a number of judgment
situations having been
given control of the
aircraft.

Figure 4.2.3: The Pilot Judgement Training Programme.

The separate components of this training programme are detailed below:

THE THREE SUBJECT AREAS: At the beginning of the training, the students attention is directed at the three variables that play a part in a pilot's decision making process. These include;

The Pilot: and his or her competency in a given situation, state of health, level of fatigue, and any other factors that may effect performance.

The Aircraft: its airworthiness, and the consideration of performance criteria, such as weight, balance, and runway requirements.

The Environment: including all outside factors; such as weather, terrain, and outside information "inputs".

THE SIX ACTION WAYS: In total, there are six ways pilots perform poor actions, and a total of three converse groupings. These actions were identified by Berlin et al., (1982), from the analysis of nearly 600 NTSB accident briefs. Each action is defined on the following page, with their respective partner evident in the use of opposite verb statements.

Do: The pilot performs an action that should not have been performed.

No Do: The pilot fails to perform an action that should have been performed.

Under Do: The pilot did not perform enough of a particular action, when there should have been more.

Over Do: The pilot performed too much of a particular action, when there should have been less.

Early Do: The pilot performed an action too early.

Late Do: The pilot performed an action too late.

From this description of pilot actions, it is easy to see that on a behaviour continuum, performing a good judgement will require a finely balanced response in terms of the three groupings of possible actions. To exercise good judgement a pilot must perform the action required, to the appropriate degree, and on time (Berlin et al., 1982).

THE POOR JUDGEMENT CHAIN: Incorrect decisions relating to any of the three subject areas (pilot, aircraft, environment), will have a chained effect on a pilot's decision making process, and lead into any one of the six action ways if not recognized. This chain effect relates to the likelihood that one poor decision will lead to another. Within this chain each poor or good judgement will provide the basis upon which subsequent decisions will be made. If

the chain is not broken, and continues to grow, alternatives for safe flight may be lost, or become fewer and fewer, leading towards an ultimate disaster. Telfer (1989), provides a clear example of a poor judgement chain, that resulted in a pilot crashing an aircraft into a cloud-shrouded mountain:

- "* The weather was bad and worsening, yet the young, inexperienced pilot took off.
- * There did not appear to be an appropriate weather check.
- * There was an urgent appointment at home.
- * There was insufficient fuel to divert.
- * Despite the lack of IFR currency, the pilot flew into cloud.
- * There was strong pressure from passengers to meet the appointment" (Telfer, 1989, p.162 & 163).

The links of this example may not occur in sequence, but it is not difficult to conceptualize how the probability of an accident increases, and how the pilot's options decrease. For example, when the decision is made to go, the option to abort the flight is discarded (Telfer, 1989).

The theory of a poor judgement chain was proposed by Ontiverous, Spangler, and Sulzer (1978); and has been later supported by Hart and Bortolussi (1984). While it is currently impossible to empirically illustrate the chain of events leading up to an accident, especially those of a fatal nature, the principles of the poor judgement chain

are presented within the training in a priori form. This information has been included to ensure that pilots are aware, and understand the importance of breaking a poor judgement chain of decisions.

BREAKING THE POOR JUDGEMENT CHAIN: The first step in breaking the poor judgement chain is in the recognition that a poor judgement has occurred. To achieve this a pilot requires feedback information that a poor judgement has been made. This feedback will come from intrinsic factors relating to a pilot's senses and the results of previous decisions; and from extrinsic factors in the form of outside observers (instructors, co-pilots, air traffic controllers, weather personnel). Based on this information, Berlin et al., (1982), presents a systematic pattern for breaking the poor judgement chain:

- "1. Recognize that a poor judgement has been made (utilize feedback). Admit the error in judgement.
2. Check for personal stress that could allow the PJ chain to continue.
3. Engage in problem resolving (PR) to correct the problem that resulted from the poor judgement.
4. Search for other poor judgements. The pilot must remember that poor judgements tend to occur in chains, and must be sure that he or she has broken the PJ chain.

5. Diagnose the original poor judgement to provide oneself the feedback needed to avoid making a similar poor judgement in the future" (Berlin et al., 1982, p.7-8).

THE THREE MENTAL PROCESSES OF SAFE FLIGHT: To enhance the ability of pilots to foresee and recognize poor judgement decisions, attention is directed at increasing the pilot's understanding of the intrinsic factors prevalent to safe flight. This begins, by explaining the mental processes that relate to safe flight:

Automatic Reaction: The mental process under which a pilot maintains instinctive control of an aircraft, while having processing space to address other considerations, or perform other activities.

Problem Solving: The mental process under which a pilot systematically works through and analyses a problem, considering the different options available, and decides on a solution.

Repeated Reviewing: The mental process of continuously assessing the three subject areas in an attempt to identify, or anticipate the factors requiring automatic reactions, and problem solving.

THE FIVE HAZARDOUS THOUGHT PATTERNS: An understanding of the three mental processes related to safe flight is insufficient to ensure poor judgements do not occur. Pilots will be affected by physiological, psychological, and

social pressures. These factors will shape the self-image a pilot projects, or attempts to maintain (Berlin et al., 1982).

By consulting experts in the behavioural sciences, Berlin et al., (1982), identified five hazardous thought patterns which could lead to the "irrational pilot judgement" described by Jensen and Benel (1977). These attitudes they describes as;

1. **Anti-Authority:** This attitude is found in pilots who disregard any form of authority, consciously neglect rules, regulations, or procedures, and whose actions resemble the thought pattern - "Don't tell me" (Berlin et al., 1982).
2. **External Control:** This attitude is found in pilots who feel they can do very little to control what happens, as everything is attributed to luck, or someone else's actions. The thought pattern of these pilots is one of resignation, or "What's the use?" (Berlin et al., 1982).
3. **Impulsivity:** Pilots with this attitude respond quickly when faced with a decision, and usually act on the first thought that comes into their mind. Pilots acting in this way respond as if they should "Do something - quickly" (Berlin et al., 1982).
4. **Macho:** This attitude is found in pilots whose actions are an attempt to prove themselves better than others,

and who attempt difficult tasks in an over confident manner so as to receive admiration. Underlying these actions, is the thought pattern "I can do it" (Berlin et al., 1982).

5. **Invulnerability:** Pilots with this attitude, act as though nothing bad could happen to them, and is characteristic of the thought pattern "It won't happen to me" (Berlin et al., 1982).

To identify, and highlight these hazardous thought patterns, a self assessment inventory is included at the start of the training in this area, and illustrates the predominance of these thought patterns in the way students think.

ANTIDOTES FOR HAZARDOUS THOUGHTS: A pilot's ability to overcome and resolve any of the hazardous thoughts will require more than the simple recognition of their presence. Acknowledging this, the judgement training material presents antidotes to substitute for each of the hazardous thoughts. Subjects are then provided with exercises on identifying hazardous thought patterns, and substituting the appropriate antidotes.

IDENTIFYING AND REDUCING STRESS: The final intrinsic teaching of this training addresses the fact that an overstressed pilot is more likely to make a poor judgement, or series of poor judgements, than a non-stressed pilot.

While the main objective of the training material is to teach the subjects how to reduce stress quickly, they must firstly be able to identify when they are being affected by stress. Using Joseph Wolpe's (1973) 'Subjective Units of Discomfort System' (SUDs), subjects are taught how to form a scale on which to rate all states of anxiety. At the top of this scale, with a rating of 100 SUDs is a situation representative of the worst anxiety a subject has experienced, and at the bottom with a rating of zero SUDs, is a situation that represents absolute calm. Having practiced rating example events, subjects should gain an awareness of what level of SUDs represents the feeling of being overstressed, and the point at which stress should be reduced.

In situations where subjects reach this overstressed state, two methods for reducing stress are provided. The first is a simple 'deep breath technique', and the second, a more elaborate method called 'progressive relaxation'. Subjects may prefer one technique over the other. Whatever the case, both present methods for relieving stress and anxiety in-flight, and for restricting its influence on a pilot's judgement, and actions.

THE IN-FLIGHT TRAINING: This training applies the components within the student manual to practical activities within the aircraft. The focus of these lessons relates to the three mental processes of safe flight,

different judgement activities, and stress assessment.

4.3 THE ROLE OF STUDENTS AND INSTRUCTORS DURING THE IMPLEMENTATION OF PILOT JUDGEMENT TRAINING.

The role of students and instructors within the pilot judgement training programme is made clear by examining the educational theory underlying the trainings implementation. These theories include, behaviour modification, and facilitation.

Behaviour modification is a direct application of the principles of reinforcement developed by B.F. Skinner in his operant-conditioning studies. Used in training, behaviour modification is used to achieve changes in motivation, skill, and performance (Berlin et al., 1982). These principles of behaviour modification are summarized within the instructors manual as:

- "1. Behaviour followed by reinforcement will continue.
 2. Behaviour followed by punishment may decrease. However, punishment does not help the student substitute the correct behaviour for error.
 3. Be very clear about learning objectives.
 4. In the early stages of learning, reinforce generously.
 5. Shift slowly from continuous to occasional reinforcement.
 6. Shape existing behaviours into desired behaviours"
- (Berlin et al., 1982, p.6).

The use of behaviour modification within the training relates directly to the principles of facilitation. Carl Rogers (1958), authored a paper outlining the nature of facilitation. In line with these factors, a facilitator within the pilot judgement training programme encourages participants to explore their feelings and motives, stimulates an exchange that is not inhibited by defensiveness, and achieves a maximum level of openness and honesty. Facilitators do not however, ask probing questions, make interpretations, or suggest courses of action.

Within the training, instructors have the role to facilitate, and aid the students in their learning. This involves encouraging students to make use of the information learnt in the student manual, helping students to recognize and address hazardous thought patterns, poor judgements, and feelings of stress. In addition, the students are to carefully study and complete all the lessons in the student manual, and to apply this learning to their flying.

4.4 SUMMARY.

In summary, this chapter has provided an indepth outline of the theoretical and contextual nature of the programme being evaluated. Attention has been given, to categorizing pilot judgement within the literature of human decision-

making, outlining the training content, and describing the student and instructor's role during training.

The training programme was designed to develop a pilot's pattern of thinking, and to improve their judgement. Having completed training, pilots should be able to correctly recognize, analyse, and evaluate information relevant to a flight, and make safe, legal, responsible, and timely decisions about an aircraft's operation.

This chapter's analysis of pilot judgement training will be carefully considered when modifying the training programme, and provides the basis for constructing relevant measures of knowledge, skill, and attitudes. These measures will assess the individual components of training, and provide the basis for determining the training's effectiveness.

The following chapter, aims to extend this analysis by examining the relationship between pilot judgement, and personality.

CHAPTER 5:

PILOT JUDGEMENT AND PERSONALITY.

Pilot judgement is related to many different factors within the field of aviation. This chapter examines the relationship between pilot judgement and personality. The results from this analysis will provide the background for an investigation included within this evaluation.

5.1 PILOT JUDGEMENT AND PERSONALITY.

The American Psychiatric Association defines personality as "the characteristic way in which a person thinks, feels, and behaves; the ingrained pattern of behaviour that each person evolves, both consciously and unconsciously, as the style of life or way of being in adapting to the environment" (American Psychiatric Association, 1980, p.103). These characteristics will account for an individual's unique adjustments to the total environment, and distinguish one individual from another. There are currently a number of different theories on how an individual's personality is formed, and the degree to which it is internally, or externally controlled (Atkinson, Atkinson, & Hilgard, 1983). Researchers do however, agree that personality is a stable construct which is very resistant to change (see Hawkins, 1987). Most personality tests are based upon this assumption of stability, and are

assumed to measure particular personality traits (Dolgin & Gibb, 1989).

Various studies strongly suggest that many attitudes and beliefs are rooted in the personality of a person (Hawkin, 1987). Although attitudes do not directly represent behaviours, they can be seen in a person's manner, emotions, and actions.

Jensen and Benel (1977), noted the significance of attitudes to pilot judgement in their appraisal of U.S General Aviation accidents. It became evident from this that the personal disposition and judgement of a pilot were important in explaining human error in aviation accidents. Berlin et al., (1982), operationalized this link by identifying five hazardous thought patterns. These thought patterns are included in the ERAU pilot judgement training programme (See Section 4.2.3).

A number of studies have been conducted suggesting pilots are distinguishable from the rest of the population in relation to a number of personality traits (Williams, 1980; Ashman & Telfer 1983; Wichman & Ball, 1983). While the use of this information was directed at predicting performance, the results were limited for identifying successful aviators, or accident prone pilots.

Research by Lester and Bombaci (1984), investigated the relationship between personality and the ERAU five

hazardous thought patterns. Using a sample of 35 pilots, subjects were classified on the basis of predominant thought patterns. This classification identified that 'invulnerability' was the most common hazardous thought pattern, being strongest in 43% of the subjects. 'Impulsivity' was dominant in 20% of the subjects, and 'macho' prevailed in 14%. A significant relationship was found between these three hazardous thought patterns and the pilot's personality profiles measured by the 16PF, and Rotter Locus of Control Scale. No relationships were found for the 'anti-authority', and 'external control' patterns, predominant in only a few subjects. In addition, 14% of the subjects displayed no predominant thought patterns.

The results from Lester and Bombaci (1984), suggested the three thought patterns of impulsivity, invulnerability, and macho, may be sufficient to describe irrational pilot judgement. This emphasises the importance to test the validity of the five hazardous thought patterns.

5.2 SUMMARY.

In summary, this chapter has provided an examination of how pilot judgement relates to personality. Attention has been given to establishing a theoretical link between personality, attitudes, and hazardous thoughts. The significance of this link was illustrated by Lester and Bombaci (1984). While identifying a number of relationships

between hazardous thoughts and personality, their research questioned the validity for having five hazardous thought patterns.

This evaluative study will include a further analysis of the relationship between personality and hazardous thought patterns. Prior to commencing this research we would anticipate finding some form of relationship. This information will be used to assess the effectiveness of the pilot judgement training.

CHAPTER 6

METHOD FOR EVALUATING PILOT JUDGEMENT TRAINING.

6.1 EXPERIMENTAL DESIGN.

Prior to commencing this evaluative study, the proposed programme was reviewed by the Massey University Human Ethics Committee, and all of the evaluations participants were briefed on the nature of this research.

The major purpose of this study was to evaluate the effectiveness of pilot judgement training in a small scale experiment. This involved making assessments of knowledge, skills, and attitudes, and examining the relationship between personality and hazardous thoughts. The experiment's design (Table 6.1), used one training group (Exp.1), and one control group (C1).

Prior to the implementation of training, both groups were to complete a number of pre-course measures. These included a skill test, knowledge test, and personality test. At the completion of training, the skill and knowledge tests were to be readministered.

Subjects in the experimental group were to complete a number of additional activities. These included, a pre-course evaluative questionnaire, ground and flight judgement training, a hazardous thought postcheck, and an immediate post-course evaluative questionnaire.

In Campbell and Stanley (1966), the design of this experiment is classified as a 'pre-test - post-test control group design'. Having confronted non-equivalent groups at the pre-experimental stage of this study, this quasi-experimental design would provide the basis for establishing group equivalence prior to experimentation.

Table 6.1 : Experimental Approach.

Groups	Exp.1	C1
Pre-Course Measures	X	X
Pre-Course Evaluative Questionnaire	X	
Judgement Training	X	
Hazardous Thought Postcheck	X	
Post-Course Evaluative Questionnaire	X	
Post-Course Measures	X	X

6.2 SUBJECTS.

The experiment was conducted using 56 student pilots enrolled at the Massey University School of Aviation. These subjects were all working towards their commercial pilot licence, and were in one of two different classes.

Class number one, consisted of 27 subjects who had obtained their private pilot licence. At the start of this research, this group was beginning their 'instrument flight rating'.

Class number two, consisted of 29 subjects; 25 who had obtained their private pilot licence prior to commencing the training, and four who obtained it during the research. At the start of this research, this group was beginning their 'twin engine flight training'.

Each class was divided approximately in half, forming an experimental and control group. The respective groups were then combined, to form one experimental group, and one control group.

The biographical makeup of the experimental and control groups, is summarized in the table below. This information was gathered from the student's files held at the Aviation School.

Table 6.2 : Biographical chart for the experimental and control groups : {()=Standard Deviation}.

Groups	Exp.1	C1
Males	20	25
Females	5	6
Mean Age	20 (2)	21 (2)
Student Pilot	0	4
Private Pilot Licence	25	27
Year Certified	Oct.89 (1 year)	Oct.89 (1 year)
Flight Hours Pre-Training	116 (18)	115 (13)

6.2.1 Education Rating.

Each of the subject's top four grades on their sixth form certificate (including English), were combined and rated. Scores of 10 or less, were rated as 1; scores greater than 10, but less than or equal to 12 were rated as 2; scores greater than 12, and less than 15 were rated as 3; and, scores greater than 15 were rated as 4. (This information, was again gathered from the student's files at the aviation school).

The use of this scale identified the subject's level of achievement, with 1 indicating the highest performance level, and 4 the lowest.

Using this scale, the average education rating for each of the groups were as follows:

Table 6.2.1: The average education rating for subjects in the experimental and control groups:
{() = Standard Deviation}.

Groups	Mean Education Rating
Exp.1	2.5 (0.96)
C1	2.5 (0.85)

6.6.2 Attrition.

Of the 56 subjects selected for this experiment, six subjects from the experimental group graduated from the flight school prior to being administered the pre-course evaluation questionnaire. Another four subjects, from the experimental group, left the school prior to completing the hazardous thought postcheck. A total of eighteen subjects from the control group graduated, or left the school unexpectedly for an early summer vacation prior to completing the post-course measures.

At the completion of this research, 28 subjects remained; 15 subjects in the experimental group, and 13 subjects in the control.

6.3 INSTRUCTORS.

A total of nine flight instructors (8 male, 1 female) employed at the Massey University School of Aviation, participated in the experiment. Each of these pilots had obtained their Commercial Licence, and one had gained his Air Transportation Licence. All but two of this group were rated as 'B' grade instructors. The remaining two included a 'C' grade, and an 'A' grade instructor.

The instructors administered the ground and flight tests included within this study, and aided the experimental group if they had any training difficulties.

6.4 THE PILOT JUDGEMENT TRAINING MATERIAL.

The pilot judgement training material was conceptualized by Jensen and Benel (1977), and then designed by the Embry-Riddle Aeronautical University, 1980. This material was designed for the purpose of teaching pilots better judgement, and used aeronautical terminology relevant to the American Aviation environment. To make this material more relevant to the subjects participating in this study, and to make the student training manual self-explanatory, a number of alterations were made to the original training material. Staff at the Massey University School of Aviation, and Department of Psychology, provided guidance and reviewed each of the alterations.

The nature of these changes, and the content of the training manuals, are listed below:

6.4.1 The Student Training Manual (Appendix A).

The ERAU student training material was originally designed as three separate training manuals. Manual One included Unit One of the training, Manual Two - Unit Two, and Manual Three - Unit Three. In the redesign of this material, the three manuals were combined into one booklet, and the separate training units were identified with coloured title pages.

The Introduction to this booklet underwent a number of modifications. The original material was expanded to include; a description of the training materials background; an outline of the training materials content; a graphical illustration of the entire training programme; and a description of the student and instructor's role during training. These alterations were made so that the training material would need only a small input from the instructors.

The major alterations to the student training material involved adapting the flight scenarios so that they would relate to the New Zealand General Aviation environment. Prior to these alterations, the training examples had been taken from American Aviation Reports, and related to American Aviation conditions. To ratify this problem, changes were made to abbreviations; location and airport names; animal names; aeroplane makes; altitude readings; density altitude levels; units of mass, temperature, height, and distance.

The nature of these changes made the scenarios read as if the flight plans, take-off and landing conditions, distances travelled, and heights flown at, had taken place within New Zealand airspace.

One final alteration was made to these scenarios, and centred upon the pilots' gender. The original ERAU-training material used a far greater number of males in their flight

scenarios than females. As all of these scenarios were taken from reports of actual accidents and incidents, this could simple have been because more males featured in these events, than females. It was however decided, while making the other alterations, that the gender distribution within the flight scenarios should be balanced to aviod any discrimination.

The training content of this manual consisted of the following three units :

Unit I: Teaching Judgement Concepts.

This unit was designed to familiarize students with the terms and concepts used throughout the judgement training course. This included the three judgement subject areas; the six action ways; the poor judgement chain; and the three mental processes of safe flight (See Section 4.2.3).

Unit II: Teaching Behaviour Aspects of Judgement.

This unit was designed to redirect students thinking, and to promote the consistent use of good judgement. The material addressed within this unit focused on two areas. The first, addressed methods for identifying the five hazardous thought patterns, and applying the appropriate antidotes. The second, addressed methods for reducing stress (See Section 4.2.3).

Unit III: Teaching Application.

This unit contained no new material, but provided practice exercises for the lesson material covered in Unit I and II. The purpose for this unit was to reinforce the student's understanding, and appreciation of the different judgement concepts.

6.4.2 The Instructor's Training Manual (Appendix B).

The ERAU Instructor's manual, also underwent a number of changes. These included; the addition of a preface; alterations to the introduction; and, modifications to the in-flight training.

Section One of this manual outlined the training material contained in the student manual, explained how to present the material for Unit I, II, and III, and provided guidance on how to resolve student difficulties.

Section Two of this manual detailed two sets of in-flight training (Unit IV & V), and explained when, and how to administer the programme to the students. Modifications were made to this material so that the training exercises would be appropriate, and cause little inconvenience to the instructors. These changes involved deleting a number of the original examples, and adding more appropriate exercises.

6.5 DATA MEASURING INSTRUMENTS.

6.5.1 The Pilot Judgement Test.

This test (Appendix C), was modified from the ERAU 'Training Material Test' (Berlin, et al., 1982), and used as a pre- and post-test measure of the experimental and control groups attitudes, and knowledge of the concepts detailed within the pilot judgement training programme. Staff at the Massey University School of Aviation, and Massey University Department of Psychology, reviewed different aspects of this test. These included, providing assistance in the modification of flight scenarios, approving the test's design, and confirming the test's answers.

This test consisted of the following six sections:

Section 1 : Non-Training Judgement Concepts.

This section used non-training terminology to measure the subjects knowledge and attitudes towards different training concepts. Subjects answered 11 questions; one multiple choice (Question 1), and ten rated on five point Likert scales (see Appendix C). The correct answers to each of the questions were obtained from the ERAU 'Training Material Test', and information within the Student Training Manual (Appendix A). These answers were then checked, and confirmed by an instructor at the Massey University School of Aviation.

Section 2 : Hazardous Thought Ratings.

This section measured how the subjects rated their current attitude to flying in terms of the five hazardous thought patterns, and five hazardous thought antidotes. Each question was rated on a five point Likert scale (ranging from; "strongly disagree" to "strongly agree"). Because this information was subjective, no scores were given to the different responses. This section was not included in the ERAU "Training Material Test", and was designed specifically for this study.

Section 3 : Judgement Rating - Flight Scenario.

This section tested the subjects ability to identify poor judgement behaviours within a pilot's accident report. Each question was rated on a five point Likert scale (ranging from; "very poor judgement" to "very good judgement"). The correct answers for these questions were obtained, and confirmed in the same manner as Section 1.

Section 4 : Factor Importance - Flight Scenarios.

This section tested the subjects ability to identify important judgement factors within a number of different judgement situations. For each situation, subjects rated a number of different judgement items. Each rating was made on a five point Likert scale (ranging from; "definitely not important" to "extremely important"). The correct answers

for this section were established during in the ERAU study (See Appendix D).

Section 5 : The Action Ways.

This section tested the subjects ability to identify, and explain the poor judgement decisions within a number of different flight scenarios. The correct answers for these questions were obtained, and confirmed in the same manner as Section 1.

Section 6 : Judgement Training Concepts.

This section used training terminology to measure the subjects knowledge of training concepts. The correct answers for these questions were obtained, and confirmed in the same manner as Section 1.

6.5.2 The Observation Flights.

Two tests were designed to provide an objective measure of the subjects pilot judgement, within a flight. Both tests were modified from an observation flight within the ERAU study (Berlin et al., 1982), and reviewed by staff at the Massey University School of Aviation, and Massey University Department of Psychology.

These tests can be described as follows:

Observation Flight One.

This test (Appendix E), consisted of 10 judgement situations, and was designed to be administered to the experimental and control groups at the pre-test stage of this study. Instructors were to test the subjects individually, and incorporate the 10 judgement situations into a normal flight lesson. Score sheets for this test are outlined in Appendix F.

Observation Flight Two.

This test (Appendix G), was standardized with observation flight one. It consisted of 10 judgement situations, and was designed to be administered to the experimental and control groups at the post-test stage of this study. Instructors were to test the subjects individually, and incorporate the 10 judgement situations into a normal flight lesson. Score sheets for this test are outlined in Appendix H.

6.5.3 The Lesson 13 Tests.

These tests were designed to measure the experimental groups knowledge and understanding of the judgement concepts included in Lesson 4 to 11, in Unit 2 of the Student Training Manual.

Lesson 13 : Hazardous Thought Postcheck Number One.

This test (Appendix K), asked the subjects to state the five hazardous thought patterns, and the five hazardous thought antidotes; label the hazardous thoughts present in different pilot responses; and, identify the hazardous thoughts present within a flying scenario. The criteria for passing this test required the perfect identification of the five hazardous thought patterns, and five hazardous thought antidotes. Furthermore, subjects could score no more than four errors in the remaining questions. The answer key for this test is outlined in Appendix L.

Lesson 13 : Hazardous Thought Postcheck Number Two.

This test (Appendix M), was standardized with the first postcheck, and measured exactly the same areas of skill and knowledge. Only the subjects who failed to pass the first test, were administered this test. The answer key for this test is outlined in Appendix N.

6.5.4 The Course Evaluation Questionnaires.

Two questionnaires were administered to the experimental group to establish qualitative information about the training material. Subjects were given the first questionnaire just prior to training, and the second immediately after the training. These questionnaires addressed the following items:

The Pre-Course Questionnaire.

In this questionnaire the subjects were asked to indicate what method of instruction they preferred for this training; the benefits they associated with pilot judgement training; their attitude towards the different training topics; and, their perceived understanding for each of these topics. Because this information was subjective, no scores were given to the subjects responses. A copy of this questionnaire is contained in Appendix I.

The Immediate Post-Course Questionnaire.

This questionnaire readdressed the questions included within the pre-course questionnaire, and examined a number of additional points. These included, the subjects impression of the time allocated to each training topic; the relevance of the training material; suggestions for future training; the value of the training programme; the subjects impressions about the pilot judgement test; the availability of instructors; and, the adequacy of the flight training. Because this information was subjective, no scores were given to the subjects responses. A copy of this questionnaire is contained in Appendix J.

6.5.5 The California Psychological Inventory (CPI).

The CPI was designed by Harrison Gough in 1957, to assess how people function within a social setting. In particular, the inventory predicts what subjects will say, and how they will act when in the presence of others. When completed, the CPI produces standard scores for 18 scales. Each scale has a mean of 50, and a standard deviation of 10. Gough and Alto (1984), outlined the reliability of the scales as ranging from +.52 to +.86, with the mean of +.71.

The individual scales of this test are divided into four composite groups. The scales within each of these groups have similar attributes, and can be defined in terms of the behaviours they are designed to reflect:

Composite 1 : Measures of Poise, Ascendency, and Interpersonal Adequacy.

1. **Dominance** : Leadership ability, persistence, and social initiative.
2. **Capacity for Status** : The personal qualities and attributes which underlie, and lead to status.
3. **Sociability** : Outgoing and participative temperament.
4. **Social Presence** : Self confident in personal and social interaction.
5. **Self-Acceptance** : A sense of personal worth.
6. **Sense of Well Being** : Free from self doubt, and disillusionment.

Composite 2 : Measures of Socialization, Maturity, Responsibility, and Intrapersonal Structuring of Values.

7. **Responsibility** : Conscientious, and dependable.
8. **Socialization** : The social maturity, integrity, and rectitude which an individual has attained.
9. **Self-Control** : Self-regulation, and freedom from impulsivity, and self-centredness.
10. **Tolerance** : Permissive, accepting, and non-judgemental of social beliefs and attitudes of others.
11. **Good Impression** : Capable of a favourable impression, and concerned about how others react to them.
12. **Communality** : The degree to which an individual's behaviour corresponds to the common pattern.

Composite 3 : Measures of Achievement Potential and Intellectual Efficiency.

13. **Achievement via Conformance** : Adhering to factors which facilitate achievement when conformance is a positive behaviour.
14. **Achievement via Independence** : Adhering to factors which facilitate achievement when autonomy, and independence are positive behaviours.
15. **Intellectual Efficiency** : The degree of personal and intellectual efficiency which an individual has attained.

Composite 4: Measures of Intellectual and Interest Modes.

16. **Psychological-Mindedness** : The degree to which the individual is interested, and responsive to, the inner needs, motives, and experiences of others.
17. **Flexibility** : The adaptability of a person's thinking, and social behaviour.
18. **Femininity** : The masculinity or femininity of interests.

6.6 PROCEDURE.

At the start of this study all participants were briefed on the nature of the research. This began with a briefing of the flight school's instructors. This briefing, described the training's content, the data collection instruments, and the study's time span. The instructor, received a copy of the student and instructor's training manual, and were asked to read the material before the next meeting. After a week the instructors were briefed for a second time. This covered any questions that had arisen over the week, explained why it was important to avoid disclosing the training material to subjects within the control group, and outlined how to administer the observation flights, and in-flight training.

All subjects were then briefed, just prior to administering the pre-course measures. This informed the subjects that a study was going to be conducted at the

flight school, that it would involve a number of tests, and a short training programme. Because the research was not a part of the students' current training, or related in any way to their course assessment, a request was made for their participation. All subjects agreed to participate.

Having gained the subjects' consented approval, testing began. Data was collected, measuring the subject's personality profiles on the 'California Psychological Inventory', and subjects were administered the Pilot Judgement Test. After this, the instructors began to administer the pre-course observation flight. Delays to this testing became evident when the students' training switched to solo flights. After gathering the results of completed tests, and feedback from participating instructors, it was established the tests were too elementary for the subjects' flight experience. Given these results, and the pressure of time restraints, it was decided not to delay the research to collect the tests outstanding. Having drawn this conclusion, the observation flights were deleted from the study.

Prior to beginning the training, or administering the 'pilot judgement pre-course questionnaire', some subjects from the experimental group graduated, and left the school. The subjects that remained were administered the 'pilot judgement pre-course questionnaire', and briefed on the content of the training material. This briefing outlined

their responsibilities within the training, described the role of the flight instructors, and detailed the time allotted to each training unit. In addition, these subjects were requested not to discuss the training content with any pilots outside of the training group.

Subjects in the experimental group were given one week to complete unit 1 of their training manual, and one week to complete unit 2. At the end of the first week the instructors were to start administering the in-flight training. Again, due to the predominance of solo flights, it became evident it would not be possible to complete the in-flight training within the set training time. Due to this reason, and pressures to adhere to the programmes timetable, the in-flight training (unit 4 & 5), was not included in this study.

Half way through the second week of training, subjects requested the completion date for unit 2 be moved forward. This request was made so subjects could prepare, and sit end of year exams. In response to this request subjects were given an additional 3 weeks so they could complete their exams.

At the completion of the subjects exams, further attrition problems arose with subjects' unexpectantly leaving early for their summer vacations, and other subjects graduating. The subjects that remained within the experimental group,

continued training. Further modifications, were made to ensure the training would finish within the flight school's time plan. These changes lead to the deletion of the unit 3 class discussion.

When the experimental group finished their exams, they had one week to finish unit 2 of the training. At the end of this week, these subjects completed the 'Lesson 13 Hazardous Thought Post Check'. The subjects who failed to pass this test were notified of their errors, and after two days administered the second 'Lesson 13 test'. Having completed these tests, subjects were given one week to complete unit 3, and then administered the 'pilot judgement immediate post-course questionnaire'. Having completed this test, the experimental and control group, were readministered the pilot judgement test.

CHAPTER 7.

RESULTS.

Data were collected from seven measuring instruments. These instruments are detailed in the previous chapter, and include, the pilot judgement test, scores for the pre-test observation flight, the Lesson 13 tests, the two course evaluation questionnaires, and the California Psychological Inventory. The results are analysed individually, and then different relationships between the measures are examined.

7.1 THE PILOT JUDGEMENT TEST.

Subjects in the experimental group (Exp.1) and control group (C1), were administered this instrument at the pre-course and post-course stage of training. The test consisted of six sections, and addressed non-training judgement concepts (section 1), hazardous thought ratings (section 2), judgement flight ratings (section 3), factor importance ratings (section 4), action ways (section 5), and judgement training concepts (section 6).

An Analysis of Variance (ANOVA), analysed the subjects' scores in section 1, 3, 4, 5, and 6. Each ANOVA, was for a mixed design with one between subject variable (control vs. experimental), and one within subject variable (pre-test vs. post-test). In reference to the experiments design, a successful training programme will be indicated by changes

in the Exp.1 group from pre- to post-test, and little if any change in the C1 group. Using ANOVA, the significance of this change will be shown in the interaction of the between subject, and within subject variables.

In addition, chi-square analysed the categorical data in section 1 (not analysed in the section 1 ANOVA), and section 2. As with the ANOVA, a successful training programme will be indicated by a change in the Exp.1 group from pre- to post-test, and little if any change in the C1 group.

Because of attrition, and the resulting missing data, many of the statistical comparisons made between the pre- and post-test data, have centred only on the subjects who completed both tests. Subjects who did not complete both tests were not included in the analysis. This approach was taken to reduce the biasing of results.

Section 1: Non-Training Judgement Concepts.

This section tested two different areas. The first tested the subjects knowledge of the concepts taught in the pilot judgement training, using non-training terminology. Subjects received one mark for each correct answer, and could score a maximum of 11 points.

Data was collected from both groups before and after training, and the total scores were subject to an ANOVA.

The results from the ANOVA, are presented in Table 7.1.1.

Table 7.1.1: Analysis of Variance on the number of pilot judgement non-training terms correctly reported by the experimental and control group.

	df	MS	F
Between-Subjects			
Groups (Exp.1 & C1)	1	7.18	4.16 ***
Subjects-within-groups	26	1.72	
Within-Subjects			
Test (Pre. & Post-test)	1	9.03	5.55 *
Groups x Test	1	7.39	4.54 *
Test x Subjects			
-within-groups	26	1.63	
Total	55	1.18	
* p < .05			
** p < .01			
*** p < .001			

The ANOVA revealed a significant difference between the Exp.1 group and the C1 group ($F(1,26) = 4.16, p < .001$). A significant difference between the pre- and post-test condition ($F(1,26) = 5.55, p < .05$), and a significant interaction between the two groups x the pre-and post-test ($F(1,26) = 4.54, p < .05$).

Table 7.1.2, illustrates that the mean scores for both groups increased over the pre- to post-test period, although the increase in the Exp.1 group was greater.

Table 7.1.2: Means and standard deviations for the number of non-training terms correctly reported by the experimental and control group.

		Group Exp.1 (N=15)	Group C1 (N=13)
Pre-test	Mean (SD)	9.067 (0.961)	9.077 (1.656)
Post-test	Mean (SD)	10.600 (0.828)	9.154 (1.625)

The results from this first analysis, indicated a significant difference between the groups. Overall, these results showed that the experimental group had a better knowledge of the pilot judgement concepts measured using non-training terminology, than the control group.

The second area tested within this section, measured the subjects impression of how well a pilot's behaviour had been 'thought out'. Subjects rated a number of different hypothetical pilot behaviours, five of which had been included to represent the hazardous thought patterns detailed within the training. Subjects pre- and post-test ratings for each of these 'representative' behaviours were analysed using chi-square. The results of this analysis are presented in Table 7.1.3 (Exp.1 group), and Table 7.1.4 (C1 group). (Medians have been presented instead of means, as they provide the best representation of the subjects responses for this categorical data).

Table 7.1.3 Medians and chi-squares for the experiment group's ratings of pilot actions representing hazardous thought patterns.

Areas Rated by Subjects	Median Pre- (n=15)	Median Post- (n=15)	χ^2
1. Impulsive Action How well thought out was this action	2	2	3.69
2. Macho Action How well thought out was this action	2	1	0.54
3. Anti-Authority Action How well thought out was this action	1	1	2.16
4. Invulnerable Action How well thought out was this action	1	1	0.19
5. External Factors Action How well thought out was this action	1	1	0.00
* p < .05 ** p < .01 *** p < .001			

Table 7.1.4 Medians and chi-squares for the control group's ratings of pilot actions representing hazardous thought patterns.

Areas Rated by Subjects	Median Pre- (n=13)	Median Post- (n=13)	χ^2
1. Impulsive Action			
How well thought out was this action	2	2	1.22
2. Macho Action			
How well thought out was this action	2	2	1.36
3. Anti-Authority Action			
How well thought out was this action	1	1	1.40
4. Invulnerable Action			
How well thought out was this action	1	1	0.17
5. External Factors Action			
How well thought out was this action	1	1	1.33
* p < .05			
** p < .01			
*** p < .001			

The results from Table 7.1.3, and Table 7.1.4, indicated no significant changes in the experimental and control groups' responses. Both groups in general, rated each of the behaviours as being "poorly", or "very poorly" thought out.

Section 2: Hazardous Thought Rating.

This section measured how the subjects rated their current attitude to flying, in terms of the five hazardous thought patterns, and five hazardous thought antidotes. Data was collected from both groups before and after training, and analysed using chi-square.

The results of this analysis are presented in Table 7.1.5 (Exp.1 group), and in Table 7.1.6 (C1 group). (Medians have been presented instead of means, as they provide the best representation of the subjects responses for this categorical data).

Table 7.1.5 Medians and chi-squares for the experimental group's ratings for the five hazardous thought patterns, and five hazardous thought antidotes.

Hazardous Thought Patterns & Antidotes	Median Pre- (n=15)	Median Post- (n=15)	χ^2
Impulsive Thought Pattern	2	2	4.65
Impulsive Antidote	4	4	0.72
Macho Thought Pattern	2	2	6.83
Macho Antidote	5	5	6.76
Anti-Authority Thought Pattern	2	1	1.86
Anti-Authority Antidote	4	4	0.55
Invulnerable Thought Pattern	1	1	0.19
Invulnerable Antidote	4	4	2.53
External Control Thought Pattern	2	1	7.14
External Control Antidote	4	4	6.80
* p < .05			
** p < .01			
*** p < .001			

Table 7.1.6 Medians and chi-squares for the control group's ratings for the five hazardous thought patterns, and five hazardous thought antidotes.

Hazardous Thought Patterns & Antidotes	Median Pre- (n=13)	Median Post- (n=13)	χ^2
Impulsive Thought Pattern	2	2	0.26
Impulsive Antidote	4	4	2.20
Macho Thought Pattern	2	2	1.42
Macho Antidote	5	4	0.15
Anti-Authority Thought Pattern	2	1	2.75
Anti-Authority Antidote	4	4	1.04
Invulnerable Thought Pattern	2	2	2.40
Invulnerable Antidote	4	4	0.20
External Control Thought Pattern	2	2	3.00
External Control Antidote	4	4	2.16
* p < .05			
** p < .01			
*** p < .001			

The results from Table 7.1.5, and Table 7.1.6 revealed no significant changes in the experimental, or control group's responses over the pre- to post-test period. At both stages, these groups indicated their attitudes represented the hazardous thought antidotes, but none of the hazardous thoughts.

Section 3: Judgement Rating - Flight Scenario.

This section measured the subject's ability to identify a pilot's poor judgement behaviour after reading the pilot's accident report. Subjects received one mark for each correct rating, and could score a maximum of 7 points.

Data was collected from both groups before and after the training, and the total scores for this section were subject to an ANOVA. The results of this analysis are presented in Table 7.1.7.

Table 7.1.7: Analysis of Variance on the number of behavioural ratings correctly reported by the experimental and control group.

	df	MS	F
Between-Subjects			
Groups (Exp.1 & C1)	1	15.77	20.22***
Subjects-within-groups	26	0.78	
Within-Subjects			
Test (Pre- & Post-test)	1	0.26	0.44
Groups x Test	1	4.97	8.57**
Test x Subjects			
-within-groups	26	0.58	
Total	55	0.59	
* p < .05			
** p < .01			
*** p < .001			

The ANOVA revealed a significant difference between the Exp.1 group and the C1 group ($F(1,26) = 20.22, p < .001$), and a significant interaction between the two groups x the pre- and post-test ($F(1,26) = 8.57, p < .001$).

Table 7.1.8, illustrates that the mean scores for the experimental group increased over the pre- to post-test period, while the mean scores for the control group decreased.

Table 7.1.8: Means and standard deviations for the number of behavioural ratings correctly reported by the experimental and control group.

		Group Exp.1 (N=15)	Group C1 (N=13)
Pre-test	Mean (SD)	5.467 (0.915)	5.000 (0.913)
Post-test	Mean (SD)	6.200 (0.676)	4.538 (0.776)

The results from this section indicated a significant difference among the groups, with the subjects in the experimental group being better at identifying poor judgement behaviours than the control group.

Section 4: Factor Importance - Flight Scenario.

This section measured the subject's ability to identify the important judgement factors within a number of different situations. For each situation, the subjects rated a number of different judgement factors. If their importance ratings matched those established by an expert panel in the ERAU study (Berlin et al., 1982), subjects were awarded 1 mark. The maximum score for this section was 12 marks (See Appendix D for expert panel ratings).

Data was collected from both groups before and after training, and total scores were subject to an ANOVA. The results of this analysis, are presented in Table 7.1.9.

Table 7.1.9: Analysis of Variance on the number of importance ratings correctly reported by the experimental and control group.

	df	MS	F
Between-Subjects			
Groups (Exp.1 & C1)	1	0.02	0.03
Subjects-within-groups	26	0.86	
Within-Subjects			
Test (Pre- & Post-test)	1	1.85	4.33 *
Groups x Test	1	0.13	0.31
Test x Subjects			
-within-groups	26	0.43	
Total	55	0.42	
* p < .05			
** p < .01			
*** p < .001			

The only significant difference revealed by the ANOVA was between the pre- and post-test condition (F(1,26)= 4.33, p<.05).

Table 7.1.10 illustrates that the mean scores for both groups decreased over the pre- to post-test period.

Table 7.1.10: Means and standard deviations for the number of importance ratings correctly reported by the experimental and control group.

		Group Exp.1 (N=15)	Group C1 (N=13)
Pre-test	Mean	11.400 (0.828)	11.538 (0.660)
Post-test	Mean	11.133 (0.743)	11.107 (0.954)

The results from this section indicated that there were no significant differences among the groups. Given that the maximum score for this section was 12, both groups pre- and post-test scores illustrate the presence of a 'ceiling effect'. These results provided limited information for determining differences in the groups ability to identify important judgement factors.

Section 5: The Action Ways.

This section measured the subjects ability to identify and explain how pilots in various situations implemented poor judgement decisions. Subjects received one mark for correctly identifying a poor pilot action, and one mark for correctly explaining why it was a poor action. The maximum score for this section was 12 marks.

Data was collected from both groups before and after training, and the total scores were subject to an ANOVA. The results of this analysis are presented in Table 7.1.11.

Table 7.1.11: Analysis of Variance on the number of poor pilot actions correctly identified and explained by the experimental and control group.

	df	MS	F
Between-Subjects			
Groups (Exp.1 & C1)	1	5.77	2.35
Subjects-within-groups	26	2.45	
Within-Subjects			
Test (Pre- & Post-test)	1	5.14	2.15
Groups x Test	1	0.00	0.00
Test x Subjects			
-within-groups	26	2.40	
Total	55	1.86	
* p < .05			
** p < .01			
*** p < .001			

The ANOVA revealed no significant differences between the groups (Exp.1, C1), the tests (Pre-test; Post-test), or the interaction between the two groups x pre- and post-test.

Table 7.1.12 illustrates that the mean scores for both groups increased over the pre- to post-test period.

Table 7.1.12: Means and standard deviations for the number of poor pilot actions correctly identified and explained by the experimental and control group.

		Group Exp.1 (N=15)	Group C1 (N=13)
Pre-test	Mean (SD)	9.267 (1.163)	8.615 (1.758)
Post-test	Mean (SD)	9.867 (1.727)	9.231 (1.536)

The results for this section indicated that the experimental and control group did not significantly differ in their ability to identify, and explain a pilot's poor judgement decisions.

Section 6: Judgement Training Concepts.

This section measured the subject's knowledge of the terminology contained within the pilot judgement training programme. Subjects received 1 mark for each correct answer, and could score a maximum of 11 points.

Data was collected from both groups before and after training, and the total scores were subject to an ANOVA. The results of this analysis are presented in Table 7.1.13.

Table 7.1.13: Analysis of Variance on the number of pilot judgement training terms correctly reported by the experimental and control group.

	df	MS	F	
Between-Subjects				
Groups (Exp.1 & C1)	1	200.29	95.12	***
Subjects-within-groups	26	2.11		
Within-Subjects				
Test (Pre- & Post-test)	1	200.86	113.95	***
Groups x Test	1	192.93	109.45	***
Test x Subjects				
-within-groups	26	1.76		
Total	55	6.43		
* p < .05				
** p < .01				
*** p < .001				

The ANOVA revealed a significant difference between the Exp.1 group and the C1 group ($F(1,26) = 95.12, p < .001$), a significant difference between the pre- and post-test condition ($F(1,26) = 113.95, p < .001$), and a significant interaction between the two groups x the pre- and post-test ($F(1,26) = 109.45, p < .001$).

Table 7.1.14, illustrates that the mean scores for both groups increased over the pre- to post-test period, although the increase in the Exp.1 group was much greater.

Table 7.1.14: Means and standard deviations for the number of pilot judgement training terms correctly reported by the experimental and control group.

		Group Exp.1 (N=15)	Group C1 (N=13)
Pre-test	Mean (SD)	1.071 (0.730)	1.000 (0.913)
Post-test	Mean (SD)	8.714 (2.199)	1.077 (1.188)

The results for this section indicated that the experimental group was significantly better than the control group at defining the terminology contained within the pilot judgement training programme. These results are hardly surprising given that the experimental group was administered the judgement training programme, and the control group was not.

7.2 THE PRE-TEST OBSERVATION FLIGHT.

This test was administered to subjects within the experimental and control group, as a pre-test measure. A total of 17 subjects (5 from the experimental group; 12 from the control group), completed this test prior to deciding that it would be deleted from the research. This

decision was made because the instructors stated the tests were too elementary for the subjects level of flight experience, and because of the delays in testing caused by solo flight training.

For the 17 subjects who were administered this measure, each completed 10 judgement activities, and could score a maximum of 20 points. The experimental group scored a mean of 18.80 (SD= .89), and the control group a mean of 17.16 (SD= 1.08). While there was a difference between the groups, no statistical comparison was made between the scores, because of the small portion of subjects that completed the test. Comparisons are however made using these scores, and other performance measures in Section 7.6.

7.3 THE LESSON 13 TESTS.

Lesson 13 test number one was administered to 15 subjects in the experimental group after they had completed unit 1, and unit 2 of the pilot judgement training programme. This test measured the subject's understanding of material covered in lesson 4 to 11, of unit 2 of the student training manual. The maximum possible score for this test was 32, the subjects mean was 28.33 (SD= 2.26).

Two subjects failed to meet the passing criteria of this test (See Section 6.5.1), and were administered Lesson 13

test number two. Both subjects passed the re-test with a score of 28.

