AN INVESTIGATION INTO SHORT PRODUCTION RUNS IN SPRAY DRYING PLANTS OF THE NEW ZEALAND DAIRY INDUSTRY

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THE ROAD NOT TAKEN

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same,

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I -
I took the one less traveled by,
And that has made all the difference.

Robert Frost

ABSTRACT

The features of short production runs in spray-drying plants of the New Zealand Dairy Industry were examined and some methods developed to help improve productivity in dealing with them.

In particular a survey was carried out of the managers of all spray-drying plants in order to establish quantitative and qualitative information on short production runs. It was found that short production runs could be classified into those caused by interruptions to runs, such as mechanical breakdown, those caused by specification changes, and those caused by the decision to run the plant for a limited period, usually as a result of the limited milk available for processing.

The effect of capacity utilisation on spray-drying plants and the costs of smoothed milk flow were examined and it was found that smoothed milk flow could not be justified on economic grounds alone.

The occurrence of short runs due to specification changes in other industries is documented as are methods to overcome their costs. It was concluded that the major effects in spray-drying plants were likely to be through set-up cost and learning behaviour. However, it was found that neither of these seriously affected cost of powder manufacture, short production runs due to specification changes were dealt with without excess costs over normal manufacture.

The relationship between run length and energy consumption and run length and processing rate were examined and quantified. A computer based management information system was developed to assist in the control of costs in general and short production runs in particular in spray-drying plants.

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R.Kay

1. New Zealand Dairy Research Institute

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LIST OF ABBREVIATIONS

B.M.P.	Buttermilk powder
C.I.P.	Clean in place
Co-op	Co-operative
E.E.C.	European Economic Community
hr	hour
kg	Kilogram
k.w.h.	Kilowatt hour
M.V.R.	Mechanical vapour recompression
N.S.P.O.	Non-standard purchase order
N