Having completed these tests, all of the subjects showed that they had gained a good knowledge of the test material. Furthermore, this indicated that the subjects had a clear understanding of the five hazardous thought patterns, and five hazardous thought antidotes.

7.4 THE COURSE EVALUATION QUESTIONNAIRES.

Subjects in the experimental group completed two course evaluation questionnaires. The first was a pre-course measure, and the second was a post-course measure. Both tests measured the preferred methods of instruction for teaching pilot judgement, what benefits were associated with pilot judgement training, attitudes towards the different training topics, and the perceived understanding of these topics. In addition, the post-course measure assessed the subjects impression of the time allocated to teaching the training topics, the relevance of these topics to pilot judgement, and a number of subjective questions.

Comparisons made between pre- and post-test measures centred only upon the subjects who completed both tests. Using this approach, missing data was controlled, and could not bias the results.

7.4.1 The Preferred Training Techniques.

This question measured the experimental groups pre- and post-test preferences for the teaching techniques to be used in pilot judgement training. The subjects could indicate as many techniques as they wanted. Table 7.4.1 lists the teaching techniques that were marked, and the percentage of subjects who indicated these techniques should be used for teaching pilot judgement.

Table 7.4.1 The experimental groups pre- and post-test preferences for six methods of teaching pilot judgement.

Method	Pre-Course (n=15)	Post-Course (n=15)
1. Lectures	13%	0%
2. Informal discussion with course members	26%	6%
3. Self paced learning with manuals	33%	53%
4. Organized discussion	47%	40%
5. Practical activities	100%	93%
6. Informal discussion with course leaders	20%	33%

The similarity between pre- and post-course preferences can be seen by rank ordering the percentage scores.

Pre-Course Preferences

Post-Course Preferences

1st	Practical activities	1st	Practical activities
2nd	Organized discussion	2nd	Self-paced learning with manuals
3rd	Self-paced learning with manuals	3rd	Organized Discussion
4th	Informal discussion with course members	4th	Informal discussion with course leaders
5th	Informal discussion with course leaders	5th	Informal discussion with course members
6th	Lectures	6th	Lectures

The results of this analysis identified that the subjects were consistent in rating practical activities as the most preferred technique for teaching pilot judgement, and lectures as the least preferred technique. Subjects preferences on the remaining four techniques underwent a number of changes during the pre- to post-test period. These changes saw self-paced learning move up to second place, organized discussion drop to third place, informal discussion with course leaders move up to fourth place, and informal discussion with course members drop to fifth place.

Training techniques that gained a higher percentage of responses at the post-test were, self-paced learning, and informal discussions with course leaders. All other training techniques gained a lower percentage of responses at the post-test.

In addition to these responses, the experimental group recorded a number of additional methods they would like to see brought into teaching pilot judgement.

Additional Teaching Methods.

Pre-Course:

1. Video
2. Demonstration of the practical uses, and aims of pilot judgement training.
3. Simulator Training.
4. Reviews of recent accident reports.

Post-Course:

1. Video, illustrating how the chain effect of good and bad judgements occurred.
2. Accident Investigations.
3. Personal training tailored to address areas of difficulty.

7.4.2 The Benefits of Pilot Judgement Training.

This question measured the experimental groups pre- and post-test perception of the benefits that pilot judgement training would have on their future flying. These responses

were analysed using chi-square, and the results are summarized in table 7.4.2.

Table 7.4.2: Medians and chi-squares of the results obtained measuring the experimental groups impressions of the trainings benefits.

	Median Pre-test (n=15)	Median Post-test (n=15)	χ^2 (df=14)
Improve flying skill	4	5	10.12 *
Fly safer/better judgement	4	4	0.16
Get better job	3	3	0.82
Future training easier	4	4	7.39
No benefits	2	2	0.56
Perform better than pilots who do not receive training	4	3	9.60 **
Get more enjoyment from flying	4	4	3.63
* p < .05 ** p < .01 *** p < .001			

The results from Table 7.4.2 revealed that the experimental group's ratings for this question significantly changed in two areas over the pre- to post-test period. The first change indicated an increase in the subjects attitude that pilot judgement training would improve their flying skill ($\chi^2(14) = 10.12, p < .05$). The second indicated a drop in the subjects attitude as to whether they would perform better than pilots who did not receive training ($\chi^2(14) = 9.60, p < .01$).

In addition to these responses, the experimental group recorded a number of additional benefits they saw judgement training to have:

Additional Benefits:

Pre-Course:

1. A reduction of stress, allowing cockpit operations to flow better.
2. Greater flying satisfaction.
3. Improved decision making.

Post-Course:

1. Making decisions with the best option, and avoiding embarrassing situations.
2. More personal confidence.

7.4.3 Attitudes to Pilot Judgement Training.

This question measured the experimental groups pre- and post-test attitudes to pilot judgement training. As with

the previous question, these responses were analysed using chi-square. The results of this analysis are summarized in Table 7.4.3.

Table 7.4.3: Medians and chi-squares of the results obtained measuring the experimental groups attitudes to pilot judgement training.

	Median Pre-test (n=15)	Median Post-test (n=15)	χ^2 (df=14)
In the future, I will pay more attention to judgement in my flying	4	4	7.92 *
Pilot judgement training is a good idea	4	4	8.82 *
Pilot judgement training should be a requirement for a commercial pilot licence	4	4	2.87
Instructors should keep, trainees aware of different judgement factors during the training flights	4		Not Measured Post-test
Talking with instructors was an important part in the training	4	4	6.71
I would have learnt just as much about judgement if there was no flying component in the training	2		Not Measured Post-test
Self paced learning is a good method for teaching pilot judgement	3	4	8.23 *
Learning about stress reduction was helpful	4	4	12.52 ***
* p < .05, ** p < .01, *** p < .001			

The results from Table 7.4.3 revealed that the experimental group's ratings significantly changed in four areas over the pre- to post-test period. These results indicated an improvement in the subjects overall attitudes towards training. More subjects indicated that in the future they would pay more attention to the judgement concepts covered in their own flying ($\chi^2(14) = 7.92, p < .05$). More subjects agreed that the training programme as a whole was a good idea ($\chi^2(14) = 8.92, p < .05$). Subjects changed from having no opinion about self paced learning, to agreeing that it was a good method for teaching pilot judgement ($\chi^2(14) = 8.23, p < .05$), and more subjects agreed that learning about stress reduction would be helpful ($\chi^2(14) = 12.52, p < .001$).

7.4.4 Perceived Understanding for the Training Topics.

This question measured the experimental group's pre- and post-test perceived understanding of the areas addressed within pilot judgement training. These ratings were analysed using t-tests, and the results are summarized in Table 7.4.4.

Table 7.4.4 Changes in the experimental group's perceived understanding.

Method	Pre-Course Mean (n=15)	SD	Post-Course Mean (n=15)	SD	t Value (df=14)
The Subject Areas	1.89	0.73	3.13	0.83	3.90 * (Increase)
The Action Ways	2.00	0.75	2.87	0.91	2.58 * (Increase)
The Poor Judgement Chain	3.11	0.66	4.07	0.26	6.09 *** (Increase)
Breaking the Poor Judgement Chain	3.11	0.66	4.07	0.26	5.14 *** (Increase)
The Three Mental Processes of Safe Flight	3.11	0.66	2.54	0.99	-2.36 * (Decrease)
Hazardous Thoughts	3.32	0.58	4.53	0.64	6.14 ** (Increase)
Hazardous Thought Antidotes	2.90	0.57	4.07	0.70	6.14 *** (Increase)
Stress/Reducing Stress	3.16	0.77	3.53	0.99	1.87

* p < .05
 ** p < .01
 *** p < .001

The results from Table 7.4.4 identified that subjects perceived understanding of the areas taught in pilot judgement training significantly changed during the pre- to post-test period. Out of the eight t-tests conducted, only stress/reducing stress did not significantly change. For the remaining areas, subjects perceived that their understanding had increased for the subject areas ($t(14)=3.90, p<.001$), action ways ($t(14)=2.58, p<.001$), the poor judgement chain ($t(14)=5.14, p<.001$), hazardous thoughts ($t(14)=6.14, p<.001$), and hazardous thought antidotes ($t(14)=6.14, p<.001$). Only one decrease in understanding was indicated by the subjects, and this was for the three mental processes of safe flight ($t(14)=-2.36, p<.05$).

7.4.5 Time Allocation in the Pilot Judgement Training.

This question measured the experimental groups post-test opinion of the time allocated to teaching the different topics in the pilot judgement training. A score of three indicated that the time allotted was 'just right', less than three indicated 'less time' be allotted, and greater than three indicated 'more time' be allotted. A summary of the subjects results is presented in Table 7.4.5.

Table 7.4.5 The experimental group's opinion of the time allocated to training topics.

Method	Post-Course Mean SD (n=15)	
The Subject Areas	3.00	0.54
The Action Ways	3.73	0.80
The Poor Judgement Chain	3.47	0.64
Breaking the Poor		
Judgement Chain	3.60	0.51
The Three Mental Processes		
of Safe Flight	3.87	0.92
Hazardous Thoughts	3.07	0.26
Hazardous Thought Antidotes	3.40	0.63
Stress/Reducing Stress	3.93	0.80
Check Mastery of Learning	3.40	0.74
Practice Exercises Unit 1 & 2	3.20	0.94

The results from Table 7.4.5 indicated that the experimental group thought the time given to 'subject areas' was just right, while for the remaining topics the time allotment needed to be greater.

7.4.6 Topic Relevance in Pilot Judgement Training.

This question measured the experimental groups post-test opinion on how relevant each of the training topics was for developing an understanding of pilot judgement. A rating of one or two indicated that the subjects thought the topic was 'irrelevant', a rating of three indicated 'no opinion', and a rating of four or five indicated the topic was 'relevant'. A summary of the subjects results is presented in Table 7.4.6.

Table 7.4.6 Median scores for the experimental group's relevance ratings of the training topics.

Method	Post-Course Median (n=15)
The Subject Areas	4
The Action Ways	4
The Poor Judgement Chain	4
Breaking the Poor Judgement Chain	5
The Three Mental Processes of Safe Flight	4
Hazardous Thoughts	5
Hazardous Thought Antidotes	4
Stress/Reducing Stress	4
Check Mastery of Learning	4
Practice Exercises Unit 1 & 2	4

The results from Table 7.4.6 identified that the most frequent rating for each topic was that it was relevant (4), or very relevant (5).

7.4.7 Subjective Data.

In addition to the questions rated within the course evaluation questionnaires, the subjects answered a number of subjective questions in the post-course measure. The subjects answers to these questions are summarized in the Table 7.4.7 (below).

Table 7.4.7 The experimental group's post-course responses about pilot judgement training.

Question	Response Summaries (N=15)
What areas would you like to see more emphasized within current training?	<p><u>More Emphasized:</u> The poor judgement chain (n=1); Reducing stress (n=1); Discussions with instructors (n=2); Practice exercises for rating hazardous thoughts (n=1).</p> <p><u>Less Emphasized:</u> Actual definitions (words are not as important as the concepts) (n=1); The 3 mental processes of safe flight (n=1).</p>
(Continued to next page)	

Table 7.4.7 The experimental group's post-course responses about pilot judgement training (Continued).

<p>Are there any other changes you would like to see in the current training programme?</p>	<p>Instructor discussions (n=3); Class discussions (n=1); Better timing of training, making it into a block course (n=1).</p>
<p>Write a short paragraph describing your feelings and impressions about the value of pilot judgement training.</p>	<p>Pilot judgement is underestimated and should be taught before pilots make their first solo; lessons on the hazardous thought patterns and their antidotes are very valuable; the more educated pilots are, the better their decisions will be; finally, one student stated that pilot judgement had definite benefits, but he was skeptical about how much it actually improved the quality of his judgements.</p>
<p>(Continued to next page)</p>	

Table 7.4.7 The experimental group's post-course responses about pilot judgement training (Continued).

<p>Do you plan to make any changes as a result of the ideas gained from this course?</p>	<p>Yes: n = 12 No: n = 3 Of the students who responded yes, the dominant theme for change related to assessing decisions for hazardous thoughts, and applying the appropriate antidote.</p>
<p>Were you asked anything in the written test that was not in the student manual?</p>	<p>Yes: n = 1 No: n = 14</p>
<p>Did you understand all the questions within the test?</p>	<p>Yes: n = 11 No: n = 4</p>
<p>Did you have ample opportunity to meet with your instructors, and discuss the content of the course?</p>	<p>Yes: n = 9 No: n = 6</p>

7.5 THE CALIFORNIA PSYCHOLOGICAL INVENTORY.

This test was completed by 56 subjects (25 from the experimental group, and 31 from the control group), as a pre-test measure of personality. No differentiation was made between the groups when analysing the data. Scores were combined and averaged for the 18 personality factors, and then compared with the norm ratings of the California Psychological Inventory (CPI), using t-tests. The results of this analysis are summarized in Table 7.6.

Table 7.5 The Subjects' Means, Standard Deviations, and T Scores for the California Psychological Inventory.

Personality Factor	All Subjects		CPI Norms		t Value	
	Mean	SD	Mean	SD		
Dominance	55.10	9.74	50	10	3.93	***
Capacity for Status	53.02	7.42	50	10	3.04	**
Sociability	59.18	6.18	50	10	11.13	***
Social Presence	59.80	10.04	50	10	7.33	***
Self-Acceptance	60.55	8.44	50	10	9.35	***
Sense of Well Being	52.14	8.16	50	10	1.96	
Responsibility	45.36	7.65	50	10	-4.54	***
Socialization	51.77	8.57	50	10	1.54	
Self-control	51.18	8.22	50	10	1.07	
Tolerance	51.52	9.24	50	10	1.23	
Good Impression	52.89	9.44	50	10	2.29	*
Communality	51.36	9.50	50	10	1.07	
Achievement via Conformance	53.69	8.01	50	10	3.45	***
Achievement via Independence	52.34	7.23	50	10	2.42	*
Intellectual Efficiency	53.18	9.32	50	10	2.55	*
Psychological Mindedness	53.00	9.74	50	10	2.31	*
Flexibility	54.34	10.73	50	10	3.03	**
Femininity	46.54	9.12	50	10	-2.84	**

* p < .05
 ** p < .01
 *** p < .001

Out of the 18 t-tests outlined in Table 7.6, a significant difference was found for 13 of the personality measures. These results indicated that the pilots rated themselves lower than the CPI norms for Responsibility ($t(55) = -4.54, p < .001$), and Femininity ($t(55) = -2.84, p < .01$); and higher than the CPI norms for Dominance ($t(55) = 3.93, p < .001$); Capacity for status ($t(55) = 3.04, p < .01$), Sociability ($t(55) = 11.31, p < .001$); Social presence ($t(55) = 7.33, p < .001$); Self acceptance ($t(55) = 9.35, p < .001$); Good impression ($t(55) = 2.29, p < .05$); Achievement via conformance ($t(55) = 3.45, p < .01$); Achievement via independence ($t(55) = 2.42, p < .05$); Intellectual efficiency ($t(55) = 2.55, p < .05$); Psychological mindedness ($t(55) = 2.31, p < .001$); Flexibility ($t(55) = 3.03, p < .001$).

Given that a number of t-tests were conducted on this data, it is possible that a number of significant differences passed through by chance. However, because the differences are used for comparative, and not absolute purposes, no effort was made to re-analyse this data using a protected t-test.

7.6 RELATIONSHIPS BETWEEN THE DATA COLLECTION INSTRUMENTS.

A number of relationships were examined between the different data measuring instruments. Each analysis focused on providing a broader knowledge about the effects of training, and on identifying unintended training outcomes. Working to this criteria, the focus for each analysis centred upon one or more of the pilot judgement measures (the pilot judgement test, the observation flight number 1, the lesson 13 test number 1, and the course evaluation questionnaires).

No multi-variate methods of analysis were used in this study because the small sample size would have produced unreliable results.

7.6.1 The relationship between the Pilot Judgement Test, and the subjects biographical data.

Using the Pearson product-moment correlation this analysis was conducted to examine the relationship between the subjects scores in the pilot judgement test (pre- & post-test), and the subjects biographical data. Table 7.6.1 illustrates that there were no significant results.

Table 7.6.1 Correlation between the Pilot Judgement Pre- and Post-test, and the subjects biographical data.

	Pilot Judgement Pre-test		Pilot Judgement Post-test	
	Exp.1 (n=25)	C1 (n=31)	Exp.1 (n=15)	C1 (n=13)
Education	0.43	0.18	-0.38	-0.02
Age	-0.74	0.02	0.23	0.21
Year Certified	0.01	-0.37	0.28	0.00
Pre-Course				
Flight Hours	-0.41	0.21	0.13	0.49
Post-Course				
Flight Hours	-0.41	-0.25	-0.09	0.38
** p < .01				
*** p < .001				

7.6.2 The relationship between the Pilot Judgement Pre-Test, and Observation Flight 1.

This analysis was conducted to examine the relationship between the subjects scores in the pilot judgement pre-test, and scores for observation flight number 1. Using the Pearson product-moment correlation, no significant relationship was identified ($r = .35$).

7.6.3 The relationship between the Pilot Judgement Test, and Lesson 13 Test Number 1.

Using the Pearson product-moment correlation, this analysis was conducted to examine the relationship between the experimental group's scores in the pilot judgement test (pre- & post-test), and scores for lesson 13 test number 1. In both cases, the results of this analysis were not significant; pre-test and lesson 13 test' ($r = -.38$); post-test and lesson 13 test ($r = .21$).

7.6.4 The relationship between the Pilot Judgement Understanding and Perceived Understanding.

This analysis was conducted to examine the relationship between the experimental groups scores for section 6 of the pilot judgement test, and subjects ratings of perceived understanding in the course evaluation questionnaire. Using the Pearson product-moment correlation, a separate analysis was conducted for subject scores and ratings at the pre- and post-test. It was found that the subjects understanding and perceived understanding at the pre-test ($r = .21$), and post-test ($r = .40$), were positive but non-significant.

7.6.5 The relationship between Observation Flight
Number 1, and the subjects biographical data.

Using the Pearson product-moment correlation this analysis was conducted to examine the relationship between the subjects scores on observation flight number one, and the subjects education rating ($r = .21$), age ($r = -.12$), year certified ($r = -.54$), and pre-course flight hours ($r = .50$). No significant relationships were identified.

7.6.6 The relationship between the subjects hazardous
thought patterns and personality.

This analysis used the combined experimental and control groups ratings for the hazardous thought patterns in section 2 of the pilot judgement pre-test, and the subjects scores for the 18 personality profiles measured in the California Psychological Inventory.

The subjects responses to the five hazardous thoughts were recoded so that a rating of 1 or 2 indicated a low hazardous thought pattern, a rating of 3 indicated the subjects were undecided, and a rating 4 or 5 indicated a high hazardous thought pattern. A t-test was then conducted between the high and low hazardous thought groupings for each of the personality factors measured on the CPI.

The results of this analysis identified no significant differences between the personality profiles of subjects with high and low hazardous thought patterns.

CHAPTER 8.

DISCUSSION, AND CONCLUSIONS.

The Williamson et al., (1978) evaluative model was offered in Chapter 2 as an appropriate model for conducting small scale evaluations within a social setting. The present study has applied this model to evaluate the effectiveness of the ERAU pilot judgement training material. This training material, was modified to match the New Zealand General Aviation environment, and modified so that the student training manual was self-explanatory. Using a number of different data measuring instruments, the effectiveness of this material was evaluated in a small scale experiment. This experiment, assessed how training affected the subjects knowledge, skill, and attitudes, and examined the relationship between personality and hazardous thought patterns. The results from this analysis are presented in the previous chapter.

This chapter evaluates these results using the six evaluative stages developed by Williamson et al., (1978). This begins with assessing the programme's general effectiveness, and is followed by an assessment of the means-ends analysis, internal validity, goal-outcome congruence, external validity, and construct validity.

8.1 GENERAL EFFECTIVENESS.

The first stage of evaluation identified by Williamson et al., (1978), considers whether an evaluation has had an effect on the subjects performance. The general effectiveness of this study was illustrated by a number of differences between the groups that were attributed to the effects of training. Given these results, it is worthwhile to proceed with the evaluation. If no effects had been identified, Williamson et al., (1978) suggested that the evaluation begin again, and the evaluator question the methodology used within the study.

8.2 MEANS-ENDS ANALYSIS.

The means-ends analysis considers the match between the implemented programme, and the programme's goals. This analysis was not included in the original evaluation of the pilot judgement training material (See Berlin et al., 1982), and therefore provides new insights into the effects of training.

The information for this stage of evaluation, came from the experimental groups' responses to the pre- and post-course evaluation questionnaires. Overall, these results provided a satisfactory means-ends analysis. The subjects supported the training techniques, the course content, and outlined a number of training benefits. In addition, a number of areas for improvement were identified. The

results, and conclusions drawn from this analysis are summarized below:

8.2.1 Assessing the Training Techniques.

After training, the majority of the subjects indicated the most preferred techniques for teaching pilot judgement include the use of practical activities, and self-paced learning with manuals. These results showed the subjects supported using these methods of instruction in the current training. Future training should continue to use self-paced learning in the student training manual, and practical activities in the in-flight training.

The subjects preference towards self-paced learning increased over the training period. Having used this method of instruction within the student training manual, this rating indicated the subjects attitudes became more positive after using the teaching technique. This was further clarified by the subjects stating they thought self-paced learning was a good method of instruction.

Teaching techniques that were not included within the training, but were suggested for future use, include the use of videos, more accident reports, practical demonstrations, simulator training, and personalized training. These suggestions provide the means for developing training to the subjects needs.

Training techniques that were given a low preference include the use of lectures, and discussion. The majority of the subjects indicated these methods were not suitable for teaching pilot judgement training.

Subjects did however, maintain that talking with instructors was an important part of the training. Discussion in this sense was used to complement training, rather than to teach training. This again supported the training design, as the instructors were intended to act as facilitators, using discussion to complement self-paced learning, and practical activities.

Further analysis in this study identified a clear division in the subjects opinion on whether they had enough time to discuss the training content with their instructors. While the majority indicated that they had enough time, more attention was evidently required by a number of subjects. These subjects may have left the training with questions that were not addressed, because the instructors were not available. Furthermore, these subjects may represent the small portion of subjects who did not understand all of the questions within the pilot judgement test. Future training will need to ensure instructors are fully available to discuss the course content with subjects.

8.2.2 Assessing the Training Topics.

In general terms, the subjects rated each of the training topics as being relevant, or very relevant. These ratings were an important factor in considering the means-ends analysis. This showed the subjects thought the training content represented important factors within pilot judgement. Furthermore, these results gave the programme high face validity.

Subjects indicated the learning time for the "subject areas" was "just right", but more time was needed for the remaining training topics. Time had played a big part within this study, with the training period being extended to allow subjects to prepare for, and sit their end of year exams. Given this factor, and the self-paced training method, subjects probably spent as much time as they required learning the "subject areas" (the first training topic), only to find time was restricted for the remaining topics. Future training should consider these factors, and possibly teach pilot judgement as a block course. This would mean different training programmes were not competing for the same time.

Even with the restricted time, subjects reported an increase in their perceived understanding for the subject areas, the action ways, the poor judgement chain, breaking the poor judgement chain, hazardous thoughts, and hazardous thought antidotes. The subjects understanding for each of

these areas, except the action ways, were rated above average. The ratings for the action ways, while increasing, at the post-test were still below average.

There was no significant change in the subjects perceived understanding for the training topic "stress". Subjects rated their understanding for this topic as above average. This suggested subjects had received prior training in this area. Subjects did however indicate they found the lesson on stress helpful.

Only one rating, "the three mental processes of safe flight", indicated a decrease in the subjects understanding. This change may have been because the subjects overrated their pre-test understanding, and at the post-test had become more realistic.

The areas where subjects indicated their understanding was below average highlights areas to improve the training. This included, the lesson for "the action ways", and the "three mental processes of safe flight".

8.2.3 Assessing the Attitudes, and Benefits of Pilot Judgement Training.

Subjects entered this course with high expectations. At its completion they indicated the training had a number of benefits. Subjects reported future training would be easier, that flying would be more enjoyable, and

satisfying. They also reported, training would improve their decision making, that they would fly safer with better judgement, and perhaps most importantly, they reported they would pay more attention to their judgement in future flying. These responses made it clear that the subjects saw pilot judgement training as a positive activity, and that at the end of training they were motivated to address judgement within their own flying. This motivation was seen in the subjects response indicating that they would assess their judgements for hazardous thoughts, and if required apply the appropriate antidotes.

What was surprising in the subjects ratings, was that they indicated judgement training should be a requirement for a commercial pilot licence, but they had no opinion on whether it would get them a better job. Furthermore, prior to training, subjects indicated they would perform better than non-trained pilots, but at the end of training they had no opinion. These responses may be because the subjects lacked evidence for making a judgement. If this is the case, a follow-up study may provide more information about the subjects attitudes to each of these questions.

8.3 INTERNAL VALIDITY.

The third stage of evaluation considers whether the training results can reliably be attributed to the effects

of training. Although, a number of threats to internal validity were confronted at the outset of this study, every attempt was made to minimize their effect. While the experimental and control group were drawn from the same sample, the experimental group and instructors were briefed on the importance of keeping the training material confidential. In addition, the use of multiple measures, and a pre-/post-test design, provided a means for quantifying any confounding effects.

Given the research results, it was clear that the outcome data had high internal validity. The clearest example of this is shown by the subjects post-test results in section 6 of the pilot judgement test. These results showed that the experimental group was significantly better at defining the training terminology, than the control group. This indicated that there was little transfer of training information between the groups.

8.4 GOAL-OUTCOME CONGRUENCE.

Goal-outcome congruence considers the match between the programme's goals, and its outcomes. The information for this stage of the evaluation came from the pilot judgement test, the pre-test observation flight, the lesson 13 tests, and the California Psychological Inventory. Overall, these results provided a satisfactory analysis of goal-outcome congruence, showing that the training improved pilot

judgement. In addition, a number of areas for improvement were identified. The results, and conclusions drawn from this analysis are summarized below:

8.4.1 The Pilot Judgement Test.

This test indicated training effected only specific areas of performance. After training, differences were identified in the subjects knowledge of judgement concepts (measured in non-training, and training terms), and the subjects ability to identify poor judgement behaviours within an accident report. In each of these areas, the experimental group improved significantly more than the control group, showing the impact of training. These trends were also found in the ERAU study.

No changes were identified in the subjects ratings of the behaviours representing hazardous thought patterns. Both groups showed that prior to training they associated behaviours representing hazardous thought patterns with poorly thought out pilot behaviours. Training therefore had no impact in this area. The ERAU study did not examine hazardous thoughts along these dimensions.

Subjects attitudes to flying did not change over the training period. Both groups indicated their attitudes represented the hazardous thought antidotes, but none of the hazardous thoughts. Given the direction and consistency of these ratings, training had little impact on changing

the hazardous thought patterns. The ERAU study again did not examine hazardous thoughts along these dimensions.

Subjects had no difficulty identifying the important judgement factors within different situations. Both groups scored highly on the pre- and post-test, illustrating the presence of a "ceiling effect". These trends were also found in the ERAU results. Future testing should modify this section's questions, so they discriminate which subjects are making the best analysis.

Furthermore, no differences were found in the subjects ability to identify, and explain poor judgement decisions. Although no ceiling effect was indicated, both groups scored highly, and illustrated a high level of proficiency. The ERAU study did not report these same results. They found the experimental group showed a significant increase over the pre- to post-test period, while no significant changes occurred in the control group.

In areas where no differences were found between the groups, subjects illustrated they already had acquired a high level of knowledge. Differences between this study and the ERAU study, may have been caused by differences in the subjects level of flight experience. At the pre-test stage of this experiment, subjects had on average three times the flight hours of those in the ERAU study.

No significant relationships were found between the subjects test scores, and their biographical data. This showed performance was not correlated with the subjects education rating, age, year certified, pre- and post-course flight hours. A further analysis also reported no relationship between the subjects test scores, and the lesson 13 test number 1. This indicated the subjects during-course performance was not significantly related to their pre- or post-test marks for the pilot judgement test.

8.2.4 The Pre-test Observation Flight.

Subjects scores on this test clearly support the instructors comments, that the test was too elementary given the subjects' level of flight experience. The results identified that the subjects had acquired the knowledge, and skills required, to make correct judgements within this flight. This also reinforced the theory that flight experience is related to pilot judgement (Hawkins, 1987).

Although this test was not completed by all of the subjects, those that completed it, scored very highly. No statistical comparisons were made between the experimental and control groups because of the small portion of subjects that completed the test.

As with the pilot judgement test, no relationship was found between the subjects scores on this test, and their biographical data. This showed performance was not significantly correlated with the subjects' education rating, age, year certified, and pre- and post-course flight hours. A further analysis identified no relationship between the subjects scores on this test, and scores for the pilot judgement pre-test. While relationships had been expected from these comparisons, the subjects' high scores for this test may have prevented the identification of significant relationships.

Because no post-test was administered for this test, there was no objective measure of the effects training had on the subjects' flight performance. For this reason, no comparison could be made between this test, and the ERAU flight test.

8.4.3 The Lesson 13 Tests.

The results from the Lesson 13 Tests showed that the experimental group had gained a good knowledge of the judgement concepts contained in Lessons 4 to 11, of the Student Training Manual. Subjects demonstrated that they could recall the five hazardous thought patterns, the five hazardous thought antidotes, label the hazardous thought patterns behind different pilot responses, and identify the hazardous thoughts present within a flying scenario.

All subjects met the passing criteria for this post-check. While two subjects failed to pass the first test, they passed the second test. These results indicated that the passing criteria was not too strict, and that the subjects had learnt the training material in the set time.

8.4.4 California Psychological Inventory.

The results from this test showed no relationship between the subjects personality, and their hazardous thought patterns. Furthermore, this analysis identified no differences in the personality of subjects with high and low hazardous thought ratings. While some sort of relationship had been expected, these results may have been because the California Psychological Inventory was not a good measure for establishing differences, the size of the sample was too small for this type of analysis, or the hazardous thought patterns lacked construct validity. This final point is dealt with in section 8.6.

Subjects ratings for the CPI, did however differ significantly from the CPI norm ratings. To avoid overstating these differences, attention has been directed at factors with a significance of .01 or less. Working to this criteria, subjects were found to be more dominant, have a greater capacity for status, a higher social presence, and a greater self acceptance. Furthermore, subjects were found to be more sociable, less responsible,

more capable of achievement via conformance, more flexible, and having more feminine interests. No comparable studies were found with which to compare these results.

8.5 EXTERNAL VALIDITY.

The fifth stage of evaluation considers whether the results of this study can be generalized to other populations, settings, and times. The external validity of this research is upheld initially by the findings of the ERAU study. Despite differences in location, time, and subjects, both studies found similar results. To reiterate a point already made, differences between the studies occurred because subjects in this research had already acquired a partial knowledge of the training material, through different methods of instruction.

Given these findings, we would expect to obtain similar results in the overall general aviation population, and see the same improvements in pilot judgement.

8.6 CONSTRUCT VALIDITY.

The final stage in evaluating the programme's results, is to assess the programme's rationale. Williamson et al., (1978), suggest that a satisfactory evaluation in the five preceding stages will provide the basis for verifying the programme's rationale. This theory, is based however on the fact that any unsatisfactory evaluations will be corrected,

and that the evaluation will begin again with an assessment of the programme's general effectiveness (See Chapter 2, section 2.2.6).

Due to the time constraints met in this study, it was not practical to correct many of the problems confronted during this research. As noted in Chapter 1, the evaluator will typically accept the dominant power structure, and then adapt the evaluation to meet their needs.

Of the five preceding stages, only one area of concern was identified that questioned the programme's rationale. This area related to the construct validity of the five hazardous thought patterns.

Although the face validity of the hazardous thought patterns was clearly supported by the "relevance" ratings in the post-course evaluation questionnaire, the results of the CPI and pilot judgement test questions their construct validity. Lester and Bombaci (1984), presented the view that if the hazardous thought patterns represented stable individual response dispositions, then there should be systematic personality differences between the subjects with one or another dominant hazardous thought pattern. No such relationships were identified in this study (See Section 7.6.6). Furthermore, the subjects attitudes to flying, in general, did not represent any of the hazardous thought patterns.

These findings go against those of Lester and Bombaci (1984), who found that impulsivity, invulnerability, and macho, were enough to describe the cognitive antecedent of irrational pilot judgement.

Alternatively, research by Telfer and Ashman (1986) concluded that "deference" should be included as a sixth hazardous thought pattern.

What is highlighted by these findings, is that there are different views on what the hazardous thought patterns should be, and quite clearly further research should be conducted to determine the validity of the ERAU five hazardous thought patterns.

8.7 CONCLUSIONS AND SUGGESTIONS FOR THE FUTURE.

Ultimately, an evaluation is a decision making exercise. The overall theme of the Williamson et al., (1978) model is centred on providing feedback from the six evaluative stages. Considering these results, and any limitations prevailing within the research, this final aspect of the model serves as the basis for facilitating programme modification, and development.

The major goal of this research, was to evaluate the effectiveness, and determine the benefits of pilot judgement training. The results from the Williamson et al., (1978) six evaluative stages, have reliably demonstrated

these factors. They showed training improved judgement, and altered the subject's pattern of thinking. Also, they indicated the subjects supported the training content, and the training techniques. Subjects were however, identified as having a prior knowledge of some training areas. This indicated the subjects were being taught part of the training material using different methods of instruction within their current training.

No relationship was found between the subjects personality and hazardous thought patterns. Overall, this identified the need to take a closer look at the validity of the five hazardous thought patterns.

The restraints of limited time highlighted one of the problems confronted when conducting evaluations within a social setting. Limited time was the reason the unit 3 class discussion, the in-flight training, and the post-test observation flights were not administered. This meant the training was not completed as originally planned, and there was no objective measure to determine how the training affected the subjects flight performance.

The unexpected loss of subjects was another problem confronted in this study that was beyond the evaluator's control. While a larger number of subjects would have strengthened the results of this study, it appears that small subject numbers are common to many aviation studies (see Buch & Diehl, 1984; Lester, Diehl & Buch, 1985; Telfer

& Ashman, 1986; Young, 1987; O'Hare, 1990).

Finally, it should be clear from these factors, that this evaluation confronted clear limits and political constraints. These factors were considered as much as possible prior to commencing the research, and constant contact was maintained with the course controllers, and instructors to establish their needs. These meetings determined the direction of this research, and the pace for administering the evaluation activities. The evaluator accepted this power structure, and aligned himself to meet the changing demands. By conducting the research in this manner, the results should be utilized, and worthwhile changes made to the judgement training programme. Suggestions for these changes include the following recommendations:

1. Longitudinal measures should be included to determine subjects retention of training.
2. Appropriate flight tests should be designed, taking into account the subjects level of flight experience.
3. An examination should be made of New Zealand Aviation Accident reports, to determine the relevance, and validity of the five hazardous thought patterns.
4. More time should be provided for training, (perhaps teaching the material within a block course).

5. Adequate time should be provided for students to discuss the course content with their instructors.
6. Training material should be expanded for the "subject areas", and the "three mental processes of safe flight".
7. Audio-visual material should be developed to support the training's content.
8. Simulator training should be developed to address dangerous flight activities.
9. Recent New Zealand aviation accident reports should be used to highlight the importance of training.
10. Personalized training should be given in areas of difficulty.

The implementation of these suggestions, and the continued evaluation of judgement training, will increase the current understanding of pilot behaviour, and improve aeronautical safety.

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APPENDIX A: THE STUDENT TRAINING MANUAL.

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MASSEY UNIVERSITY
SCHOOL OF **AVIATION**

**PILOT
JUDGEMENT
TRAINING**

**STUDENT'S
MANUAL**

INTRODUCTION.

A safe pilot consistently makes good judgements. At a first glance, this statement probably seems easy enough to believe. But, what is "judgement", and is it really possible to learn to improve one's judgement making ability through training ?

There is no simple explanation of what judgement means in relation to being a good pilot. We know that dangerous flight situations and accidents do occur - that all pilots do not fly safely all of the time. For situations within the pilot's control, the problem may be caused by poor training, or it may be caused by poor pilot judgement. When poor training is the cause, the pilot has never learned the appropriate knowledge, skills and behaviour to avoid the situation. When poor judgement is the cause, the pilot has learned the appropriate knowledge, skills, and behaviour, but does not choose to use them or does not use them correctly.

DEFINITION OF PILOT JUDGEMENT.

Still, judgement is not simply defined. One definition is that judgement is "sense" applied to the making of decisions, especially correct ones. Now it becomes necessary to define "sense". Sense relates to an intense awareness, realization, and understanding of the factors which are forcing a person to respond in some way, and is generally applied to the ability to act effectively in any situation. The important aspect of judgement, then, is the outcome -- a decision to act and the action. Therefore, judgement is not an end; it is the process through which a decision is made to take some sort of action. In making the decision, the pilot must consider all the factors which have, or should have, influence upon his or her decision-making process. These factors shall include all pilot, aircraft, and environmental considerations. Based upon these considerations, judgement is defined as follows:

Pilot judgement is the mental process by which the pilot recognises, analyses, and evaluates information regarding himself, the aircraft, and the outside environment. The final step in the process is to make a decision pertaining to the safe operation of the aircraft and to implement the decision in a timely manner.

Thus it can be said that if a pilot properly recognises, analyses, and evaluates the factors and subsequently makes the proper decision, then he or she exercises good judgement. If he or she does not properly recognise, analyse, or evaluate the factors or subsequently makes a poor decision which leads to improper action, then he or she exercises poor judgement.

RELATIONSHIP OF TRAINING TO JUDGEMENT.

Conventional flight training prescribes the knowledge, procedures and flight skills necessary to conduct safe flight within a limited environment. This environment consists of the aircraft and its systems, and the global environment within which the aircraft and pilot are operating. The effectiveness of pilot training is very much related to the level of exposure to the flight environment provided by the instructor. The low time pilot has limited experiences in uncontrolled or unpredictable flight situations, so the instructor attempts to teach good judgement behaviour and performance from a set of supervised flight situations.

The flight instructor teaches the student the aviation knowledge and the skills required to execute specific flight manoeuvres. In addition, the instructor teaches the student to apply the learned knowledge and skills to environmental situations. Since the instructor cannot teach the student about every possible situation, the instructor tries to provide a representative range of learning experiences that the student pilot can later apply to similar, but new and unusual situations. As the pilot displays competence and organized behaviour in representative flight situations provided during instruction, he or she increases his or her ability to perform safely in similar or more unusual situations. In new situations, the pilot's decision will be based upon two considerations: (1) what the pilot has previously learned that may be applicable to the situation; and, (2) what the pilot chooses to consider as relevant information for arriving at a decision.

This reveals an important distinction for describing pilot judgement. There are decisions which result from judgement, and there are decisions which result from training. Poor training decisions are those in which the necessary knowledge and skills were never taught or were never sufficiently learned for effective recall. Poor judgement decisions are those in which the desired knowledge and skills were learned but were not used or not used correctly.

Basic flight instruction gives a student pilot the opportunity to acquire the resources necessary to make good pilot judgements: aviation knowledge, flying skills, and experience at performing in a representative variety of typical environmental situations. Judgement training develops the pilot's ability to effectively use all of these resources as a means to making safe, legal, responsible and timely decisions about the aircraft's operation.

PILOT RESPONSIBILITY.

Flying offers tremendous benefits to our society. It is a means of fast, direct transportation for people and goods. It provides a uniquely effective way to accomplish valuable scientific goals such as weather research and aerial mapping. It is a source of pleasure and recreation for pilots and passengers.

Along with all these beneficial activities, flying also offers possibilities for great harm. A pilot can annoy, terrify, injure or kill others. This can include people in the aircraft and in other aircraft, as well people on the ground. Due to an aircraft's speed and mobility, activities can be disrupted and property can be destroyed in a matter of seconds. There are criminal activities and threats to national security that are most easily accomplished by aircraft.

The government controls the airways and licenses pilots in the best interest of everyone. When the government licenses a pilot, this action represents the granting of a very special privilege to use the nation's air space and air navigation facilities. Along with accepting this privilege, the pilot is expected to act in a manner that takes advantage of flying's benefits without engaging in any undesirable activities which might infringe on the rights and safety of others.

The pilot in command always has direct responsibility for the operation of his aircraft. This responsibility is not shared with anyone - not with controllers, passengers, or flight instruction personnel. Furthermore, all the specific responsibilities of general aviation pilots are not spelled out in detail in any official document. Rather, it is expected that a pilot will use his or her good judgement to understand and interpret the rules in individual situations.

Nearly 90 percent of all general aviation accidents may be attributed to pilot error, including poor judgement. The exercise of good judgement is critical to safe flying. As you move towards becoming a commercial pilot, recognise that 100 percent of all aviation activities take place in public airspace. Use of that airspace is a privilege, granted only to a select few. As you are earning that privilege, remember it is always your responsibility to operate your aircraft legally, safely and carefully at all times.

PILOT JUDGEMENT TRAINING.

The following training programme has been designed to teach pilots to have better judgement when they are flying. The material covered in this manual, and in the in-flight training was originally conceptualized by Jensen and Benel (1977), and then designed by the Embry-Riddle Aeronautical University (1980). Alterations have been made to this material to match the New Zealand General Aviation Environment. With these alterations made, the training programme will include 5 Training Units (Figure 1), and will cover the following elements:

UNIT 1: TEACHING JUDGEMENT CONCEPTS.

Unit I of the student manual contains concepts and terms which are used throughout the judgement training course. The success of this training greatly depends upon you thinking more carefully and more thoroughly about the judgement process at all times. Traditional pilot training emphasizes a pilot's knowledge about the aircraft and the flight environment. Judgement training focuses on the need for accurate and complete self-knowledge.

The terms and concepts of Unit I have been especially designed to help you into modified patterns of thinking, so as to produce better judgement. The terminology also provides the most concise, objective means possible of discussing pilot behaviour in judgement situations.

LESSON CONTENT.

Lesson 1.

This lesson will introduce three subject areas relevant to pilot judgement: the Pilot (P), the Aircraft (A), and the Environment (E).

Lesson 1 will also present easy-to-learn terms for six decisive actions - the actions which result from pilot judgements. These decisive actions are verb phrases called "action ways". The six possible action ways are:

DO, NO DO, UNDER DO, OVER DO, EARLY DO, LATE DO.

Lesson 2.

Lesson 2 will introduce the Poor Judgement Chain, and uses elementary behaviour modification to teach new responses that will effectively break the poor judgement sequence chain.

Lesson 3.

In lesson 3, you will be taught to understand and apply the Three Mental Processes of Safe Flight.

"Automatic Reaction" (AR).
"Problem Resolving" (PR).
"Repeated Reviewing" (RR).

UNIT II:TEACHING BEHAVIOUR ASPECTS OF JUDGEMENT.

Unit II of the student manual is designed to redirect your thinking in order to promote the consistent use of good judgement. This is done through two approaches. The first addresses the pilot's hazardous thought patterns. Specific hazardous thoughts are identified, and a way to substitute good judgement for these thoughts is promoted. The second approach addresses the reduction in judgement-making ability that results from high stress, and methods for reducing this stress are suggested.

LESSON CONTENT.

Lesson 4.

This lesson presents a self assessment inventory of hazardous thought patterns.

Lesson 5-9.

These five lessons will teach you to identify and understand the five hazardous thoughts. Each lesson is devoted to one particular thought pattern.

Lesson 10.

This lesson is important because it specifies substitute thoughts, called "antidotes", for the five hazardous thoughts.

EACH STUDENT MUST MEMORIZE THE HAZARDOUS THOUGHTS ANTIDOTES PRESENTED IN THIS LESSON.

Lesson 11.

Lesson 11 provides exercisers which require you to use your knowledge about replacing hazardous thoughts through the use of antidotes. The lesson consists of ten paragraphs describing situations in which you must make and implement a decision. You will have to specify the hazardous thought evident by the description of the pilot's thinking, write in the appropriate antidote, and write a brief description of a good pilot's judgement for the same situation.

If you do well on the first five situations, you should advanced to lesson 12. If not, you should practice further on situations 6 through to 10.

Lesson 12.

Lesson 12 deals with stress and methods to reduce it. The lesson has two objectives:

1. To teach you to identify when you are being affected by stress; and
2. To help you reduce this stress quickly.

Lesson 13.

After you have completed the initial judgement training, you will be administered the Lesson 13 Test. This test will see if you have a mastery of the ideas from Lesson 4 thru to 11.

For a successful postcheck, you must do three things:

1. State the 5 hazardous thoughts, and their antidotes;
2. Label the hazardous thought patterns present in different pilot responses; and
3. Identify the hazardous thoughts present within a flying scenario.

UNIT III: TEACHING APPLICATIONS.

Unit III contains written lessons which relate the concepts of Units I and II to actual flight situations. No new flight or judgement information is taught. Rather, these lessons are intended to reinforce your understanding, and appreciation of the judgement training concepts. This is established by integrating these concepts with true-to-life examples of flight situations.

The unit is composed of exercises centred about scenarios in which pilots are carrying out some sort of flight activity.

LESSON CONTENT.

Each lesson contains an introduction, and three exercise sections. The introduction identifies the area to be addressed.

Lesson 14 : Preflight and Aircraft Systems.

Lesson 15 : Weight/Balance and Performance.

Lesson 16 : Official Procedures and Communications.

Lesson 17 : Cross-Country Flying.

Lesson 18 : Physiological Factors and Night Flying.

UNIT IV: IN-FLIGHT INSTRUCTION: CONCEPT LESSONS.

In this unit, you will be given a number of flight activities to perform. Each activity is designed to develop your learning of one of the three mental processes of safe flight; Automatic Reaction (AR), Problem Resolving (PR), or Repeated Reviewing (RR).

These lessons will start once you have completed Unit I of the student manual.

UNIT V: IN-FLIGHT INSTRUCTION: BEHAVIOURAL SITUATION.

This phase of judgement training will be introduced when you have completed Unit II of the student manual. In this unit, you will be placed in a number of situations which will require you to exercise good judgement. For each of these activities your instructor will provide feedback on your behaviour.

PILOT JUDGEMENT TRAINING

STUDENT MANUALS:

UNIT 1:
Lesson 1:
a. Subject Areas;
Pilot, Aircraft, Environment
b. Action Ways;
Do, No Do, Under Do, Over Do,
Early Do, Late Do.
Lesson 2:
a. Poor Judgement Chain.
b. Breaking the PJ Chain.
Lesson 3:
a. Three Mental Processes of
Safe Flight; Automatic
Reaction, Problem Resolving,
Repeated Reviewing.

Unit II:
Lesson 4:
a. Self assessment inventory
of hazardous thought
patterns.
Lesson 5-9:
Identify and understand
Hazardous Thoughts.
Lesson 10:
Antidotes for five
Hazardous Thoughts.
Lesson 11:
Exercise for replacing
Hazardous Thoughts with
antidotes.
Lesson 12:
a. Stress.
b. Reducing Stress.
Lesson 13:
a. Check mastery of learning
Lesson 4 to 11.

Unit III:
Lesson 14 - 18:
Practice Exercises relating
to Unit I and II.

IN-FLIGHT INSTRUCTION:

UNIT IV:
CONCEPT LESSONS:
Develop Student
Learning of Three
Mental Processes of
Safe Flight. See
UNIT I, Lesson 3.

UNIT V:
BEHAVIOURAL SITUATION:
Students are placed in
a number of judgement
situations, having been
given control of the
aircraft.

FIGURE 1 : Pilot Judgement Training.

YOUR ROLE IN THE TRAINING.

As you are aware there are two distinct parts in the pilot judgement training programme. Firstly, there are the lessons detailed in the training manual, and secondly there is the in-flight training. Within each of these sections you will be required to fulfil certain demands.

The Student Manual.

Self Paced Learning. You will notice that the training manual has been designed so that you are in control of the learning process. The material has been arranged so that you will progress through it in a regular stepwise fashion, and will finish having achieved a mastery of the material.

The central benefit of this type of training is that the learning material is individualized and self paced. This means that you can proceed through the training manual at a rate that matches your own learning speed, and not that which has been determined for your class. If you find a section easy there is no reason to spend alot of time on it, on the other hand, if you find a section difficult you can spend more time learning it, and if required seek the help of an instructor.

Learn the Student Manual. The material contained in the Student Manual (Unit I, II, III), constitutes about 80 percent of the judgement training course. This material is critical to the success of the judgement training programme. You must carefully study and complete all the lessons contained in the Student Manual. Merely becoming familiar with the material is not sufficient. Learning the material is not difficult because the Student Manual requires a minimum of study and memorization. By reading the lessons and completing the exercises you will learn most of the material.

Use the Scenarios to their full advantage. The student manual contains numerous brief stories and examples of pilots using judgement. The "scenarios" are taken from reports of actual accidents and incidents. Some have been slightly altered to fit the requirements of the lesson, and to match the New Zealand General Aviation Environment. You should keep in your mind the reality of these situations. They are not like word problems thought up as practice exercises for alegbra students. They are flight judgement situations which have actually occurred. Similar situations continue to occur year after year. In fact, you may be aware of similar incidents reported recently in New Zealand.

In-flight Training.

This training relates to Unit IV and V. These lessons do not appear in the Student Manual because they depend entirely upon your interaction with the instructor. No learning of new

material is necessary because the lessons are experiential exercises. In these lessons, you should apply what you have learned from the judgement material to actual flight situations.

THE INSTRUCTOR'S ROLE IN TRAINING.

The flight instructor plays a very important part in the training programme. While the amount of learning is up to you.

The flight instructor's role is to aid your learning, by providing you with feedback during the in-flight training (Unit IV and V), and by answering any questions you have relating to the training manuals (Unit I, II, and III).

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UNIT I.

JUDGEMENT CONCEPTS.

This Unit contains concepts and terms which are used throughout the judgement training course. These terms and concepts have been especially designed to lead you to think more carefully about your flight activities and to guide you towards exercising better pilot judgement.

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LESSON 1.

THE THREE SUBJECT AREAS AND THE SIX ACTION WAYS.

THE THREE SUBJECT AREAS.

There is no need to memorize a lot of material in this training programme in order to improve your judgement. However, you must know the meaning of a few terms - and know them well.

One term you must know is called SUBJECT AREA. Subject Area refers to the subject about which a judgement is made. In aviation there are three subject areas:

The pilot himself/herself - P
His or her aircraft - A
The rest of the environment - E

Pilot - Aircraft - Environment. This is what you must remember! Every judgement is made about the Pilot - P; and/or Aircraft - A; and/or Environment - E. Now, let's look at these individually.

PILOT - P.

Judgements are always being made about such things as the pilot's own competency, state of health, level of fatigue, and many other variables. It is factors such as these that we call the subject area Pilot. Example:

The pilot had only 4 hours of sleep the night before. A friend then asked the pilot to fly him to a meeting in a town 700 miles away. Using good judgement about his state of fatigue, the pilot said no.

AIRCRAFT - A.

Decisions are frequently based on judgements about the aircraft, such as its power, equipment, or state of repair. Any judgement about the aeroplane and its equipment is lumped into the subject area Aircraft. Example:

During the preflight, the pilot noticed the gas cap did not seem to lock securely. The pilot decided to delay take-off while a mechanic checked the situation. The pilot's good judgement was confirmed when the mechanic strongly suggested installing a new cap.

ENVIRONMENT - E.

The Aircraft subject area is really part of the pilot's environment, but because it is such a critical and frequent focus of judgements, we separate it. Everything else, everything "out there" besides the aircraft, is the subject area Environment. Example:

The pilot was landing a small, single-engine aeroplane just after a helicopter had departed. The pilot made a poor judgement when he assumed that wake turbulence would not be a problem. The aeroplane spun on final approach due to the wake turbulence from the helicopter.

COMBINATIONS.

The last concept that must be remembered about subject areas is that judgements often combine Pilot-Aircraft-Environment. Examples:

PILOT/AIRCRAFT - P/A.

The pilot reported to approach control that her attitude indicator (A) had failed. She asked for a routing back to her origin airport. The controller instructed the pilot to make a right turn to a new heading, but noticed on the radar that the aircraft was turning left (P). The controller advised her to continue the left turn to the new heading and to be aware that she was losing altitude. "Stand by, I'm trying to control a little trouble here," was the pilot's reply.

PILOT/ENVIRONMENT - P/E.

With a 30 knot left crosswind at 90 degrees (E), the pilot attempted to make a landing. The pilot's left leg was in a cast (P), and he had trouble using the rudder. Upon touchdown, the aircraft veered sharply to the right and collided with an embankment.

AIRCRAFT/ENVIRONMENT - A/E.

The aircraft was heavily loaded (A). The pilot was attempting to depart from a short runway of soft grass (E). Acceleration was slow, and the pilot wisely decided to abort the take-off run.

PILOT/AIRCRAFT/ENVIRONMENT - P/A/E.

Ideal conditions for carburettor icing in cruise existed, and ice did develop (E). However, the pilot concluded that the engine was running roughly due to a mechanical failure, and he did not apply carburettor heat (A). Instead, the pilot rushed into an emergency landing

attempt, landed downwind unnecessarily, and ground looped the aeroplane (P).

SIX ACTIONS WAYS.

Another term you must know for this training programme is called ACTION WAY. Action Way refers to the way in which a pilot carries out or performs a poor judgement. There are six action ways, and they can be grouped in three pairs:

- 1 & 2 One pair is: DO - NO DO
- 3 & 4 Another pair is: UNDER DO - OVER DO
- 5 & 6 A third pair is: EARLY DO - LATE DO

Know that every time a pilot carries out a poor judgement, his or her action results in one of the six action ways: DO - NO DO; UNDER DO - OVER DO; EARLY DO - LATE DO.

Now let's learn more about each of the six action ways. Remember, in each case the pilot does or does not do something. The action ways tell us whether, how, or when the pilot performed the action. In each case, the action performed by the pilot is based on a decision resulting from a poor judgement.

DO The pilot did something which he or she should not have done.

NO DO The pilot did not do something which he or she should have done.

UNDER DO .. The pilot did not do enough when he or she should have done more.

OVER DO ... The pilot did too much when he or she should have done less.

EARLY DO .. The pilot acted too early when he or she should have delayed acting.

LATE DO ... The pilot acted too late when he or she should have acted earlier.

LESSON 2.

THE POOR JUDGEMENT BEHAVIOUR CHAIN.

INTRODUCTION.

Most aircraft accidents result from a combination of circumstances rather than from a single cause, such as pilot error, aircraft defect, or environmental stress. Aircraft accidents are most often the end result of a chain of causes that involves a variety of pilot-aircraft-environment factors. Similarly, most accidents do not result from one error in judgement. Accidents more frequently occur as a result of a series of errors in judgement. This series of errors in pilot judgement is called the POOR JUDGEMENT BEHAVIOUR CHAIN (PJ CHAIN).

PJ CHAIN: An Example.

Here is an example of a PJ chain. The pilot has a strong desire to arrive at his destination by a certain time and he is already 30 minutes late. The pilot has little experience flying in rough weather and is not instrument rated. Despite these facts, he decides to make his flight through an area of possible thunderstorms. He will reach this area just before dark. The pilot elects not to route himself around the thunderstorm area because it would cause him further delay. When the pilot arrives in the thunderstorm area, he encounters lightning, turbulence and heavy clouds. Night is approaching, and it is very dark because of the thick cloud cover. The PJ chain continues as the pilot panics and becomes disoriented.

This pilot made several errors in judgement. First, he let his desire to arrive at his destination on time override his concern for a safe flight. He then overestimated his flying abilities and decided to fly via a route that took him through a possible thunderstorm, turbulence, and darkness instead of changing course.

In the darkness and turbulence, the pilot became confused and then disorientated because he failed to trust his instruments.

In this example, as in any flight, an accident could have resulted at any time from any cause. However, this pilot placed himself in an increasingly dangerous situation as he pressed on into the bad weather. Conversely, the pilot could have broken the PJ chain at any time. By exercising good judgement, the pilot could have decided to route himself around the area of possible bad weather, accepting the fact that his arrival would be further delayed. Once in the area of bad weather, good judgement could have led the pilot to

decide to avoid flying into clouds and turbulence. And, before becoming disorientated in the dark, the pilot could have used good judgement to force himself to keep calm and to rely on his instruments.

PRINCIPLES OF THE PJ CHAIN.

1. One poor judgement increases the probability that another poor judgement will follow. Judgements are based on the pilot's information about himself or herself, the aircraft, and the environment. The pilot is less likely to make a poor judgement if his/her information is accurate at all times. One poor judgement increases the availability of false information which may then negatively influence the judgements which follow.
2. The more poor judgements made in sequence, the more probable it is that others will continue to follow. The reasoning for this principle follows from the first principle, except here the concern is with several poor judgements made in sequence. The more erroneous information used by the pilot to make judgements, the more likely that the pilot will make subsequent poor judgements.
3. As the PJ chain grows, the alternatives for safe flight decrease. If a pilot selects one alternative among several, the option to select the remaining alternatives may be lost. For example, if a pilot makes a poor judgement to fly through a hazardous weather area, the alternative to circumnavigate the weather is lost once the severe weather is encountered.
4. The longer the PJ chain becomes the more probable it is that a mishap will occur. As the PJ chain becomes longer, the alternatives for safe flight become fewer. The greater, then, the chance becomes that a mishap will occur. Although unpleasant and even disastrous, an accident or safety violation is one very possible ending to a PJ chain.

BREAKING THE PJ CHAIN.

Pilot judgement is a mental process by which pilots recognise, analyse, and evaluate information. Pilots can be trained in this process. Breaking a PJ chain is an act of good pilot judgement, and there are five steps a pilot may use to break a PJ chain. While reading the following explanations for each of these steps, refer to (figure 2-3; page 2-3) to better understand how the five steps all work together to break a poor judgement chain.

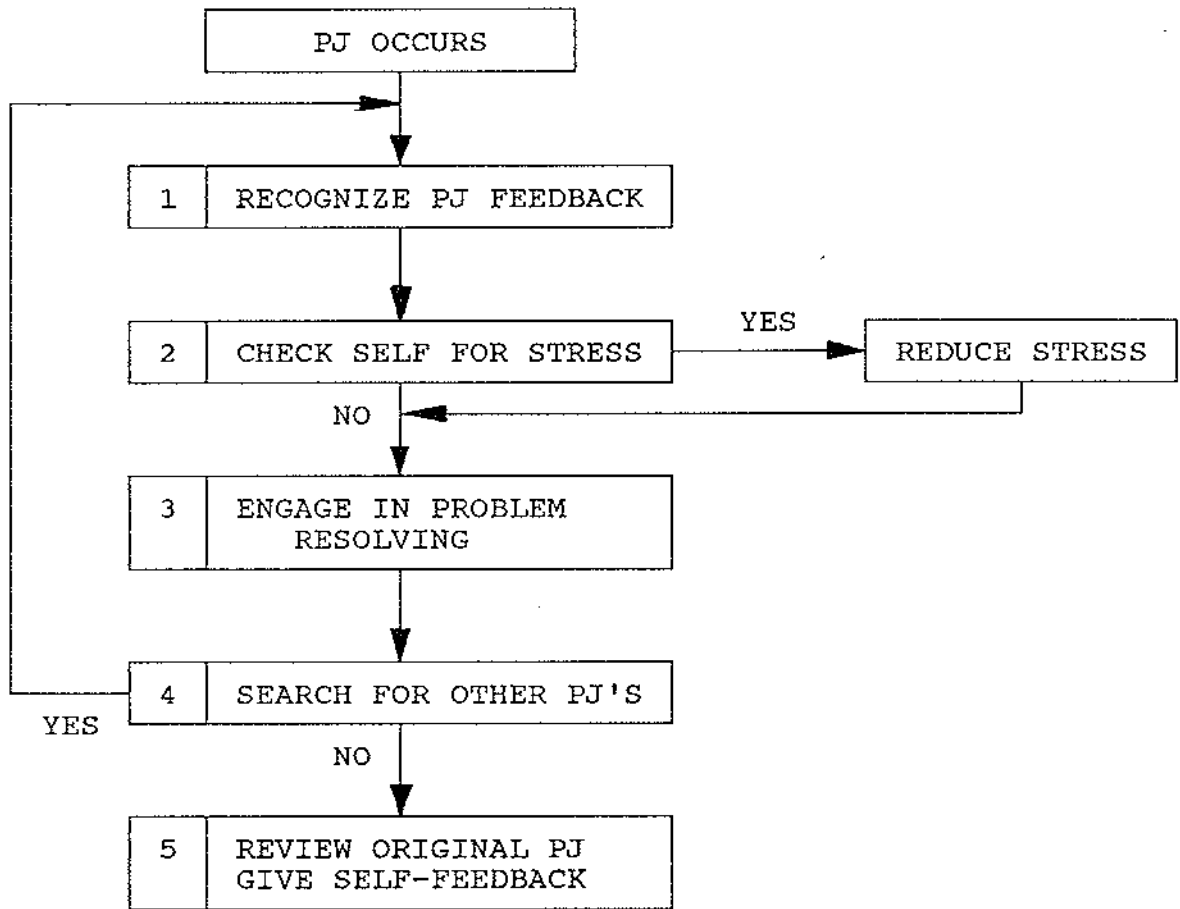


FIGURE 2-3: FIVE STEPS TO BREAK POOR JUDGEMENTS CHAINS.

5 STEPS TO BREAK THE PJ CHAIN.

1. Recognise PJ - Get Feedback.

First, recognise that a poor judgement has been made, and admit to the error in judgement. If recognition of the poor judgement is not made, the pilot's ability to prevent another poor judgement is reduced. To recognise a poor judgement, the pilot requires corrective information about the judgement. This information - this feedback - must then be used to form the related judgements which follow.

A pilot generally receives feedback from two sources: the pilot's own senses, and an outside observer. Since good judgement is a learned process, generally the pilot's first feedback comes from an outside observer: the instructor. As training continues, the pilot learns to provide his or her own feedback. This is sometimes difficult, because a new pilot may be hesitant to admit an error in judgement. Yet, it is necessary to do this in order to break the PJ chain as quickly as possible.

2. Check for Stress.

A high degree of stress and anxiety can reduce a pilot's ability to exercise good judgement. Lesson Twelve will show you how to estimate your own stress level and then to reduce high stress and anxiety levels.

3. Engage in Problem Resolving.

Problem resolving is the necessary activity of solving problems and correcting all hazardous situations that resulted from the poor judgement. You will be learning more about a pilot's problem resolving activities in Lesson Four of this manual.

4. Search for Other PJ's.

You must always remember that poor judgements tend to occur in chains. If one poor judgement is recognised, then you must be absolutely certain that it is the only one currently affecting your operation of the aircraft.

5. Review Original PJ - Give Self Feedback.

After a poor judgement chain has been broken, review the original poor judgement. Critically examine what the poor judgement involved, and how you came to make it. This critical review provides you the feedback you need to avoid beginning a similar poor judgement chain in the future.

LESSON 3.

THE THREE MENTAL PROCESSES OF SAFE FLIGHT.

INTRODUCTION.

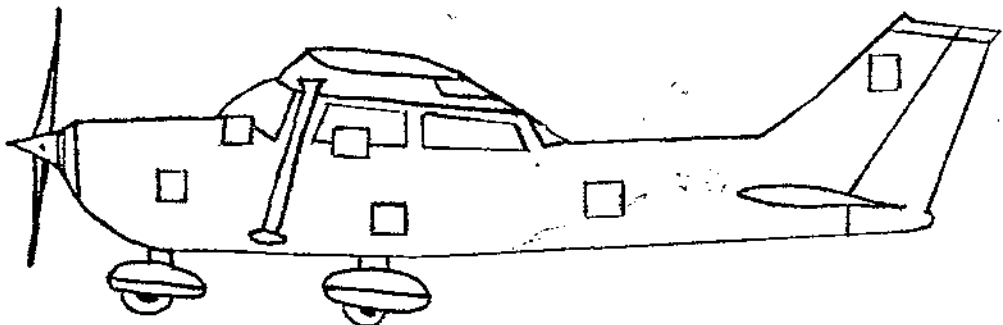
This lesson introduces three very important concepts called the Three Mental Processes of Safe Flight. Before learning about these concepts, do the short drills that follow this introductory paragraph. You will not be graded on these drills, but do your work carefully. It will help you to understand the explanations that follow.

DRILL 1.

Write your signature (use your full name).

DRILL 2.

Look at the picture below. Wherever you see the box symbol in the picture write inside of it this character: **S**. Try to reproduce the character exactly in shape and size.



DRILL 3.

This drill requires you to use your knowledge about an aircraft's centre of gravity. Some of you may still be new enough to aviation that you don't know what "centre of gravity" means. Simply defined, the centre of gravity (CG) is an imaginary point where all the aircraft's weight is considered to be concentrated.

In flight, the wings support the entire aircraft. It is very important for flight that the safe support zone of the wings contain the centre of gravity. This safe support zone is called the centre of gravity range or CG range. The extreme ends of the CG range are called forward CG limit and aft CG limit.

Since aircraft balance is so important to safe flight, aircraft manufacturers always provide at least one means whereby the pilot can accurately locate the aircraft's centre of gravity. One method is by doing a series of computations which amount to working a physics problem. However, most manufacturers provide the pilot with either a graph or a chart that makes finding the centre of gravity relatively simple.

TRY TO DETERMINE WHERE THE CENTRE OF GRAVITY MIGHT BE ON THE AEROPLANE PICTURE IN DRILL 2. DO NOT BE CONCERNED THAT YOU HAVE LITTLE INFORMATION TO GO ON. JUST THINK CAREFULLY AND LOGICALLY ABOUT HOW TO SOLVE THIS PROBLEM, THEN DRAW A HEAVY DOT ON THE AEROPLANE'S FUSELAGE TO INDICATE YOUR ANSWER.

REVIEW OF DRILLS.

Drill 1.

Do you know that the average signature requires about 40 changes in the direction of the signer's pen? Did you stop and think about changing the movement of your pen that many times when you did the exercise? Chances are good that you did not - you just automatically signed your name without thinking at all about exactly how you were doing it.

Drill 2.

At first, did the character cause you some problem? Did it help you to realize this character is actually an inverted figure 5? Most people find it helpful to think through a new situation before actually trying to do anything. Also, learning usually takes place more quickly when a connection or an association is realized between the new information and something already learned. Was there a point in the drill when you started making the character almost automatically - much as you do your signature? Chances are, you became very good at making the character with little or no thought by the time you finished the drill.

Drill 3.

Did you notice that three things with regard to the printing style were changed within the text of drill number 3? Check your observations against this list:

1. Each paragraph is indented differently.
2. Each paragraph is printed in a different style of type.
3. Only the fourth paragraph is printed all in capitals.

If you are like most people, you skimmed through the text of drill number 3 to get the information you needed to do the drill. You were not really alert to changes in the way that the printer presented the information. However, when your attention was directed to the printing you easily recognized them all.

RELEVANCE OF THE DRILLS TO FLIGHT.

Your mental activities while doing the three drills were representative of the three mental processes of safe flight.

Here is an explanation of why that is true.

MENTAL PROCESS 1 - AUTOMATIC REACTION.

In Drill number 1, you performed a rather complex activity, signing your name, without thinking much at all. Your response to the drill was automatic.

The first mental process of safe flight is AUTOMATIC REACTION (AR). Automatic Reaction is used in two ways. First, to maintain ongoing control of the aircraft, a pilot most often stabilizes his/her heading and altitude by making small, automatic adjustments. A good pilot learns to do many things in the aircraft simultaneously, and without thinking about each individual act. This is Automatic Reaction (AR).

Secondly, the pilot learns to respond in emergency situations by relying on Automatic Reaction. Your flight instructor will identify skills and procedures which must become Automatic Reactions. The instructor will then teach you these skills by first giving you demonstrations and directions. Gradually, with practice, you will witness the decline and elimination of your need to "think about" what to do as these skills become truly Automatic Reactions.

MENTAL PROCESS 2 - PROBLEM RESOLVING.

Drill number 2 gave you something to do that required you to understand what needed to be done and then to figure out how to do it. Once you knew how, you went ahead and did what was required.

The second mental process of safe flight is PROBLEM RESOLVING (PR). Problem resolving can be thought of as a three step process:

- Step 1: Uncover, analyse, and define the problem.
- Step 2: Consider the methods and the possible outcomes of possible solutions.
- Step 3: Apply the selected solution to the best of your ability.

In drill number 2, your ability to reproduce the character probably improved with practice. As you work with your instructor, you will find that you can resolve flight problems more easily and more quickly. You will also become more proficient as you gain flight experience. Remember, problem resolving is different from Automatic Reaction. In PR, you actually work through a process; in AR you just do.

MENTAL PROCESS 3 - REPEATED REVIEWING.

In the review section for drill number 3, your attention was directed to the fact that it is much more probable you will find something when you are consciously looking for it than when you are not.

The Third Mental Process is called REPEATED REVIEWING (RR). Repeated Reviewing means that you are continuously trying to find or to anticipate situations which may require you to engage in Problem Resolving or Automatic Reaction. Recognising feedback regarding Poor Judgement Sequence Chains (lesson 2), is also a part of Repeated Reviewing.

In an aeroplane, almost anything is subject to change, and to change quickly. Changes can occur in any of the three subject areas, including the weather conditions (E), aircraft performance (A), or the pilot's state of health (P). Only by Repeated Reviewing can a pilot be constantly aware of all conditions that contribute to safe flight - OR - that have the potential of leading to disaster.

SUMMARY.

The Three Mental Processes of Safe Flight are:

1. AR ... Automatic Reaction
2. PR ... Problem Resolving
3. RR ... Repeated Reviewing

AUTOMATIC REACTION is the mode of thinking that you use to maintain ongoing control of the aircraft and to respond to emergencies.

PROBLEM RESOLVING is the mode of thinking that you use to overcome undesirable situations by means of a systematic process.

REPEATED REVIEWING is the mode of thinking that keeps you constantly aware of all the factors that contribute to safe flight.

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UNIT II.

BEHAVIOURAL ASPECTS OF JUDGEMENT.

This unit is designed to modify and to redirect your thinking in ways that will promote the consistent use of good judgement. In this unit you will be taught how to recognise and to eliminate hazardous thinking. Then, having mastered these lessons, you will be taught about the role that stress plays in pilot judgement and how to more effectively manage your own stress levels.

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LESSON 4.

SELF-ASSESSMENT OF HAZARDOUS THOUGHT PATTERNS.

INTRODUCTION.

In this unit you will learn the five hazardous thought patterns affecting pilot judgement. You will learn to understand these patterns as they apply to your own flying. You will also learn methods to remove your own hazardous thoughts and to reduce the effects of high stress.

As a first step, you are now to take a self-assessment inventory. This inventory will give you a personal insight for the following discussions and training. The information you gain is only for your own use. It is not intended to be shared with your flight instructor or anyone else.

INSTRUCTIONS: ASSESSMENT INVENTORY.

This assessment inventory asks you to decide why you, as a pilot, might have made certain decisions. Ten situations will be presented. Each will involve a flight decision. After each situation, you will find a list of five possible reasons for a decision. No "correct" answer is provided for any of the ten situations. You may indeed be correct in believing that a safe pilot would not choose any of the five alternatives.

First, remove the answer sheet, on page 4-9, of this manual.

Now read over each of the "Situation Questions" and the five choices. Decide which of the choices listed would best relate to your own actions under the same situation. Place a number 5 in the space provided on the answer sheet.

Continue by placing a number 4 by the next most probably reason, and so on, until you have filled in all five blanks with ratings of 5, 4, 3, 2, and 1.

When you have completed the first situation, continue to the second. Do all 10 situations and fill in each blank, even though you may disagree with the choices listed. Remember, there are no "correct" answers.

<u>EXAMPLE:</u>	1	a.	(your least likely response)
	3	b.	
	5	c.	(your most likely response)
	2	d.	
	4	e.	

SITUATION QUESTIONS.

1. You are on a VFR flight to a small rural airport about which you know very little. Air Traffic Control suggests that you turn back since heavy cloud cover is moving into the destination airport area. The threatening weather will arrive about the time you expect to land and might limit visibility. You consider returning to your home base where visibility is still good. You decide to continue on as planned, and after some problems, land safely. Why do you reach this decision ?
- a. You hate to admit that you cannot complete your original flight plan.
 - b. You resent the controller's suggestion that you should change your mind.
 - c. You feel sure that things will turn out safely, that there is no danger.
 - d. You reason that since your actions would make no real difference, you might as well continue.
 - e. You feel the need to decide quickly so you take the simplest alternative.
2. While taxiing for take-off, you notice that your right brake pedal is softer than the left. Once airborne, you are sufficiently concerned about the problem to radio for information. It is recommended that you abandon the flight since strong winds are reported at your destination. You chose to continue the flight and experience no further difficulties. Why do you continue ?
- a. You feel that suggestions made in this type of situation are usually overly cautious.
 - b. Your brakes have never failed before, so you doubt that they will go out this time.
 - c. You feel that you can leave the decision to the tower at your destination.
 - d. You immediately decide that you want to continue.
 - e. You are sure that if anyone could handle the landing, you can.

3. Your regular aeroplane has been grounded because of an engine problem. You are offered another aeroplane, and discover that it is a different type that you are not familiar with. You conduct a preflight inspection, and you decide to take off on your business trip as scheduled. What is your reasoning ?

- a. You feel that a difficult situation will not arise so there is no reason not to go.
- b. You tell yourself that if there were any danger, you would not have been offered the plane.
- c. You are in a hurry and do not want to take the time to think of alternate choices.
- d. You do not want to admit that you may have trouble flying an unfamiliar aeroplane.
- e. You are convinced that your flight instructor was much too conservative and pessimistic when he cautioned you to be thoroughly checked out in an unfamiliar aircraft.

4. You were briefed about icing conditions, but did not think there was any real problem since your home airport temperature was 14 degrees. Towards the end of the flight, you encounter severe icing, and your passenger begins to panic. You consider returning to your home airport but continue on instead. Why do you not return ?

- a. You feel that having come this far, things are out of your hands.
- b. The panic of the passenger makes you commit yourself without thinking the situation over.
- c. You do not want to appear afraid to the passenger.
- d. You are determined not to let the passenger think she can influence what you do.
- e. You cannot believe that the icing might cause your plane to crash in these circumstances.

5. You do not bother to check weather conditions at your destination. Enroute, you begin having problems with the altimeter. Your fuel supply is adequate to reach your destination, but there is almost no reserve for emergencies. You continue the flight and land with an almost dry tank. What most influenced you to do this ?

- a. Being unhappy with the pressure of having to choose what to do, you make a snap judgement.
- b. You do not want your friends to hear that you had to turn back.
- c. You feel that flight manuals always understate the safety margin in fuel tank capacity.
- d. You believe that all things usually turn out well - this will be no exception.
- e. You reason that the situation has already been determined because the destination is closer than any other airport.

6. Piloting a small aeroplane, you are forty minutes late. As you walk to your aeroplane, you decide to skip most of the preflight check, since the aeroplane handled well on the last leg of the flight. What leads you to this decision ?

- a. You simply take the first approach to making up time that comes to mind.
- b. You feel that your reputation for being on time demands that you cut corners when necessary.
- c. You believe that some of the preflight inspection is unnecessary, just a waste of time.
- d. You see no reason to think that something unfortunate will happen during this flight.
- e. If any problems develop, the responsibility would not be yours. It is the maintenance of the aeroplane that really makes the difference anyway.

7. You are to fly an aeroplane which you realize is old and has been poorly maintained. A mechanic tells you that the spark plugs are in only fair condition and suggests cancelling the flight. Your friends, who are travelling as passengers, protest. They do not want to be delayed. After five minutes of debate, you agree to make the trip. Why would you permit yourself to be persuaded ?

- a. You feel that you must always prove your ability as a pilot, even under less than ideal circumstances.
- b. You believe that regulations overstress safety in this kind of situation.
- c. You think that the spark plugs will certainly last for just one more flight.
- d. You feel that your opinion may be wrong since all the passengers are willing to take the risk.
- e. The thought of changing arrangements is too annoying, so you jump at the suggestion of the passengers.

8. You are on final approach when you notice a large object lying on the far end of the runway. You are not sure what it is and consider coming around again. Your friend suggests landing anyway since the runway is "plenty long enough". You land, stopping at least 60 metres short of the obstacle. Why do you agree to land ?

- a. You have never had a major accident, so you feel that nothing will happen this time.
- b. You are pleased to have someone else help with the decision and decide your friend is right.
- c. You do not have much time, so you just go ahead and act on your friend's suggestion.
- d. You want to show your friend that you can stop the plane as quickly as needed.
- e. You feel that the regulations making the pilot always responsible for the safe operation of the aircraft do not apply here since it is the airport's responsibility to maintain the runway.

9. You are landing at an uncontrolled airport, and you have just completed your base leg for a landing on runway 14. As you turn on final, you see that the wind has changed to about 90 degrees. You make two sharp turns and land on runway 11. What is your reasoning ?
- a. You believe you are a really good pilot who can safely make the sudden manoeuvres.
 - b. You believe your flight instructor was overly cautious when insisting that a pilot must go around rather than make sudden course changes while on final approach.
 - c. You know there would be no danger in making the sudden turns because you do things like this all the time.
 - d. You know landing into the wind is best, so you act as soon as you can to avoid a crosswind landing.
 - e. The unexpected wind change is a bad break, but you figure if the wind can change, so can you.
10. You have flown into your destination airfield only in daylight hours but believe that you know it well. You learn that your aeroplane needs a minor repair which will delay your arrival until well after dark. Although a good portion of the flight is over water, you feel that you should be able to recognise some of the lighted landmarks. Why do you decide to make the flight ?
- a. You believe that when your time comes you cannot escape, and until that time there is no need to worry.
 - b. You do not want to wait to study other options, so you carry out your first plan.
 - c. You feel that if anyone can handle this problem, then you can do it.
 - d. You believe that the repair is not necessary. You decide you will not let recommended, but minor maintenance stop you from getting to your destination.
 - e. You simply do not believe that you could get off course despite the flight over water and your unfamiliarity with the night ground references.

SCORING INSTRUCTIONS.

Now that you have completed taking the inventory, the next step is scoring it to develop your own hazardous thought profile. You will need to use your answer sheet (page 4-9), the scoring keys on pages 4-11 thru to 4-15, and the profile graph on page 4-16.

1. Place the left side of the answer sheet on top of the first scoring key (Anti-Authority, page 4-11). Position the answer sheet so that it is lined up with the scoring key blanks for question numbers 1 thru to 5. Add the numbers written on your answer sheet which appear next to the x's on the answer key.
2. When you have done this for questions 1 thru to 5, move the answer sheet so that its right edge now lines up with the answer key blanks for question numbers 6 thru to 10. Use the total for questions 1 thru to 5, and continue adding the numbers next to the x's for questions 6 thru to 10.
3. Write this sum for the 10 answers from the scoring key on the top of the profile graph (page 4-16).
4. Repeat this procedure for all five scoring keys. Each time add the total of the ten numbers on the answer sheet next to the x's on the scoring key. Transfer each total to the appropriate blank at the top of the profile graph.

See Figure 4-1 for an example of the use of the scoring key.

ANSWER SHEET.

1. a. _____
b. _____
c. _____
d. _____
e. _____

2. a. _____
b. _____
c. _____
d. _____
e. _____

3. a. _____
b. _____
c. _____
d. _____
e. _____

4. a. _____
b. _____
c. _____
d. _____
e. _____

5. a. _____
b. _____
c. _____
d. _____
e. _____

6. a. _____
b. _____
c. _____
d. _____
e. _____

7. a. _____
b. _____
c. _____
d. _____
e. _____

8. a. _____
b. _____
c. _____
d. _____
e. _____

9. a. _____
b. _____
c. _____
d. _____
e. _____

10. a. _____
b. _____
c. _____
d. _____
e. _____

FIGURE 4-1.

EXAMPLE OF SCORING KEY USE.

ANSWER SHEET
ANTI-AUTHORITY

SCORING KEY:

1. a. _____
 b. x
 c. _____
 d. _____
 e. _____
2. a. _____
 b. _____
 c. _____
 d. x
 e. _____

1. a. 4
 b. 3
 c. 1
 d. 5
 e. 2
2. a. 3
 b. 2
 c. 5
 d. 1
 e. 4

- 3 (number next to "x" on scoring key at 1-b)
+1 (number next to "x" on scoring key at 2-d)
+... (numbers next to "x's" for questions 3-10)
= total of all 10 numbers next to x's.

Transfer this total to the "ANA" blank at the top of the profile graph, page 4-16.

ANSWER KEY ANTI-AUTHORITY.

1. a. _____
b. x
c. _____
d. _____
e. _____

2. a. x
b. _____
c. _____
d. _____
e. _____

3. a. _____
b. _____
c. _____
d. _____
e. x

4. a. _____
b. _____
c. _____
d. x
e. _____

5. a. _____
b. _____
c. x
d. _____
e. _____

6. a. _____
b. _____
c. x
d. _____
e. _____

7. a. _____
b. x
c. _____
d. _____
e. _____

8. a. _____
b. _____
c. _____
d. _____
e. x

9. a. x
b. _____
c. _____
d. _____
e. _____

10. a. _____
b. _____
c. _____
d. x
e. _____

ANSWER KEY IMPULSIVITY.

- 1. a. _____
- b. _____
- c. _____
- d. _____
- e. x

- 2. a. _____
- b. _____
- c. _____
- d. x
- e. _____

- 3. a. _____
- b. _____
- c. x
- d. _____
- e. _____

- 4. a. _____
- b. x
- c. _____
- d. _____
- e. _____

- 5. a. x
- b. _____
- c. _____
- d. _____
- e. _____

- 6. a. x
- b. _____
- c. _____
- d. _____
- e. _____

- 7. a. _____
- b. _____
- c. _____
- d. _____
- e. x

- 8. a. _____
- b. _____
- c. x
- d. _____
- e. _____

- 9. a. _____
- b. _____
- c. _____
- d. x
- e. _____

- 10. a. _____
- b. x
- c. _____
- d. _____
- e. _____

ANSWER KEY INVULNERABILITY.

1. a. _____
b. _____
c. x
d. _____
e. _____

2. a. _____
b. x
c. _____
d. _____
e. _____

3. a. x
b. _____
c. _____
d. _____
e. _____

4. a. _____
b. _____
c. _____
d. _____
e. x

5. a. _____
b. _____
c. _____
d. x
e. _____

6. a. _____
b. _____
c. _____
d. x
e. _____

7. a. _____
b. _____
c. x
d. _____
e. _____

8. a. x
b. _____
c. _____
d. _____
e. _____

9. a. _____
b. x
c. _____
d. _____
e. _____

10. a. _____
b. _____
c. _____
d. _____
e. x

ANSWER KEY MACHO.

1. a. x
b.
c.
d.
e.

2. a.
b.
c.
d.
e. x

3. a.
b.
c.
d. x
e.

4. a.
b.
c. x
d.
e.

5. a.
b. x
c.
d.
e.

6. a.
b. x
c.
d.
e.

7. a. x
b.
c.
d.
e.

8. a.
b.
c.
d. x
e.

9. a.
b.
c.
d.
e. x

10. a.
b.
c. x
d.
e.

ANSWER KEY EXTERNAL CONTROL.

1. a. _____
b. _____
c. _____
d. x
e. _____

2. a. _____
b. _____
c. x
d. _____
e. _____

3. a. _____
b. x
c. _____
d. _____
e. _____

4. a. x
b. _____
c. _____
d. _____
e. _____

5. a. _____
b. _____
c. _____
d. _____
e. x

6. a. _____
b. _____
c. _____
d. _____
e. x

7. a. _____
b. _____
c. _____
d. x
e. _____

8. a. _____
b. x
c. _____
d. _____
e. _____

9. a. _____
b. _____
c. x
d. _____
e. _____

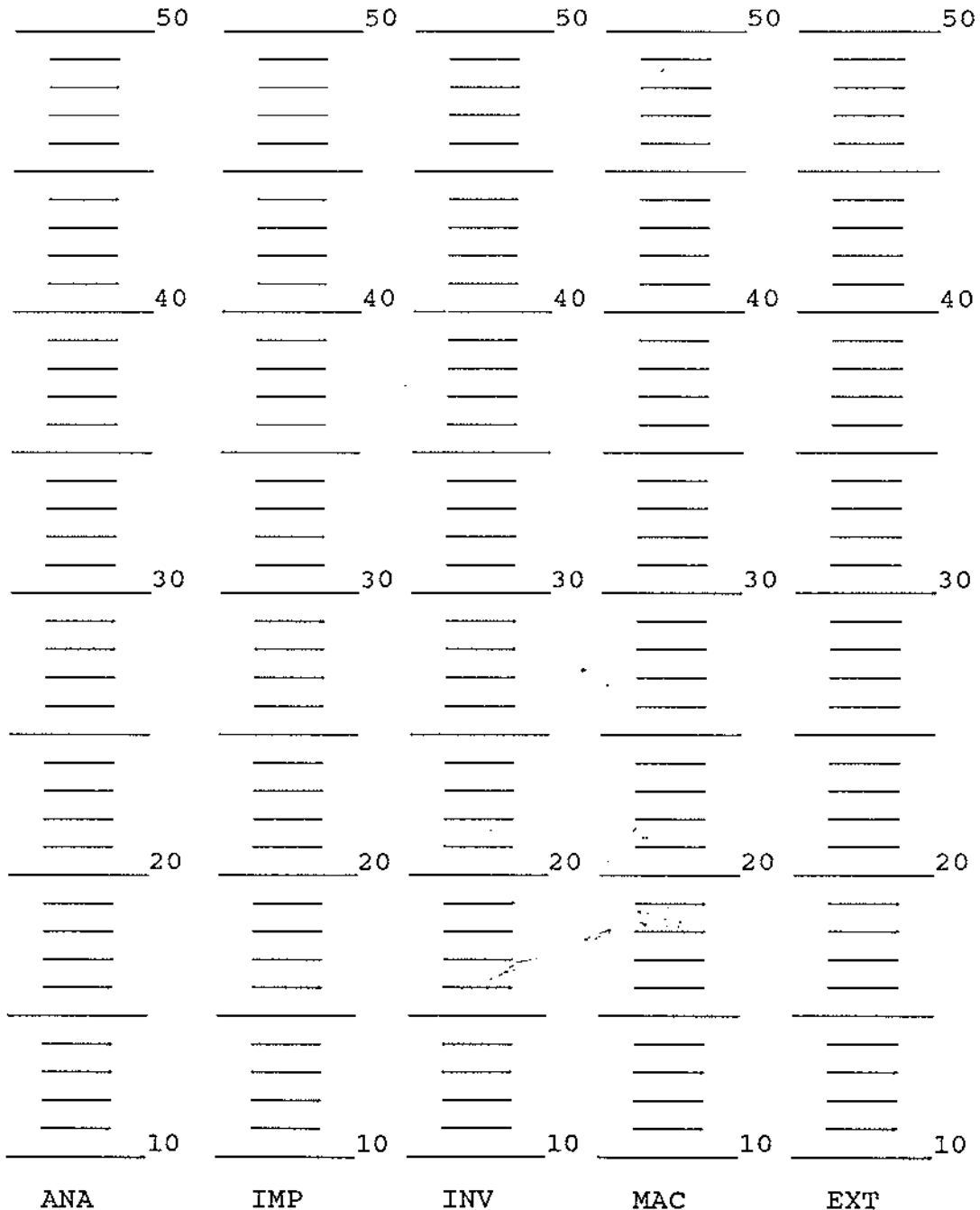
10. a. x
b. _____
c. _____
d. _____
e. _____

PROFILE GRAPH.

I. Enter the raw score obtained from each scoring key in the correct blank space below. The sum of the five scores should equal 150. If it does not, go back and check your work.

ANA _____; IMP _____; INV _____; MAC _____; EXT _____.

II. Now look at the profile form shown below. Notice that there are five vertical lines; one for each of the raw scores shown above. Place a mark on each line at the height that matches your score. Now draw lines connecting the five marks.



PROFILE EXPLANATION.

You now have a profile which indicates the comparative strength of each of five hazardous thought patterns for you right now. (Remember, these scores are confidential and need not be divulged to anyone).

Let us begin the explanation of your profile by setting up a short description of an all-too-common flight situation.

A pilot of a single engine aeroplane checks the weather and notes that there is a strong possibility of a thunderstorm at his destination airport. He has never operated an aircraft in bad weather. He knows that his flight instructor would advise him not to fly in the weather. Despite this, he takes off, crashes his aeroplane, and nearly kills himself.

Why does this type of situation develop so often? This is because many accidents involve pilots who allow themselves to be influenced by one or more of five basic thoughts: hazardous thoughts which get pilots into trouble by causing them to take chances and invite accidents. These five hazardous thoughts are the ones recorded on the assessment inventory which you just completed. Each hazardous thought is defined and described below.

ANA -- ANTI-AUTHORITY : "Don't tell me !"

This thought is found in people who do not like anyone telling them what to do. They think, "Don't tell me !" In a sense, they are saying, "No one can tell me what to do." The person who thinks "Don't tell me," may either be resentful of having someone tell him or her what to do, or may just regard rules, regulations, and procedures as silly or unnecessary.

EXT -- EXTERNAL CONTROL : "What's the use ?"

Some people think, "What's the use ?" These people do not see themselves as making a great deal of difference in what happens to them. When things go well, they think, "That's good luck." When things go badly, they think that it is either bad luck or that someone is out to get them. They do not take action. They leave action to others - for better or worse.

IMP -- IMPULSIVITY : "Do something -- quickly !"

This is the thought pattern of persons who feel the need to do something -- anything ! They think to themselves, "Do something -- quickly !" They do not stop to think about what they are about to do; they do not examine a set of alternatives then select the best one -- they just do the first thing that comes to mind.

INV -- INVULNERABILITY : "It won't happen to me !"

This thought is "It won't happen to me !" It is easy for these people to think that accidents happen to others but never to them. The chance of possible misfortune seems remote to these people. They know disasters do exist; they know that anyone can be affected -- yet they know this only "in their heads." They never really feel or believe that they will be affected. Pilots who think this way are more apt to take chances and run unwise risks, thinking all the time, "It won't happen to me!"

MAC -- MACHO : "I can do it."

These people are always trying to prove that they are better than anyone else. They think, "I can do it !" They prove themselves by taking risks and by trying to impress others. While this pattern is thought to be a characteristic of male thinking, women may be equally susceptible to this thought pattern.

CONCLUSION.

If you have not already done so, look back at your profile and see which hazardous thoughts matched your own thinking most strongly at the time you answered the questions. The inventory does not show how often you use these thoughts. What it does show is which ones you tend to use when your judgement becomes influenced by hazardous thought patterns. You should be aware that sometimes the hazardous thoughts may overlap each other and run together. But the less often you allow yourself to engage in hazardous thinking, the better pilot you become, and the higher your chances of survival are. Whether you have these thoughts often or only rarely, it is well worth learning to identify them so that you can rid yourself of the hazardous thinking as quickly as possible. In lessons 5 through to 9 you will work on all five hazardous thoughts; pay particular attention to the ones on which you scored the highest.

LESSON 5 THROUGH TO 9 ARE TO BE COMPLETED AS SOON AS POSSIBLE AFTER YOU HAVE FINISHED THE SELF-ASSESSMENT PROFILE.

LESSON 5.

DIRECTIONS FOR STUDY OF LESSONS 5-9.

In lessons 5 through to 9, you will find a series of situations. At the end of each situation, you will be asked to select which alternative best illustrates the reactions of a pilot who is thinking a particular hazardous thought. When you select the alternative which you believe best illustrates a pilot reaction, you will be directed to turn to a particular page in the workbook. Do this immediately. This page will tell you if your answer is correct or incorrect. If you answer correctly, you will be directed to the next situation. If you answer incorrectly you will be told why; and you will be then directed to try again: go back to the situation and select another alternative.

YOU ARE TO KEEP SELECTING ALTERNATIVES UNTIL YOU SELECT THE CORRECT ONE. Do not be concerned if you select a wrong alternative. You will learn something from the feedback given to you. The lessons are deliberately repetitious - it gets easier as you go along.

These lessons are designed to help you identify and understand the hazardous thoughts, and to see how they can influence a pilot's reaction to situations calling for judgement. After completing these exercises, you will better understand each hazardous thought and its effect on pilot actions.

THE ANTI-AUTHORITY HAZARDOUS THOUGHT.

SITUATION ONE.

You do not conduct a thorough preflight check. On take-off you notice that the air speed indicator is not working. Your passenger feels strongly that you should discontinue the flight and return to the airfield because the aeroplane is defective. You then become upset with your friend.

Which of the following alternatives best illustrates the ANTI-AUTHORITY reaction ?

- a. You tell off your passenger for butting in.
(Turn to page 5-5).
- b. You start banging the indicator to get it working.
(Turn to page 5-5).
- c. You think that the preflight check is something thought up by bureaucrats just to waste a pilot's time. (Turn to page 5-6).
- d. You tell the passenger that nothing dangerous will happen on the flight. (Turn to page 5-6).
- e. Your passenger continues to become more upset but you do nothing, because you feel there is no use trying to calm down the fellow. (Turn to page 5-7).

SITUATION TWO.

On your approach to an airport, you are somewhat confused since the runway is only partially lighted. You are not sure if this is the airfield at which you intend to land. The surrounding buildings do not look familiar, but it has been over a year since your last visit to the airfield. A much larger, more familiar airfield is 15 miles away.

Which of the following alternatives best illustrates the ANTI-AUTHORITY reaction ?

- a. You decide to land anyway, thinking, "Of course I can handle the situation." (Turn to page 5-5).
- b. Rather than get confused thinking about options, you decide to land to get the flight over with. (Turn to page 5-5).
- c. You feel nothing will happen since you have got out of similar jams before. (Turn to page 5-6).
- d. You decide to land since you feel that "somebody up there" is protecting you. (Turn to page 5-7).
- e. You decide to land reasoning that CA (Civil Aviation) regulations do not really apply in this situation. (Turn to page 5-7).

SITUATION THREE.

On your final approach, you fly into patches of ground fog which severely limit visibility. Altitude is 150 feet and you debate whether you can level off at the correct height and land properly, or whether you should abort the approach.

Which of the following alternatives best illustrates the ANTI-AUTHORITY reaction ?

- a. You think the rules which indicate you should abort the approach are much too rigid. (Turn to page 5-5).
- b. You feel that the situation presents a challenge and decide to make the landing. (Turn to page 5-6).
- c. You begin immediately to level off and say, "To heck with the fog." (Turn to page 5-6).
- d. You continue, feeling that the decision has already been made. (Turn to page 5-7).
- e. You say to yourself, "I'm going in because nothing is going to happen." (Turn to page 5-7).

Situation One - Alternative a.

By acting in a superior, bossy way, you are being macho. You are thinking, "I can do it." Go back to page 5-2 and select another alternative.

Situation Two - Alternative a.

Thinking that you can handle the situation even when there is reason to be concerned is an example of the macho hazardous thought, "I can do it." Go back to page 5-3 and select another alternative.

Situation Three - Alternative a.

Yes. You are correct. Regarding the rules as too rigid, illustrates the anti-authority hazardous thought, "Don't tell me." Go on to the next lesson as the directions indicate.

Situation One - Alternative b.

By becoming upset and banging the air speed indicator, and by not thinking about the situation, you are being impulsive, thinking "Do something - quickly." Go back to page 5-2 and select another alternative.

Situation Two - Alternative b

This is the hazardous thought of impulsivity: "Do something - quickly !" Go back to page 5-3 and select another alternative.

Situation Three - Alternative b.

Seeing a situation as a challenge, as a time to prove oneself instead of as a problem to be solved, is an illustration of the macho hazardous thought, "I can do it." Go back to page 5-4 and select another alternative.

Situation One - Alternative c.

Absolutely correct ! Looking on rules and procedures as just a "waste of time" instead of taking them seriously is an indication of the anti-authority hazardous thought, "Don't tell me !" Go on to situation two, page 5-3.

Situation Two - Alternative c.

Anyone who thinks that nothing will happen to him or her, especially when he or she is in a problem situation, is illustrating the hazardous thought of invulnerability, "It won't happen to me." Go back to page 5-3 and select another alternative.

Situation Three - Alternative c.

This quick decision without any real thinking of the alternatives or consequences illustrates the hazardous thought, "Do something - quickly." It is an example of a pilot who is impulsive. Go back to page 5-4 and select another alternative.

Situation One - Alternative d.

Thinking that nothing will happen to you illustrates the hazardous thought of invulnerability, "It won't happen to me." Go back to page 5-2 and select another alternative.

Situation Two - Alternative d.

The belief that "somebody up there is watching" means that the pilot expects the outcome to be decided totally by that "somebody" - he or she leaves himself or herself out of the process. That is the hazardous thought of external control, "What's the use?". Go back to page 5-3 and select another alternative.

Situation Three - Alternative d.

The belief that a decision has already been made, with the implication that you can do nothing about it, is an example of thinking, "What's the use?" - the hazardous thought of external control. Go back to page 5-4 and select another alternative.

Situation One - Alternative e.

By assuming that what you do has no effect on the copilot, the pilot is illustrating the external control hazardous thought, "What's the use?" Go back to page 5-2 and select another alternative.

Situation Two - Alternative e.

Well done. Disregarding regulations - not taking them seriously - is the anti-authority hazardous thought, "Don't tell me". Go on to situation three, page 5-4.

Situation Three - Alternative e.

The belief that "nothing is going to happen" is the hazardous thought of invulnerability. Go back to page 5-4 and select another alternative.

LESSON 6.

THE EXTERNAL CONTROL HAZARDOUS THOUGHT.

(Directions for study of this lesson appear on page 5-1).

SITUATION ONE.

You are quite determined to arrive at your destination by 3 p.m. If you stay on your predetermined course, you will just about make it, assuming there are no problems. Or, you can take an unauthorized route which will get you there at 2.30. If you choose the unauthorized route, it means you must fly through fog conditions. Good weather conditions prevail over the regular route.

Which of the following alternatives best illustrates the EXTERNAL CONTROL reaction ?

- a. You take the unauthorized route believing that authorization does not apply in this situation. (Turn to page 6-4).
- b. You take the unauthorized route, thinking that flying through the fog will not cause any trouble for this flight. (Turn to page 6-4).
- c. You feel it will be a real victory for you if you can take the unauthorized route and arrive by 2.30 p.m. (Turn to page 6-5).
- d. You tell yourself that there is no sense sticking to the scheduled route because, "there's nothing else to do to be sure to make it by 3 pm." (Turn to page 6-5).
- e. You quickly choose the unauthorized route, deciding that you just must get there on time. (Turn to page 6-6).

(6-1)

SITUATION TWO.

The weather briefing advises you of possible difficult weather conditions at your destination. You elect to go. You then encounter a brief snowstorm and increasingly poor visibility. You have plenty of fuel to turn back but have a hunch that the weather will improve before you reach your destination.

Which of the following alternatives best illustrates the EXTERNAL CONTROL reaction ?

- a. You feel there is no need to worry about the weather since there is nothing one can do about it. (Turn to page 6-4).
- b. You decide to continue, and block the weather conditions out of your mind. (Turn to page 6-4).
- c. You feel nothing will happen to you since you have plenty of fuel. (Turn to page 6-5).
- d. You think to yourself that the weather people are always complicating your flights and sometimes, such as now, it is best to ignore them. (Turn to page 6-6).
- e. You fly on, determined to prove that your own weather judgement is sound. (Turn to page 6-6).

SITUATION THREE.

On your final approach, you fly into patches of ground fog which severely limit visibility. Altitude is 150 feet and you debate whether you can level-off at the correct height and land properly, or whether you should abort the approach.

Which of the following alternatives best illustrates the EXTERNAL CONTROL reaction ?

- a. You think the rules which indicate you should abort the approach are much too rigid. (Turn to page 6-4).
- b. You feel that the situation presents a challenge and that you are going to make the landing. (Turn to page 6-5).
- c. You begin immediately to level off saying "To heck with the fog". (Turn to page 6-5).
- d. You continue, feeling that the decision has already been made. (Turn to page 6-6).
- e. You say to yourself "I'm going in because nothing is going to happen." (Turn to page 6-6).

Situation One - Alternative a.

Seeing the lack of authorization as not applying to you is a good example of the hazardous thought of anti-authority. Rules do not apply to me: "Don't tell me." Go back to page 6-1 and select another alternative.

Situation Two - Alternative a.

Correct ! Well done ! If you decide that there is nothing that you can do about the situation, this is the hazardous thought of external control. People who think this way say to themselves, "What's the use ?" Go on to situation three, page 6-3.

Situation Three - Alternative a.

By regarding the rules as too rigid, you are acting on the anti-authority hazardous thought, "Don't tell me." Go back to page 6-3 and select another alternative.

Situation One - Alternative b.

This illustrates the hazardous thought of invulnerability: "It won't happen to me." Go back to page 6-1 and select another alternative.

Situation Two - Alternative b.

When you block thoughts from your mind and decide to go on without considering the consequences, your thinking is, "Do something - quickly !" and this is impulsivity. Go back to page 6-2 and select another alternative.

Situation Three - Alternative b.

Seeing a situation as a challenge, as a time to prove yourself instead of as a problem to be solved, is an illustration of the macho hazardous thought, "I can do it." Go back to page 6-3 and select another alternative.

Situation One - Alternative c.

Trying for a victory means you are trying to prove yourself better than others. It means making this a personal challenge rather than a problem to be solved with care. This illustrates the macho hazardous thought, "I can do it." Go back to page 6-1 and select another alternative.

Situation Two - Alternative c.

Having plenty of fuel does not mean that nothing will happen to you. This illustrates the hazardous thought of invulnerability: "It won't happen to me." Go back to page 6-2 and select another alternative.

Situation Three - Alternative c.

A quick decision without any real thinking through of the alternatives or consequences illustrates the hazardous thought, "Do something - quickly !" It is an example of a pilot who is impulsive. Go back to page 6-3 and select another alternative.

Situation One - Alternative d.

Correct ! Well done ! Thinking that there is nothing you can do is an illustration of the hazardous thought of external control: "What's the use." Go on to situation two, page 6-2.

Situation Two - Alternative d.

Having no respect for authority (the weather people) and disregarding their advice illustrates the hazardous thought of anti-authority: "Don't tell me." Go back to page 6-2 and select another alternative.

Situation Three - Alternative d.

Nice job ! You are correct in indicating that when you believe that a decision has already been made, that you can do nothing more about it, is an example of thinking, "What's the use ?" - the hazardous thought of external control. Go on to the next lesson as the directions indicate.

Situation One - Alternative e.

A quick decision, without careful thought or consideration of the consequences, illustrates impulsivity: "Do something - quickly !" Go back to page 6-1 and select another alternative.

Situation Two - Alternative e.

When a pilot tries to show how good he or she is, instead of taking careful action, he/she is being macho and thinking, "I can do it." Go back to page 6-2 and select another alternative.

Situation Three - Alternative e.

The belief that "nothing is going to happen" is the hazardous thought of invulnerability. Go back to page 6-3 and select another alternative.

LESSON 7.

THE IMPULSIVITY HAZARDOUS THOUGHT.

(Directions for study of this lesson appear on page 5-1)

SITUATION ONE.

Visibility is just over 6000 metres with a 1100 foot ceiling in snow and sleet. Earlier you cleared the fuselage of accumulated snow, but take-off has been delayed for 15 minutes due to traffic. You notice that snow and ice are forming again and wonder if you will be able to lift off.

Which of the following alternatives best illustrates the IMPULSIVITY reaction ?

- a. You feel there is no use getting out and cleaning it since it is only going to form again.
(Turn to page 7-4).
- b. You believe that you can take off in these conditions and you think how impressed your friends will be when they hear of it. (Turn to page 7-4).
- c. You take off immediately, thinking that any further delay will worsen the problem. (Turn to page 7-5).
- d. You reason that you can do it because many other pilots you know have done so and nothing happened to them. (Turn to page 7-5).
- e. You resent being delayed 15 minutes and decide you are not going to clear the snow and ice again for anybody.
(Turn to page 7-6).

SITUATION TWO.

You are quite determined to arrive at your destination by 3 p.m. If you stay on your predetermined course, you will just about make it, assuming there are no problems. Or, you can take an unauthorised route which will get you there at 2:30 pm. If you choose the unauthorised route, it means you must fly through fog conditions. Good weather conditions prevail over the regular route.

Which of the following alternatives best illustrates the IMPULSIVITY reaction ?

- a. You take the unauthorised route believing that authorisation does not apply in this situation. (Turn to page 7-4).
- b. You take the unauthorised route, thinking that flying through the fog will not cause any trouble for this flight. (Turn to page 7-4).
- c. You feel it will be a real victory for you if you can take the unauthorised route and arrive by 2.30 pm. (Turn to page 7-5).
- d. You tell yourself that there is no sense sticking to the schedules route because, "there's nothing else to do to be sure to make it by 3 pm." (Turn to page 7-6)
- e. You quickly choose the unauthorised route, deciding that you just must get there on time. (Turn to page 7-6).

(7-2)

SITUATION THREE.

The weather forecast called for freezing rain. During the flight, you notice that ice is beginning to accumulate on the aircraft's wings. You are not sure what to do. You have never encountered this problem before. You are tempted to do nothing since the aeroplane is still flying well. A passenger suggests that you might radio for information.

Which of the following alternatives best illustrates the IMPULSIVITY reaction ?

- a. You feel that there probably will not be any difficulty since you have always come out of difficult situations rather well. (Turn to page 7-4).
- b. You feel that there is nothing you can really do because radio information won't change the weather conditions. (Turn to page 7-5).
- c. You quickly tell the passenger to stop butting in. (Turn to page 7-5).
- d. You tell the passenger that you are the boss and will handle the problem your way. (Turn to page 7-6).
- e. You radio for information, but decide to ignore the advice since the aeroplane continues to fly well. (Turn to page 7-6).

Situation One - Alternative a.

When a pilot does not see himself or herself as affecting what happens, he/she is illustrating the hazardous thought of external control and thinks, "What's the use ?" Go back to page 7-1 and select another alternative.

Situation Two - Alternative a.

Seeing the lack of authorisation as not applying to you is a good example of the hazardous thought of anti-authority. Rules do not apply to me; "Don't tell me." Go back to page 7-2 and select another alternative.

Situation Three - Alternative a.

Thinking that since nothing has ever happened before, nothing will happen to you in the future is the invulnerability hazardous thought. Go back to page 7-3 and select another alternative.

Situation One - Alternative b.

This is the hazardous thought of macho: "I can do it." Go back to page 7-1 and select another alternative.

Situation Two - Alternative b.

Thinking that you are exempt from danger and that nothing will happen, is the hazardous thought of invulnerability; "It won't happen to me." Go back to page 7-2 and select another alternative.

Situation Three - Alternative b.

You have decided nothing you do will make any difference. You do not even try. Such a person is thinking, "What's the use?" and is illustrating the external control hazardous thought. Go back to page 7-3 and select another alternative.

Situation One - Alternative c.

Right! You take off immediately. No thinking, no planning, no looking ahead. Action without thought illustrates the hazardous thought, "Do something - quickly!". This is impulsivity. Go on to situation two, page 7-2.

Situation Two - Alternative c.

Trying for a victory means trying to prove you are better than others. It means making this a personal challenge rather than a problem to be solved with care. This illustrates the macho hazardous thought; "I can do it." Go back to page 7-2 and select another alternative.

Situation Three - Alternative c.

Correct! The clue here is the word, "quickly". You act without thinking and that is impulsivity. "Do something - quickly!" Go on to the next lesson as the directions indicate.

Situation One - Alternative d.

When you think, "Nothing happened to them," you are really saying, "There is really no chance of an accident. It won't happen to me." That is the hazardous thought of invulnerability. Go back to page 7-1 and select another alternative.

Situation Two - Alternative d.

Thinking that there is nothing you can do means that you feel helpless in the situation and expect that anything you do will make no difference. This is an illustration of the hazardous thought of external control: "What's the use?" Go back to page 7-2 and select another alternative.

Situation Three - Alternative d.

This tendency to say, "We'll do it my way." is a good indication of the macho hazardous thought, "I can do it." Go back to page 7-3 and select another alternative.

Situation One - Alternative e.

Pilots who resent using appropriate safety procedures because they are prescribed by some authority are illustrating the anti-authority hazardous thought, "Don't tell me." Go back to page 7-1 and select another alternative.

Situation Two - Alternative e.

You got it ! A quick decision, without careful thought or consideration of the consequences, illustrates impulsivity: "Do something - quickly !" Go on situation three, page 7-3.

Situation Three - Alternative e.

Those who are in danger and ignore advice from a qualified source certainly do not take authority seriously. This illustrates the anti-authority hazardous thought of "Don't tell me." Go back to page 7-3 and select another alternative.

LESSON 8.

THE INVULNERABILITY HAZARDOUS THOUGHT.

(Directions for study of this lesson appear on page 5-1).

SITUATION ONE.

You are making a pleasure flight with four friends, all of whom are drinking. You refuse to drink, but your friends remind you that you have flown this route many times, and that the weather conditions are excellent. They are beginning to mock you for not drinking with them.

Which of the following alternatives best illustrates the INVULNERABILITY reaction ?

- a. You decide to drink, thinking that a little liquor will not have any bad effect on you.
(Turn to page 8-4).
- b. You believe that the Civil Aviation Regulations are far too rigid on its policy about drinking.
(Turn to page 8-4).
- c. You resent your friends' insults and start drinking, saying to yourself, "I'll show them."
(Turn to page 8-5).
- d. You bend to their will saying to yourself, "If my time is up, it's up whether I drink or not."
(Turn to page 8-5).
- e. You suddenly decide to down a drink or two yourself.
(Turn to page 8-6).

SITUATION TWO.

Weather and visibility are poor and the control tower advises you to land on a runway other than the one you prefer. You see larger airplanes using your preferred runway and wonder why you have been denied permission. Since the recommended runway is on the far side of the airport, you radio the tower and ask for a reconsideration.

Which of the following alternatives best illustrates the INVULNERABILITY reaction ?

- a. Before you receive a reply, you start making your approach on the unauthorised runway. (Turn to page 8-4).
- b. You feel that if other pilots can land their airplanes, so can you. (Turn to page 8-4).
- c. You think that nothing dangerous will occur because the weather conditions are not really that bad. (Turn to page 8-5).
- d. Regardless of what the tower tells you, you are going to do what you want to. (Turn to page 8-6).
- e. You figure there is no sense in waiting for instructions because the tower is going to do whatever it pleases, regardless of your wishes. (Turn to page 8-6).

SITUATION THREE.

The weather briefing advises you of possible difficult weather conditions at your destination. You elect to go. You then encounter a brief snowstorm and increasingly poor visibility. You have plenty of fuel to turn back but have a hunch that the weather will improve before you reach your destination.

Which of the following alternatives best illustrates the INVULNERABILITY reaction ?

- a. You feel there is no need to worry about the weather since there is nothing you can do about it.
(Turn to page 8-4).
- b. You decide to continue, and block the weather conditions out of your mind. (Turn to page 8-5).
- c. You feel nothing will happen to you since you have plenty of fuel. (Turn to page 8-5).
- d. You think to yourself that the weather people are always complicating your flights and sometimes, such as now, it is best to ignore them.
(Turn to page 8-6).
- e. You fly on, determined to prove that your own weather judgement is sound. (Turn to page 8-6).

Situation One - Alternative a.

Very good. Correct. Liquor affects everybody. A pilot who believes that it will not affect him or her, considers himself or herself invulnerable - he or she thinks, "It won't happen to me." Go on to situation two, page 8-2.

Situation Two - Alternative a.

By rushing into action without waiting for a reply, and without thinking about it, your thinking represents impulsivity. Go back to page 8-2 and select another alternative.

Situation Three - Alternative a.

Deciding that there is nothing that you can do about the situation illustrates the hazardous thought of external control. People who think this way say to themselves, "What's the use?" Go back to page 8-3 and select another alternative.

Situation One - Alternative b.

Regarding the authority of the Civil Aviation Regulations as too rigid is one way of thinking, "They really aren't to be taken seriously. Those rules are much more strict than they need to be, so I can disregard them." That is the hazardous thought of anti-authority and reflects the "Don't tell me" attitude. Go back to page 8-1 and select another alternative.

Situation Two - Alternative b.

Your thinking that you can do anything that they can do is like saying, "I can do it", in an effort to prove yourself. This is a macho response. Go back to page 8-2 and select another alternative.

Situation Three - Alternative b.

When you block thoughts from your mind and decide to go on without considering the consequences, your thinking is, "Do something - quickly !" which is impulsivity. Go back to page 8-3 and select another alternative.

Situation One - Alternative c.

The desire to show somebody how great you are, the need to prove yourself, represents the macho hazardous thought, "I can do it." Go back to page 8-1 and select another alternative.

Situation Two - Alternative c.

You are correct ! The tower is concerned about the weather. The fact that you are not and the fact that you feel that there is nothing to worry about, is a sign of thinking, "It won't happen to me." That is the hazardous thought of invulnerability. Go on to situation three, page 8-3.

Situation Three - Alternative c.

Right ! Good reasoning ! Having plenty of fuel does not mean that nothing will happen. This illustrates the hazardous thought of invulnerability: "It won't happen to me." Go on to the next lesson as the directions indicate.

Situation One - Alternative d.

This indicates that you are thinking what will happen is determined by fate, that you have nothing to do with it. That is a belief in external control. Go back to page 8-1 and select another alternative.

Situation Two - Alternative d.

That is an anti-authority response: "I'll do what I want to do, regardless of what the authority says". "Don't tell me." Go back to page 8-2 and select another alternative.

Situation Three - Alternative d.

The pilot who has no respect for authority (the weather people) and disregards their advice thinking they are just complicating his or her flight illustrates the hazardous thought of anti-authority: "Don't tell me." Go back to page 8-3 and select another alternative.

Situation One - Alternative e.

The sudden decision to drink, omitting any serious thinking about the situation; is an example of the hazardous thought of impulsivity: "Do something - quickly !" Go back to page 8-1 and select another alternative.

Situation Two - Alternative e.

Thinking that nothing you do will make any difference is thinking in terms of external control: "What's the use?" Go back to page 8-2 and select another alternative.

Situation Three - Alternative e.

When a pilot tries to show how good he or she is, instead of taking careful action, the pilot is being macho and thinking, "I can do it." Go back to page 8-3 and select another alternative.

LESSON 9.

THE MACHO HAZARDOUS THOUGHT.

(Directions for study of this lesson appear on page 5-1)

SITUATION ONE.

Visibility is just over three miles with a 1100 foot ceiling in blowing snow. Earlier you cleared the fuselage of snow, but take-off has been delayed for 15 minutes due to traffic. Snow and ice are forming again and you wonder if you will be able to lift off.

Which of the following alternatives best illustrates the MACHO reaction ?

- a. You feel there is no use getting out and cleaning it since it is only going to form again.
(Turn to page 9-4).
- b. You believe that you can take off in these conditions and you think how impressed your friends will be when they hear of it. (Turn to page 9-4).
- c. You take off immediately, thinking that any further delay will worsen the problem. (Turn to page 9-5).
- d. You reason that you can do it because many other pilots you know have done so and nothing happened to them. (Turn to page 9-5).
- e. You resent being delayed 15 minutes and decide you are not going to clear snow and ice again for anybody.
(Turn to page 9-6).

(9-1)

SITUATION TWO.

The weather forecast called for freezing rain. During the flight, you notice ice is beginning to accumulate on the aircraft's wings. You are not sure what to do. You have never encountered this problem before. You are tempted to do nothing since the aeroplane is still flying well. A passenger suggests that you might radio for information.

Which of the following alternatives best illustrates the MACHO reaction ?

- a. You feel that there probably will not be any problem since you have always come out of difficult situations rather well. (Turn to page 9-4).
- b. You feel that there is nothing you can really do because radio information won't change the weather conditions. (Turn to page 9-4).
- c. You quickly tell the passenger to stop butting in. (Turn to page 9-5).
- d. You tell the passenger that you are the boss and will handle the problem your way. (Turn to page 9-6).
- e. You radio for information, but decide to ignore the advice since the aeroplane continues to fly well. (Turn to page 9-6).

SITUATION THREE.

The runway is short with a building 300 metres from the end. A strong crosswind is blowing. You are asked to take an additional passenger and this will overload the aeroplane by about 30 kgs. The extra passenger is waiting for your reply.

Which of the following alternatives best illustrates the MACHO reaction ?

- a. You take the passenger, reasoning that if fate says you are going to crash, you will, with or without extra weight. (Turn to page 9-4).
- b. You take the passenger, fearing that you will lose respect if you do not. (Turn to page 9-5).
- c. You take the passenger, remarking to yourself that the weight and balance rules are too strict to begin with. (Turn to page 9-5).
- d. Since the passenger seems friendly, you take him on board right away and do not give another thought to it. (Turn to page 9-6).
- e. You accept the passenger, thinking that accidents only happen to others. (Turn to page 9-6).

Situation One - Alternative a.

When a pilot does not see himself or herself as affecting what happens, he or she is illustrating the hazardous thought of external control. He or she thinks, "What's the use ?" Go back to page 9-1 and select another alternative.

Situation Two - Alternative a.

When you think that since nothing has ever happened before, nothing will happen in the future, you are thinking invulnerability. "It won't happen to me." Go back to page 9-2 and select another alternative.

Situation Three - Alternative a.

Trusting to luck is the same as assuming that whatever happens will happen, in spite of anything you might do to change it. This is illustrating the hazardous thought of external control: "What's the use ?" Go back to page 9-3 and select another alternative.

Situation One - Alternative b.

Absolutely ! You want to prove yourself; to show off; to have others think that you are great. This is the hazardous thought of macho: "I can do it." Go on to situation two, page 9-2.

Situation Two - Alternative b.

This is thinking, "What's the use ?", and is illustrating the external control hazardous thought. Go back to page 9-2 and select another alternative.

Situation Three - Alternative b.

You are right ! Good thinking ! The pilot who is worried about losing face is more concerned about what others think than he or she is about safety. This illustrates the macho hazardous thought, "I can do it". Go on to the next lesson as the directions indicate.

Situation One - Alternative c.

You take off immediately. No thinking, no planning, no looking ahead. Action without thought illustrates the hazardous thought, "Do something - quickly !". This is impulsivity. Go back to page 9-1 and select another alternative.

Situation Two - Alternative c.

Acting without thinking is impulsivity. "Do something - quickly !". Go back to page 9-2 and select another alternative.

Situation Three - Alternative c.

This is anti-authority: you are not taking the weight limits seriously, disregarding them, thinking, "Don't tell me." Go back to page 9-3 and select another alternative.

Situation One - Alternative d.

When you think, "Nothing happened to them", you are really saying, "There is really no chance of an accident - it won't happen to me." That is the hazardous thought of invulnerability. Go back to page 9-1 and select another alternative.

Situation Two - Alternative d.

Absolutely. This tendency to say, "We'll do it my way," is a good indication of the macho hazardous thought, "I can do it". Go on to situation three, page 9-3.

Situation Three - Alternative d.

Making an immediate decision without any thought of its consequences or any consideration of alternatives illustrates the hazardous thought - impulsivity, "Do something - quickly!" Go back to page 9-3 and select another alternative.

Situation One - Alternative e.

Pilots who resent using appropriate safety procedures because they are prescribed by some authority are illustrating the anti-authority hazardous thought, "Don't tell me." Go back to page 9-2 and select another alternative.

Situation Two - Alternative e.

Those who ignore the advice that the tower gives them certainly do not take authority seriously. They are determined to do what they want to do. This illustrates the anti-authority hazardous thought of "Don't tell me." Go back to page 9-2 and select another alternative.

Situation Three - Alternative e.

When you think that accidents happen only to other people you think you are invulnerable. The pilot in this situation is thinking, "It won't happen to me." Go back to page 9-3 and select another alternative.

LESSON 10.

ANTIDOTES FOR HAZARDOUS THOUGHTS.

INTRODUCTION.

You know there are five major hazardous thoughts which contribute to poor pilot judgement. Because you worked extensively with these thoughts in the previous lessons, you should already be more aware of them and more alert to them in your own thinking. This is an important first step in eliminating them from your judgements.

This lesson is designed to teach you ways to counteract hazardous thoughts so that they do not affect your actions.

You cannot think two different things at the same time. One way to keep from thinking a hazardous thought is to think another thought. By saying to yourself a statement which represents a thought other than the hazardous thought, you are "taking an antidote" and counteracting the hazardous thought. As long as you are concentrating on the antidote, you cannot be thinking the hazardous thought.

Remove a hazardous thought by substituting the antidote. Thus, if you discover yourself thinking, "It won't happen to me", note that this is a hazardous thought. What you must learn to do is to recognise when you are having a hazardous thought, correctly label the thought, and then say its antidote to yourself.

To do this, you must learn the antidote for each of the hazardous thoughts. MEMORIZE THE ANTIDOTES. Learn them thoroughly. You must know them so well that they will come to mind whenever you need them. (Note: This is the only material in the entire programme which you must memorize word for word).

THE FIVE ANTIDOTES.

HAZARDOUS THOUGHTS.

ANTIDOTE.

ANTI-AUTHORITY:	"Don't tell me."	"Use the rules: they are usually right."
EXTERNAL CONTROL:	"What's the use?"	"I'm not helpless. I can make a difference."
IMPULSIVITY:	"Do something-- quickly!"	"Not so fast. Think first."
INVULNERABILITY:	"It won't happen to me".	"Why not me ? I am human, too."
MACHO:	"I can do it."	"Risks don't make me fly better. They make me a fool"

MEMORISATION DRILL.

You must not continue with this lesson until you have learned the antidotes thoroughly. Practice this now. Without referring to the text, write the antidote to each hazardous thought below. Check your statements with the text above and, if you are correct, continue with this unit. If not, continue studying the antidotes until you can write them from memory, word for word. You will be tested on this learning.

HAZARDOUS THOUGHT.

ANTIDOTE.

ANTI-AUTHORITY:

EXTERNAL CONTROL:

IMPULSIVITY:

INVULNERABILITY:

MACHO:

(10-2)

SITUATION EXERCISES.

Each of the following situations contains a description of what is happening in a flight situation and what the pilot is thinking. Gain practice in correctly applying the hazardous thought antidotes in flight situations by doing the following exercises.

Instructions:

1. Begin with situation one, and review the thinking and actions of the pilot. Look for signs of hazardous thoughts. Whenever you recognise one, write the name of the hazardous thought and its antidote in the space provided to the right. (In situation one, the first hazardous thought and its antidote have been provided as an example).
2. After completing your work on situation one, turn to the page indicated at the end of the situation to review the answers. Compare your answers to the ones given in the key. Your responses should closely match the hazardous thought responses identified in the key. (Different people may see the same situation slightly differently, and your answers may not be identical to the key). You should have agreement with the key on at least three of the hazardous thoughts, and you should have written, word for word, the correct antidote for each hazardous thought you identified.
3. If you do not do well on situation one, study your answers to discover what misunderstandings you have about the five hazardous thoughts and the five antidotes. Return to earlier lessons in the manual to clear up any confusion before going on to the next situation.
4. Having completed situation one, continue on with situation two, reading and reviewing the situation. Write the hazardous thoughts and antidotes in the right margin. When finished follow the instructions at the end of the situation key which will guide you to the completion of this lesson.

SITUATION ONE.

On his third solo flight, a student pilot decides to take a friend for an aeroplane ride. Up in the air, the pilot thinks, "This is great to be up here flying without an instructor criticizing everything I do. His do-it-by-the-book attitude takes all the fun out of flying."

ANTI-AUTHORITY
Use the rules:
They are usually
right.

As the pilot nears his friend's farm, he remembers that it is about 8 miles from the local airport. The pilot thinks, "I'll land on the road that runs by my buddy's farm. It won't be dangerous at all . . . the road's straight and wide, just like a runway. I'll just tell Hank not to tell anyone I did it so I won't get into trouble with anyone who knows it's against the rules."

"No one other than Hank's family lives anywhere near there. If anyone happens to check on me, I'll just tell them it was an emergency landing. OK. I'll do it. The plan is foolproof."

The student pilot makes a hard landing on the road and nearly runs off the pavement before he gets the aircraft stopped. However, he is very proud of himself and he thinks, "Way to go, Ace ! You're a natural for being a great pilot."

The pilot secures the aircraft and starts walking towards his buddy's house as a sheriff's car drives up. Surprised that anyone observed his landing, he starts cursing this unpleasant turn of events. "Rats! I just know this cop is going to foul up my whole day. Why don't they stick to catching robbers and murderers, and leave people like me alone to have some harmless fun. If it weren't for my bad luck, this cop wouldn't have come along and this would have been a great afternoon."

TURN TO PAGE 10-9 FOR THE ANSWER KEY TO THIS SITUATION.

(10-4)

SITUATION TWO.

Landing at night, Bill discovers that the runway lights are not on. He thinks, "Rats! I forgot about the possibility that the airport might be closed. I should have thought to telephone ahead." He becomes angry with the airport management, thinking, "They could leave the lights on this early at night. Who are they to control how late I can land? The next time I see the manager, I will tell him a thing or two about how to run an airport."

Determined to land, Bill declares, "I'm landing here tonight, lights or no lights. I'll just have to rely on myself and show these guys how a top-notch pilot can do whatever needs doing." Bill chooses the runway which runs parallel to the highway adjacent to the airport, and he uses the street lights as a reference point. Unsure of his height above the runway, he flares too quickly and begins to float. He immediately forces the aeroplane to the ground rather than going around or extending his landing.

He contacts the runway very hard. The aircraft swerves off the runway and into a fence. Bill is unhurt, but the aeroplane sustains serious damage. He says to himself, "Doggone this place. If the lights were on, this would not have happened."

A few minutes later some people arrive to see what has happened. Bill starts telling them how the accident is the fault of the local airport management. Someone asks Bill why he decided to land without the airport lights turned on. Bill answers, "Look, I'm an expert pilot - no lights is not a serious problem. There should be more rules about how to run an airport and less about how a guy like me is supposed to fly his aeroplane!".

CHECK YOUR ANSWERS TO THIS SITUATION WITH THE KEY ON PAGE 10-10.

SITUATION THREE.

The pilot, Larry, and his wife, Kathy, are on a vacation trip with another couple. Larry has been flying for almost a year. He has decided that this trip, his first cross country with passengers, is the best opportunity to show off his new flying skills to his wife and their friends.

The aeroplane Larry is flying is rented. Although it is the same type he usually flies, it is a newer and better equipped model. However, Larry is sure he can fly it just fine without any special practice.

About an hour after takeoff, there is a partial loss of engine power. The engine is running rough, and the passengers suspect there are problems. Kathy says, "Larry, is the aeroplane alright?"

Larry immediately says, "Yes, I'll just decrease our altitude a little. That should help."

He descends 500 feet, but the engine sounds even worse, and the power loss is greater. The couple in the back is really getting worried, and the man asks Larry if they should not turn around and go back to their home airport. Larry replies, "I can handle this little problem. Just leave the flying to me."

Larry decides to make a precautionary emergency landing. He lands in a wheat field a few minutes later. No one is hurt during the emergency landing, but the aircraft is damaged. As they all climb out of the plane, Larry remarks, "This aeroplane is a piece of junk. I'll never fly one of these again."

CHECK YOUR ANSWERS TO THIS SITUATION WITH THE KEY ON PAGE 10-11.

SITUATION FOUR.

Amy is making a routine flight from New Plymouth to Palmerston North with two friends on board. Fifty miles from Palmerston North she notices the gyrohorizon is not functioning. She radios to Palmerston North and is told that visibility is poor in the Palmerston Airport area due to rain. She thinks, "I can try to land at Wanganui or even go back to New Plymouth since I have plenty of fuel left. Returning to New Plymouth would be the safest thing to do. On the other hand, I'd really like to get into Palmerston now. Chances are nothing will happen. It is daylight, and I should have no trouble making the landing."

Still undecided about what to do, Amy decides to fly toward Palmerston for another ten minutes to see if the weather looks worse or if the gyrohorizon might start working again. Ten minutes later, the situation has not changed, and Amy begins looking at a sectional chart to find out what she will have to do to get to the Wanganui Airport if necessary. The rain starts and the gyrohorizon still does not work.

A passenger, sensing things are not going according to routine, asks if there is a problem. Amy says there is a minor problem that might prevent making a landing at Palmerston. The two passengers being arguing about their own feelings on making a landing at Wanganui or going back to New Plymouth. The passengers do agree on one thing: they want to land at Palmerston.

Amy starts to get annoyed, but decides that all she can do to calm the passengers down is to assure them that she will go on to Palmerston and attempt to land.

(10-7)

She feels somewhat anxious, but she says to herself, "I'm an excellent pilot, and I know the visibility is not that bad. Only inexperienced pilots get disoriented in weather like this. I'm sure there is no chance of me getting into a dangerous situation on the landing at Palmerston." As she enters the pattern at Palmerston, the rain gets heavier.

In her anxiety to get the aeroplane on the ground, she keeps her speed high and flies below her assigned altitude.

CHECK YOUR ANSWERS WITH THOSE IN THE KEY ON PAGE 10-12.

KEY TO SITUATION ONE.

Compare your responses in each situation with those given below. Remember that different people may see the same situation differently. As a result, all of your responses may not be identical to those in the key. Still, you should have identified most of the hazardous thoughts indicated.

On his third solo flight, a student pilot decides to take a friend for an aeroplane ride. Up in the air, the pilot thinks, "This is great to be up here flying without an instructor criticizing everything I do. His do-it-by-the-book attitude takes all the fun out of flying."

ANTI-AUTHORITY:
Use the rules:
They are usually right.

As the pilot nears his friend's farm, he remembers that it is about 8 miles from the local airport. The pilot thinks, "I'll land on the road that runs by my buddy's farm. It won't be dangerous at all the road's straight and wide, just like a runway. I'll just tell Hank not to tell anyone I did it so I won't get into trouble with anyone who knows it's against the rules."

IMPULSIVITY:
Not so fast.
Think first.

No one other than Hank's family lives anywhere near there. If anyone happens to check on me, I'll just tell them it was an emergency landing. OK. I'll do it. The plan is foolproof."

INVULNERABILITY:
Why not me ?
I'm human too.

The student pilot makes a hard landing on the road and nearly runs off the pavement before he gets the aircraft stopped. However, he is very proud of himself and he thinks, "Way to go, Ace ! You're a natural for being a great pilot."

MACHO:
Risks don't make me fly better.
They make me a fool.

The pilot secures the aircraft and starts walking towards his buddy's house as a sheriff's car drives up. Surprised that anyone observed his landing, he starts cursing this unpleasant turn of events. "Rats ! I just know this cop is going to foul up my whole day. Why don't they stick to catching robbers and murderers, and leave people like me alone to have some harmless fun. If it weren't for my bad luck, this cop wouldn't have come along and this would have been a great afternoon."

External Control:
I'm not helpless.
I can make a difference.

AFTER YOU HAVE COMPARED YOUR RESPONSES WITH THOSE ABOVE, GO ON TO SITUATION TWO ON PAGE 10-5.

(10-9)

KEY TO SITUATION TWO.

Landing at night, Bill discovers that the runway lights are not on. He thinks, "Rats! I forgot about the possibility that the airport might be closed. I should have thought to telephone ahead." He becomes angry with the airport management, thinking, "They could leave the lights on this early at night. Who are they to control how late I can land?" The next time I see the manager, I will tell him a thing or two about how to run an airport."

EXTERNAL CONTROL:
I'm not helpless
I can make a
difference

ANTI-AUTHORITY:
Use the rules:
They are usually
right.

Determined to land, Bill declares, "I'm landing here tonight, lights or no lights. I'll just have to rely on myself and show these guys how a top-notch pilot can do whatever needs doing." Bill chooses the runway which runs parallel to the highway adjacent to the airport, and he uses the streetlights as a reference point. Unsure of his height above the runway, he flares too quickly and begins to float. He immediately forces the aeroplane to the ground rather than going around or extending his landing.

MACHO: Risks
don't make me
fly better. They
make me a fool.

IMPULSIVITY:
Not so fast.
Think first.

He contacts the runway very hard. The aircraft swerves off the runway and into a fence. Bill is unhurt, but the aeroplane sustains serious damage. He says to himself, "Doggone this place. If the lights were on, this would not have happened."

EXTERNAL CONTROL
I'm not helpless
I can make a
difference.

A few minutes later some people arrive to see what has happened. Bill starts telling them how the accident is the fault of the local airport management. Someone asks Bill why he decided to land without the airport lights turned on.

EXTERNAL CONTROL
I'm not helpless
I can make a
difference.

Bill answers, "Look, I'm an expert pilot- no lights is not a serious problem. There should be more rules about how to run an airport and less about how a guy like me is supposed to fly his aeroplane!"

MACHO: Risks
don't make me
fly better. They
make me a fool.

ANTI-AUTHORITY:
Use the rules:
They are usually
right.

DID YOU GET ALL ANSWERS CORRECT ? IF SO, YOU HAVE FINISHED THIS LESSON. IF NOT, GO ON TO SITUATION THREE ON PAGE 10-6 FOR MORE PRACTICE.

(10-10)

KEY TO SITUATION THREE.

The pilot, Larry, and his wife Kathy, are on a vacation trip with another couple. Larry has been flying for almost a year. He has decided that this trip, his first cross country with passengers, is the best opportunity to show off his new flying skills to his wife and their friends.

MACHO: Risks
don't make me
fly better. They
make me a fool.

The aeroplane Larry is flying is rented. Although it is the same type he usually flies, it is a newer and better equipped model. However, Larry is sure he can fly it just fine without any special practice.

INVULNERABILITY
Why not me?
I'm human too.

About an hour after take-off, there is a partial loss of engine power. The engine is running rough, and the passengers suspect there are problems. Kathy says, "Larry, is the aeroplane alright?"

Larry immediately says, "Yes, I'll just decrease our altitude a little. That should help."

IMPULSIVITY:
Not so fast.
Think first.

He descends 500 feet, but the engine sounds even worse, and the power loss is greater. The couple in the back is really worried, and the man asks Larry if they should not turn around and go back to their home airport. Larry replies, "I can handle this little problem. Just leave the flying to me."

MACHO: Risks
don't make me
fly better. They
make me a fool.

Larry decides to make a precautionary emergency landing. He lands in a wheat field a few minutes later. No one is hurt during the emergency landing, but the aircraft is damaged. As they all climb out of the plane, Larry remarks, "This aeroplane is a piece of junk. I'll never fly one of these again."

EXTERNAL CONTROL:
I'm not helpless
I can make a
difference.

DID YOU GET ALL ANSWERS CORRECT THIS TIME ? IF SO, GREAT !
YOU HAVE COMPLETED THIS LESSON. IF NOT, GO ON TO SITUATION
FOUR ON PAGE 10-7 FOR MORE PRACTICE.

KEY TO SITUATION FOUR.

Amy is making a routine flight from New Plymouth to Palmerston North with two friends on board. Fifty miles from Palmerston North she notices the gyrohorizon is not functioning. She radios to Palmerston North and is told that visibility is poor in the Palmerston Airport area due to rain. She thinks, "I can try to land at Wanganui or even go back to New Plymouth since I have plenty of fuel left. Returning to New Plymouth would be the safest thing to do. On the other hand, I'd really like to get into Palmerston now. Chances are nothing will happen. It is daylight, and I should have no trouble making the landing."

INVULNERABILITY
Why not me ?
I'm human too.

Still undecided about what to do, Amy decides to fly toward Palmerston for another ten minutes to see if the weather looks worse or if the gyrohorizon might start working again. Ten minutes later, the situation has not changed, and Amy begins looking at a sectional chart to find out what she will have to do to get to the Wanganui Airport if necessary. The rain starts and the gyrohorizon still does not work.

EXTERNAL CONTROL
I'm not helpless
I can make a
difference.

A passenger, sensing things are not going according to routine, asks if there is a problem. Amy says there is a minor problem that might prevent making a landing at Palmerston. The two passengers being arguing about their own feelings on making a landing at Wanganui or going back to New Plymouth. The passengers do agree on one thing: they want to land at Palmerston.

Amy starts to get annoyed, but decides that all she can do to calm the passengers down is to assure them that she will go on to Palmerston and attempt to land.

EXTERNAL CONTROL
I'm not
helpless.
I can make a
difference.

She feels somewhat anxious, but she says to herself, "I'm an excellent pilot, and I know the visibility is not that bad. Only inexperienced pilots get disoriented in weather like this. I'm sure there is no chance of me getting into a dangerous situation on the landing at Palmerston." As she enters the pattern at Palmerston, the rain gets heavier.

Invulnerability:
Why not me ?
I'm human too.

In her anxiety to get the aeroplane on the ground, she keeps her speed high and flies below her assigned altitude.

ANTI-AUTHORITY:
Use the rules:
they are usually
right.

IF YOU DID WELL ON THIS SITUATION YOU HAVE COMPLETED THIS LESSON. IF YOU ARE STILL HAVING DIFFICULTY WITH THE ANTIDOTES, SEE YOUR INSTRUCTOR FOR FURTHER EXPLANATION.

LESSON 11.

RECOGNISING AND REPLACING HAZARDOUS THOUGHTS.

INTRODUCTION.

In Lesson 5 through to 9, you learned the meaning of the five hazardous thoughts. You saw how pilots having these thoughts might react in a variety of situations. And, in lesson 10, you learned antidote thoughts that are substituted whenever hazardous thinking might be influencing you to make unsafe decisions.

For this judgement training to be of maximum benefit to you, the mental process of recognising a hazardous thought, of substituting the correct antidote, and of then supplying good judgement thoughts must become an automatic reaction for you.

In this lesson, you will learn by practice to recognise potential hazardous thoughts in various flight situations. In addition, you will practice recalling the correct antidote and thinking of good pilot judgement for the same situation.

INSTRUCTIONS.

1. Read each situation and the description of the pilot's thinking.
2. In the blanks beneath each situation, fill in the answers requested: the hazardous thought, the antidote for that hazardous thought, and a brief description of good pilot judgement for the same situation. (You do not need to write complete sentences).
3. Review your answers when you have completed the first five situations, as indicated on page 11-5.

EXAMPLE:

Situation:

The pilot leaves his non-pilot wife at the aircraft's controls while he goes outside to see why the engine will not start. The pilot concludes that the battery is dead.

Pilot's thinking:

I'm in a hurry. I'll just prop start it, and get the battery checked when we land again. My wife is pretty good with machinery. She will understand what to do until I get back into the cabin.

Hazardous Thought: Invulnerability

Antidote: Why not me ? I am human too.

Good Judgement:

The pilot delays the flight while he gets a mechanic or a line service person to charge or replace the battery.

SITUATIONS.

Situation 1:

The pilot did not allow for strong headwinds when calculating fuel consumption. With 15 minutes of fuel left, he can make an emergency landing on an abandoned dirt road just below. A second option is to fly to an airfield which he thinks is ten minutes away.

Pilot's Thinking:

I will fly on to my destination. I can be there in 10 minutes. I see no problems, I just have to keep going.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 2:

The pilot is preparing to taxi his aircraft when he feels a sharp pain in his chest. He is somewhat anxious about this, even though he had a thorough physical three weeks before. He thinks it might be indigestion and is undecided if he should mention anything to his passengers.

Pilot's Thinking:

There is nothing I can say to the passengers that would help. I will continue the flight. It is just my rotten luck that I had bad food for lunch.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

(11-3)

Situation 3:

The pilot is on a pleasure flight with a friend. Weather conditions for the area include snow showers and gusty winds. The purpose of the trip is to scout some nearby ski slopes.

Pilot's Thinking:

I am sure I'll be able land without permission at that private airstrip near the lodge if the weather gets too bad.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 4:

A passenger appears to be suffering from a sudden illness. It is still a two hour flight to the intended destination. The passenger says he is all right, but his wife is very concerned that he may need medical aid. The nearest airport is unmanned, and it is 60 kilometres from a hospital.

Pilot's Thinking:

This man is sick and his wife is really upset. I can't deal with this in the aeroplane. I better land at the nearest airport I can find on the sectional chart.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 5:

It is after dark, and the pilot arrives at the airport with two friends after leaving a picnic dinner. The pilot intends to take his friends on a local VFR trip along the lake shore. The weather is officially reported as clear at the airport, but fog has begun to form over the lake 10 miles away.

Pilot's Thinking:

The beers I had this afternoon at the picnic certainly are not going to affect my flying skills. Besides, the weather looks good, and my friends will be impressed when I fly them over the lake at night.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

NOW THAT YOU HAVE COMPLETED THE FIRST FIVE SITUATIONS, REVIEW YOUR ANSWERS WITH THOSE PROVIDED ON PAGE 11-6. IF YOU HAVE DONE WELL, THEN MOVE ON TO LESSON 12. IF YOU NEED MORE PRACTICE YOU SHOULD DO SITUATIONS 6 THROUGH TO 10.

NOTE: DO NOT BECOME DISCOURAGED WITH DOING EXERCISES THAT SEEM REPETITIVE. JUST AS REPEATED TOUCH-AND-GO LANDINGS TEACH YOU GOOD LANDING TECHNIQUES, THESE EXERCISES TEACH YOU GOOD JUDGEMENT TECHNIQUES BY HELPING YOU FORM STRONG, NEW HABITS.

Answers:

Situation 1:

Hazardous Thought: Invulnerability.

Antidote: "Why not me ? I am human too."

Good Judgement: Recheck calculations and if fuel limited make a controlled precautionary landing while the fuel is available because actual fuel consumption may differ to that planned.

Situation 2:

Hazardous Thought: External Control.

Antidote: "I'm not helpless. I can make a difference."

Good Judgement: The pilot is in doubt of his health, and should abandon the flight and seek medical advice.

Situation 3:

Hazardous Thought: Anti-Authority.

Antidote: "Use the rules: They are usually right."

Good Judgement: Request permission to land at the private airstrip as a precaution.

Situation 4:

Hazardous Thought: Impulsivity.

Antidote: "Not so fast. Think first."

Good Judgement: Assess other options, for example are there any airstrips that are close to the hospital.

Situation 5:

Hazardous Thought: Macho.

Antidote: "Risks don't make me fly better. They make me a fool."

Good Judgement: Don't fly.

Situation 6:

The pilot checks twice by phone for weather in the area of his proposed VFR trip. On both occasions he receives warnings of severe or greater turbulence. He takes off as planned, despite suggestions from FIS (flight information service) personnel that a flight is very risky.

Pilot's Thinking:

I have to get there by 10 o'clock. It can't be that bad, and I've handled weather like this before without an accident. Nothing will happen to me.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 7:

A pilot decides to do some night flying. He calls up two buddies and tells them that he will pick them up at 8.00 pm. He does not check the weather. When he gets to the airport the ceiling is 250 feet with 6000 metres visibility.

Pilot's Thinking:

I can't let those guys think that I'm afraid of a few little clouds. I'd never hear the end of it. Anyway, I promised them we would go, and I know I can handle the plane even when it is rough.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 8:

A Cessna 152 is on final. Behind it, another aircraft is also on final. The pilot of the second plane notices that he is quickly closing the distance between himself and the plane in front. The Cessna 152 (cleared by the tower) touches down and then does a touch-and-go take-off. The second plane, with no clearance from the tower, executes a missed approach. On climb, the Cessna almost hits the other aircraft.

Pilot's Thinking:

I should call the tower, but I'm busy. If I do a missed approach, I'll have more time to get set up right for my landing next time. I am new to this airport, so I'm sure they'll give me a break if I slip up on one procedure.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 9:

The pilot decides to take a friend flying. He flies low over a lake to show his friend where he caught a ten pound trout last year. Flying at 50 feet, the pilot thinks he sees birds which are taking off in front of the aircraft's flight path. The pilot pulls back hard on the controls and starts a climbing turn. He stalls and crashes into the trees.

Pilot's Thinking:

Those birds might knock out my engine or come right through the windshield. I'd better not take any chances. I'll get as far from them as fast as I can !

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

Situation 10:

The non-instrument rated pilot takes off in good weather for a local training flight. Upon return two hours later she finds the airport beacon is out due to heavy rain. The pilot is low on fuel because she stayed in the practice area longer than intended.

Pilot's Thinking:

Gee, my practice went so well. What rotten luck to be low on gas now. I guess I'll just keep flying around out here and hope the rain stops and the airport goes back to VFR so I can land.

Hazardous Thought: _____

Antidote: _____

Good Judgement: _____

(11-9)

Answers:

Situation 6:

Hazardous Thought: Invulnerability.

Antidote: "Why not me ? I am human too."

Good Judgement: Take note of the warnings from the flight information service - delay your departure and perhaps cancel your flight.

Situation 7:

Hazardous Thought: Macho.

Antidote: "Risks don't make me fly better. They make me a fool."

Good Judgement: Don't fly, wait for better conditions.

Situation 8:

Hazardous Thought: Anti-Authority.

Antidote: "Use the rules: They are usually right."

Good Judgement: Maintain visual lookout to keep separation from other aircraft, and contact the tower for assistance with any doubts on the procedures for landing.

Situation 9:

Hazardous Thought: Impulsivity.

Antidote: "Not so fast. Think first."

Good Judgement: Should not be at 50 feet. When confronted with birds take more care handling altitude to avoid stall.

Situation 10:

Hazardous Thought: External Control.

Antidote: "I'm not helpless. I can make a difference."

Good Judgement: Assess fuel situation and calculate how long you can hold for while the conditions improve, seek assistance.

LESSON 12.

IDENTIFYING AND REDUCING STRESS.

WHAT IS STRESS ?

Stress may be defined as a condition of mental pressure, urgency and tension. When a situation causes you stress, your thinking may become scattered or confused. You may be unable to focus your thinking, or you may give too much attention to details which you should ignore. An overstressed state of mind most often occurs when a pilot is trying to think about and do many things at once. This is a situation which encourages a pilot to make a poor judgement or to begin a series of poor judgements, a poor judgement chain.

When you have to think about one thing and one thing only, and then make a decision, that is not too difficult. But, what about those times when several things are happening at once? For instance, you notice that you are much lower on fuel than expected. There are cumulus clouds ahead, and they appear to be building. Your primary radio becomes difficult to understand due to static. You may be getting off course, but you cannot locate your current position on the sectional chart. Now you have a great deal to think about, and all at once. This sort of circumstance may very well lead you to feel pressured and tense and to have high stress.

The causes of stress do not include only events happening outside us. What is going on inside our minds may also cause stress. For example, suppose you take off for a flight with your mind filled with worries and concerns. You have several bills which you are late paying. You are having problems with a love relationship. You fear you have symptoms of a serious medical condition. Before leaving the airport, you become angry with an attendant working there. All this worry, concern, and anger takes energy. It distracts your attention from your flying, and it reduces the effectiveness of your reasoning powers. Any decision you must make under such circumstances may very well suffer.

A third situation may also generate stress. You make a mistake while flying which, although it is an error, is corrected. The most sensible thing to do is to forget about the matter, and to return your entire attention to flying. But you do not. You keep thinking about the mistake: "Why did I do it? How could I be so stupid? Where did I go wrong? What happens if I do it again?" Because of all this worrying, your mental energies and attention are distracted from the job of flying.

Stress, then, can reach high levels due to many causes. Because several things often happen all at once in flight, and because they happen fast, pilots are especially vulnerable to the problem of high stress which affects judgement.

(12-1)

IDENTIFYING STRESS LEVELS.

If you are to do anything to prevent stress from influencing your judgement, you must first be able to identify a high stress level. Many times you know you are overloaded by stress. You feel rushed, pressured and frustrated. Anger, worry and confusion have raised your stress level to the point that you realize you are not functioning at your best. On the other occasions, you may gradually slip into a high stress condition and not realize that your ability to function has undergone a change. Or, you may constantly experience so much high stress and anxiety that you do not notice you are not as calm or mentally alert as you should be.

To detect how overloaded by stress you are, you will now learn how to use SUDs. SUDs stands for the Subjective Units of Discomfort System. This system, developed by Joseph Wolpe, provides a way for people to quickly and easily identify their level of stress or overload.

Using SUDs is easy. To begin, you need to put your imagination to work for a few minutes. First make yourself comfortable. Now think of a situation where you are completely and totally relaxed and at ease. Many people think of themselves lying on a beach on a warm sunny afternoon. Others imagine themselves floating on a cloud. Some prefer a waterbed! Note that you do not have to visualize the scene in your mind. Just clearly think about the situation and all the details associated with it. For example, the beach scene might include thinking about the feel of the sand beneath the towel, the sound of the waves, the sight of a fishing boat on the horizon, and the feel of the sun beaming down.

Take a few moments, pick a scene, close your eyes and imagine yourself relaxing there. This relaxing situation rates a value of zero. Your stress level - your discomfort level - is zero: zero SUDs.

Next, think of a situation in which you are in absolute terror. Perhaps you are being held at gunpoint in a dark alley by three very savage looking thugs. Or, your aeroplane has lost its engine, and you are about to plunge into the sea 50 miles from any known source of help. Imagine the most terrible, stress and anxiety producing situation you wish. A situation such as this rates a value of 100 Subjective Units of Discomfort -100 SUDs.

You now have the reference points necessary for using SUDs to evaluate your own level of stress. When totally relaxed, comfortable and content, your SUDs level is zero. When totally terrified, anxious, confused and tense, your SUDs level is 100. You are now ready to proceed with your own SUDs test.

USING SUDs.

You can now take any situation and identify your stress level by deciding how many SUDs you are experiencing in that situation. When totally relaxed, you experience zero SUDs. When in an extremely stressful situation, whether the situation be terror or total confusion, you experience 100 SUDs. How about the first time you flew? How excited were you?, 50 SUDs?, 60?, 70? Think about it and decide what number best represents your experience at that time.

How about right now? How aroused or excited are you right now? Probably you are experiencing fewer SUDs now than on your first flight. Think of the last time you were angry. Something got to you and you were really mad. How many SUDs did you experience then?

A bit of practice will best help you use SUDs effectively. Below is a list of situations. Think about each of them and indicate how many SUDs you would experience in each of them. Indicate your SUDs score in the blank space to the left of each choice.

SUDs.

- ___ A). You are flying an aeroplane on a clear, beautiful day.
- ___ B). You are on a flight and the captain announces to all the passengers that the plane is about to hit some moderate turbulence.
- ___ C). You are driving in your car through heavy traffic during the rush hour.
- ___ D). You are watching a vivid scene in a scary movie.
- ___ E). You are on a picnic with close friends on a pleasant summer day.
- ___ F). You have just been stopped by two men who are demanding your money.
- ___ G). You just had a fight with your best friend.
- ___ H). You are on your way to the airport for a flight when you discover you have forgotten your tickets.
- ___ I). You have just been severely criticized by someone you admire very much.
- ___ J). You have been waiting to buy tickets for a show for over an hour and someone crashes the line in front of you.

In the next few days, think about SUDs and note how many SUDs you experience at different times. Or, at the end of the day think of five moments during that day and decide the SUDs for each moment. An interesting variation is to think of the moment each day which had the highest SUDs and the moment which had the fewest. Any practice method you employ will teach you to use SUDs in your flight judgement activities.

For most people a stress situation is one in which their SUDs level is 75 or higher. 75 is the number that will be used to indicate a high stress level in this lesson. As you become familiar with SUDs you can decide what number (SUDs level) represents high stress for you. At that point, use that number rather than the 75 in the lesson. Whenever you find yourself becoming "keyed up" or tense, decide the number of SUDs you are experiencing. Whenever that number reaches 75 (or the number you have personally selected) you are overly stressed. At that point, you want to consciously and deliberately reduce your SUDs level.

REDUCING STRESS: THE DEEP BREATH METHOD.

Here is a simple and easy technique to reduce your stress level. Whenever you wish to reduce your SUDs level - to reduce stress - take a deep breath, hold it, and then, as you let the air out slowly, say to yourself (or outloud if you wish): EASY ! RELAX NOW. ONE STEP AT A TIME. Repeat it a few times. Try it for yourself now. Take a deep breath, hold it briefly, and then, as you let the air out slowly, say EASY ! RELAX NOW. ONE STEP AT A TIME. Do this four or five times before continuing.

As you practice this breathing technique, notice how easy it is and how quickly it lowers any tension you are experiencing. Remember, when highly stressed, you feel so keyed up that you don't stop to think. The more you sense that you are keyed up, the more anxious and tense you become. This simple breathing exercise will interrupt this process. Practice the technique a few times and then read on.

Now that you know this simple technique for reducing stress, you may do it whenever you choose. However, for this technique to be of use to you when you are feeling overly stressed, you must train yourself to use it. Right now it is easy for you. But, when you are in a flight situation where things begin to happen quickly and you begin to feel stress, you must tell yourself to do the technique. That is not easy. When you are keyed up and tense and everything is happening fast, you are not apt to remember to stop take a breath, and think or speak the calming words. Fortunately, you can train yourself so that this response on your part will become automatic. TO DO THIS, YOU MUST PRACTICE REGULARLY ! Whenever you note that your SUDs level is reached the critical value (75 or the number you have chosen), you must always remind yourself to take a deep breath and complete the technique. You must do this until it becomes an automatic reaction.

(12-4)

LEARNING THE DEEP BREATHING METHOD.

Here is how to practice so that you speed up making this an automatic reaction. First, develop the habit of deciding what your SUDs level is. Anytime you find yourself becoming a little excited or tense, decide what number represents how you feel. Note that number carefully. Soon, this will become an automatic response on your part.

Second, seat yourself in a comfortable chair. Let yourself become nicely relaxed. Now imagine yourself flying - or in some other realistic situation. All you are doing is daydreaming: let your imagination be free. Then, imagine that you are becoming tense. You make a small error and are worried about it. Something goes wrong with the aeroplane. You are confused about the message you received. Imagine a number of things going wrong or a number of things happening at once. About every 30 seconds in your imagining, estimate your SUDs level - decide what number represents the amount of tension you are experiencing.

When that number reaches 75 (or your own number), stop, take a deep breath, and complete the exercise. During each practice session, bring yourself to a high stress level and complete the breath exercise. Repeat this procedure often. Each day for at least a week, seat yourself in a comfortable chair and imagine a scene in which you reach a high SUDs level, then stop, take a breath, and complete the exercise.

Why will this help? Because after you have repeated this often enough, you will have developed an automatic response to high stress situations. You will work to the point where whenever you think your SUDs level has reached the critical value, you will automatically respond with a deep breath and the complete breath exercise. It is the repeated practice which makes the response automatic.

REDUCING STRESS: PROGRESSIVE RELAXATION.

If you find the deep breath method is not completely satisfying to you, you may prefer using a technique called "Progressive Relaxation". Progressive Relaxation has been used for many years by people in all walks of life to control stress and to reduce tension. The technique is easy and enjoyable. It involves giving yourself carefully planned suggestions to relax. After a training period to get your mind and body accustomed to these suggestions, you will be able to relax quickly and easily whenever you desire even in flight situations.

Instructions on how to learn Progressive Relaxation are printed in the appendix to this lesson which begins on page 12-7.

LESSON REVIEW.

In this lesson, you have learned about high stress levels and how this condition can make poor judgements more likely (12-1). You have learned how to measure or rate your own stress level using the SUDs system (page 12-2). To reduce unsatisfactorily high stress levels, you have learned two methods of stress reduction. One of these is called the deep breath method, and it may be learned quickly by doing a short practice exercise each day for a week (page 12-4). The second method of stress reduction is called Progressive Relaxation (page 12-5). It takes about two weeks to learn, and it may be used instead of, or along with, the deep breath method to quickly reduce your stress level at any time - even while flying.

(12-6)

APPENDIX TO LESSON 12:

LEARNING PROGRESSIVE RELAXATION.

There are three phases to learning the progressive relaxation technique. You must practice each phase carefully to gain maximum benefit from this method of stress reduction. Remember, relaxation is a skill, and like any other skill, you will get better at it through proper training and practice. As you begin, plan to set aside about 30 minutes a day for two or three days for Phase I and about 10 minutes a day for the following three to five days for Phase II. Phase III will require only a few minutes a day.

PHASE I - GETTING STARTED.

You will begin learning this technique by practicing with the first series of relaxation suggestions. These suggestions are presented in "Progressive Relaxation Script Number 1," which begins on page 12-12. You will also need to review three other instructional sheets in preparation for working with this script. These are: "The Four Ways to Deliver the Scripts" on page 12-10; and "How to Read the Scripts" on page 12-11. BEFORE ACTUALLY DOING THE PRACTICE STEPS LISTED BELOW, FIRST READ THE STEPS AND READ THE REST OF THIS APPENDIX SECTION TO FAMILIARIZE YOURSELF WITH THE PROGRESSIVE RELAXATION METHOD AND HOW TO USE IT.

Practice Steps - Phase I.

1. Decide which way you will deliver the script to yourself. Get whatever you need to do this: the script, a helper, a tape recorder.
2. Find a location where you will be undisturbed for about half an hour. Sit down in a comfortable chair. (Do not lie down !).
3. Now go through the entire script number 1 without interruption, following along with the script's directions and suggestions.
4. If you are disturbed for more than about 30 seconds, go back and begin again.
5. Repeat this phase using script number 1 for two or three consecutive days. Do it until you feel relaxed during the practice session. When this happens, you may move on to Phase II.
6. You may return to the Phase I script whenever you wish to treat yourself to an extra long relaxation session or to reinforce the power of the suggestions in the Phase II script.

(12-7)

PHASE II - BECOMING ACCUSTOMED TO RELAXATION BY SUGGESTION.

This practice phase is very much like the first one, except it is completed in a much shorter time period, about five minutes. The suggestions for this phase are presented in script number 2 beginning on page 12-15.

Practice Steps - Phase II.

1. Get whatever you need to deliver the script, and seat yourself in a quiet location where you will be undisturbed for about 10 minutes.
2. Go through script number 2 without interruption. If you are interrupted for more than about 30 seconds, go back and begin again.
3. Repeat Phase II using script number 2 for at least 3 to 5 consecutive days. Keep at it until you feel relaxation each time you do it and until you can remember all most all of the suggestions without referring to the script.
4. Do not hesitate to return to using script number 1 for a day or more if script number 2 is not relaxing enough for you.

PHASE III - PROGRESSIVE RELAXATION WITHOUT THE SUGGESTION SCRIPT.

Now that your mind and body are accustomed to progressive relaxation by suggestions, you are ready to relax yourself without a script.

Practice Steps - Phase III.

1. Seat yourself in a comfortable chair where you will not be disturbed for 3 to 5 minutes.
2. Close your eyes and say to yourself, "Relax now."
3. Direct your attention to the various parts of your body as you did when following script number 2. Remember to go at a moderate pace with 5 second pauses as you move from one area to another.
4. In a few sessions, you will be able to relax yourself quickly and deeply without the script.
5. Do the exercise at least once a week to maintain your ability to lower your stress level. You may do it as often as two or three times each day if you like.

REDUCING STRESS WHILE FLYING.

You have now learned how to relax. You are able to sit down, close your eyes, say, "Relax now," and in a very few minutes become quite relaxed. When in a stressful situation, even though you may not be able to get yourself deeply relaxed, you can reduce your SUDs enough to enable you to function more effectively.

You may be thinking, "That's all right in some situations, but what about when I am flying and there is a crisis coming up? I can't stop, close my eyes, and go through all that procedure. I don't have even 3 minutes then!" You are right, of course, but you can still reduce your SUDs in such a situation. In fact, your training in dealing with overload up to this point has been to prepare you to learn to deal with exactly that type of situation.

Take a few seconds right now to take a deep breath and say to yourself, "Relax now." Do this once or twice and then continue reading.

Notice the effect? Because of the relaxation training you have experienced, even this brief exercise results in a reduction of SUDs. You do not put yourself into a deep state of relaxation quickly this way - and you wouldn't want to be deeply relaxed in a crisis. You can reduce your stress level enough to enable you to handle the situation more effectively.

In addition to taking a breath and saying to yourself "Relax now," you may wish to add a few words in a flight situation. You might choose the words you learned earlier in this lesson for use with the deep breathing exercise. Remember them? "Easy now! One Step at a time." Or, you might wish to say to yourself, "Relax now. What is the next thing to do?"

Remember, as you do your practicing with Phase II of Progressive Relaxation, you may also practice saying to yourself a few words or a short phrase to help force your thinking to be more relaxed and on dealing with your immediate priorities. The specific words are not so important, so long as they are meaningful and comfortable for you. What is most important is that you choose the words and practice them along with your stress reduction method BEFORE you actually need to quickly reduce your stress in a real situation.

THE FOUR WAYS TO DELIVER THE SCRIPTS.

The suggestions which train you in Progressive Relaxation may be delivered from the scripts in four ways. You may think them to yourself: you may speak them to yourself; you may have someone else speak them to you: you may tape record the suggestions and then play them back to yourself. Consider the following descriptions of the advantages and disadvantages of the different ways of practicing. Choose the way or combination of ways which is most comfortable for you. You may even wish to experiment with each of the different ways at first before choosing.

1. Think to yourself. This is good because it requires no equipment and you can do it most any time and most anywhere. First though, you must learn to recall the suggestions from memory before you can effectively learn Progressive Relaxation without the script, which is a drawback. Also, you may tend not to pace yourself properly.
2. Reading to yourself. This way is good because it requires no special equipment, and you can do it on your own. The drawbacks are that you may find it difficult to relax at the same time you are trying to read the script correctly, since you must keep opening and closing your eyes.
3. Someone reads to you. This way is good because it allows you to completely relax and follow the suggestions, and it may be done without the aid of special equipment. One difficulty is that you must find a helper whenever you wish to practice. Also, you must be certain that your helper reads the script correctly and pleasantly.
4. Tape record and play back. This way is good because you can get the script done once in a manner that pleases you, and then play it back again and again. (You may record the script yourself or have a friend with a clear, pleasant voice do it for you). A problem is that you must have a tape recorder available for use each time that you wish to practice. If, however, it is convenient and comfortable for you to use a tape recorder, this method is recommended.

HOW TO READ THE SCRIPTS.

To learn Progressive Relaxation quickly and correctly, it is very important that you receive the suggestions properly.

Follow these instructions closely:

1. The scripts should be spoken in a quiet voice, yet they should also be spoken assertively and convincingly. The reader's voice should sound pleasant and soothing.
2. The final section (the "wake up" section) should be read more loudly and energetically than the relaxation section.
3. Take the specified amount of time to complete each script. Go slowly ! Wherever there are (...) separating phrase, pause about 5 seconds before going on to the next phrase. Wherever there are directions in parenthesis telling you to pause, do so for the specified amount of time. THIS IS IMPORTANT ! (At first, you may wish to use a watch or clock to check your timing).

HOW TO LISTEN TO THE SCRIPTS.

1. Be sure to do this exercise in a comfortable, quite place where you will not be interrupted for 30 minutes.
2. As you listen, it is important to just let the suggestions guide you. You need not try to do anything - do not even relax ? Just let go and let the relaxation come over you.
3. As you go through the suggestions, various sounds from around you, and some thoughts from within you, will come to your awareness. That is to be expected. Just leave these distractions alone - no need to worry about them - and they will go away on their own. At times your mind may wander. When you discover that this has happened, just return your attention to the Progressive Relaxation suggestions - no need to be concerned.
4. Do not try to listen to the suggestions when you are very tired. You are very likely to fall asleep. Also, if you choose to record the suggestions, do not play the recording while driving a car. Your level of alertness may be seriously reduced.

PROGRESSIVE RELAXATION.

SCRIPT 1.

(Time = 20 to 25 minutes).

This is an exercise in progressive relaxation. By following these directions, you will find yourself becoming deeply and profoundly relaxed. The experience that you are about to have is easy, comfortable, and very, very, enjoyable.

(Pause 10 seconds)

To prepare for this experience, let yourself settle into the chair. Let the back of the chair support you; let the legs and seat of the chair support you. Let yourself lean into the chair. Place your arms and hands on your lap, not on the sides of the chair. And be sure that your legs and ankles are not crossed; that both your feet are on the floor.

(Pause 10 seconds)

Now that you are in this position just close your eyes and listen to my voice. (Pause 5 seconds). As you continue to hear my voice, all other sounds will simply go in one ear and out the other; and those sounds will in no way disturb your relaxation but, in fact, will help you relax.

(Pause 10 seconds)

In this exercise, you let yourself relax. You need not try to relax. Just let it happen. If distracting thoughts come into your mind, you need not force them out, because the effort of forcing them out will keep them there. Just leave them alone - they will disappear of their own accord.

This exercise consists merely of letting your awareness rest on different parts of your body as I mention those parts. As you do, those parts of your body will relax and when we have completed the process, your entire body will be deeply relaxed. (Pause 10 seconds)

Now just be aware of the big toe on your right foot Now, each of the little toes on your right foot, one at a time The arch of your right foot the heel of your right foot the remainder of your right foot.

Now be aware of the big toe on your left foot each of the little toes on your left foot, one at a time the arch of your left foot the heel of your left foot the remainder of your left foot your left ankle the lower half of your left leg, from your ankle to your knee your left knee your right ankle the lower half of your right leg from your ankle to your knee your right knee. (Pause 10 seconds)

(12-12)

You may notice different sensations and a feeling of relaxation in the lower half of your legs. Notice how good they feel. We will now let that feeling of relaxation move up through your entire body. Become aware, now, of the upper half of your right leg, from your knee to your hip ... the upper half of your left leg from your knee to your hip...your left hip your right hip your pelvic region between your hips ... the lower half of your back, including the base of your spinal column.

Notice how, when the base of your spinal column relaxes, the rest of you relaxes with it. (Pause 10 seconds) Now relax your stomach ... the upper half of your back, including your shoulder blades ... the big muscles relax, the little muscles relax, all the muscles relax ... your chest. Let all the muscles in your chest relax (Pause 10 seconds) ... your right shoulder ... the upper half of your right arm, from the shoulder to the elbow your right elbow ... the lower half of your right arm, from the elbow to the wrist ... your right wrist ... the back of your right arm ... the palm of your right hand ... your right thumb ... all the fingers of your right hand, one finger at a time, even to the tips of your fingers. (Pause 10 seconds)

Your left shoulder ... your left arm, from the shoulder to the elbow your left elbow ... the lower half of your left arm, from the elbow to the wrist ... your left wrist ... the back of your left arm ... the palm of your left hand ... your left thumb ... all the fingers of your left hand, one finger at a time, even to the tips of your fingers. (Pause 10 seconds)

Now relax the back of your neck - and notice how, when the back of your neck relaxes, the rest of you relaxes even more .. your throat ... your chin and jaw ... your lips ... your tongue ... your right cheek ... your left cheek ... your right ear ... your left ear ... your nose ... your eyes and eyelids ... your forehead and eyebrows ... and your scalp. (Pause 10 seconds)

Now, enjoy that feeling of deep relaxation. Enjoy the comfortable, wonderful feeling. (Pause 15 seconds) Now take a deep breath and say to yourself, "Relax now". (Pause 10 seconds). Continue to relax as I talk to you for a minute.

Now that you have experienced this deep relaxation, you will be able to return to this relaxed state again in a very short period of time. In later sessions, you will be seated in your chair listening to a series of suggestions like this one - only much shorter. You will take a deep breath and say to yourself "Relax Now," then progressively relax the various areas of your body in just a few minutes.

At the end of that brief period of time, you will be as deeply relaxed as you are now. (Pause 15 seconds)

(12-13)

Wake-up section: (Read more energetically).

Shortly, I am going to count from one to five. At the count of five you will be wide awake, mentally alert, and feeling good all over. You will feel refreshed, like you have had a long comfortable nap.

Each number will bring you closer to that state. One immediately your body begins to return to normal sensations. Two ... let the energy flow through your arms, legs, body, head - all through you. Three shortly your eyes will open: they will feel like they've been bathed in cool, refreshing water. Four wider and wider awake, now, wider and wider awake. Five, wide awake.

PROGRESSIVE RELAXATION.

SCRIPT 2.

(Time = 3 to 5 minutes).

This is an exercise in progressive relaxation. By playing this tape and following the directions, you will find yourself becoming deeply relaxed very quickly. Be sure you are seated comfortably in your chair. Close your eyes. Let the back of the chair support you let yourself lean into the chair. Take a deep breath and say to yourself. "Relax Now". (Pause 10 minutes). Notice that feeling of deep relaxation come over you. Immediately you feel yourself going deeper and deeper into relaxation.

Expand that good feeling now by becoming aware of certain parts of your body. Feel the relaxation particularly in both your feet and ankles ... the lower parts of both your legs, up to and including your knees ... the upper parts of your legs, from your knees to your hips (Pause 10 seconds). The lower half of your torso; your hips and pelvic region; the lower half of your back, including the spinal column; your stomach ... the upper half of your torso; the upper half of your back, including your shoulder blades; your chest. (Pause 10 seconds) your shoulders ... the upper half of both your arms, down through and including your elbows ... the lower half of your arms down through and including your wrists ... your hands - back of your hands; the palms of your hands; your thumbs; each of your fingers, even to the tips of your fingers. (Pause 10 seconds). Your neck your throat your chin and jaw and lips and tongue your checks ... your ears ... your nose ... your eyes and eyelids ... your forehead and eyebrows ... your scalp. (Pause 10 seconds).

Just enjoy the relaxation. You can become even more relaxed by taking a deep breath and saying to yourself, "Relax now". Go ahead and do that now. (Pause 10 seconds).

You should continue working with this series of suggestions yourself becoming very deeply relaxed by following its directions. When this happens, you will then be able to relax yourself without using the script. Just make yourself comfortable, close your eyes, take a deep breath and say "Relax Now", and take yourself through your body as you have just done. This is a skill which, once learned, will always be available to you. (Pause 15 seconds).

Wake-up section: (Read more energetically).

Shortly, I am going to count from one to five. At the count five you will wide awake, mentally alert, and feeling good all over. You will feel refreshed, like you have had a comfortable nap. Each number will bring you closer to that state. One ... immediately your body begins to return to normal sensations. Two ... let the energy flow through your arms, legs, body, head - all through you. Three ... shortly your eyes will open; they feel like they've been bathed in cool, refreshed water. Four wider and wider awake, now wider and wider awake. Five, wide awake !

(12-16)

LESSON 13.

HAZARDOUS THOUGHT POSTCHECK.

This lesson takes the form of a test, and is designed to examine if you have mastered the ideas included in Lesson 4 through to 11. Your instructor will notify you when this test has been timetabled, and will reinforce the level of proficiency required to gain a pass.

UNIT III.

APPLICATIONS.

The five lessons of Unit III will not present any new information about flight or about pilot judgement. Rather, these lessons will reinforce your understanding and appreciation of the pilot judgement material you have studied up to this point.

These exercises demand that you apply your newly acquired knowledge about judgement to true-to-life situations. The examples and scenarios used in the exercises are based on true stories of real pilots who made unfortunate errors by failing to exercise good judgement.

If you do not clearly remember the three subject areas, the six action ways, and the PJ sequence chain from Unit I, you should now go back and review Lessons 1 and 2, before beginning work on Lessons 14 through to 18.

Having completed this Unit of training, your instructor will arrange a class meeting to go over Lesson 14 through to 18. During this meeting you will be expected to participate in a small group discussion, and to justify your answers for each of the judgement questions.

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LESSON 14.

JUDGEMENT RELATED TO PREFLIGHT AND AIRCRAFT SYSTEMS.

INTRODUCTION.

Any mechanical problem is a very serious and dangerous matter once an aircraft is airborne. Aircraft manufacturers, maintenance personnel and government regulatory authorities work hard to keep each aircraft as safe as possible. However, things still do go wrong, and maintenance personnel do make mistakes. It is the pilot who must make the final judgement regarding the safety conditions of his or her aircraft before each flight.

Here are some examples of common situations which involve poor judgements (PJ's) in relation to preflight actions and to aircraft systems:

1. Assuming maintenance work was done correctly.
2. Failing to do part or all of the standard preflight inspection check.
3. Carelessness during the preflight check, for example leaving gas or oil caps loose or off.
4. Incomplete checking of flight controls for freedom of operation.
5. Not adequately checking aircraft systems prior to take-off.
6. Not acknowledging the importance of each system.
Example: Taking off with an inoperative carburettor heat system.
7. Improper use of aircraft systems.
8. Inadequate understanding of aircraft systems.

EXERCISE 1: SUBJECT AREAS.

DIRECTIONS.

1. Read the Pilot, Aircraft and Environment sections below, and read the case history which completes each section.
2. Underline the words in the case history which tell you the pilot made a poor judgement about each section's subject.
3. If you believe another subject area is also related to the situation, circle the appropriate "Related Subject Areas" combination.

1.1 PILOT.

The most common PJ's in this area involve the pilot who thinks all or part of the usual preflight inspection routine is not necessary because he or she already has enough information about the aircraft's condition to ensure safe operation.

Case History 1.

Subject Area: Pilot.

Related Subject Area: P/A, P/E, P/A/E.

It was the first flight for the aircraft after its required annual inspection. Maintenance personnel were careless at one point in their inspection process. Relying on the accuracy of the maintenance release prepared by a friend of his, the pilot made an incomplete preflight check prior to take-off. The engine failed just after take-off, the plane stalled and the pilot was unable to recover from the spin which resulted. The investigation following the accident revealed that there was no oil in the engine.

1.2 AIRCRAFT.

The most common poor judgement made about the aircraft during preflight is believing that a "quick once over" will uncover the same problems as a complete inspection.

Case History 2.

Subject Area: Aircraft.

Related Subject Areas: A/P, A/E, A/P/E.

The pilot's preflight inspection included a "quick look" to see that the oil filler cap was in place. He did not realize that the cap's locking gears were bent, and that the cap was not firmly secured. Shortly after take-off the cap came loose, the engine oil escaped, and the engine seized. The pilot had no choice but to make an emergency landing in rough terrain. He escaped with minor injuries, but the aircraft was destroyed.

1.3 ENVIRONMENT.

Some poor judgements occur during preflight activities because the pilot ignores environmental conditions that should alert him/her to pay particular attention to certain aspects of his/her aircraft's readiness.

Case History 3.

Subject Area: Environment.

Related Subject Areas: E/A, E/P, E/P/A.

Airport weather conditions included moderate snow, a 1600 foot ceiling, and visibility of 4000 metres. Although there was a noticeable accumulation of ice and snow on the aircraft, the pilot took off without cleaning the windshield. Immediately after liftoff the pilot reported zero visibility. While attempting to turn back to the airport, the pilot crashed into a radio tower. Accident investigators noted the aircraft was equipped with an alcohol deicing system for the windshield, but the tank was empty.

EXERCISE 2 : ACTION WAYS.

DIRECTIONS.

1. Read the true case history accident reports in each sub-section below.
2. Underline the words in each accident report that express the PJ Action Way listed in the headings of the sub-sections.
3. Write a phrase that describes the correct (safe) action way in the space provided below each accident report.

2.1 DO.

The aircraft was placarded against take-off or approaches using the auxiliary fuel tank. The pilot took off with the engine feeding from the auxiliary tank. The engine failed shortly after take-off.

2.2 NO DO.

This pilot did only part of the recommended preflight checks. He attempted to abort his take-off when he noticed the control binding. The pilot lost control, and the aeroplane slid off the end of the runway. Investigation revealed that the seat belt in the rear cockpit was fastened around the control stick.

2.3 OVER DO.

The cabin door came open in flight, and the passenger reacted in panic. The pilot was afraid to try to correct the situation in the air. She immediately attempted an emergency landing on a road. The aircraft slid off the narrow dirt road into a ditch.

2.4 UNDER DO.

Experiencing a partial loss of power, the pilot made an emergency landing in a field where the rough terrain damaged the landing gear. A careful inspection revealed the power loss to be due to fuel contamination. Dirt and plant fibers were found caked around the area of the carburettor air intake.

2.5 EARLY DO.

The pilot landed on a grass strip. Attempting to stop as soon as possible, he applied the brakes almost immediately after touchdown. The aircraft veered off the runway and nosed over into high grass.

2.6 LATE DO.

The pilot noticed an engine vibration and a loss of power at take-off. Instead of retracting the landing gear immediately as the approved procedure directed, the pilot first tried to improve engine operation by checking the throttle, mixture and carburettor heat settings. As the pilot began retracting the gear, the aircraft struck treetops about one mile beyond the end of the runway.

EXERCISE 3 : SCENARIO ANALYSIS.

DIRECTIONS.

1. Read the following pilot report. The report tells a true story about a pilot who got into trouble because he made a poor decision during his preflight activities.
2. After you finish your reading, answer the questions following the scenario. (Sentences in the pilot report have been numbered for your convenience). Circle the answer you think is correct.

Pilot's Report.

(1) I taxied out of the apron area about 15 minutes later than I had planned. (2) When I got about 1000 metres down the taxiway, the tower called me. (3) They said that they thought they could see smoke coming from around my left wheel assembly. (4) I did not want to stop and check the problem because I was determined to get to Wanganui on time for a meeting. (5) I figured I should do something right away to get the tower off my back, so I decided to speed up. (6) I thought maybe the rush of air would blow away the smoke that had attracted the tower's attention.

(7) Then the left wheel started binding up a little. (8) The aeroplane was moving pretty fast, and I was having a hard time steering it in a straight line. (9) The dimly lit taxiway did not help matters. (10) Before I really knew what was happening, the left wheel was off the taxiway and onto the grass. (11) I closed the throttle and tried to stop as fast as I safely could, but the brakes were not working on the left side. (12) By then I figured there was nothing I could do to overcome this run of bad luck, so I figured I would just bring the aeroplane to a stop as best I could. (13) I was so busy cursing my bad luck that I did not notice a concrete block sticking up until it was too late. (14) I hit the box at only about 5 knots per hour, but that was fast enough to do substantial damage to the landing gear. (15) It really makes me mad to think that the whole thing was due to a hydraulic fluid leak in the brake system. (16) I probably would have noticed it if I had done all of my usual preflight inspections.

Questions.

- 3.1 In sentence 4, the pilot's thought pattern was probably the hazardous one we call:
- a. Impulsivity
 - b. Invulnerability
 - c. Macho
 - d. External Control
- 3.2 The action way represented by the pilot's decision in sentence 4 is:
- a. Do
 - b. No Do
 - c. Early Do
 - d. Under Do
- 3.3 In sentence 5, the pilot's thought pattern was probably the hazardous one we call:
- a. Anti-Authority
 - b. Impulsivity
 - c. Macho
 - d. External Control
- 3.4 What subject area was the pilot making a judgement about in sentence 6 ?
- a. Pilot
 - b. Aircraft
 - c. Environment
 - d. Aircraft/Environment

3.5 What action way is represented in sentence 10 ?

- a. Do
- b. Under do
- c. Over do
- d. Early do

3.6 What hazardous thought could the pilot be using in sentence 12 ?

- a. Anti-Authority
- b. Impulsivity
- c. Invulnerability
- d. External Control

3.7 What is the antidote for the hazardous thought displayed in sentence 12 ?

3.8 What subject area was the pilot's attention being directed to in sentence 13 ?

- a. Pilot
- b. Aircraft
- c. Environment
- d. Pilot/Aircraft

3.9 What action way is shown by sentence 16 ?

- a. No Do
- b. Under Do
- c. Over Do
- d. Late Do

3.10 In Lesson 2 you were taught that an important step in breaking the PJ chain is to "Diagnose the original poor judgement to provide oneself feedback needed to avoid making a similar poor judgement in the future."

Which sentence indicates the pilot is taking this step ?

- a. Sentence 4
- b. Sentence 11
- c. Sentence 12
- d. Sentence 16

LESSON 15.

JUDGEMENT RELATED TO WEIGHT/BALANCE AND PERFORMANCE.

INTRODUCTION.

Engineers design an aircraft to fly safely and efficiently. One design factor that is very important to an aircraft's safe operation, as well as its operating efficiency, is the weight and balance criterion. Flying an aircraft loaded beyond its weight and balance limitations always creates dangerous changes in control and performance characteristics. These unsafe changes cause or contribute to many serious accidents.

Of course, performance is dependent on factors in addition to weight and balance. For instance, density altitude is a very important consideration. Runway surface conditions can also have a noticeable effect on take-off and landing performance.

Here are some examples of common poor judgements relating to weight and balance and to aircraft performance.

1. Estimating passenger and cargo weights instead of getting exact information.
2. Being in a hurry and not taking the time to make exact calculations.
3. Knowingly exceeding weight and balance limitations to accommodate the desires or demands of supervisors, customers, friends, etc.
4. Forgetting or ignoring such things as density altitude and runway surface conditions that affect aircraft performance.
5. Loading the aircraft as one would a car with no regard to total weight or location of the weight.
6. Failing to secure cargo to prevent the weight distribution from changing while in flight.
7. Failing to consider density altitude when flying in high temperature and high altitude conditions.
8. Trying to make a short field take-off when other than standard conditions exist. For example, a wet runway, or one that slopes up.

(15-1)

EXERCISE 1 : SUBJECT AREAS.

DIRECTIONS.

1. Read the Pilot, Aircraft and Environment sections below, and read the case history which completes each section.
2. Underline the words in the case histories which tell you the pilot made a poor judgement about the section's subject area.
3. If you believe another subject area is also related to the situation, circle the appropriate "Related Subject Areas" combination.

1.1 PILOT.

The most common PJ's in this area are made when pilots operate their aircraft without knowing the weight and balance data, or knowing it, do not use it. One reason this mistake is made is that in many flights it does not matter. But, when it does matter, it is extremely important!

Case History 1.

Subject Area: Pilot.

Related Subject Areas: P/A, P/E, P/A/E.

The aircraft was overloaded by approximately 40 kgs. The pilot was aware of this and told one of the passengers that he "knew" the manufacturers tended to exaggerate restrictions and to set them for "the low skilled pilot". He "pulled" the aircraft off the runway and the aircraft crashed into a row of hedges at the airport boundary.

1.2 AIRCRAFT.

The most frequent weight and balance PJ is related to the concept that an aircraft represents a completely fillable space without regard to how much or where. The pilot assumes that because the aeroplane has 4 seats, holds 42 gallons of fuel, and has 4 cubic feet of baggage space, he or she can fill them all at the same time.

Case History 2.

Subject Area: Aircraft.

Related Subject Areas: A/P, A/E, A/P/E.

The aircraft was loaded 60 kgs over the maximum gross weight and exceeded the aft CG limit. The pilot attempted to take off from a field with 5500 feet density altitude using 20 degree flaps. The aeroplane stalled after the liftoff and crashed on the runway.

1.3 ENVIRONMENT.

Pilots who take weight and balance seriously may still neglect to consider the effect of the environment on aircraft performance. Factors such as outside air temperature, runway length, field conditions and pressure altitude are ESSENTIAL ELEMENTS in the weight and balance equation.

Case History 3.

Subject Area: Environment.

Related Subject Areas: E/P, E/A, E/A/P.

The occupants of this aeroplane were lucky it did not get off the ground. On a hot day at a high altitude field, the aircraft was loaded to its maximum gross weight, with load distribution aft. Take-off performance was poor, but the pilot delayed in deciding to abort. When the pilot made the decision to abort, she could not stop the aeroplane on the remaining runway and ran into the boundary fence.

EXERCISE 2 : ACTION WAYS.

DIRECTIONS.

1. Read the true case history accident reports in each sub-section below.
2. Underline the words in each accident report that express the PJ action way listed in the heading of the sub-section.
3. Write a phrase that describes the correct (safe) action way in the space provided below each accident report.

2.1 DO.

The aircraft was loaded 60 kgs over maximum gross weight and exceeded the aft CG limit. Take-off was attempted using 20 degree flaps. The aeroplane stalled and crashed shortly after take-off.

2.2 NO DO.

The pilot neglected to secure 50 kgs of frozen fish loaded in the baggage area. The load shifted aft during climb out. Aircraft control was seriously affected and the aeroplane mushed in short of the runway during an emergency landing attempt.

2.3 OVER DO.

The pilot and the passenger were hunting deer from the aircraft. Density altitude was 6000 feet. The aeroplane stalled and crashed while the pilot was making a steep 360 degree turn.

2.4 UNDER DO.

The aeroplane was 140 pounds over maximum gross weight because the pilot estimated passenger weights too low. On landing, the aeroplane was slow to respond when the pilot tried to flare. The pilot's poor attempt to control the aircraft resulted in a hard landing which damaged the nose gear.

2.5 EARLY DO.

The pilot was anxious to take off from a soft field located at a high altitude. The aircraft was heavily loaded with the weight improperly distributed. He lifted the aeroplane off as soon as he thought it would fly. It munched along above the runway and finally hit a truck parked at the edge of the airport.

2.6 LATE DO.

The aircraft was loaded to within 5 kgs of maximum gross weight. Take-off was to be made under crosswind conditions on a short runway with a creek 300 metres from the end. The pilot's decision to abort the take-off attempt came with little runway remaining, and the aeroplane wound up in the creek.

EXERCISE 3 : SCENARIO ANALYSIS.

DIRECTIONS.

1. Read the following fact summary and pilot report. The report tells the true story of a pilot who got into trouble because of his poor decision-making about weight and balance and its effect on performance.
2. After you finish your reading, answer the questions following the scenario. (Sentences in the pilot report have been numbered for your convenience). Circle the answer you think is correct.

Fact Summary.

Pilot : 168 hours total flying time, 76 hours in this aircraft type. Has held private pilot's licence 8 months. All flying was done in the South Island of New Zealand.

Aircraft : Single engine, 4 seats. Loaded within 10 kgs of maximum gross weight at take-off. The CG is slightly beyond the aft limit due to cargo in the rear baggage area. All systems are operating normally.

Airport : Departure being made from Tekapo in the South Island, a small field, elevation 2496 feet. One runway, sealed, 840 metres, direction 11/29, slight uphill slope from east to west.

Flight Plan : Filed with ATCHCH. Depart Mt Cook - 0700 via Pukaki to arrive Tekapo 0730 and depart 1300; arrive Queenstown 1350 and depart 1900; arrive Mt Cook 2000.

Current Conditions : Qnt 100B, temperature 35 degrees C, wind 260 degrees at 7 knots, density altitude 5500 feet, sky clear, runway dry.

Pilot's Report.

(1) Taking off from Tekapo, I knew the aircraft was only 10 kgs under maximum gross weight. (2) I failed to realize that our new cargo had moved the CG to slightly beyond the aft CG limit. (3) At our time of departure, the temperature was 35 degrees C, and the density altitude was 5500 feet.

(4) Because weight and balance had never created any problems for me, I did not bother to calculate take-off distance. (5) I did try to estimate it, however, by remembering my figures from earlier in the morning at Mt Cook. (6) At maximum gross weight and at the Mt Cook density altitude of 4500 feet, the aircraft performance chart called for 580 metres of take-off roll.

(7) Since the runway at Tekapo gave me 840 metres, I was sure there would be no problem.

(8) The prevailing wind was from 260 degrees at 7 knots, so I made the departure on Runway 29. (9) During the take-off roll, the aeroplane accelerated very slowly. (10) About half way down the runway, I thought about aborting the take-off attempt, but the speed gradually continued to increase. (11) I finally rotated after using about two-thirds of the runway, figuring it would either fly or it wouldn't.

(12) Then my real problems began. (13) As I attempted to establish the aircraft at its best rate-of-climb, I found the nose wanted to stabilize at a higher than normal angle of attack. (14) Next, I noticed the aeroplane was not gaining much altitude in relation to the ridge which was just a little over a mile ahead of us. (15) Worried, I felt I had to do something right then, so I pulled the nose up higher in an attempt to get the best-angle-of-climb airspeed. (16) The aeroplane was very difficult to control.

(17) As the ridge grew closer, the aeroplane's altitude above the ground got lower and lower. (18) With the crest of the ridge less than a mile away, I concluded it was unlikely that the aeroplane would climb fast enough to get over the top. (19) My height above terrain at one half mile had dipped below 300 feet, and I decided that my only hope was to turn 180 degrees and to go back to the airport. (20) To say the least, the turn was a very unnerving experience. (21) But, it was my only way out. (22) I was flying just above stall speed, and aircraft control was unstable because of the loading beyond the aft CG limit. (23) At one point in the turn the wheels were less than 20 feet off the ground. (24) Somehow though, I succeeded in making the turn and in getting back to the airport.

(15-8)

Questions.

- 3.1 Which sentence indicates the pilot did something he should not have done ?
- a. Number 1
 - b. Number 4
 - c. Number 6
 - d. Number 8
- 3.2 The pilot's thought pattern at the decision point referred to in question 3.1 was probably the hazardous one called:
- a. Impulsivity
 - b. Invulnerability
 - c. External Control
 - d. Anti-Authority
- 3.3 Which sentence suggests the pilot did something too late ?
- a. Number 7
 - b. Number 8
 - c. Number 9
 - d. Number 10
- 3.4 The pilot's thought pattern at the decision point referred to by sentence 11 was probably the hazardous one called:
- a. Impulsivity
 - b. Invulnerability
 - c. Macho
 - d. External Control

- 3.5 The pilot's thought pattern at the decision point referred to in sentence 15 could be the hazardous one called:
- a. Impulsivity
 - b. Invulnerability
 - c. Macho
 - d. Anti-Authority
- 3.6 The correct antidote for the hazardous thought pattern referred to in question 3.5 could be expected to call the pilot's attention to:
- a. The rule about loading the heaviest passengers to the front of the aircraft.
 - b. The real possibility that being overloaded might cause the aeroplane to crash.
 - c. A sudden change in attitude might stall the aircraft.
 - d. The pilot, not "Lady Luck", needs to do something quickly.
- 3.7 What type of poor decision making does sentence 19 best represents ?
- a. Do
 - b. No Do
 - c. Early Do
 - d. Late Do
- 3.8 One principle of the PJ sequence chain states that, "As the PJ chain grows, the alternatives for safe flight decrease." Which sentences best illustrates this principle ?
- a. Number 11
 - b. Number 13
 - c. Number 17
 - d. Number 19
 - e. Number 22

3.9 Do you think the pilot fully considered his aircraft during this series of events ?

- a. Yes
- b. No
- c. Why?

3.10 Do you think the pilot fully considered his environment during this series of events ?

- a. Yes
- b. No
- c. Why ?

LESSON 16.

JUDGEMENT RELATED TO OFFICIAL PROCEDURES AND COMMUNICATIONS.

INTRODUCTION.

Many rules, procedures and regulations control aircraft operations. The Civil Aviation Regulations (CAR) and the Aeronautical Information Publication (AIP) contain information that every pilot must know and use correctly at all times. Airport procedures, radio communications and radio navigation aids are all designed to make flying safer by requiring every pilot to conform to standard systems and procedures.

There are a number of ways pilots can endanger themselves and others because of poor judgements in relation to official rules and procedures.

Here are some examples:

1. Failing to learn all regulations and procedures correctly.
2. Failing to review regulations and procedures that have become unclear or have been forgotten over time.
3. Not keeping current on changes and additions to official information, such as the C.A.R.'s and sectional charts.
4. Ignoring the rules and procedures.
5. Failing to get further explanation when something seems confusing or illogical.
6. Failing to be assertive and to challenge apparent mistakes when an official source of information, such as a controller or a Civil Aviation publication, seems to be in error.

EXERCISE 1 : SUBJECT AREAS.

DIRECTIONS.

1. Read the Pilot, Aircraft and Environment sections below, and read the case history which completes each section.
2. Underline the words in the case histories which tell you the pilot made a poor judgement about the subject area.
3. If you believe another subject area is also related to the situation, circle the appropriate "Related Subject Areas" combination.

1.1 PILOT.

Poor Judgements are often made when a pilot assumes his or her knowledge is complete about things that the official rules and procedures require him/her to know and to verify.

Case History 1.

Subject Area: Pilot.

Related Subject Areas: P/A, P/E, P/A/E.

An experienced pilot was landing at a small airport for the first time in over a year. After taxiing to a stop, he was met by the tower chief who wanted to know why the pilot had not radioed to request landing clearance. Red faced with embarrassment the pilot explained that he did not know that a tower was now in operation where none had existed on previous visits.

1.2 AIRCRAFT.

A pilot will sometimes make a poor judgement regarding how carefully he/she has to follow the rules to assure safety in a particular aircraft. As a result, he/she may underestimate the potential danger of a given situation.

Case History 2.

Subject Area: Aircraft.

Related Subject Areas: A/P, A/E, A/P/E.

While making touch-and-go landings, the pilot of a single engine aircraft was contacted by the tower. The tower advised caution due to possible wake turbulence from a departing turboprop. The pilot executed a touch-and-go less than a minute after the turboprop's take-off. Wake turbulence carried the single engine aircraft into uncontrolled flight, and it crashed before the pilot could recover.

1.3 ENVIRONMENT.

The most common poor judgements about the environment result when a pilot assumes that the environment will remain unchanged after receiving an official report.

Case History 3.

Subject Area: Environment.

Related Subject Areas: E/P, E/A, E/P/A.

The Cessna pilot was cleared for a touch-and-go landing after calling the tower from 2 miles out. A Piper aircraft entered the landing pattern with its radio turned off. The two airplanes collided on final approach. The crash seriously injured 5 people and destroyed both aircraft. Investigators noted that each pilot had over 900 hours flying time.

EXERCISE 2 : ACTION WAYS.

DIRECTIONS.

1. Read the true case history accident reports in each sub-section below.
2. Underline the words in each accident report that express the PJ action way listed in the heading of the sub-section.
3. Write a phrase that describes the correct (safe) action way in the space provided below each accident report.

2.1 DO.

After landing, the pilot selected 121.7 for ground control while the correct frequency was 121.9. Taxiing to the ramp the pilot crossed the active runway. The pilot of a second aircraft was unable to abort his take-off run, and a ground collision resulted.

2.2 NO DO.

The pilot reported the airport in sight 10 miles out and was cleared for a visual approach. Approach control advised the pilot to contact the tower for landing clearance. The pilot landed without contacting the tower.

2.3 UNDER DO.

The traffic pattern was congested and the local frequency was very busy. There were wide variations in the standard pattern because of the differing approach speeds of the variety of aircraft attempting to land. A Cessna 150 pilot, assuming he was next to land, started his turn to final after a short base leg. He failed to see a Mooney in-bound on a long final approach and the two collided in mid-air.

2.4 OVER DO.

There was ice and snow on the taxiways and runways. Light snow was falling, limiting visibility. The pilot mistook a taxiway for the active runway. Cleared for take-off, the pilot began his roll. At the moment of liftoff the tower informed the pilot that he was taking off from a taxiway. The pilot reacted by trying to abort the take-off. The aircraft hit a barrier chain at the end of the taxiway.

2.5 EARLY DO.

A pilot was taxiing for takeoff at a large and busy airport. He thought he heard a clearance for his aircraft to move into take-off position. The clearance was actually for another aircraft, but the pilot moved forward immediately without waiting for the tower to respond to his readback. The jet blast from the DC-10 departing in front of him overturned the aircraft.

2.6 LATE DO.

A VFR aircraft at 5,500 feet advised the control tower that he was climbing to 9,500 feet, VFR. The controller advised the pilot that Terminal Controlled Airspace (TMA) was in effect above 5,500 feet. The controller's next check showed the aircraft at 6,500 feet and climbing. The controller then forcefully advised the pilot to descend VFR to 5,000 feet. This time the pilot complied. The report of the incident notes, "He had been crossing a departure route which, luckily, was unoccupied."

EXERCISE 3 : SCENARIO ANALYSIS.

DIRECTIONS.

1. Read the following pilot's report. Making judgements about information received is a very important part of a pilot's work. Sometimes even official information can be confusing or incorrect. The following scenario tells the true story of a pilot who was led astray by such information.
2. After you finish your reading, answer the questions following the scenario. (Sentences in the pilot report have been numbered for your convenience). Circle the answer you think is correct.

Pilot's Report.

(1) I got up early and watched the television weather. (2) Conditions looked good for the area, except for a squall line due to move in from the southeast during the afternoon. (3) At the airport, the briefing office was not open and I couldn't find a pay phone nearby. (4) I therefore did not get a weather briefing. (5) I decided not to file a VFR flight plan, since I expected a routine flight. (6) Once in my aircraft, I tuned in the ATIS broadcast which reported the local weather to be VFR, wind at 090 degrees, 10 knots, altimeter setting 1022 hPa.

(7) I took off on runway 02, and I changed my radio to control. (8) The controller said, "Left 360, climb to 3500, follow the main highway." (9) I read back, "Roger, a left 360, climb to 3500." (10) The departure controller responded, "... affirm, follow traffic 10 o'clock, 4 miles." (11) I replied, "turning left 360 degrees and looking for traffic." (12) I thought to myself that a 360 degree turn just after take-off was very unusual, but I trusted the controller and did it anyway. (13) About half way around, the controller said, "What are you doing? You were supposed to roll out on a heading of 360 degrees." (14) I immediately turned back to 360 degrees and departed the aerodrome circuit area without further incident.

(15) As I headed north at 5500 feet, I could see a cumulonimbus cloud off to my left. (16) About an hour later, the weather in my vicinity had worsened to the point where I feared I would soon be flying into IFR conditions. (17) I got out my Topographical chart to look for an alternate aerodrome. (18) Fortunately, I was close to Christchurch, an airport I had landed at a few times in years past. (19) I headed there right away. (20) I arrived near the field about 10 minutes later, and I began descending from 5500 feet to 2000 feet to circle the field, to look for traffic and determined the active runway.

(21) All of a sudden, I saw an aircraft at my altitude (2000 feet indicated), and it was heading straight at me from my 2 o'clock position. (22) Since I was there first, I decided to continue straight on my course - the other aircraft quickly passed rapidly under my wing. (23) I then tried to establish radio contact on what I thought was the local frequency for Christchurch. (24) Another pilot answered my call, and advised me to contact Christchurch tower on 118.3. (25) I thanked him and took a second look at my sectional chart: it was over 10 months old !

(26) The tower told me to enter a downwind for runway 11 at circuit altitude, and they gave me an altimeter setting of 1022. (27) As I moved to reset my altimeter, I was surprised to find it was set at 1012. (28) I must have erred when I set it from the ATIS broadcast at my departure aerodrome ! (29) That explained the near mid-air collision - I was at circuit altitude, not 1000 feet above it !

QUESTIONS.

- 3.1 Which are the two possible action ways the pilot performed according to information in sentence 3:
- a. Late Do/No Do
 - b. Do/Under Do
 - c. Late Do/Under Do
 - d. No Do/Over Do
- 3.2 Which sentence illustrates the beginning of a PJ chain ?
- a. Number 2
 - b. Number 3
 - c. Number 4
 - d. Number 5
- 3.3 Which antidote is appropriate for the hazardous thought that may be present in sentence 5 ?
- a. Not so fast. Think first.
 - b. Use the rules. They are usually right.
 - c. I'm not helpless. I can made a difference.
 - d. Why not me ? I'm human, too.
- 3.4 What action way is described by the controller's instructions to the pilot in sentence 10 ?
- a. Do
 - b. Early Do
 - c. Under Do
 - d. Late Do

- 3.5 Which hazardous thought is shown by what the pilot says in sentence 12 ?
- a. Anti-Authority
 - b. External Control
 - c. Macho
 - d. Impulsivity
- 3.6 Which combinations of subject areas is of greatest concern to the pilot in sentence 21 ?
- a. Pilot/Environment
 - b. Pilot/Aircraft
 - c. Environment/Aircraft
 - d. Pilot/Aircraft/Environment
- 3.7 What hazardous thought might the pilot have had in ignoring the right-of-way regulations in sentence 22 ?
- a. Anti-Authority
 - b. Macho
 - c. Invulnerability
 - d. External Control
- 3.8 What action way is illustrated by the poor judgement exercised in relation to communications in sentence 23 ?
- a. No Do
 - b. Under Do
 - c. Late Do
 - d. Early Do

3.9 What action way is suggested by sentence 25 ?

- a. No Do
- b. Late Do
- c. Under Do
- d. Do

3.10 In sentence 28 the pilot noticed he had misunderstood information from the ATIS. To which subject area or areas would a pilot have to pay careful attention in order to notice such an error ?

- a. Pilot
- b. Environment
- c. Pilot/Environment
- d. Aircraft/Environment

LESSON 17.

JUDGEMENT RELATED TO CROSS COUNTRY FLYING.

INTRODUCTION.

For many pilots, cross country flying creates a feeling of excitement. As the anticipation builds, a pilot may view his or her abilities in an unrealistic, over-confident manner. Another pilot may tend to view cross country flights as very routine and take a complacent attitude. In either case, poor judgements before and during the flight can lead to risky situations and accidents.

Examples of cross country related poor judgements are:

1. Carelessness when obtaining the preflight weather briefing.
2. Lack of familiarity with the aircraft.
3. Poor planning of the cross country route.
4. Improper use of navigational aids and methods.
5. Poor planning of fuel load and usage.
6. Over extension of skills in weather conditions.
7. Failing to ask for help when a problem occurs.

EXERCISE 1 : SUBJECT AREAS.

DIRECTIONS.

1. Read the Pilot-Aircraft-Environment sections below and read the case history which completes each section.
2. Underline the words in the case histories which tell you the pilot made a poor judgement about the section's subject area.
3. If you believe another subject area is also related to the situation, circle the appropriate "Related Subject Areas" combination.

1.1 PILOT.

Often a pilot becomes over-confident of his/her ability to navigate on a cross country flight. This can lead to unexpected situations which are difficult or impossible to overcome.

Case History 1.

Subject Area: Pilot.

Related Subject Areas: P/A, P/E, P/A/E.

The pilot was flying a single engine aircraft from Auckland to Nadi using dead reckoning as her primary means of navigation. She estimated her time enroute as 9 hours. The pilot did not properly correct for wind and drifted off course. Thirteen and a half hours after departure she ran out of fuel and had to ditch in the ocean.

1.2 AIRCRAFT.

When preparing for a cross country flight, it is a serious mistake to not be sure that the aircraft is properly equipped to make the flight. For example, if the flight is to be conducted under night or instrument conditions, the aircraft must be equipped with the necessary lighting, instrument and anti-icing/deicing systems. The pilot must also check that the required equipment is operational.

Case History 2.

Subject Area: Aircraft.

Related Subject Areas: A/E, A/P, A/P/E.

The weather forecast called for icing conditions enroute. The pilot departed even though the aircraft was not equipped with wing deicers. Freezing rain and sleet were encountered causing ice to form on the wings. The pilot experienced airspeed and control problems which resulted in a stall and a fatal crash.

1.3 ENVIRONMENT.

We have defined environment as everything other than the aeroplane. Certainly most of what is "out there" on a cross country flight involves the weather. The most common poor judgement made about the environment is to continue flight into deteriorating weather conditions.

Case History 3.

Subject Areas: Environment.

Related Subject Areas: E/P, E/A, E/P/A.

Even though the pilot was not instrument rated, he continued his flight into IFR conditions (overcast, low ceiling). While attempting to get below the overcast to find a landing area, the pilot flew into high voltage power lines and crashed.

EXERCISE 2 : ACTION WAYS.

DIRECTIONS.

1. Read the true case history accident reports in each sub-section below.
2. Underline the words in each accident report that express the PJ action way listed in the heading of the sub-section.
3. Write a phrase that describes the correct (safe) action way in the space provided below each accident report.

2.1 DO.

The pilot did not have an instrument rating. Even though there was a good possibility of enroute IFR conditions due to snow, the pilot decided to continue the flight. He encountered a snowstorm and low ceilings. The pilot had to make a precautionary landing on a snow covered road.

2.2 NO DO.

The pilot had been flying above scattered clouds when she noticed the clouds beneath her had developed into a solid overcast. Trying to remain VFR, the pilot began a descent and encountered unbroken cloud cover. She then declared an emergency and requested the ATC Centre to provide vectors to the nearest airport.

2.3 OVER DO.

On a cross country flight the pilot was eastbound at 3500 feet. She was being very careful to stay on course. While intently watching the VOR Course Deviation Indicator (CDI), she neglected to check her altimeter. She was startled to see an aircraft pass 100 feet above her. A look at the altimeter told her she was currently flying at 3850 feet.

2.4 UNDER DO.

About 350 miles from his intended destination, the pilot experienced a rough running engine. He decided to make a precautionary landing at the nearest airport. On landing, he failed to check carefully for a "gear-down-and-locked" indication prior to landing. The gear was not locked because the hydraulic pump had stopped working when the engine had failed.

2.5 EARLY DO.

Although there had been no mention of fog in the weather forecast, the pilot ran into patches of ground fog during final approach. He continued the approach, but misjudged his ability to make the landing flare and levelled off too high. A hard landing resulted, damaging the aircraft.

2.6 LATE DO.

Flying over water, the pilot reported that he was dangerously low on fuel and was unsure of his position. Air Traffic Control radar located the aircraft, and the pilot was given a heading toward land. Minutes later, the pilot reported he was out of fuel and was ditching in the ocean. No survivors were found.

EXERCISE 3: SCENARIO ANALYSIS.

DIRECTIONS.

1. Read the following pilot report. The report tells the true story of a pilot whose judgement with regard to planning and flying a cross country trip led to disaster. This story is an excellent example of how one poor judgement often leads to another, and how the alternatives for safe flight are reduced when this happens.
2. Underline the words or phrases that express the subject areas.
3. Circle the words or phrases that express the PJ action ways.
4. Identify the sentences which suggest hazardous thoughts by writing the appropriate identifying symbol in the margins:

ANA = Anti-Authority,
IMP = Impulsivity,
INV = Invulnerability,
MAC = Macho,
EXT = External Control.

5. After you finish your reading, answer the questions following the scenario. (Sentences in the pilot report have been numbered for your convenience). Circle the answer you think is correct.

Pilot's Report.

(1) I was flying two friends from Taupo to Rotorua to look at a new boat and then returning to Taupo with one of them. (2) The visibility at Taupo was near VFR landing minimums during my preflight planning. (3) Enroute to Rotorua I received a weather briefing from FIS (Flight Information Service) personnel telling me that the weather was probably not going to improve. (4) I was becoming somewhat concerned because I did not have an instrument rating and the aircraft was not equipped with deicing equipment.

(5) While on the ground at Rotorua, I debated about refuelling for the return trip. (6) I figured there was enough to get back to Taupo with about a 25 minute reserve. (7) I expected to get back about sunset, and decided that I would not really need any extra fuel for the night VFR flight. (8) I considered topping up the tanks, but I decided against that. (9) I had made this trip probably 50 times, and I was sure I could do it with no problem - bad weather or not. (10) Besides, I was in a hurry to get going before the weather got even worse.

(11) So I left the Rotorua area with my passengers. (12) He asked me if I thought the weather was going to be a problem. (13) I remember telling him, "No, there's nothing to flying in this stuff." (14) At the time I really meant it. (15) About 20 miles out from Taupo, the weather had become really nasty with steady snow flurries and gusty winds.

(16) Taupo flight service informed me that the airport was at landing minimums, and that their VASI system (Visual Approach) was inoperative. (17) I checked our fuel and as best I could tell there was only 15 minutes left. (18) This was not enough to get us to another airport, nor was I sure it was enough for a second landing attempt.

(19) With the VASI system inoperative, I knew I would have to fly a very precise approach. (20) Not wanting to alarm my friend, I simply told him, "We'll be landing as quickly as possible. (21) Let's have no conversation until we get on the ground." (22) His reply of "okay" came with a flat voice and a concerned look on his face.

(23) I decided to dip below the recommended minimum altitude when I did not see the runway as soon as expected, and make a flat approach. (24) My thought at the time was "Don't worry, the guy who makes up these altitudes always makes them a little higher than necessary." (25) I did not adjust my descent. (27) Soon after that the aircraft struck the tree tops on the ridge a few hundred yards from the airport boundary.

QUESTIONS.

- 3.1 What subject area combinations concern the pilot in sentence 4 ?
- a. Pilot/Aircraft
 - b. Pilot/Environment
 - c. Aircraft/Environment
 - d. Pilot/Aircraft/Environment
- 3.2 Considering the ending to the scenario, what action way is suggested by sentence 8 ?
- a. Do
 - b. No Do
 - c. Over Do
 - d. Early Do
- 3.3 Which hazardous thought would you associate with the pilot's comment in sentence 9 ?
- a. Anti-Authority
 - b. Impulsivity
 - c. Invulnerability
 - d. External Control
- 3.4. Which hazardous thought would you suspect the pilot of using by what is said in sentence 13 ?
- a. Anti-Authority
 - b. Impulsivity
 - c. Macho
 - d. External Control

- 3.5 What is the subject area being considered in sentence 18 ?
- a. Pilot
 - b. Aircraft
 - c. Environment
 - d. Aircraft/Environment
- 3.6 Which antidote would you suggest for the hazardous thought that may be present in sentence 20 ?
- a. "Give the rules a chance. They could be right."
 - b. "I'm not helpless. I can make a difference."
 - c. "Not so fast. Think about it."
 - d. "Risks don't make me a better pilot. They make me a fool."
- 3.7 Which Action Way describes the pilot's action in sentence 23 ?
- a. Do
 - b. Under Do
 - c. Over Do
 - d. Late Do
- 3.8 Which hazardous thought is shown by what the pilot says in sentence 24 ?
- a. Anti-Authority
 - b. Impulsivity
 - c. Macho
 - d. External Control

3.9 What is the action way associated with the pilot's judgement in sentence 25 ?

- a. Do
- b. No Do
- c. Over Do
- d. Late Do

3.10 One principle of the PJ chain states, "The more poor judgements made in sequence, the more probable that others will continue to follow". Which sentence in the scenario best illustrates this principle ?

- a. Number 4
- b. Number 7
- c. Number 13
- d. Number 23

LESSON 18.

JUDGEMENT RELATED TO PHYSIOLOGICAL FACTORS AND NIGHT FLYING.

INTRODUCTION.

Flying VFR at night introduces additional difficulties in the already challenging job of flying. Obvious dangers face the pilot who flies with a physiological impairment such as illness, fatigue, or being intoxicated. Yet, many accidents occur because pilots make poor judgements with regard to their ability to fly safely in spite of night conditions or physiological limitations.

Here are some common examples of these poor judgements:

1. Flying while under the influence of alcohol.
2. Flying with a known illness.
3. Flying when extremely fatigued due to lack of sleep or food.
4. Flying into conditions which are likely to cause vertigo.
5. Flying VFR at night without sufficient experience at recognising landmarks.
6. Underestimating the factors - which can cause disorientation at night.

EXERCISE 1: SUBJECT AREAS.

DIRECTIONS.

1. Read the Pilot, Aircraft and Environment sections below and read the case history which completes each section.
2. Underline the words in the case histories which tell you the pilot made a poor judgement about the section's subject area.
3. If you believe another subject area is also related to the situation, circle the appropriate "Related Subject Areas" combination.

1.1 PILOT.

All physiological factors obviously involve the subject area Pilot. And, as you might suspect, flying while under the influence of alcohol leads the list of problem areas. Research indicates that 16 per cent of fatal general aviation accidents involved pilots with positive alcohol levels.

Case History 1.

Subject Area: Pilot.

Related Subject areas: P/A, P/E, P/A/E.

The pilot was 25 years old, had 114 hours total time and 2 hours in this type aircraft. He and his three passengers were observed drinking alcoholic beverages before getting into the aeroplane. Even though IFR conditions existed, the non-instrument rate pilot took off. About one minute after take-off, the aeroplane crashed into a nearby field and all four lives were lost.

1.2 AIRCRAFT.

Pilots often forget - or never learn - that night flying can alter the appearance of things. Visibility, both inside and outside the cockpit, must receive extra care and attention during night flying.

Case History 2.

Subject Area: Aircraft.

Related Subject Areas: A/P, A/E, A/P/E.

A non-instrument rated pilot was trying to land at night under VFR. Conditions included a partially obscured sky and visibility that was, at some points, less than 700 metres due to patches of fog. The approach was made with the landing lights on. The pilot overshot the runway and crashed into a gully. Investigators believed that light reflecting from the water droplets forming the fog probably reduced the pilot's visibility to nearly zero.

1.3 ENVIRONMENT.

Pilots often make poor judgements because of their inability to locate and recognise ground references when flying VFR at night.

Case History 3.

Subject Area: Environment

Related Subject Areas: E/P, E/A, E/P/A

A pilot on a night VFR flight was unable to locate the airport. Running low on fuel, the pilot circled the town for 45 minutes trying to find the airfield. He finally ran out of fuel and had to make an emergency landing.

EXERCISE 2: ACTION WAYS.

DIRECTIONS.

1. Read the true case history accident reports in each sub-section below.
2. Underline the words in each accident report that express the PJ action way listed in the heading of the sub-section.
3. Write a phrase that describes the correct (safe) action way in the space provided below each accident report.

2.1 DO.

During cruising flight the engine failed because of fuel starvation. The pilot's emergency landing attempt ended in a spin and crash. Investigation revealed: 1) The fuel selector was set on a empty tank; 2) The pilot's blood alcohol level was high enough to reduce her efficiency and judgement.

2.2 NO DO.

It was after sunset, and the pilot was planning to land on an unlit dirt strip. He mistook a section of road for the strip, attempted to land on his first approach, and flew into power lines.

2.3 OVER DO.

With no previous experience in this type aircraft, the pilot took off at night to do some low level pleasure flying. While he was attempting a low power right turn, the aircraft stalled. The aeroplane spun in before the pilot could make a recovery.

2.4 UNDER DO.

While the aeroplane was climbing to a cruising altitude of 6,500 feet, the engine failed. The pilot was unable to recover properly. The aircraft lost altitude, veered left and crashed into high terrain. Investigators concluded that the pilot's reaction abilities and his judgement were reduced by the presence of alcohol in his blood.

2.5 EARLY DO.

The pilot was attempting an engine out emergency landing at night. The weather was marginal VFR with a low ceiling. As the pilot descended out of the overcast on his final approach, he had trouble identifying the runway. However, he elected to continue his approach. He landed between two rows of blue taxiway lights and crashed into a fire truck.

2.6 LATE DO.

Because of darkness, the pilot could not accurately determine wind direction or velocity. During his approach, he noticed that he was landing with a fairly strong tailwind. The resulting high ground speed led the pilot to believe that he had plenty of airspeed. Seeing that he was going to overshoot the runway, the pilot elected to around. He increased pitch before applying power, still believing his airspeed to be adequate. Actually he was below normal approach speed. While he was adding power, the aircraft stalled and entered a spin from which he was unable to recover.

EXERCISE 3 : SCENARIO ANALYSIS.

DIRECTIONS.

1. Read the following pilot report. The report tells the true story of a pilot who nearly got into trouble because of his poor decision-making related to preflight activities and the operation of an aircraft system.
2. After you finish your reading, answer the questions following the scenario. (Sentences in the pilot report have been numbered for your convenience). Circle the answer you think is correct.

Pilot's Report.

(1) I had been flying at between 13,500 and 14,500 feet for about an hour and a half before I began my descent for landing. (2) I guess I was pushing my luck since I had no oxygen. (3) I did not think anything would happen to me because I had done similar things before and had always come out okay. (4) My altitude had dropped to below 13,000 feet for about 25-30 minutes before I began my landing approach.

(5) When I got over the runway threshold, my brain was a little foggy about how to actually land the aeroplane. (6) I guess "confused" is a better word for how I was feeling. (7) Well, my slow and fuzzy thinking let the aeroplane get ahead of me. (8) I tried to land it anyway, wanting to get on the ground and out of the aeroplane as soon as possible.

(9) The next thing I knew, I was porpoising down the runway. (10) The first hop scared the stuffings out of me. (11) But, surprisingly enough, it also made me more alert. (12) I got the aeroplane airborne again, and called the tower for a low level circuit. (13) My second landing attempt went a little better, but it was still rough because I was still feeling fuzzy in the head. (14) I guess I was lucky I made it around the second time.

(15) Right away I went to see my doctor. (16) He asked me what I had eaten before the flight. (17) When I told him my last meal was almost seven hours ago and had consisted of vending machine chicken broth and a candy bar, he was obviously annoyed with me. (18) His comments to me were, "Your story sounds like a case of hypoxia (oxygen starvation) or of hypoglycemia (low blood sugar) - or both. (19) I suspect both because you continued to feel confused at the lower altitudes. Also, your symptoms cleared rapidly after your fright reactions to your first landing attempt. (21) A surge of adrenalin in such a situation will produce a very rapid increase in blood sugar level. (22) The hypoxia may have made the blood sugar problem more severe, however."

(23) I left his office a grateful, wiser pilot. (24) I assured him that before flying I would eat a solid meal to maintain an adequate blood sugar level. (25) I also promised myself to get a supplement oxygen system before trying another long flight at high altitudes.

QUESTIONS.

3.1 The hazardous thought best describing the pilot's thinking in sentence 3 is ?

- a. Anti-Authority
- b. Impulsivity
- c. Invulnerability
- d. External Control

3.2 The Subject Area mentioned in Sentence 5 is ?

- a. Pilot
- b. Aircraft
- c. Environment
- d. Aircraft/Environment

- 3.3 Which action way is most likely going to be the result of sentence 7 ?
- a. Do
 - b. Early Do
 - c. Over Do
 - d. Late Do
- 3.4 Which sentence suggested the hazardous thought of impulsivity ?
- a. Number 7
 - b. Number 8
 - c. Number 9
 - d. Number 10
- 3.5 Which antidote would you suggest for what the pilot is saying in sentence 14 ?
- a. "Who says it can't happen to me ? I'm human too."
 - b. "Not so fast. Think about it."
 - c. "Risks don't make me a better pilot. They make me a fool."
 - d. "I'm not helpless. I can make a difference."
- 3.6 What combination of subject areas does sentence 18 suggest ?
- a. Pilot/Aircraft
 - b. Pilot/Environment
 - c. Aircraft/Environment
 - d. Pilot/Aircraft/Environment

- 3.7 What does sentence 19 suggest to you about the doctor ?
- a. He knows his patient very well.
 - b. He does not know anything about the airplanes.
 - c. He knows something about psychiatry and psychology.
 - d. He understands flight physiology and its effect on pilot judgement.
- 3.8 For which subject area has the pilot gained a greater respect, as indicated by sentence 24 ?
- a. Pilot
 - b. Aircraft
 - c. Environment
 - d. Pilot/Aircraft
- 3.9 Which combination of subject areas has the pilot become more concerned about as is shown by his remarks in sentence 25 ?
- a. Pilot/Aircraft
 - b. Pilot/Environment
 - c. Aircraft/Environment
 - d. Pilot/Aircraft/Environment
- 3.10 The first principle of the PJ chain states, "One poor judgement increases the probability that another poor judgement will follow." Which sentence best represents what this principle is about ?
- a. Number 1
 - b. Number 2
 - c. Number 3
 - d. Number 5

(18-10)

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APPENDIX B: THE INSTRUCTOR'S TRAINING MANUAL.

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MASSEY UNIVERSITY SCHOOL OF **AVIATION**

**PILOT
JUDGEMENT
TRAINING**

**INSTRUCTOR'S
MANUAL**

PREFACE.

During 1975, the United States Federal Aviation Administration (FAA), initiated a programme to improve the judgement - making abilities of civil aviation pilots. The first phase of this programme commissioned Jensen and Benel at the University of Illinois to examine the psychology of Pilot Judgement. This commission resulted in a review of US general aviation accidents (1970-74), and led to the observation that faulty decisions were implicated in 35% of all non-fatal accidents, and 52% of all fatal accidents. Furthermore, the researchers conducted a review of judgement related literature, constructed a definition of pilot judgement, and concluded that pilot judgement training and its evaluation was feasible.

In 1978, the second phase of the FAA programme was initiated, and the Embry-Riddle Aeronautical University (ERAU) was contracted to develop, implement, and evaluate appropriate materials, and methods for pilot judgement training. The FAA Office of Aviation Medicine supervised the project which used student pilots at Embry-Riddle. These subjects were placed in one of two groups: the first received special training from instructors (who themselves had been specially trained) and from the use of the newly developed manuals; the second received normal flight training. The observable benefits of this training were demonstrated in an observation flight. The results, illustrated significant differences between the training and non-training group, and were regarded as highly promising. The experimenters however, drew attention to the need for further studies.

Following this initial research, the ERAU training material has been used in training studies by Transport Canada (1983), the FAA (1983), the French Directorate of Civil Aviation (1983), and the Australian Department of Aviation (1986). A more detailed outline of these studies can be found in the book Aviation Psychology by R.S. Jensen (1989).

More recently, the ERAU training material has been modified to match the New Zealand General Aviation Environment. These alterations have been made by Philip List, under the guidance of Dr. Nigel Long, Roger Crosthwaite, and Dr. Ross St George. In conjunction with these changes, a number of evaluative measures have been designed, and a small evaluative study has been implemented to measure the effectiveness of the training material. If you require any information relating to this material or its evaluation, please address your enquiry to the following office :

Dr. N. R. Long.
Senior Lecturer - Psychology.
Massey University.
Palmerston North.
New Zealand.

INTRODUCTION.

You will find, the Instructor's Manual is divided into two sections. The first section outlines the training programme contained in the Student Manual, explains how to present the material, and provides guidance on how to resolve student difficulties. Having completed this section you will be directed to work through the Student Manual, and to learn the terms and concepts used in training. Your understanding of this material will provide the knowledge required to teach Section Two of this manual. This final section details two sets of in-flight training, and explains when, and how you should administer the programme to your students.

You will soon realize that this manual is a supplement to the Student Manual, and not a stand-alone document. The material contained in the Student Manual constitutes about 80 percent of the training course. You must carefully study and complete all of the lessons it contains. Merely becoming familiar with the material is not sufficient. You must know the material as well as, or better than, your best student. Learning the material is not difficult because the Student Manual requires a minimum of study and memorization. By reading the lessons and completing the exercises you, as well as your students, will learn the material.

Your understanding of the Student Manual, and an awareness of the student learning process is critical for the success of the training programme. This knowledge and experience will serve to facilitate your answers for any student difficulties, but more important, as has already been stated, it is the baseline knowledge for administering the in-flight training.

The in-flight training outlined in Section 2 of this manual, should be presented in conjunction with the normal flight training of your students. The lessons do not appear in the Student Manual because they depend entirely upon your interaction with the student. No learning of new material is necessary because the lessons are experiential exercises. In these lessons, the students apply what they have learned from the judgement training material to actual flight situations. As you study Section One of this Instructor's Manual, and then complete the Student Manual, be alert to the ways you can incorporate the judgement training material into your own methods of flight instruction. This will aid your preparation for the in-flight training.

YOUR ROLE IN THE TRAINING.

This training is designed to help student pilots overcome a variety of circumstances which may result in poor pilot judgement. As the flight instructor, you are the key part of this programme. Your attitude and your approach to flying may often influence students more than any specific lesson in the judgement training programme. Help your students develop good judgement and sound flying practices by always setting a good example and by giving them your support and encouragement throughout this programme.

To help prepare yourself for this role, think about the difference between the instructor as an evaluator and the instructor as a coach. Flight instructors who acts as evaluators see their role as one of telling the student what to do, and then monitoring the student's performance. They make assignments, watch performance, answers questions, measure performance, and indicate how well the student has done. The amount of learning accomplished is basically up to the student. The flight instructor spends most of his or her time observing the student and reporting on their performance.

In contrast, think of the instructor as a coach. In this role, the instructor actively stimulates learning. The instructor not only makes assignments and watches to see what happens, he or she helps the student learn through demonstration and personalized instruction. The instructor does more than just answer questions - he/she asks them. The instructor does more than point out errors - he/she encourages the correct way of doing things.

Similarly, the baseball umpire who calls balls and strikes is only concerned with evaluating performance; he or she is not interested in helping the pitcher get the batter out. In contrast, the pitching coach instructs the pitcher during practice and then supports the pitcher as much as he or she can during the game. A win for the pitcher is a win for the team, so the coach plays an active role in the pitcher's development and performance. Simply put, your approach to your flight students should match that of the pitching coach.

How do you instruct as a coach? First, be actively involved with your students as people. Students will learn more when they realize that their instructor knows them as unique individual. Determine what makes a student unique. What are his or her interests, strengths and weaknesses? Show the student that you know and care. One day a student is alert and ready to learn; another day the student is tired or has something on his or her mind. Respond to changes in the student from day to day.

Students, like other people, will often find it difficult to tell you what is on their minds. How can you help a student learn to be more open? Listen and respond constructively. If a student admits a mistake, praise him or her for their willingness to be objective, discuss the reasons for the mistake, and help the student to correct the situation.

BEHAVIOUR MODIFICATION.

An excellent way to be a learning coach is to practice methods of behaviour modification. In behaviour modification, you deal only with the actual behaviour of the student. There is no attempt to change their ideas, or develop their will power. Your attention is focussed completely on what the student actually says or does. Your responses to the students are most effective when they relate directly to specific observable actions or statements.

The basic concepts of behaviour modification are simple, but the applications take some practice. When you first try to apply them, you may feel somewhat awkward. With practice, you will feel increasingly comfortable and after a while, the use of these principles will become as automatic as doing flight manoeuvres.

The first thing to remember is:

BEHAVIOUR FOLLOWED BY REINFORCEMENT WILL CONTINUE.

A reinforcement is simply anything desirable which follows a specific behaviour. In practice, this may consist of such ordinary things as a smile, praise, or information that the student has done something correctly.

The second thing to remember is:

BEHAVIOUR FOLLOWED BY PUNISHMENT MAY DECREASE.

Generally, punishment is not an effective way to correct erroneous or undesirable behaviour. If the punishment is potent or highly painful, it will reduce the likelihood of repeating undesirable behaviour. However, it does not teach the student to substitute the correct response for the error. The student is as likely to substitute a different mistake as he or she is likely to learn the correct response. Mild punishment may cause the student to associate attention received from the instructor with a behaviour and thereby increase the chances that he or she will repeat the mistake. In addition, any type of punishment may have a variety of undesirable side effects which could range from student discomfort to active anger or hostility directed against the flight instructor.

Still, punishment related training techniques are often thought to work. At one time, Israeli flight instructors were convinced that punishment worked. They yelled at students who made bad mistakes, and the mistakes were rarely repeated. However, a close examination of the flight records showed that bad mistakes were not often made to begin with. Whether instructors yelled or not, the mistakes were unlikely to happen again. Researchers found no hard evidence that threats, yelling, making students feel guilty, or other forms of punishment actually improved learning.

There is also little evidence that pleading, persuasion, or appeals to a student's better nature will improve learning. Appropriate learning is most effectively achieved by the systematic rewarding of correct responses. The problem is to identify objectives - the exact behaviour responses you wish to occur - and then to reward or reinforce them when they happen.

RULES FOR BEHAVIOUR MODIFICATION.

To become a behaviour modifier you should apply these four basic rules:

1. **BE VERY CLEAR ABOUT LEARNING OBJECTIVES** - Exactly what behaviours do you want the student to learn? The judgement training programme spells out many of the specific things that the student is to learn. For example, the three subject areas and the six action ways.
2. **IN THE EARLY STAGES OF LEARNING, REINFORCE GENEROUSLY** - The entire course of learning is influenced by its early stages. In the first parts of any sequence, proceed slowly but reinforce or reward as frequently as possible. You should look for responses that can be rewarded. After a firm beginning, later stages can be handled more quickly and simply. Reinforcements range from a smile, to verbal approval, to simple close attention, to making a special record of excellent performance.
3. **SHIFT SLOWLY FROM CONTINUOUS TO OCCASIONAL REWARDS** - In the early stages, all correct responses should be rewarded. As time passes and responses become automatic, you should decrease the frequency of your praise or attention. The strongest learning is established in the final stages when rewards are irregularly made at fairly long intervals. If the student has come to expect continuous rewards from his or her instructor and they suddenly cease, there is a good chance that the established learning pattern will breakdown and that learning will cease. However, if the reinforcement becomes less and less frequent, the behaviour will more easily come under the control of other rewards such as the student's own satisfaction or competence.
4. **SHAPE EXISTING BEHAVIOURS INTO DESIRED BEHAVIOURS** - You cannot wait for the desired behaviour to occur and then reinforce it. It is necessary to shape current behaviours into the required form.

In learning to taxi an aeroplane, for example, students are not able to directly transfer automobile driving experiences to the aircraft where feet and hands are used quite differently. In shaping behaviour, your goal is to move the student's responses through a series of closer and closer approximations until they match the required standards. Do this by reinforcing behaviours near the desired performance, then gradually increase the performance requirements until the desired behaviour is reached.

Critique and correct the existing behaviour, not the person. In other words, tell the student specifically what needs to be changed to meet the learning objective. Do not make general statements of disapproval or correction. Say, "You need to be firmer on the rudders pedals as you flare," NOT, "Your landings are sloppy and need more work."

BEHAVIOUR MODIFICATION REVIEW.

1. Behaviour followed by reinforcement will continue.
2. Behaviour followed by punishment may decrease. However, punishment does not help the student substitute the correct behaviour for error.
3. Be very clear about learning objectives.
4. In the early stages of learning, reinforce generously.
5. Shift slowly from continuous to occasional reinforcement.
6. Shape existing behaviours into desired behaviours.

INSTRUCTOR MANUAL.

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SECTION ONE.

PILOT JUDGEMENT TRAINING.

The following section covers the training material detailed within the Student Training Manual. At the end of this section you should have a clear understanding of what the Student Manual covers, and the objectives for each of the training units.

Having completed this section you will be directed to work through the Student Training Manual. This manual has been designed so that a students can work through the material at his or her own pace. Your understanding of the training material will be used to aid students with learning difficulties, and will serve as the baseline knowledge for administering the next section of this training programme.

UNIT I.

TEACHING JUDGEMENT CONCEPTS.

OBJECTIVES OF THE UNIT.

Unit I of the student manual contains concepts and terms which are used throughout the judgement training course. The success of this training greatly depends upon getting the student to think more carefully and more thoroughly about his or her judgement process. Traditional pilot training emphasizes the pilot's knowledge about the aircraft and the flight environment. Judgement training focuses on the pilot's need for accurate and complete self-knowledge.

The terms and concepts of Unit I have been especially designed to lead the student into modified patterns of thinking so as to produce better judgement. The terminology also provides the most concise, objective means possible of discussing pilot behaviour in judgement related situations. For these reasons, it is essential that you know this new terminology and use it as often as possible during all flight training activities.

Students become acquainted with the terms and concepts by carefully reading Unit I. The three lessons contain no student exercises. Memorization is not a required. Rather, the exercises in Unit III of the student workbook reinforce the learning of these new terms and concepts, as will your use of them throughout the student's flight training.

After your students have completed reading Unit I, be sure that they understand each lesson. You may wish to give them a brief oral quiz to be certain that they do. Be prepared to discuss any problems and clear up any confusion. If the student does not clearly understand, get them to review Lesson 1 through to 3.

INDIVIDUAL LESSON CONTENT.

LESSON 1.

This lesson introduces the student to three subject areas relevant to pilot judgement: the Pilot (P), the Aircraft (A), and the Environment (E). Conventional flight training focuses on subject areas A and E. This judgement training focuses on the pilot's need to know more about area P, the pilot and how the pilot interacts with the aircraft (PA), the flight environment (PE), and the combination (PAE).

Lesson 1 also presents easy-to-learn terms for six decisive actions - the actions which result from pilot judgements. These decisive actions are verb phrases called "action ways".

The six possible action ways are:

DO = The pilot did something which he or she should not have done.

NO DO = The pilot did not do something which he or she should have done.

UNDER DO = The pilot did not do enough when he or she should have done more.

OVER DO = The pilot did too much when he or she should have done less.

EARLY DO = The pilot reacted too early when he or she should have waited.

LATE DO = The pilot reacted too late when he or she should have reacted sooner.

The repetitive use of action ways in the following lessons will support teaching the student to substitute a desired response for any erroneous response.

LESSON 2.

Lesson 2 introduces students to the Poor Judgement Behaviour Chain. Once a poor judgement (PJ) is made, the probability is greater that another PJ will follow, until a sequence of poor judgements (a PJ chain is established). As the PJ chain grows, the number of safe alternatives available to the pilot diminishes very rapidly. If the PJ chain is broken early the pilot may have more alternatives for successful recovery. The student is also taught what must be done to break the chain. The judgement training programme uses elementary behaviour modification to teach new responses to the pilot to effectively break the PJ sequence chain.

LESSON 3.

In lesson 3, the student is taught to understand and apply the Three Mental Processes of Safe Flight. The pilot who consistently exercises good judgement is engaged in at least two of the three mental processes at all times during a flight. You will train the student to utilize these perceptual-motor skills during the flight training increments presented in Unit IV of this manual.

The first of the three processes is called "Automatic Reaction" (AR). Two types of Automatic Reactions are taught. One type concerns maintaining positive, on-going control of the aircraft with a minimum of attention. The other concerns responses to unusual or emergency situations.

The second mental process is called "Problem Resolving" (PR). Problem Resolving is the mode of thinking that a pilot uses to overcome undesirable situations by means of a systematic process. The process consists of four steps:

Step 1 : Uncover, analyse and define the problem.

Step 2 : Consider the methods and the possible outcomes of possible solutions.

Step 3 : Apply the selected solution.

Step 4 : Obtain feedback about how the solution is working.

You may already have an approach to teaching problem resolution in the aircraft, or you may wish to use the four steps presented here as the basis of your instruction. Use whichever you prefer, but be certain that the student learns to view Problem Resolving as a mental process and not just an instant reaction involving no systematic forethought.

The third mental process is called "Repeated Reviewing" (RR). This is the mode of thinking used to find or to anticipate situations which may eventually require Problem Solving or Automatic Reaction. It is the mental process that keeps the pilot constantly aware of all factors (Pilot/Aircraft/Environment) that contribute to safe flight.

UNIT II.

TEACHING BEHAVIOURAL ASPECTS OF JUDGEMENT.

OBJECTIVES.

Unit II of the student manual is designed to redirect a pilot's thinking in order to promote the consistent use of good judgement. This is done through two approaches. The first addresses the pilot's hazardous thought patterns. Specific hazardous thoughts are identified, and a way for pilots to substitute thoughts which advance good judgement is promoted. The second approach addresses the reduction in judgement-making ability that results from high stress levels. Students are taught how to deal with unusually high stress which threatens the effectiveness of their judgement-making ability.

INDIVIDUAL LESSON CONTENT.

LESSON 4.

This lesson contains a brief self-assessment inventory to help the student gain an understanding of the relative strength of each of his or her hazardous thought patterns. Having finished this section of the manual you will be asked to complete the Student Manual. In doing this, you will complete and score your own inventory. You will find the experience helpful in understanding the programme and in assisting your students.

This lesson's only purpose is to make the student pilot aware that various hazardous thought patterns exist which are likely to interfere with safe flying. The student manual is aimed at teaching the student the importance of moving away from such hazardous thinking to thinking that promotes good judgement.

By completing the self-assessment inventory, the student gains appreciation of the degree to which he or she may be influenced by one or more of the hazardous thoughts. The inventory is scored by the student, and the score remains confidential. Be prepared, however, to answer any questions the student might have about how to complete the inventory.

The score profile is a self-diagnostic tool used only by the person taking the test. It provides an indication of the relative strength of each hazardous thought for that person at that time. It helps to personalize the programme by suggesting which thoughts are most likely for each individual. Under no circumstances should it be used to label a student.

Reassure your students that they will not be asked to reveal their scores to you or to anyone else. It is important that they feel free to answer the items truthfully, without worrying about what others might say. Be sure each student realizes the seriousness of the task. This is the critical lesson in redirecting the student's awareness toward a greater concern for the "Pilot" subject area. Help students see that the tendency to use these thoughts is commonplace, that it is a habit to be broken, not an insurmountable fault. Again, the inventory is to help students gain a better self-understanding, not to find faults or defects !

LESSONS 5 - 9.

These five lessons teach students to identify and understand the five hazardous thoughts. Each lesson is devoted to one particular thought. The lessons are intentionally repetitive. Students, by working through them, will gain a full understanding of each hazardous thought. When the students point out how repetitious they are - and they will - explain the purpose of the repetition.

Although anyone who reads and follows the directions carefully should be able to work through the lessons, some students may have difficulty with the format and will need your help.

LESSON 10.

This lesson is important because it specifies substitute thoughts, called "antidotes", for the five hazardous thoughts. The tendency to act on hazardous thoughts can be reduced once the pilot is aware of them. Lessons 4 through to 9 are designed to provide this awareness. To completely overcome these thoughts, the pilot must become aware of thinking them and must substitute different thoughts, thoughts that promote good judgement.

EACH STUDENT MUST MEMORISE THE HAZARDOUS THOUGHT ANTIDOTES PRESENTED IN LESSON 10.

Merely being familiar with them is not enough. They must be memorised word for word. Help your students understand that memorisation is absolutely necessary so they can quickly and automatically substitute the new good judgement thought for the hazardous thought.

After the student memorises each antidote, he or she will read a description of a pilot's thoughts and actions in a particular situation. Whenever the student identifies actions representing a hazardous thought, he or she will write the name of that hazardous thought on the right side of the page and the antidote for that thought immediately after it. You must be sure that the student completes this exercise in its entirety. The hazardous thoughts are repetitive, but repetition aids learning. The student needs to reach a point in learning where, the instant a hazardous thought comes to mind, the antidote will also come to mind. This will come only with repeated practice. Explain this to the student and keep him or her working.

Included in the student manual is a key for the student to use for grading this exercise. If you discuss the answers with the student, bear in mind that there is some room for differences of opinion. Thus, the student may attribute some actions to a hazardous thought which the key has not identified. You and your student should come to some agreement as to whether or not the answer is logically acceptable.

Although it is permissible for the student to find some extra instances of hazardous thoughts, it is not permissible to leave any out. Also, the correct antidote must be supplied word-for-word in each case.

LESSON 11.

Lesson 11 requires the student to reinforce his or her knowledge about replacing hazardous thoughts through the use of antidotes. The lesson consists of ten paragraphs describing situations in which the student must make and implement a decision. The student specifies the hazardous thought evidenced by the description of the pilot's thinking, writes in the appropriate antidote, and writes a brief description of good pilot judgement for the same situation.

If the student does well on the first five situations, he or she can advance to lesson 12. If not, the student should practice further on situations 6 through to 10.

LESSON 12.

Lesson 12 deals with stress and methods to reduce it. The lesson has two objectives: (1) to teach students to identify when they are being affected by stress; and (2) to help them reduce their stress quickly.

First, students are taught to identify for themselves the conditions of overload by using what is known as SUDS. SUDS stands for Subjective Units of Discomfort System. The lesson materials explain the use of the SUD system.

The second part of the lesson teaches students to begin to relax. Many people do not know how to relax - at least they cannot relax themselves deeply in a few minutes. The students, and you, will learn to relax by using the relaxation techniques described in this lesson. The first technique uses imagery as a practice method. If students are dissatisfied with this method, they are encouraged to try using the progressive relaxation technique provided at the end of the lesson. You should be familiar with both techniques.

Perhaps you have seen a student who was so overloaded, who was under so much anxiety and stress, that he or she could not think clearly. Through the use of one or both of the techniques described in the lesson, students should be able to significantly reduce their stress levels. Remember to remind students that they can, and should use the stress reduction techniques whenever it is appropriate.

LESSON 13.

After the initial training of judgement has been completed, administer this progress check to see if the students have retained a mastery of the ideas from lessons 4 through to 11. To do this you will use one of the two postcheck forms. Provide the student with a quiet place to work and assign Postcheck One. The postcheck is not a speed test. Allow the student as much time as he or she needs, within reasonable limits. Score the form using the keys provided.

For a successful postcheck, the student must do two things:

- (1). Provide a perfect response for Situation 1, stating the five hazardous thoughts, and each of their antidotes: and,
- (2). For Situations 2 through to 5, get no more than four answers wrong.

Extra responses should not be penalised unless they are clearly incorrect. If the above grading criteria is not met, give the student back the marked test, and tell the student that he or she will be checked again at a later date. You should suggest that the student review the appropriate materials, and remind him or her of the seriousness of the training. In the recheck, use Postcheck Two. Please keep in mind that this material is to be presented as a lesson. It is meant to be a learning experience, not just an evaluation of what the student knows. Help the unsuccessful student learn the material in Unit II before allowing him or her to move on to Unit III.

Remember that your central concern as a flight instructor is the safety of your students. Unit II has been carefully designed to make them aware of some of the thoughts that could endanger them, and to help them deal with stress situations. The success of this part of their flight training will depend largely on your own attitudes, for your students will take their cues from you. If they are to obtain the greatest gains possible, it will be because of your support and assistance.

UNIT III.

TEACHING APPLICATIONS.

OBJECTIVES.

Unit III of the Students Manual contains written lessons to relate the concepts of Units I and II to actual flight situations. No new flight or judgement information is taught. Rather, these lessons are intended to reinforce the student's understanding and appreciation for the judgement training concepts. This is achieved by integrating these concepts with true-to-life examples of flight situations.

This unit is composed of exercises centred about scenarios in which pilots are carrying out some sort of flight activity. These scenarios are based upon official reports of real occurrences, but have been modified somewhat to fit the needs of this training programme, and to match the New Zealand General Aviation Environment. Stress to your students that the scenarios provide opportunities to learn from the mistakes of others.

INDIVIDUAL LESSON CONTENT.

LESSONS 14-18 - Each lesson contains an introduction and three exercise sections. The introduction identifies the area to be addressed. The areas include pre-flight and aircraft systems (Lesson 14), weight/balance and performance (Lesson 15), official procedures and communications (Lesson 16), cross-country flying (Lesson 17), and physiological factors and night flying (Lesson 18). The lessons relate to the types of poor judgements which pilots may make with regard to each of the areas of aviation knowledge. The exercises require the student to use all the terms and concepts learned in Units I and II to answer the questions. Encourage the students to review the lessons pertaining to subjects in which they feel they are deficient.

Having completed this training unit, you will arrange a time for the students to meet and discuss their answers for each of the lessons. To cover the material outlined in this unit, and to address any questions that the students may have, you should plan a meeting time of 2 hours.

Although responses to most of the questions are relatively obvious, there are no absolutely right or wrong answers. Rather, the exercises are intended to stimulate learning in two ways. Firstly, having the student look for the subject areas and action ways in "real life" flight situations reinforces the student's knowledge of these concepts and their relevance in the pilot judgement process. Secondly, your interactions with the student while discussing the answers should improve student awareness of the judgement aspects of all flight situations. Use these exercises to teach your students that there is not always a clearly defined right or wrong answer to every problem encountered while flying; but, the use of the judgement training concepts will allow the best answer possible.

NOW THAT YOU HAVE COMPLETED THIS SECTION OF THE INSTRUCTOR'S MANUAL, YOU SHOULD WORK THROUGH THE STUDENT MANUAL AND GAIN A COMPLETE UNDERSTANDING OF THE MATERIAL YOUR STUDENTS WILL LEARN.

SECTION 2.

PILOT JUDGEMENT TRAINING.

The following section covers the In-flight Training material. Each unit of this training should be applied as directed, and combined with the students current flight training.

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UNIT IV.

IN-FLIGHT INSTRUCTION - CONCEPT LESSONS.

How does a flight instructor combine behaviour modification with the judgement concepts to help students learn better judgement? You do this by giving your students a series of lessons in which you observe and respond to their behaviour. As a behaviour modifier, you will observe the performance of the student and comment only on specific behaviours. You do not comment on intentions or motivations, only on behaviour. Further, you will use rewards (praise) frequently, avoiding criticism (punishment) as much as possible. Errors by the student are to be seen as opportunities for learning, not as occasions for criticism.

INTRODUCING THE LESSONS.

In this Unit, you will give your students a flight activity to perform. Each activity is designed to develop the student's learning of Automatic Reaction (AR), Problem Resolving (PR), or Repeated Reviewing (RR). Of course, a lesson designed for AR might also include PR and RR elements as well, but each activity is designed to focus on one of these processes. After observing the student's response to your instructions, use the subject area, action way, and PJ chain concepts of the Judgement Training Programme to give positive reinforcement when the student has done well, and to correct the student when performance was unacceptable. For example, you might say: "You did X early with respect to your aeroplane". (Early Do A-subject area), or "You did not do Y concerning the environment." (No Do E-subject area). Each time you point out an error, indicate which of the six action ways and which of the three subject areas is involved. When one error follows another, point out that this is an example of a poor judgement behaviour chain. Use of these terms and concepts will assure the student proper feedback. It will also help you considerably with a very difficult part of the instructor's role in the judgement training programme. It will keep your instruction focussed on pilot judgement and not on flight skills.

You will need 15 minutes or so for lesson preparation the first few times you work with each lesson. As with any new activity, you should allow yourself two or three trials with each lesson before the lesson is established as a solid part of your instructional techniques. After that, you will feel much more comfortable teaching these lessons, and you will need little preparation time to assure proper instruction.

Remember that your style of delivery and your professional approach to these lessons is critical for improving pilot judgement. If you know the lesson plan and then deliver the lesson using the principles of behaviour modification explained in the introduction, you will assure that these lessons favourably affect your student's judgement.

WHEN TO BEGIN.

Start these lessons when the student has completed Unit I of the Student Manual.

USING THE LESSON PLANS.

You will devote at least three lessons to teaching each mental process, or a total of nine lessons. Each lesson should take less than 5 minutes. Do only one lesson per training flight. However, one of these lessons, and three or more judgement situations from Unit V may be accomplished during the same flight. (NB: You should review the recommendations for when Unit V can be started, before combining Unit IV and V material).

At the end of this section you are provided with 18 sample lesson plans for the in-flight teaching of the three mental processes. These lesson plans are designed to correctly structure each lesson for you and your students.

The 18 sample lessons do not include each and every valid way to accomplish this unit's training objective. You may wish to modify, or to substitute parts of the sample lessons. Or, you may wish to develop your own lesson plans to suit your students and your own style of teaching. This is perfectly acceptable, so long as you meet the objective of this unit. If you intend to make some alterations to the lessons, you may find it helpful to use the empty "Instructor Lesson Plan" on page 4-23. At all times keep it in mind that your mission is to encourage better judgement through coaching and behaviour modification techniques, not to give students more flight practice. To achieve this, you should adhere to the principles of lesson delivery, listed below.

PRINCIPLES OF LESSON DELIVERY.

1. Assign an activity to develop one specific mental process. This is the lesson's focus - not the flight activity.
2. Monitor the student's behaviour in terms of the lesson objective: Does the observed student behaviour indicate success at using the mental process being developed ?
3. Praise correct behaviour (reinforcement).
4. Coach the student to correct errors using the three subject areas, the six action ways and the poor judgement chain.
5. Coach the student to correct errors, and at the same time occasionally offer some sort of reward (not punishment).
6. Encourage the student to be aware of hazardous thinking and high stress levels.

INDIVIDUAL LESSON CONTENT.

Before meeting your student for his or her flight, select the lesson plan you want to use. Review it carefully as follows:

- Part I Objective - Know which mental process you are going to present. Can you also teach another mental process along with this one? If so, examine the rest of the lesson plan to see how this might be accomplished.
- Part II Activity - Where will this activity best fit into the rest of the flight activity? You may want to do the judgement increments early in the lesson so that you can work with the student again later in the lesson if he or she needs additional practice.
- Part III Observable Behaviour Sought - Be sure that you know what you expect the student to do when he or she is correctly demonstrating the selected mental process. It is acceptable to evaluate other flight skills during the time as long as you are certain to reinforce the student for demonstrating the desired behaviour.
- Part IV Reinforcement - Be prepared to give the student positive reinforcement. Remember, you are the student's coach for learning. This is an ideal time to use some behaviour modification teaching techniques. Use the three subject areas as a focus for finding a reason to give the student positive feed-back. You may use your own positive reinforcers, but have at least three of them prepared before the training flight begins. If the student's stress level appears high, call attention to the stress reduction techniques.
- Part V Making Corrections - If the student's performance is unsatisfactory in some way, describe the erroneous behaviour in relation to the six action ways, the three subject areas, and describe how the behaviour could develop into a PJ chain.
- Part VI Student Debriefing - Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student more aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts.

CONCEPT LESSONS CHECKLIST.

1. Focus on one mental process.
2. Before the lesson, plan positive reinforcements for each of the three subject areas.
3. Observed behaviour is to indicate success by using the mental process being practiced.
4. Praise correct behaviour.
5. Correct errors by coaching. Use the judgement concepts to do this.
6. Debrief afterwards, encouraging the student to reflect on how he or she handled potential hazardous thoughts, stress and poor judgement behaviour chains.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR PR RR

PART II Activity: Flap Operation.

PART III Observable Behaviour Sought: The student consistently makes immediate and appropriate corrections with the flaps, and maintains an altitude and heading within your acceptable limits.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You showed that you can handle the aircraft properly while your attention was directed to the flap operations.
2. Aircraft: You are handling the aircraft well as the flaps change.
3. Environment: You did a good job of watching for other traffic in the airport area as you were doing this.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR x PR _ RR _

PART II Activity: The student will taxi the aircraft, positioning ailerons and elevator for existing wind conditions.

PART III Observable Behaviour Sought: The student consistently moves the yoke or stick to climb into the headwind or drive away from the tailwind while taxiing.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. **Pilot:** You remember to correct for the wind while taxiing.
2. **Aircraft:** You successfully adjusted the yoke while in a turn to compensate for new wind position.
3. **Environment:** You were aware of the wind direction and taxi direction and properly adjust the yoke.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR x PR _ RR _

PART II Activity: The student will experience a complete communication failure.

PART III Observable Behaviour Sought: The student quickly and accurately completes a process to confirm that he or she has lost communication and maintains safe control of aircraft while doing so.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You seem confident in taking the proper action.
2. Aircraft: You knew which switches and fuses to check to try and solve your problems.
3. Environment: You were alert for other aircraft. You took the proper actions to inform the tower of your problem.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR X PR _ RR _

PART II Activity: Transition from cruise to minimum controllable flight using various flap settings.

PART III Observable Behaviour Sought: The student automatically co-ordinates pitch and power for various slow flight configurations.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: I believe you understand the pitch power relationship.
2. Aircraft: You remembered to add power before pitching up in climbing slow flight, and the aircraft did not stall.
3. Environment: You checked the area for traffic while setting up for slow flight.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR x PR _ RR _

PART II Activity: Control the aircraft's altitude by using only one of the available pitch instruments. (Repeat using a second instrument if time allows).

PART III Observable Behaviour Sought: The student properly interprets the trend indicated by the instruments, and immediately corrects when the aircraft strays from the assigned flight path.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You seem to understand that "Aircraft Control and Power Control equals Aircraft Performance."
2. Aircraft: You made smooth adjustments and did not over correct.
3. Environment: You showed a good scan between instrument references and visual cues.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I **Objective:** (Mental Process Presented) AR PR RR

PART II **Activity:** Control the aircraft by using only one of the available bank instruments (Repeat using a second instrument if time allows).

PART III **Observable Behaviour Sought:** The student properly interprets the trend indicated by the instrument, and immediately corrects any time the aircraft strays from the desired bank.

PART IV **Reinforcements:** Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. **Pilot:** You have shown me that you thoroughly understand the information available from this instrument.
2. **Aircraft:** You made positive corrections for each instrument and its trends.
3. **Environment:** You keep a good scan for traffic while practicing turns.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V **Making Corrections:** If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI **Student Debriefing:** Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR x RR _

PART II Activity: Electrical System Failure - loosen one or two fuses.

PART III Observable Behaviour Sought: The student continues to fly the aircraft straight and level, maintaining attention to safe operations, while he searches for the cause of the electrical problem and resolves it.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You did not get rattled when you realized you had electrical problems, and you did a fine job of locating the cause.
2. Aircraft: You noticed the tripped circuit breaker and compensated for it.
3. Environment: You did well by avoiding any situation that required the use of failed system(s).

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR X RR _

PART II Activity: The student will experience a total loss of communication equipment.

PART III Observable Behaviour Sought: Student demonstrates correct procedures to find the source of failure and takes proper actions to determine the extent of failure.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

- 1. Pilot:** You quickly and accurately recognized the equipment failures and proceeded to check it out and confirm the extent of the problem.
- 2. Aircraft:** You landed the aircraft and notified ATC of the problem.
- 3. Environment:** You interpreted the light gun signals correctly, and manoeuvred the aircraft accordingly.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR x RR _

PART II Activity: VOR orientation and tracking.

PART III Observable Behaviour Sought: The student quickly orients himself or herself without being distracted from flying the aircraft. He or she intercepts the desired radial smoothly and tracks within your acceptable levels.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: By remembering your procedures, you were able to fly the aeroplane better.
2. Aircraft: You started your turn to roll out on the desired radial and not fly through the course.
3. Environment: You avoided ground obstacles, clouds, traffic, etc., when you needed to and still maintained the course.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR x RR _

PART II Activity: Takeoffs and landings after a jet to practice wake turbulence avoidance.

PART III Observable Behaviour Sought: The student demonstrates an awareness of the presence of wake turbulence and alters his flight path to avoid it or delays take offs and landings.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. **Pilot:** You told me about the other aircraft's wake turbulence and then avoided it. That was excellent.
2. **Aircraft:** You kept your final high and landed long to avoid the jet's vortices. Nice job.
3. **Environment:** It was a good idea to stay on the ground that extra minute to avoid the departing 747's vortices.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I **Objective:** (Mental Process Presented) AR _ PR x RR _

PART II **Activity:** The student will transition through various flight conditions without assistance of trim.

PART III **Observable Behaviour Sought:** The student correctly and consistently transitions from one flight attitude to another, and maintains the new flight attitude, despite resistance of the aircraft.

PART IV **Reinforcements:** Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. **Pilot:** You seem more confident of yourself on controlling the aircraft without using trim.
2. **Aircraft:** You controlled the aircraft to make it do what you want it to.
3. **Environment:** You remained aware of the outside environment even though you were having a difficult time flying the aeroplane.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V **Making Corrections:** If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI **Student Debriefing:** Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR X RR _

PART II Activity: Practice of stall entry, recognition, and recovery.

PART III Observable Behaviour Sought: The student can identify the cues of a stall and recover from a full stall.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You realized that a nose high attitude can lead into a stall. You were not afraid of the aircraft today.
2. Aircraft: You maintained direction with the rudder instead of doing your usual aileron trick.
3. Environment: You flew well clear of the airport traffic area before commencing stall practice.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

- PART I Objective: (Mental Process Presented) AR _ PR _ RR X
- PART II Activity: Control of the aircraft in crosswind conditions.
- PART III Observable Behaviour Sought: The student should correct for wind while doing manoeuvres, and apply correction to maintain a ground track.
- PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You did a good job of adjusting your usual flying style to cope with the effects of the wind on the aircraft.
2. Aircraft: You knew how to experiment with the aircraft to establish the proper track over the ground.
3. Environment: You knew how to check the wind direction, and how to tell if you were making proper corrections.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR _ RR x

PART II Activity: Make a standard pattern landing while in a heavy airport traffic situation.

PART III Observable Behaviour Sought: Constant checking of the aircraft's track for conformance to the pattern. Regular observation of traffic and areas of potential. Continual attention to radio transmissions.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You did a nice job of keeping ahead of the aircraft.
2. Aircraft: You managed your approach descent very well.
3. Environment: You were very observant of other traffic in the pattern - you responded well to radio directions from the controller.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR _ RR X

PART II Activity: The student will point out all aircraft in his or her vicinity within a 30 second period.

PART III Observable Behaviour Sought: The student scans for aircraft in his or her immediate vicinity and takes necessary evasive manoeuvres when required.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You were more observant of the traffic today.
2. Aircraft: You turned away from the aircraft you felt to be dangerous. That was well done.
3. Environment: You looked for traffic entering the pattern before turning downwind.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR _ RR X

PART II Activity: You (or ATC) will radar vector the student and the student must maintain basic VFR.

PART III Observable Behaviour Sought: The student will make proper diversions from clouds to maintain basic VFR.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You were confident of the actions required to maintain basic VFR.
2. Aircraft: You anticipated the 2000 foot ceiling and leveled off at 1500 feet while you advised ATC.
3. Environment: You saw that the weather was deteriorating and started heading back to the airport. Asking the air traffic controller for a special VFR clearance was good judgement.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR _ RR X

PART II Activity: To practice ground reference manoeuvres.

PART III Observable Behaviour Sought: The student selects a field that allows a safe landing if necessary. The student continually scans the area and aircraft for hazardous conditions while performing the manoeuvre.

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You have learned how to transfer ground reference practice to the traffic pattern.
2. Aircraft: Your scanning between visual and instrument references was good.
3. Environment: I like the field you chose.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR _ RR x

PART II Activity: The student taxies the aircraft and continually scans and corrects for changing wind conditions.

PART III Observable Behaviour Sought: The student is aware of constantly changing wind direction and compensates by "climbing into a headwind and diving away from a tailwind."

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot: You realized that wind is not constant all over the field and kept a good scan of different wind indications.
2. Aircraft: You recognized changing wind conditions and adjust taxi speed and yoke positions for new wind.
3. Environment: You knew that the front passing over the field would shift the wind 180 degrees.

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Objective: (Mental Process Presented) AR _ PR _ RR _

PART II Activity:

PART III Observable Behaviour Sought:

PART IV Reinforcements: Firstly, state the objective you are focusing upon, and then give positive reinforcements by focusing on the three subject areas.

Suggested areas of reinforcement.

1. Pilot:

2. Aircraft:

3. Environment:

The next two sections of this lesson plan will be dependent on the students behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Making Corrections: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas (above), and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

UNIT V.

IN-FLIGHT INSTRUCTION: BEHAVIOURAL SITUATIONS

The purpose of this unit is to stimulate the student to depend on himself or herself to exercise good judgement. Your role is to encourage the student's self-reliance in this respect by providing coached practice. Unit V plans appropriate practice situations for you. As with Unit IV, you may modify or replace these situations, by using the blank form on page 5-30. Just be certain that what you do continues to meet the unit's objectives.

You have two activities to perform. First, you must set up a situation to engage the student in a judgement making process. Second, using principles of behaviour modification, you must respond to the student's behaviour in a manner that discourages poor judgement and encourages good judgement.

Practice situations are provided at the end of this unit. Each situation creates circumstances that may encourage the student to make a poor pilot judgement or series of poor judgements. Why do this? Because it is important to force the student to practice good judgement behaviour, to become skilled at recognising and replacing hazardous thoughts and poor judgement tendencies. It does little good if all you do is teach students about the principles and importance of good judgement. Rather, exercising good judgement must become a habit, and habits are formed by practicing the behaviour in realistic situations.

SETTING UP THE SITUATIONS.

When to Begin.

Introduce this phase of judgement training when the student has established his or her ability to act as pilot in command of the aircraft and feels somewhat confident about his or her understanding of general aviation knowledge and of pilot operations. You must use your discretion about this, but a good point may be after the student has flown solo three or four times. Also, the student must complete Unit II of the student manual before you begin work on this unit.

What to do First.

Advise the student that, after this one briefing session, you will be introducing practice behavioural situations into the training activities. There is to be no further advanced notice, and the practice situations are to occur at random intervals. The student must always be alert for possible poor judgement situations without further promptings.

It is very important: (1) that the student be given only one briefing to be alert for the practice situations; (2) that the situations be presented at random intervals (NOT every other lesson or every Saturday session, for instance); and (3) that the student understands you will not allow him or her to become endangered at any time.

It is possible that a situation could arise in which you would not wish to have your instructions questioned, such as at the approach of another aircraft. When you tell the student that you will sometimes be leading him or her into a poor judgement situation, you should also arrange a clear signal to end the testing, such as saying "Testing off". This signal will tell the student that he or she should do as you say immediately and without question, or should relinquish control of the aircraft to you.

Introducing the Sessions.

First read over the situation you are going to use. Carefully formulate in your mind these things:

1. What materials do I need ?
2. How must I act to make the student believe I am sincere, that the situation is "for real". (The better you prepare and the better actor you are, the better these situations will succeed).
3. How might the student react ?
4. At what points do I end the practice and review it with the student ?

Set up the situations in a realistic manner, at the same time occupying the student's attention with customary flight training activities.

RESPONDING TO THE STUDENT.

Why response is Important.

Lesson 2 of the Student Manual emphasizes that breaking a poor judgement chain requires the pilot to be supplied with corrective information, or feedback, about the judgement. It is also noted that generally the pilot's first feedback comes from an outside observer: the instructor. Your responses to the student's pilot judgement are important for two reasons. First, you are teaching the student to recognise what is good judgement and what is poor judgement. Second, you are establishing a model, and setting a standard for the student to copy when providing his or her own feedback. This unit not only furnishes judgement behaviour practice for the student, but it also challenges you to favourably influence the student's judgement by responding with the best possible feedback.

When to Respond.

Stop the practice session and begin giving feedback immediately at one of the two points explained below.

1. The student has recognised the situation as one inviting poor judgement and has objected to following your suggestions or to continuing within the arranged circumstances.

Praise the student for recognising the judgement practice situation. Discuss the situation briefly using the judgement concepts. Point out the "worst possible case" that could result for a pilot who did begin a chain of poor judgements in such a situation.

You do not have to reveal the practice situation immediately when the student first challenges you. Part of good judgement is to be assertive, when appropriate, against the suggestions of others - even those in authority such as flight instructors.

For example, you attempt to get the student to fly the aircraft with loose "junk" in the cockpit. The student suggests cleaning out the aircraft before the pre-flight, or begins removing the junk on his own. Rather than stop the exercise at that point, try to convince the student that you are in a hurry or that it's someone else's responsibility to clean up the mess. Make the student assert that he or she believes it would be poor judgement to fly without removing the junk, and that there is no way to rationalize (remember the five hazardous thoughts?) flying the aircraft in such a condition.

2. The student fails to recognise the practice situation and makes a decision representing poor judgement. Allowing the student to continue will either present no further opportunities for judgements related to the situation, or will possibly allow the student to get into dangerous or unauthorised circumstances.

First question the student as to why he or she has made the decision or is taking the action. Try to give the student the opportunity to explain the decision or action based on general pilot knowledge. See if the student becomes caught up in contradictions due to incorrect judgement about Pilot-Aircraft-Environment.

Then announce that this was a judgement practice situation in which the student failed to demonstrate good judgement. Follow with a discussion of the student's judgement based on the judgement concepts, the possibility of hazardous thinking, and the influence of a high stress level.

How to Respond.

Your responses must use the principles of behaviour modification to provide the highest quality feedback. Remember, punishment does not work - positive reinforcement does. You are correcting specific poor judgement actions to shape existing behaviour into desired behaviour. You are not to criticize the student's judgement making abilities in general, and you are not to indicate disappointment in the student's level of flight skill and aviation knowledge.

The judgement concepts will help you to focus on proper judgement feedback using principles of behaviour modification. Be careful, however, in working with the hazardous thoughts and stress. Do not try to analyse, criticize or correct the student's behaviour based on your opinion of the possible presence of hazardous thinking or high stress. Do encourage the student to consider the possible influence of these factors influencing judgement with regard to the practice situation. Here you are again acting as a coach to reinforce the necessity and importance of the student providing self-generated feedback as to the status of the "Pilot" subject area.

The student may question legitimate suggestions that you make even when you are not involved in judgement training. In these cases, you will have an opportunity for a short discussion of the situation. This is appropriate and is a valuable aid to learning.

Always try to end your responses with some sort of positive reinforcement. Remind the student that better pilot judgement comes through practice. Some errors are to be expected during practice sessions. That is what practice is for !

COMPLETION SCHEDULE.

The practice situations included at the end of this unit are divided according to the phase of flight. Choose situations which match the student's level of experience.

Plan on scheduling the situations so that you finish as many as possible during the time set aside for this training. You should develop a tentative schedule for when to introduce each situation and record the schedule in an appropriate place, such as the margin of your syllabus or on your personal lesson plans. Keep in mind that you may need to change your schedule based upon each student's rate of progress. Remember, judgement situations should be distributed evenly over the student's flight training and should be presented using a random schedule.

Suggested Format.

The lessons and judgement situations should be related to allow for a smooth sequence of flight activities. A suggested format for a judgement training mission is as follows:

- 1 lesson from the concept lesson plans
(AR, PR, RR subject areas), Unit IV,
- 3 or more judgement situations, Unit V.

If the student has trouble identifying or understanding these situations, schedule more until he or she reacts properly. It is much better to have him or her question too much than too little. At this stage in the training, it is important to keep the student aware of the judgement process and talk about it as much as possible. Your reinforcement is essential.

BEHAVIOURAL SITUATIONS CHECKLIST.

1. Set up the situation in advance, and plan your actions to convince the student this is a routine flight.
2. Anticipate the student's possible reactions. Be ready to discuss the student's initial questioning or poor judgement behaviours.
3. Give the student feedback using the judgement concepts.
4. Encourage the student to review his or her own handling of hazardous thinking and stress after the practice.

JUDGEMENT SITUATIONS.

The remainder of this unit contains a series of pilot judgement situations. Each situation contains the applicable phase of flight for the situation, a brief description of the situation, and the observable behaviour(s) which indicate the proper response to the situation.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

If you wish to make up your own situations, refer to page 5-30 for a blank master copy of the Judgement Situation Record form.

INSTRUCTOR LESSON PLAN.

PART I Title: Entire Flight - Checklist.

PART II Judgement Situation: Checklist Use.
The more experienced a pilot becomes the less he or she "relies" on the checklists. This does not relieve the responsibility to use it. Therefore, he or she must use a checklist from before "interior inspection" to after "engine shutdown".

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) The student uses the checklist for the entire flight.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-6)

INSTRUCTOR LESSON PLAN.

PART I Title: Flight Planning - Chart Currency.

PART II Judgement Situation: Out of date sectional chart.
The student conducts a VFR cross country flight with an expired sectional chart.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) The student replaces the sectional chart.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Flight Planning - Weather Check.

PART II Judgement Situation: Destination Airport, weather is marginal.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Check Weather.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Inspection.

PART II Judgement Situation: Aircraft within a few hours of a required inspection.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Student states, "The aircraft needs an inspection." Terminate flight.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Door Handle.

PART II Judgement Situation: Door handle not secure prior to flight.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Check the locks prior to flight (takeoff).

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-10)

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Shoulder Harness.

PART II Judgement Situation: Stowed shoulder harness. The Civil Aviation Regulations (CAR's) require pilots to wear a lap belt and a shoulder belt. Many pilots leave the shoulder belt stowed because it is uncomfortable.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

a. What materials do I need ?

b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Unstow shoulder harness. Wear it for the entire flight.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-11)

INSTRUCTOR LESSON PLAN.

- PART I Title:** Preflight - Weight and Balance (1).
- PART II Judgement Situation:** A full fuel load is in the aircraft, and four persons board for the flight.
- PART III Preparation for the Lesson:** Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

- PART IV Critical Actions: (Behaviours)** A weight and balance calculation is made.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

- PART V Feedback:** Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

- PART VI Student Debriefing:** Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Post-Refueling Check (1).

PART II Judgement Situation: The aircraft is being refuelled during the preflight. The student has to decide if he or she should delay the fuel sump checks until refuelling is completed.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Student Checks fuel sumps after refuelling.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-13)

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Loose Items.

PART II Judgement Situation: Loose articles in the cabin. Empty soft drink cans, paper, books, etc. spread out in the cabin.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Remove loose items.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Compass Card.

PART II Judgement Situation: The compass card is missing.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Search Aircraft.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Windscreen.

PART II Judgement Situation: Dirty windscreen.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Clean the windscreen.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Hydraulic Leak.

PART II Judgement Situation: Hydraulic fluid on ground or brake assembly.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Inspect for obvious leaks. Have a mechanic check the brake system for leaks and proper operation.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Preflight - Low Oil.

PART II Judgement Situation: Low Oil -- Engine quantity is marginal or low for normal operations.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Check oil. Add oil as required.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Taxi - Controls for wind.

PART II Judgement Situation: The student is taxiing the aircraft in windy conditions (above 5 knots).

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Student places aircraft controls as needed for the prevailing wind.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Taxi - Across Runway.

PART II Judgement Situation: The instructor draws the student's attention inside the cockpit immediately prior to crossing a runway.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Student looks outside the aircraft along the runway to check for traffic.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-20)

INSTRUCTOR LESSON PLAN.

PART I Title: Takeoff - Intersection.

PART II Judgement Situation: A departure from a runway intersection is suggested by the instructor. The runway remaining would make a safe takeoff difficult; the aircraft is fully loaded and the weather is hot.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

a. What materials do I need ?

b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) The student decides to use the full length of the runway.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-21)

INSTRUCTOR LESSON PLAN.

PART I Title: Take-off - Engine Failure.

PART II Judgement Situation: Engine failure on take-off.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Land straight ahead.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Enroute - Low-Speed Turn.

PART II Judgement Situation: The aircraft is set up at low altitude (500-800 feet) and low airspeed ($V_s + 20$ knots). The need for a sharp turn is simulated.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) The student adjusts the aircraft pitch attitude to avoid a stall.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-23)

INSTRUCTOR LESSON PLAN.

PART I Title: Enroute - Aircraft Location.

PART II Judgement Situation: The flight is being conducted in the local practice area.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Constant awareness of aircraft's location (in response to question by instructor).

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Enroute - Clearing Turns.

PART II Judgement Situation: No clear turns. Student begins various flight manoeuvres in the practice area.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

a. What materials do I need ?

b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Execute clearing turns prior to flight manoeuvres.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Descent - VFE Limit.

PART II Judgement Situation: The instructor directs the flight so as to require a descent over a short distance. He tells the student to lower the flaps and descend at a rate (in feet per minute) that will cause VFE to be exceeded.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

a. What materials do I need ?

b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) The student points out the conflict and does not exceed VFE.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

(5-26)

INSTRUCTOR LESSON PLAN.

PART I Title: Landing - Runway Occupied.

PART II Judgement Situation: An aircraft pulls out onto the runway (simulated).

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Go-around.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Landing - High Approach.

PART II Judgement Situation: The approach is too high.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours) Go-around.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title: Landing.

PART II Judgement Situation: The approach to landing is being made in gusty conditions.

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions:(Behaviours) Partial flap extension and higher approach speed.

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

INSTRUCTOR LESSON PLAN.

PART I Title:

PART II Judgement Situation:

PART III Preparation for the Lesson: Set up the situation in advance, plan your actions to convince the student this is a routine flight.

Address the following points:

- a. What materials do I need ?
- b. How must I act to make the student believe I am sincere, and that the situation is for real.

Use your own imagination and creativity to lead the student astray, to make it likely for him or her to overlook proper procedures, and to ignore previous training.

PART IV Critical Actions: (Behaviours)

NB: Anticipate the student's possible reactions. Be ready to discuss the students initial questioning or poor judgement situations.

The next two sections of this lesson plan will be dependent on the student's behaviour. You should be consciously aware that it is during this section that the students will do the majority of their learning.

PART V Feedback: Firstly explain the objective of the lesson. If a student's performance is unsatisfactory, describe the incorrect behaviour in relation to the three subject areas, and the six action ways. To support your corrections, outline how the incorrect behaviour could develop into a poor judgement chain.

If a student's performance is satisfactory, reinforce the behaviour in relation to the three subject areas, and the six action ways. Having done this ask the student how the wrong behaviour could lead into a poor judgement chain.

PART VI Student Debriefing: Immediately after the lesson, discuss the overall performance with the student. Determine whether the student was aware of any hazardous thoughts during the exercise. Do not try to figure out why a hazardous thought may have occurred. Simply make the student aware of his or her own behaviour by directing attention to the need for pilot self-awareness of hazardous thoughts. In addition to this, have the students think about whether they experienced any high stress levels during the flight.

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APPENDIX C: THE PILOT JUDGEMENT TEST.

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MASSEY UNIVERSITY **AVIATION**
SCHOOL OF

PILOT
JUDGEMENT
TEST

PILOT JUDGMENT TEST.

Name: _____

SECTION 1.

1. What three general areas should be of concern to the pilot who is using good judgment ?

Place the letter of your answer in the box below.

- a. Lift, Drag, Thrust
- b. Airspeed, Groundspeed, ETA
- c. Pilot, Aircraft, Environment
- d. Weight, Weather, Fuel

Answer:

2. After a pilot makes a poor judgment, how would you rate the chances of him or her making another poor judgment ?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Much
Lower | Lower | No
Different | Higher | Much
Higher |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Answer:

3. When flying an airplane there is little a pilot can do to reduce stress.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly
Disagree | Disagree | Undecided | Agree | Strongly
Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Answer:

4. Are there methods a pilot can use to decrease the chance of making a series of poor judgments while flying ?

Never	Almost Never	Undecided	Almost Always	Always
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

5. In making a good judgment, a pilot's decision should represent a balanced appraisal of the pilot's skill, the type of aircraft, and the environmental conditions.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

6. If a pilot makes a number of poor judgments, the chances of continuing on a safe flight are:

Highly Decreased	Decreased	No Different	Increased	Highly Increased
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

7. Read the following paragraph, and then rate each of the pilots responses in terms of your impression of the pilot's behaviour. Each response has two scales, the first addresses the pilots thinking, and the second addresses a particular attitude. For each response place your answer in the boxes provided.

The pilot did not calculate fuel consumption correctly and did not bother to "top up" the tanks during his last stop. With fifteen minutes of fuel left, he can make an emergency landing on an abandoned dirt road just below, or a second option is to fly to an airfield which he thinks is ten minutes away.

- A. He lands on the dirt road with no further consideration of other alternatives.

- i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

- ii. How impulsive do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

B. He turns toward the airfield and looks for his chart of the area.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How impulsive do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

C. He reduces his speed and altitude and looks for another emergency landing site.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How impulsive do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

D. He radios for assistance.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How impulsive do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

8. Read the following paragraph, and then rate each of the pilots responses in terms of your impression of the pilot's behaviour. Each response has two scales, the first addresses the pilots thinking, and the second addresses a particular attitude. For each response place your answer in the boxes provided.

A non-instrument rated pilot is on a pleasure flight with three friends. He is advised that the weather conditions are poor in the area where he is heading due to low clouds and showers. The excursion plan is to view some lakes and mountains in the vicinity.

A. The pilot goes to the area and dodges in and out of the clouds to give his passengers a view of the lakes.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

ii. How Macho do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

B. The pilot decides to fly to the area anyway, figuring if his time is up, his time is up, no matter what the weather.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How Macho do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

C. The pilot changes plans and flies to another area where he hopes weather conditions are better.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How Macho do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

D. The pilot disregards the weather advisory and flies to the edge of the mountain to see if he can avoid the weather.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

ii. How Macho do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

9. Read the following paragraph, and then rate each of the pilots responses in terms of your impression of the pilot's behaviour. Each response has two scales, the first addresses the pilots thinking, and the second addresses a particular attitude. For each response place your answer in the boxes provided.

The pilot does not conduct a thorough preflight check. On take off she notices that her airspeed indicator is not working. Everything else seems normal. Her friend, also a pilot, feels strongly that they should discontinue the flight and return to the airfield. The pilot then becomes upset with her friend.

- A. The pilot starts banging the indicator to get it working.

- i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

- ii. How Anti-Authority do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

B. The pilot tells her friend that it is okay to fly the airplane because the Regulations are just rules to discipline pilots.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How Anti-Authority do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

C. The pilot tells her friend that nothing will go wrong on the flight.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How Anti-Authority do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

D. The pilot continues to become upset, but does nothing because she feels there is no point trying to calm down her friend.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

ii. How Anti-Authority do you think the pilot was ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

10. Read the following paragraph, and then rate each of the pilots responses in terms of your impression of the pilot's behaviour. Each response has two scales, the first addresses the pilots thinking, and the second addresses a particular attitude. For each response place your answer in the box provided.

On a pleasure flight, the pilot is showing his family some of the local sights. His eight year-old son suggests that it would be great fun to fly under the large bridge ahead. His wife is upset at the idea, but his older son (aged 16) dares him to do it.

A. The pilot decides to do it since he thinks it is really not all that risky.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

ii. How Invulnerable was the pilot's thinking ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

B. The pilot quickly pulls the aircraft into a steep climbing turn to make the children forget about the bridge.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How Invulnerable was the pilot's thinking ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

C. The pilot explains that it is illegal to do such a thing, but he does it anyway since no one is around to see.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How Invulnerable was the pilot's thinking ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

D. The pilot flies past the bridge to be sure he can do it, then he flies under to show his family how confident he is of his flying skills.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

ii. How Invulnerable was the pilot's thinking ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

11. Read the following paragraph, and then rate each of the pilots responses in terms of your impression of the pilot's behaviour. Each response has two scales, the first addresses the pilots thinking, and the second addresses a particular attitude. For each response place your answer in the boxes provided.

A pilot is on her final approach when she notices a large object lying on the far end of the runway. She is not sure what it is and considers coming around again. Her friend suggests landing anyway since the runway is "plenty long enough".

A. The pilot decides to land, because if her time is up, it is up.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

ii. How reliant was the pilot on external factors ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

B. The pilot contacts air traffic control, and gets their okay before landing.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How reliant was the pilot on external factors ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

C. The pilot checks the wind condition, and after ensuring herself that she can stop before the obstacle, lands.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How reliant was the pilot on external factors ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

D. The pilot decides to land, believing that the regulations making the pilot responsible for the safe operation of the aircraft do not apply here since it is the airport's responsibility to maintain the runway.

i. What is your impression of the pilot's response ?

Very Poorly Thought Response	Poorly Thought Response	Undecided	Well Thought Response	Very Well Thought Response
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

ii. How reliant was the pilot on external factors ?

Not At All	Slightly	Somewhat	Very Much	Extremely
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

SECTION 2:

Rate each of the statements below with the mark which best indicates your current attitude towards flying.

a. I feel that a lot of the flying regulations are not that relevant to safe flight.

Strongly Disagree Disagree Undecided Agree Strongly Agree

1 2 3 4 5

Answer:

b. I believe that taking chances in the air is always foolish.

Strongly Disagree Disagree Undecided Agree Strongly Agree

1 2 3 4 5

Answer:

c. When I am flying I feel there is always time to think before acting.

Strongly Disagree Disagree Undecided Agree Strongly Agree

1 2 3 4 5

Answer:

d. A lot of the troubles that other pilots get themselves into, will never happen to me.

Strongly Disagree Disagree Undecided Agree Strongly Agree

1 2 3 4 5

Answer:

e. I believe that given the chance, I could show a few people what I can really do in the air.

Strongly
Disagree

Disagree Undecided

Agree

Strongly
Agree

 1 2 3 4 5

Answer:

f. When I am flying and trouble strikes, I am competent about the skill I have.

Strongly
Disagree

Disagree Undecided

Agree

Strongly
Agree

 1 2 3 4 5

Answer:

g. I follow the rules, as they are usually right.

Strongly
Disagree

Disagree Undecided

Agree

Strongly
Agree

 1 2 3 4 5

Answer:

h. When trouble happens in the air there is usually no time to think, and acting fast is a necessity.

Strongly
Disagree

Disagree Undecided

Agree

Strongly
Agree

 1 2 3 4 5

Answer:

i. If I confronted a big problem when flying, there probably would not be a lot I could do.

Strongly
Disagree

Disagree Undecided

Agree

Strongly
Agree

 1 2 3 4 5

Answer:

j. A lot of the troubles that other pilots get themselves into, could easily happen to me.

Strongly
Disagree

Disagree Undecided

Agree

Strongly
Agree

 1 2 3 4 5

Answer:

SECTION 3.

Read the following pilot report. The report is by a pilot who got into difficulties because of his preflight activities, and the operation of his aircraft.

After reading the report, you will be asked a number of questions regarding the pilot's judgment.

Pilot's Report.

(1) I taxied out of the apron area about 15 minutes later than I had planned. (2) When I got about 1,000 metres down the taxiway, the tower called me. (3) They said that they thought they could see smoke coming from my left wheel assembly. (4) I did not want to stop to check out the problem because I was determined to get to Wanganui on time for a meeting. (5) I figured I should do something right away to get the tower off my back, so I decided to speed up. (6) I thought maybe the rush of air would blow the smoke that had attracted the tower's attention.

(7) Then the left wheel started binding up a little. (8) The airplane was moving pretty fast, and I was having a hard time steering it in a straight line. (9) The dim taxiway lights did not help matters any. (10) Before I really knew what was happening, the left wheel was off the taxiway and into the grass. (11) I closed the throttle and tried to stop as fast as I safely could, but the brakes were not working on the left side. (12) By then I figured there was nothing I could do to overcome this run of bad luck, so I figured I would just bring the airplane to a stop as best I could. (13) I was so busy cursing my bad luck that I did not notice a concrete block sticking up from the ground until it was too late. (14) I hit the block at only about 5 knots an hour, but that was fast enough to do substantial damage to the landing gear. (15) It really makes me mad to think that the whole thing was due to a hydraulic fluid leak in the brake system. (16) I probably would have noticed it if I had done my usual preflight inspections.

1. Consider sentence 4. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

2. Consider sentence 5. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

3. Consider sentence 6. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

4. Consider sentence 8. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

5. Consider sentence 11. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

6. Consider sentence 12. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

7. Consider sentence 13. In the box provided, indicate which statement best illustrates your opinion of the pilot's judgment.

Very Poor Judgment	Poor Judgment	No Judgment	Good Judgment	Very Good Judgment
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Answer:

SECTION 4.

Read the pilot judgment scenario below. After you have finished reading, you will be asked to rate a series of questions. Each of these questions will require you to rate how important each of the factors would have been if you had been in the same situation.

Pilot Judgment Scenario No.I.

(1) Chris Joll is a 23 year old university student enjoying his summer break at home in New Plymouth. (2) He is a non-instrument rated private pilot with 156 hours of flying time. (3) His father owns a new single engine aircraft, and he has flown it 20 hours during the summer.

(4) Around 4:00 p.m., Chris receives a telephone call from his girlfriend in Palmerston North. (5) She tells him there is going to be a party at her friends flat that night. (6) She asks if he can get the family airplane to fly to Palmerston North, and accompany her to the party.

(7) Chris has not seen her for three weeks, and he tells her he will come. (8) He asks her to meet him at the airport at 7:00 pm. (9) Before hanging up, he asks her how the weather is there. (10) She says the sun has been out most of the afternoon.

(11) Arriving at the home town airport about 5:30 p.m., Chris carefully preflights the airplane. (12) Since his girlfriend said that the weather was good in Palmerston, and since it is nice and clear locally, he does not check the aviation weather forecast. (13) Chris knows the 110 mile flight to Palmerston will take just over one hour. (14) At 5:45 p.m., Chris takes off with 2-1/2 hours of fuel aboard.

(15) About 50 miles from Palmerston, Chris sees thick cloud ahead and to the west. (16) About 35 miles out of Palmerston, Chris finds he is encountering an increasing amount of cloud at his cruising altitude of 1,500 feet. (17) Chris continues on course, but he reduces his altitude to about 1,000 feet to stay below the clouds. (18) Five minutes later Chris is once again dodging cloud, and he is concerned enough to radio the Palmerston TWR. (19) He is told that the airport has recently gone below VFR minimums. (20) He is directed to an airfield about 15 miles west of his current position for an alternate landing.

(21) Chris now reduces his altitude to 600 feet to stay out of the clouds, and he knows he must maintain at least 500 feet to stay above local hills. (22) With clouds closing in on all sides, Chris considers making an immediate forced landing rather than continue on another 10 miles or so in search of the nonfamiliar alternative airfield.

(23) Seeing a long, level field below him, Chris flies over it once to check for obstacles. (24) Finding it clear, Chris executes an emergency landing using proper procedures. (25) Chris makes a good landing, but the heavy rains have made the recently cultivated field very muddy. (26) Shortly after the wheels encounter the soft mud, the aircraft noses over.

Question Series 1.

Look at sentence 12, and consider Chris's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation as Chris.

a. The weather information at airport:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

b. The time the party starts:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

c. The experience in this type of aircraft:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

d. The weather information from his girlfriend:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

e. The type of aircraft:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

Question Series 2.

Look at sentence 17, and consider Chris's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation as Chris.

a. The flying time to the destination:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

b. The type of aircraft:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

c. The cloud cover in the area:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

d. The Visual Flight Rules:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

e. The reason for the trip:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

Question Series 3.

Look at sentence 19, and consider Chris's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation as Chris.

a. The area weather conditions:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

b. The fuel on board:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

c. The distance from the destination:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

d. The time of the day:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

e. The radio contact currently available:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

Question Series 4.

Look at sentence 22, and consider Chris's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation as Chris.

a. The pilot's total flying time:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

b. The area weather conditions:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

c. The time of the day:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

d. The location of the alternate airport:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

e. The regulations for a VFR flight:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

f. The estimated arrival time:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

g. The type of aircraft:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

h. The condition and contour of the local terrain:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

i. Auckland ATIS information:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

j. The instruments on board the aircraft:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
--------------------------------	------------------	-----------	-----------	------------------------

Answer:

Pilot Judgment Scenario No.II.

(1) The pilot was on a cross-country flight in a high performance, single engine airplane. (2) The weather was VFR, and she was cruising at 5,000 AMSL. (3) The ground below consisted of tree-covered hills interspaced with what seemed to be grassy clearings. (4) All appeared well until the fuel pressure dropped, and engine power decreased suddenly. (5) The pilot immediately switched fuel tanks and turned on the auxiliary boost pump. (6) The engine regained power, and the pilot attempted to climb to a higher altitude.

(7) As the pilot applied climb power, the engine once again began to malfunction. (8) This time the power loss was complete. (9) A minute passed before the pilot realized that there was not a suitable landing area within gliding distance.

(10) A glance at the air speed indicator shocked her back to reality. (11) The airspeed had already decreased to 10 knots below best glide speed, and the VSI was showing a descent of 1,100 pm -- 500 feet of previous altitude had already been lost. (12) The pilot got hold of herself and established power-off best glide speed, selected a landing area, and established a pattern. (13) She recalls her "simulated" engine failures, but this was for real!. (14) Now, at only 4000 feet and with the VSI reading an uncomfortable 750 fpm, the pilot had roughly five minutes to go. (15) She considered a landing in the tops of the smaller trees. (16) The airplane would probably be heavily damaged, but at least he would walk away. (17) She thought again about the probable damage and the possibility of never flying again. (18) No, the trees were out - she would try for one of the smaller clearings. (19) Still maintaining glide speed as she turned onto final approach, it became apparent that she would clear the trees. (20) The pilot lowered the landing gear and flew the aircraft toward the clearing. (21) The aircraft picked up speed and struck the ground hard on the main gear, tearing it away. (22) What had appeared to be a relatively smooth surface from the air was actually uneven and strewn with rocks. (23) The aircraft slid to a stop on its belly. (24) The pilot restrained only by a seatbelt, jackknifed into the control panel, sustaining severe head and facial injuries.

Question Series 5.

Look at sentence 5 and consider the pilot's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation.

a. The airspeed:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Answer: <input type="checkbox"/>

b. The Carb Heat:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Answer: <input type="checkbox"/>

c. The altitude:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Answer: <input type="checkbox"/>

d. The weather:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important	
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Answer: <input type="checkbox"/>

Question Series 6.

Look at Sentence 9 and consider the pilot's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation.

a. The altitude:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

b. The wind:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

c. The airspeed:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

d. The radio:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
				Answer: <input type="checkbox"/>

e. The engine restart:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
				Answer: <input type="checkbox"/>

Question Series 7.

Look at Sentence 12 and consider the pilot's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation.

a. The airspeed:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
				Answer: <input type="checkbox"/>

b. The altitude:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
				Answer: <input type="checkbox"/>

c. The wind:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

d. The radio:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

e. The terrain:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Answer:

Question Series 8.

Look at Sentence 18 and consider the pilot's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation.

a. The aircraft damage:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
				Answer: <input type="text"/>

b. Filing an accident report:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
				Answer: <input type="text"/>

c. The personal injuries:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
				Answer: <input type="text"/>

d. The airspeed:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>
				Answer: <input type="text"/>

e. The altitude:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

f. The engine restart:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

g. The shut down checklist:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

Question Series 9.

Look at Sentence 20 and consider the pilot's situation. Use the scales below to rate how important each of the factors would be if you were in the same situation.

a. The airspeed:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

b. The altitude:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

c. The aircraft damage:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer:

d. The personal injuries:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
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Answer:

e. The engine restart:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
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Answer:

f. The shutdown checklist:

Definitely Not Important	Not Important	Undecided	Important	Extremely Important
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Answer:

SECTION 5:

ACTION WAYS QUESTIONS.

1. In each of the six paragraphs below, underline the phrase which indicates a poor judgment action by the pilot.
2. Below each paragraph, briefly state why the action indicates poor judgment.

The aircraft was placarded against takeoff or approaches using the auxiliary fuel tank. The pilot took off with the engine feeding from the auxiliary fuel tank. The engine failed shortly after takeoff.

This pilot did only part of the recommended preflight checks. He attempted to abort his takeoff when he noticed the controls were binding. The pilot lost control, and the airplane slid off the end of the runway. Investigation revealed that the seat belt in the rear cockpit was tied to the control stick.

The cabin door came open in flight, and the passenger panicked. The pilot immediately decided he could not correct the situation in the air and attempted an emergency landing on a road. The aircraft slid off the narrow dirt road into a ditch.

The pilot hurried through preflight, yet he did everything on the checklist. After about ten minutes of flight the pilot experienced partial loss of power and made an emergency landing. A careful inspection revealed the power loss was due to fuel contamination and water was found in the fuel line.

The pilot was taking his passenger for a low flight over some fields and was flying downwind. He pulled up rather sharply. The combination of the aircraft's low altitude and its relatively fast ground speed led the pilot to believe that his airspeed was adequate. During the sharp pullup, the aircraft stalled and spun into the ground.

The pilot made an approach to the 3200-foot landing strip in strong, gusty wind. At the beginning of the flare a wind gust caused the pilot to have difficulty in controlling the aircraft. After struggling to get the aircraft settled down onto the runway, he decided to go around. The aircraft was unable to gain sufficient altitude to clear power lines at the departure end of the run way.

SECTION 6:

1. What are the Subject Areas relating to Pilot Judgment ?

2. Define Action Way.

3. What are the 6 Action Ways ?

4. Describe each of the six Action Ways.

5. What is a Poor Judgment Chain ?

6. What are the steps a pilot can take to break a Poor Judgment Chain ?

7. What are the 3 mental processes of safe flight ?

8. Write the abbreviations for the 3 mental processes of safe flight.

9. Define each of the three mental processes of safe flight.

10. What are the 5 hazardous thoughts ?

11. Write the Antidote for each of the 5 hazardous thoughts ?

APPENDIX D: ANSWER KEY TO THE PILOT JUDGEMENT TEST.

Section 1: (Maximum 11 points).

1. C (Pilot, Aircraft, Environment).
2. 4 or 5
3. 1 or 2
4. 4 or 5
5. 4 or 5
6. 1 or 2

- 7 a/ii. Impulsive, 4 or 5
- 8 a/ii. Macho, 4 or 5
- 9 b/ii. Anti-Authority, 4 or 5
- 10 a/ii. Invulnerability, 4 or 5
- 11 b/ii. External Factors, 4 or 5

Section 2.

Attitudes - Subjective.

Gain the means for each group on each question and compare the different groups. Note elements of consistency, and elements of difference.

Section 3: (Maximum 7 points).

1. 1 or 2
2. 1 or 2
3. 1 or 2
4. 3
5. 4 or 5
6. 1 or 2
7. 1 or 2

Section 4: (Maximum 12 points).

The answers for this section were established 12 experts within the ERAU study (Berlin et al., 1982). Judgement items were identified as important, if their was a high level of consensus (indicated by a standard deviation of no more than 1.5 in the distribution of scores). These experts identified the following factors as being important:

2c, 3a, 3b, 4h, 6a, 6c, 6e, 7a, 7b, 7e, 9a, 9b.

Section 5: (Maximum 12 points).

(Underline Phrase = 1 point, Choose Action Way = 1 point).

1. The Pilot took off with the engine feeding from the auxiliary fuel tank.

DO

2. This pilot did only part of the recommended pre-flight checks.

NO DO

3. The pilot immediately decided he could not correct the situation in the air and attempted an emergency landing on the road.

EARLY DO

4. The pilot hurried through pre-flight.

UNDER DO

5. He pulled up rather sharply.

OVER DO.

6. After struggling to get the aircraft settled down onto the runway, he decided to go around.

LATE DO

SECTION 6: (Maximum 11 points).

1. Pilot, Aircraft, Environment.

2. Action which is a result of poor judgement.

3. Do, No Do, Over Do, Under Do, Early Do, Late Do.

4. Do ----- Did something you should not have.
No Do ----- Did not do something you should have.
Over Do ----- Did too much.
Under Do ----- Did not do enough.
Early Do ----- Acted too early.
Late Do ----- Acted too late.

5. Series of errors in judgement.

6. Recognize PJ feedback.
 Check self for stress.
 Engage in problem resolving.
 Search for other PJ's.
 Review original PJ give self feedback.
7. Automatic Reaction, Repeated Reviewing, Problem Resolving.
8. AR, RR, PR.
9. AR - Maintain on going control of the aircraft
 and respond to emergencies.
 Mode of
 Thinking PR - Used to overcome undesirable situations by
 that: means of systematic process.
 RR - Keeps you constantly aware of all factors
 that contribute to safe flight (P,A,E).
10. Anti Authority, Macho, External Control, Invulnerability,
 Impulsivity.
11. Use the rules : they are usually right.
 Not so fast. Think first.
 Why not me ? I am human, too.
 Risks don't make me fly better. They make me a fool.
 I'm not helpless. I can make a difference.

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APPENDIX E: DESCRIPTION OF OBSERVATION FLIGHT ONE.

The observation flight begins at the Palmerston North Airport. All instructors should prepare the following elements prior to the students arrival :

1. Remove the Flight Manual, and keep it out of the students sight.
2. Fuel aircraft, and prepare for the flight.
3. Check the weather.
4. Set up the pre-flight anomalies to be tested.

Upon arrival, each of the students is briefed on the following factors:

1. Keeping the flight's activities confidential.
2. His or her role as the pilot-in-command when flying the aircraft : "Do what you would normally do using your common sense."
3. The flight route.
4. The possibility of poor judgement situations.
5. Testing off signals: verbal commands "My aircraft".

Palmerston North Airport.

After the briefing, student is given the aircraft key, and told to do a complete pre-flight. During this time, an instructor should pay particular attention to the following judgement situations:

Situation 1: The Flight-Checklist.

In preparing for the flight, the student is expected to address all the items which appear on the pre-flight checklist. If the student satisfactorily covers all of the items, award 2 marks. If one item is missed out, and it is not seen as important, award 1 mark, and notified the student about the item missed out. If the student fails to satisfactorily cover the items on the flight checklist, award no marks, and notify the student about their errors.

Situation 2: Missing Flight Manual.

During the pre-flight inspection, the student should find the flight manual missing. If they do, the instructor should reassure them that they sighted the manual earlier on, and are satisfied that flight may proceed without it. If the student refuses to fly the aircraft, award 2 marks. If the student accepts your reassurance, or does not notice the manual is missing, award no marks. Be sure to replace the manual at the end of this flight.

Situation 3: Door Handle

Upon entering the aircraft, the instructor should leave the door open, or fail to secure at least one of the latches. If the student picks up on this fact, prior to ending the pre-flight checks, award 2 marks. If the door is not secured, the student should be given no marks, and their attention brought to address the problem.

Situation 4: Shoulder Harness.

Prior to the student's arrival, the instructor should stow the shoulder harnesses. If the student picks up on the point and states that the shoulder harnesses should be worn, award 2 marks. If the student fails to notice the change, award no marks, and state that the shoulder harnesses should be worn.

Situation 5: Loose Items in Cabin.

Before the student's arrival, the instructor should place a number of loose items in the cabin. If the student secures these items during the pre-flight check, award them 2 marks. If the student fails to address the problem then award no marks, and suggest they pick up and secures the loose items.

Having completed the pre-flight check and debriefing, the instructor should suggest the student taxi out onto the runway. During the taxiing, the instructor should address the following situation :

Situation 6: Taxiing.

While taxiing, the instructor should distract the students attention into the cabin. If the student performs clearing turns before addressing the instructors question, award 2 marks. If the student immediately directs their attention to the instructors question, award no marks, and notify them about their error.

Once the student has taken off, the instructor should pay particular attention to the following situations:

Situation 7: Low Altitude Flight Over Residential Area.

During the flight, the instructor should suggest the performance of low altitude airwork over a residential area. If the student refuses to perform the manoeuvre, and explains his or her response, awarded 2 marks. If the student starts to descend, and it is clear they intend to perform the manoeuvre, award no marks, and explain what regulations the student was about to violate. (NB. Do not allow the student to violate airspace).

Situation 8: OHAKEA TMA.

Flying at 1000' QNH in the PM. Control Zone, instruct the student to climb immediately to 2000' at the best rate of climb speed. If the student refuses to comply due to the 1500' Control Zone limitation, or indicates that an ATC clearance is required, award 2 marks. If the student complies without clearance, award no marks. (NB. Do not allow the student to violate airspace).

Situation 9: Clearing Turns Prior to Manoeuvre.

Through out the flight, the instructor is to pay attention to whether or not the student performs clearing turns prior to a manoeuvre. If the student is always making observations over both shoulders prior to a manoeuvre, award 2 marks. If the student makes occasional clearing turns, award 1 mark. If no turns are made, then no marks are awarded.

Having completed all the flying activities, the instructor should tell the student to head for home, and then observe the following situation :

Situation 10: High Approach Landing.

The instructor should set the student up for a high approach landing. In addition to this, and as a distractor, the student should be told to practice finding ground reference points close to the airport. If the student states that the approach for the landing is too high, the instructor is to tell them to go around, and approach at a lower height. Such a response will gain 2 marks. If the student begins his or her approach from the high altitude, the instructor should suggest that they go around, and approach from a lower altitude. If such a response is required, the student should be awarded no marks.

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APPENDIX F: SCORE SHEET FOR OBSERVATION FLIGHT ONE.

Instructors Name: _____

Students Name: _____

For each of the situations below simply circle the mark that best depicts the students behaviour. If the student satisfies the criteria for each situation, reinforce his or her behaviour, if this criteria is not met, state the areas that need to be improved.

Situation 1: The Flight Checklist.

- a. The student covers all the items on the checklist. 2
- b. The student covers all the items on the checklist except one. 1
- c. The student does not satisfactorily cover all the items on the checklist. 0

Situation 2: Missing Flight Manual.

- a. The student does not accept the instructors reassurance, and refuses to fly without the flight manual. 2
- b. The student accepts the instructors assurance, and prepares to fly without the flight manual. 0

Situation 3: The Door Handle.

- a. The student secures the instructors door. 2
- b. The student does not secure the instructors door. 0

Situation 4: The Shoulder Harness.

- a. The student unstows, and wears the shoulder harness. 2
- b. The student does not unstow the shoulder harnesses. 0

Situation 5: Loose Items within the Cabin.

- a. The student stows the loose items. 2
- b. The student does not stow the loose items. 0

Situation 6: Taxiing.

- | | |
|---|---|
| a. The student performs clearing turns before addressing the instructors questions. | 2 |
| b. The student does not perform clearing turns before addressing the instructors questions. | 0 |

Situation 7: Low Altitude Flight over Residential Area.

- | | |
|---|---|
| a. The student refuses to break the height restriction. | 2 |
| b. The student attempts to perform the manœuvre. | 0 |

Situation 8: OHAKEA TMA.

- | | |
|--|---|
| a. The student refuses to climb without ATC clearance. | 2 |
| b. The student attempts to comply without clearance. | 0 |

Situation 9: Clearing Turns.

- | | |
|--|---|
| a. The student continually performs clearing turns. | 2 |
| b. The student occasionally performs clearing turns. | 1 |
| c. The student never performs clearing turns. | 0 |

Situation 10: High Approach Landing.

- | | |
|---|---|
| a. The student suggests a lower approach landing. | 2 |
| b. The student attempts a high approach landing. | 0 |

APPENDIX G: DESCRIPTION OF OBSERVATION TWO.

The observation flight begins at the Palmerston North Airport. All instructors should prepare the following elements prior to the students arrival :

1. Change the aeronautical chart.
2. Fuel aircraft, and prepare for the flight.
3. Check the weather.
4. Set up the preflight anomalies to be tested.

Upon arrival, the student is briefed on the following factors:

1. Keeping the flight's activities confidential.
2. His or her role as pilot-in-command when flying the aircraft : "Do what you would normally do using your common sense."
3. The flight route.
4. The possibility of poor judgment situations.
5. Testing off signals: verbal commands "My aircraft".

Palmerston North Airport.

After the briefing, the student is given the aircraft key, and told to do a complete pre-flight. During this time, an instructor should pay particular attention to the following judgment situations:

Situation 1: The Preflight-Checklist.

In preparing for the flight, the student is expected to address all the items which appear on the pre-flight checklist. If the student satisfactorily covers all of the items, award 2 marks. If one item is missed out, and it is not seen as important, awarded 1 mark, and notify the student about the item missed out. If the student fails to satisfactorily cover the items on the flight checklist, award no marks, and notify the student about their errors.

Situation 2: Outdated Aeronautical Chart.

During the pre-flight time, the student is expected to look at a current aeronautical chart for information, or to verify with the instructor that they will be acting as an information source during the flight. If the student satisfies this criteria, award 2 marks. If this criteria is not satisfactorily met, award no marks, and then request that the student inspect an aeronautical chart for the flight planned.

Situation 3: Dirt Screen.

Prior to the students arrival the instructor should dirty the front windscreen. If the student picks up on this fact, and cleans the window prior to ending the pre-flight checks, award 2 marks. If the window is not cleaned, the student should be given no marks, and attention directed to address the point.

Situation 4: Hydraulic Leak.

Prior to the student's arrival, the instructor should pour hydraulic fluid on the ground or brake assembly. If the student picks up on the point and makes an inspection for obvious leaks, or suggests that a mechanic check the break system for leaks and proper operation prior takeoff, award 2 marks. If the student fails to notice the problem, award no marks, and then address why the student neglected, or overlooked the problem.

Situation 5: Compass Card Missing.

Before the student's arrival, the instructor should remove the compass card. If the student searches the aircraft for the card, award 2 marks. If the student fails to address the problem, award no marks, and then suggest that the student look for the card before continuing with the flight.

Having completed the pre-flight check and debriefing, the instructor should suggest that the student taxi out onto the runway. During the taxiing, the instructor should address the following situation :

Situation 6: Intersection Takeoff.

While taxiing, the instructor should suggest a departure from a runway intersection. If the student states that the runway remaining would make a safe takeoff difficult, award 2 marks. If the student makes a move to proceed with the takeoff, the instructor should take control of the aircraft, and notify the student of the dangers of following such a request. If this response is required, award no marks.

Once the student has taken off, the instructor should pay particular attention to the following situations:

Situation 7: Exceed VFE Limit.

During the flight, the instructor should direct the student to lower the flaps and descend at a rate (in feet per minute) that will cause VFE to be exceeded. If the student notices that they are about to break the VFE limit, award 2 marks. If it becomes clear that the student will break the VFE limit then the instructor should take control of the aircraft, and then explain the regulations which the student was about to violate. If this response is required, award no marks. (NB. Do not allow the student to violate airspace).

Situation 8: Partial Engine Failure.

During the flight, the instructor should simulate a partial engine failure. If the student considers the different options which are available, in particular examining whether it is possible to reach an airport, award 2 marks. If the student carries on with the normal pattern of flight, no marks should be awarded, and their behaviour questioned.

Situation 9: Clearing Turns Prior to Manoeuvre.

Through out the flight, the instructor is to pay attention to whether or not the student performs clearing turns prior to performing a manoeuvre. If the student is always making observations over both shoulders before performing a manoeuvre, award 2 marks. If the student makes 'occasional' clearing turns, then award 1 mark. If no turns are made, no marks should be awarded.

Having completed all the flying activities, and having landed the aircraft, an instructor should observe the following situation:

Situation 10: The PostFlight Checklist.

Having completed the flight, the student is expected to address all the items which appear on the post-flight checklist. Of particular interest to the instructor should be that the student checks the emergency frequency 12.51. To make this exercise more of a judgment activity, the instructor should try to hurry the student along. If the student satisfactorily covers all of the items on the checklist, award 2 marks. If the student fails to satisfactorily cover the items on the flight checklist, award no marks, and then make clear the errors which were made.

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OBSERVATION FLIGHT 2: SCORE SHEET.

Instructors Name: _____
Students Name: _____

For each of the situations below simply circle the mark that best depicts the students behaviour. If the student satisfies the criteria for each situation, reinforce his or her behaviour, if this criteria is not met, state the areas that need to be improved.

Situation 1: The Flight Checklist.

- a. The student covers all the items on the checklist. 2
- b. The student covers all the items on the checklist except one. 1
- c. The student does not satisfactorily cover all the items on the checklist. 0

Situation 2: The Outdated Aeronautical Chart.

- a. The student reads the aeronautical chart and states that it is out of date. 2
- b. The student fails to read the aeronautical chart, or reads it and fails to comment that it is outdated. 0

Situation 3: The Dirt Screen.

- a. The student cleans the front screen. 2
- b. The student fails to clean the front screen. 0

Situation 4: The Hydraulic Leak.

- a. The student states that the flight should not continue until the leak is checked out. 2
- b. The student does not notice the leak, or fails to do anything about it. 0

Situation 5: Missing Compass Card.

- a. The student searches the cockpit for the missing compass card. 2
- b. The student does not search for the missing compass card and proceeds with the flight. 0

Situation 6: Intersection Takeoff.

- a. The student refuses to takeoff from the intersection. 2
- b. The student proceeds to takeoff from the intersection. 0

Situation 7: Exceed VFE Limit.

- a. The student refuses exceed the VFE limit. 2
- b. The student attempts to exceed the VFE limit. 0

Situation 8: Partial Engine Failure.

- a. The student acknowledges the partial engine failure, and examines the different options available. 2
- b. The student offers an inappropriate response, or no response at all to the partial engine failure. 0

Situation 9: Clearing Turns Prior to a Manoeuvre.

- a. The student continually performs clearing turns. 2
- b. The student occasionally performs clearing turns. 1
- b. The student never performs clearing turns. 0

Situation 10: The Post-flight Checklist.

- a. The student covers all the items on the checklist. Including a check of the emergency frequency. 2
- b. The student does not satisfactorily cover all the items on the checklist. 0

APPENDIX I: THE PILOT JUDGEMENT PRE-COURSE QUESTIONNAIRE.

Name: _____

As participants in the following training program you may have certain expectations relating to Pilot Judgment Training.

Before beginning this training program, please take a few moments to answer the following questions.

(1). Which of the following methods of instruction would you prefer for the teaching of this course?

Please tick none or more items.

- | | |
|--|--------------------------|
| Lectures | <input type="checkbox"/> |
| Informal discussions with other course members | <input type="checkbox"/> |
| Self Paced Learning with Manuals | <input type="checkbox"/> |
| Organized Discussion | <input type="checkbox"/> |
| Practical activities | <input type="checkbox"/> |
| Informal discussion with course leaders | <input type="checkbox"/> |

(2). What additional teaching methods would you like to see used?

(3). What benefits, if any, do you associate with pilot judgment training?

For each of the following statements use the scale below to indicate what benefits you envisage pilot judgment training having on your future flying? Place your answer in the box provided, you may use the same rating more than once.

Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

It will improve my flying skill

I will fly a lot safer and with better judgment

I will get a better job

Future training will be easier

There will be no benefits

I will perform better than pilots who have not received the training

I will get more enjoyment from my flying

(4). Are there any other benefits you associate with pilot judgment training?

(5). Using the scale below, rate each question with the response you believe best indicates your current attitude towards the different parts of the judgment training program. Place your answer in the box provided, you may use the same rating more than once.

Strongly Disagree Disagree No Opinion Agree Strongly Agree

Student Attitude Questionnaire

A. In the future I am going to pay more attention to the judgment concepts covered in my own flying.

Answer:

B. The program, as a whole, is a good idea.

Answer:

C. I'd like to see material on pilot judgment included as a requirement for a commercial pilot licence.

Answer:

D. During the training flights, the instructor should keep me aware of the different judgment factors.

Answer:

E. I think that talking about judgment with the instructors will be an important part of the training.

Answer:

F. I think I could learn just as much about pilot judgment on the ground without having flying lessons on the topic.

Answer:

G. I think self-paced learning is a good method for teaching students about pilot judgment.

Answer:

H. Learning about stress reduction will be helpful.

Answer:

(6). How do you rate your present understanding of the topics which will be included in the pilot judgment training programme?

Rate your opinion using the scale below, and place your answer in the box provided. You may use the same rating more than once.

No Understanding	Poor	Average Understanding	Good	Excellent Understanding
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

- a. The three subject areas in pilot judgment.
- b. The six action ways resulting from pilot judgment.
- c. The poor judgment chain, and how to break it.
- d. Identifying hazardous thought patterns.
- e. Overcoming hazardous thoughts.
- f. Understanding stress, and how to reduce it.

APPENDIX J: THE PILOT JUDGEMENT IMMEDIATE POST-COURSE QUESTIONNAIRE.

Name: _____

We would like to know your immediate reactions to some aspects of the course in which you have participated. Please read the following items and express your opinions in the manner indicated.

(1). Which of the following methods of instruction would you prefer for the teaching of this course?

Please tick none or more items.

Lectures

Informal discussions with other course members

Self Paced Learning with Manuals

Organized Discussion

Practical activities

Informal discussion with course leaders

(2). What additional teaching methods would you like to see used?

(3). What benefits, if any, do you associate with pilot judgment training?

For each of the following statements use the scale below to indicate what benefits you envisage pilot judgment training having on your future flying? Place your answer in the box provided, you may use the same rating more than once.

Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
1	2	3	4	5

It has improved my flying skill

I fly a lot safer and with better judgment

I will get a better job

Future training will be easier

There were no benefits

I perform better than pilots who have not received the training

I get more enjoyment from my flying

(4). Are there any other benefits you associate with pilot judgment training?

(5). Using the scale below, rate each question with the response you believe best indicates your current attitude towards the different parts of the judgement training program. Place your answer in the box provided, you may use the same rating more than once.

Strongly Disagree Disagree No Opinion Agree Strongly Agree

1	2	3	4	5
---	---	---	---	---

Student Attitude Questionnaire

A. In the future I am going to pay more attention to the judgement concepts covered in my own flying.

Answer:

B. The program, as a whole, is a good idea.

Answer:

C. I'd like to see material on pilot judgement included as a requirement for a commercial pilot licence.

Answer:

*** D. The instructor pilot really kept me aware of the different judgement factors during the training flights.

Answer:

E. I think that talking about judgement with the instructors was an important part of the training.

Answer:

*** F. I would have learned just as much about pilot judgement if there had been no flying component in the training.

Answer:

G. I think self paced learning is a good method for teaching students about pilot judgement.

Answer:

H. Learning about stress reduction was helpful.

Answer:

*** This question was deleted from the questionnaire, because the experimental group did not complete the training relating to this question.

(6). What is your opinion of the time which you allocated to the various topics, and that which was allocated in the classroom, and in the aircraft?

For each of the questions, rate your decision on the following scale, indicating whether you think more or less time should have been spent on the subject.

Much Less Time	Less Time	Time Just Right	More Time	Much More Time
1	2	3	4	5

Unit 1 Student Manual.

Lesson 1:

a. The Subject Areas.

Answer:

b. The Action Ways.

Answer:

Lesson 2:

a. The Poor Judgement Chain.

Answer:

b. Breaking the Poor Judgement Chain.

Answer:

Lesson 3:

a. The Three Mental Processes of Safe Flight.

Answer:

Unit 2: Student Manual.

a. Lesson 4 - 9: Hazardous Thoughts.

Answer:

b. Lesson 10 - 11: Antidotes-Hazardous Thoughts.

Answer:

c. Lesson 12: Stress/Reducing Stress.

Answer:

d. Lesson 13: Check Mastery of Learning

Answer:

Unit 3: Student Manual.

a. Lesson 14 - 18: Practice Exercises Unit 1&2.

Answer:

Unit 4: In-Flight Instruction.

*** a. Lesson Concepts

Answer:

Unit 5: In-Flight Instruction.

*** a. Behavioural Situation.

Answer:

*** This question was deleted from the questionnaire, because the experimental group did not complete the training relating to this question.

(7). How relevant do you think each of the following topics was in establishing your understanding of pilot judgement?

Rate your opinion using the scale below, and place your answer in the box provided. You may use the same rating more than once.

Totally Irrelevant	Irrelevant	No Opinion	Relevant	Very Relevant
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Unit 1 Student Manual.

Lesson 1:

a.The Subject Areas. Answer:

b.The Action Ways. Answer:

Lesson 2:

a.The Poor Judgement Chain. Answer:

b.Breaking the Poor Judgement Chain. Answer:

Lesson 3:

a.The Three Mental Processes of Safe Flight. Answer:

Unit 2:Student Manual.

a.Lesson 4 - 9: Hazardous Thoughts. Answer:

b.Lesson 10 - 11:Antidotes-Hazardous Thoughts. Answer:

c.Lesson 12: Stress/Reducing Stress. Answer:

d.Lesson 13: Check Mastery of Learning Answer:

Unit 3:Student Manual.

a.Lesson 14 - 18: Practice Exercises Unit 1&2. Answer:

Unit 4:In-Flight Instruction.

*** a.Lesson Concepts Answer:

Unit 5:In-Flight Instruction.

*** a.Behavioural Situation Answer:

*** This question was deleted from the questionnaire, because the experimental group did not complete the training relating to this question.

(8). How do you rate your present understanding of the topics which were included in the pilot judgement training?

Rate your opinion using the scale below, and place your answer in the box provided. You may use the same rating more than once.

No Understanding	Poor	Average Understanding	Good	Excellent Understanding
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>

Unit 1 Student Manual.

Lesson 1:

a.The Subject Areas.

Answer:

b.The Action Ways.

Answer:

Lesson 2:

a.The Poor Judgement Chain.

Answer:

b.Breaking the Poor Judgement Chain.

Answer:

Lesson 3:

a.The Three Mental Processes of Safe Flight.

Answer:

Unit 2:Student Manual.

a.Lesson 4 - 9: Hazardous Thoughts.

Answer:

b.Lesson 10 - 11:Antidotes-Hazardous Thoughts.

Answer:

c.Lesson 12: Stress/Reducing Stress.

Answer:

(9). What areas would you like to see more emphasized, or less emphasized within the current training?

a. More Emphasized: _____

b. Less Emphasized: _____

(10). Are there any other changes you like to see in the current training program?

(11). Write a short paragraph, or two, describing your feelings and impressions about the value of pilot judgement training.

(12). Do you plan to make any changes as a result of the ideas gained from this course?

YES/NO (Cross out one)

If "YES", what are the changes and from what ideas.

(13). Were you asked anything in the written test that was not in the student manual?

- a. Yes
- b. No

Answer _____

(14). Did you understand all the questions within the test?

- a. Yes
- b. No

Answer _____

(15). Did you have ample opportunity to meet with your instructors, and discuss the content of the course?

- a. Yes
- b. No

Answer: _____

*** (16). During the flight training did the pilot instructor make the objective of the lessons clear?

Answer: _____

*** (17). During the flight training, in situations where the flight instructor indicated you made a poor judgement, did you think you were coerced or forced into the manoeuvre?

Answer: _____

*** This question was deleted from the questionnaire, because the experimental group did not complete the training relating to this question.

*** (18). During the flight training, when the instructor gave an explanation of your poor judgement, was the explanation clear and just?

Answer: _____

*** (19). Were there any situations you thought were unfair or overly confusing during the flight training?

Answer: _____

*** (20). Were there any manoeuvres or procedures requested of you, during the flight training, with which you were not familiar?

Answer: _____

*** This question was deleted from the questionnaire, because the experimental group did not complete the training relating to this question.

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APPENDIX K: THE LESSON 13 TEST NUMBER 1.

HAZARDOUS THOUGHT POSTCHECK.

This postcheck has two purposes. First, it is intended to reinforce your judgement training. Second, if for some reason you have not mastered any part of the hazardous thought and antidote training, the postcheck will help you identify and remedy that problem.

Situation 1.

In the space below, record the five hazardous thought patterns, and their appropriate antidotes:

<u>HAZARDOUS THOUGHT</u>	<u>ANTIDOTE</u>
(1). _____	_____ _____
(2). _____	_____ _____
(3). _____	_____ _____
(4). _____	_____ _____
(5). _____	_____ _____

Situation 2.

Each of the situations below have been taken from your training manuals. After reading the passage, you are to write down the hazardous thought best illustrated by each of the responses.

On your approach to an airport, you are somewhat confused since the runway is only partially lighted. You are not sure if this is the airfield at which you intended to land. The surrounding buildings do not look familiar, but it has been over a year since your last visit to the airfield. A much larger, more familiar airfield is 15 miles away.

- a. You decide to land reasoning that the Civil Aviation Regulations do not really apply in this situation.

Hazardous Thought Pattern: _____

- b. You decide to land anyway, thinking, "Of course I can handle the situation".

Hazardous Thought Pattern: _____

- c. You decide to land since you feel that "somebody up there" is protecting you.

Hazardous Thought Pattern: _____

- d. You feel nothing will happen since you have got out of similar jams before.

Hazardous Thought Pattern: _____

- e. Rather than get confused thinking about options, you decide to land to get the flight over with.

Hazardous Thought Pattern: _____

Situation 3.

The weather forecast called for freezing rain. During the flight, you notice that ice is beginning to accumulate on the aircraft's wings. You are not sure what to do. You have never encountered this problem before. You are tempted to do nothing since the airplane is still flying well. A passenger suggests that you might radio the information.

- a. You radio for information, but decide to ignore the advice since the airplane continues to fly well.

Hazardous Thought Pattern: _____

- b. You quickly tell the passenger to stop butting in.

Hazardous Thought Pattern: _____

- c. You feel that there probably will not be any difficulty since you have always come out of difficult situations rather well.

Hazardous Thought Pattern: _____

- d. You feel that there is nothing you can do because radio information won't change the weather conditions.

Hazardous Thought Pattern: _____

- e. You tell the passenger that you are the boss and will handle the problem your way.

Hazardous Thought Pattern: _____

Situation 4.

Weather and visibility are poor and the control tower advises you to land on a runway other than the one you prefer. You see larger airplanes using your preferred runway and wonder why you have been denied permission. Since the recommended runway is on the far side of the airport, you radio the tower and ask for a reconsideration.

- a. Regardless of what the tower tells you, you are going to do what you want to.

Hazardous Thought Pattern: _____

- b. You think that nothing dangerous will occur because the weather conditions are not really that bad.

Hazardous Thought Pattern: _____

- c. You figure there is no sense in waiting for instructions because the tower is going to do whatever it pleases, regardless of your wishes.

Hazardous Thought Pattern: _____

- d. Before you receive a reply, you start making your approach on the unauthorized runway.

Hazardous Thought Pattern: _____

- e. You feel that if other pilots can land their airplanes, so can you.

Hazardous Thought Pattern: _____

Situation 5.

The runway is short with a building 300 metres from the end. A strong crosswind is blowing. You are asked to take an additional passenger and this will overload the airplane by about 35 kilograms. The extra passenger is waiting for your reply.

- a. You take the passenger, fearing that you will lose respect if you do not.

Hazardous Thought Pattern: _____

- b. You accept the passenger, thinking that accidents only happen to others.

Hazardous Thought Pattern: _____

- c. Since the passenger seems friendly, you take him aboard right away and do not give another thought to it.

Hazardous Thought Pattern: _____

- d. You take the passenger, remarking to yourself that the weight and balance rules are too strict to begin with.

Hazardous Thought Pattern: _____

- e. You take the passenger, reasoning that if fate says you are going to crash, you will, with or without extra weight.

Hazardous Thought Pattern: _____

Situation 6.

The situation below outlines a description of what happened in a flight situation, and what the pilot was thinking. Carefully review the article, and underline any hazardous patterns of thought. Whenever you underline one, write the name of the hazardous thought and in the space provided to the right.

Tom and George are flying in Tom's single engine aircraft, and they decide to "buzz" some friends who are swimming in a nearby lake. Tom is an experienced pilot, who has done buzzing many times before. In fact he takes pride in being able to do it really well. He often brags that someday he will be a stunt flier, and then everybody can see his talents on display.

George likes Tom and likes to go along on "buzzing" runs. However, George is a low time pilot and he sometimes wonders if Tom is not pushing his luck. George is not worried about an accident, however. He is convinced that Tom is a great pilot who can handle anything that might happen to the two of them in the air.

As they are buzzing the lake, both are interested in watching the reactions of their friends on the ground. Tom descends lower than usual in their third pass. When he tries to climb out, the plane does not make it over a power transmission line. The wing brushes the power line, sparks fly, and the wing sustains minor damage. George panics and yells, "We're going to crash, we're going to crash!".

Tom is also shaken, but he maintains control of the airplane and tells George, "Calm down and help me fly this thing back to the airport, or we're going to be in big trouble over this. I told you I could handle anything in this airplane."

As they head for the airport, the airplane continues to fly without difficulty. They have a good laugh over the incident, telling one another that it is another great adventure in their flying careers. Tom tells George, "You know, if the power company had any sense, they would bury all those power lines. If they would do that, pilots like us would have an easier time flying safely."

APPENDIX L: ANSWER SHEET FOR LESSON 13: TEST NUMBER 1.

Situation 1.

1. Anti-Authority "Use the rules:They are usually right".
2. External Control "I'm not helpless.I can make a difference".
3. Impulsivity "Not so fast. Think first".
4. Invulnerability "Why not me ? I am human, too".
5. Macho "Risks don't make me fly better. They make me a fool".

Situation 2:

- a. Anti-Authority.
- b. Macho.
- c. External Control.
- d. Invulnerability.
- e. Impulsivity.

Situation 3:

- a. Anti-Authority.
- b. Impulsivity.
- c. Invulnerability.
- d. External Control.
- e. Macho.

Situation 4.

- a. Anti-Authority.
- b. Invulnerability.
- c. External Control.
- d. Impulsivity.
- e. Macho.

Situation 5.

- a. Macho.
- b. Invulnerable.
- c. Impulsivity.
- d. Anti-Authority.
- e. External Control.

Situation 6.

Tom and George are flying in Tom's single engine aircraft, and they decide to "buzz" some friends who are swimming in a nearby lake. Tom is an experienced pilot, who has done buzzing many times before. In fact he takes pride in being able to do it really well. He often brags that someday he will be a stunt flier, and then everybody can see his talents on display. **Anti-Authority Macho**

George likes Tom and likes to go along on "buzzing" runs. However, George is a low time pilot and he sometimes wonders if Tom is not pushing his luck. George is not worried about an accident, however. He is convinced that Tom is a great pilot who can handle anything that might happen to the two of them in the air. **Invulnerability**

As they are buzzing the lake, both are interested in watching the reactions of their friends on the ground. Tom descends lower than usual in their third pass. When he tries to climb out, the plane does not make it over a power transmission line. The wing brushes the power line, sparks fly, and the wing sustains minor damage. George panics and yells, "We're going to crash, we're going to crash!" **Impulsivity**

Tom is also shaken, but he maintains control of the airplane and tells George, "Calm down and help me fly this thing back to the airport, or we're going to be in big trouble over this. I told you I could handle anything in this airplane." **Macho**

As they head for the airport, the airplane continues to fly without difficulty. They have a good laugh over the incident, telling one another that it is another great adventure in their flying careers. Tom tells George, "You know, if the power company had any sense, they would bury all those power lines. If they would do that, pilots like us would have an easier time flying safely." **Invulnerability External Control**

APPENDIX M: THE LESSON 13 TEST NUMBER 2.

HAZARDOUS THOUGHT POSTCHECK-NUMBER TWO.

This postcheck has two purposes. First, it is intended to reinforce your judgement training. Second, if for some reason you have not mastered any part of the hazardous thought and antidote training, the postcheck will help you identify and remedy that problem.

Situation 1.

In the space below, record the five hazardous thought patterns, and their appropriate antidotes:

<u>HAZARDOUS THOUGHT</u>	<u>ANTIDOTE</u>
(1). _____	_____ _____
(2). _____	_____ _____
(3). _____	_____ _____
(4). _____	_____ _____
(5). _____	_____ _____

Situation 2.

Each of the situations below have been taken from your training manuals. After reading the passage, you are to write down the hazardous thought best illustrated by each of the responses.

You are quite determined to arrive at your destination by 3 p.m. If you stay on your predetermined course, you will just about make it, assuming there are no problems. Or, you can take an unauthorized route which will get you there at 2:30. If you choose the unauthorized route, it means you must fly through fog conditions. Good weather conditions prevail over the regular route.

- a. You take the unauthorized route believing that authorization does not apply in this situation.

Hazardous Thought Pattern: _____

- b. You take the unauthorized route, thinking that flying through the fog will not cause any trouble for this flight.

Hazardous Thought Pattern: _____

- c. You feel it will be a real victory for you if you can take the unauthorized route and arrive by 2:30 p.m.

Hazardous Thought Pattern: _____

- d. You tell yourself that there is no sense sticking to the schedule route because, "there's nothing else to do to be sure to make by 3 p.m."

Hazardous Thought Pattern: _____

- e. You quickly choose the unauthorized route, deciding that you just must get there on time.

Hazardous Thought Pattern: _____

Situation 3.

On your final approach, you fly into patches of ground fog which severely limit visibility. Altitude is 150 feet and you debate whether you can level-off at the correct height and land properly, or whether you should abort the approach.

- a. You think the rules which indicate you should abort the approach are much too rigid.

Hazardous Thought Pattern: _____

- b. You feel that the situation presents a challenge and that you are going to make the landing.

Hazardous Thought Pattern: _____

- c. You begin immediately to level off saying, "To heck with the fog".

Hazardous Thought Pattern: _____

- d. You continue, feeling that the decision has already been made.

Hazardous Thought Pattern: _____

- e. You say to yourself, "I'm going in because nothing is going to happen."

Hazardous Thought Pattern: _____

Situation 4.

Visibility is just over 6000 metres with a 1100 foot ceiling in snow and sleet. Earlier you cleared the fuselage of accumulated snow, but take-off has been delayed for 15 minutes due to traffic. You notice snow and ice are forming again and wonder if you will be able to lift off.

- a. You feel there is no use getting out and cleaning it since it is only going to form again.

Hazardous Thought Pattern: _____

- b. You believe that you can take off in these conditions and you think how impressed your friends will be when they hear it.

Hazardous Thought Pattern: _____

- c. You take off immediately, thinking that any further delay will worsen the problem.

Hazardous Thought Pattern: _____

- d. You reason that you can do it because many other pilots you know have done so and nothing happened to them.

Hazardous Thought Pattern: _____

- e. You resent being delayed 15 minutes and decide you are not going to clear the snow and ice again for anybody.

Hazardous Thought Pattern: _____

Situation 5.

The weather briefing advises you of possible difficult weather conditions at your destination. You elect to go. You then encounter a brief snowstorm and increasingly poor visibility. You have plenty of fuel to turn back but have a hunch that the weather will improve before you reach your destination.

- a. You feel there is no need to worry about the weather since there is nothing one can do about it.

Hazardous Thought Pattern: _____

- b. You decide to continue, and block the weather conditions out of your mind.

Hazardous Thought Pattern: _____

- c. You feel nothing will happen to you since you have plenty of fuel.

Hazardous Thought Pattern: _____

- d. You think to yourself that the weather people are always complicating your flights and sometimes, such as now, it is best to ignore them.

Hazardous Thought Pattern: _____

- e. You fly on, determined to prove that your own weather judgment is sound.

Hazardous Thought Pattern: _____

Situation 6.

The situation below outlines a description of what happened in a flight situation, and what the pilot was thinking. Carefully review the article, and underline any hazardous patterns of thought. Whenever you underline one, write the name of the hazardous thought and in the space provided to the right.

The pilot, Larry, and his wife, Kathy, are on a vacation trip with another couple. Larry has been flying for almost a year. He has decided that this trip, his first cross country with passengers, is the best opportunity to show off his new flying skills to his wife and their friends.

The airplane Larry is flying is rented. Although it is the same type he usually flies, it is a newer and better equipped model. However, Larry is sure he can fly it just fine without any special practice.

About an hour after take-off, there is a partial loss of engine power. The engine is running rough, and the passengers suspect there are problems. Kathy says, "Larry, is the airplane alright?"

Larry immediately says, "Yes, I'll just decrease our altitude a little. That should help."

He descends 500 feet, but the engine sounds even worse, and the power loss is greater. The couple in the back is really getting worried, and the man asks Larry if they should not turn around and go back to their home airport. Larry replies, "I can handle this little problem. Just leave the flying to me."

Larry decides to make a precautionary emergency landing. He lands in a wheat field a few minutes later. No one is hurt during the emergency landing, but the aircraft is damaged. As they all climb out of the plane, Larry remarks, "This airplane is a piece of junk. I'll never fly one of these again."

APPENDIX N: ANSWER SHEET FOR LESSON 13 TEST: NUMBER 2.

Situation 1.

1. Anti-Authority "Use the rules:They are usually right".
2. External Control "I'm not helpless.I can make a difference".
3. Impulsivity "Not so fast.Think first".
4. Invulnerability "Why not me ? I am human, too."
5. Macho "Risks don't make me fly better.They make me a fool".

Situation 2:

- a. Anti-Authority.
- b. Invulnerability.
- c. Macho. External Control.
- d. External Control.
- e. Impulsivity.

Situation 3.

- a. Anti-Authority.
- b. Macho.
- c. Impulsivity.
- d. External Control.
- e. Invulnerability.

Situation 4.

- a. External Control.
- b. Macho.
- c. Impulsivity.
- d. Invulnerability.
- e. Anti-Authority.

Situation 5.

- a. External Control.
- b. Impulsivity.
- c. Invulnerability.
- d. Anti-Authority.
- e. Macho.

Situation 6.

The pilot, Larry, and his wife Kathy, are on a vacation trip with another couple. Larry has been flying for almost a year. He has decided that this trip, his first cross country with passengers, is the best opportunity to show off his new flying skills to his wife and their friends. MACHO

The airplane Larry is flying is rented. Although it is the same type he usually flies, it is a newer and better quipped model. However, Larry is sure he can fly it just fine without any special practice. INVULNERABILITY

About an hour after take-off, there is a partial loss of engine power. The engine is running rough, and the passengers suspect there are problems. Kathy says, "Larry, is the airplane alright?"

Larry immediately says, "Yes, I'll just decrease our altitude a little. That should help." IMPULSIVITY

He descends 500 feet, but the engine sounds even worse, and the power loss is greater. The couple in the back is really worried, and the man asks Larry if they should not turn around and go back to their home airport. Larry replies, "I can handle this little problem. Just leave the flying to me." MACHO

Larry decides to make a precautionary emergency landing. He lands in a wheat field a few minutes later. No one is hurt during the emergency landing, but the aircraft is damaged. As they all climb out of the plane, Larry remarks, "This airplane is a piece of junk. I'll never fly one of these again." EXTERNAL CONTROL
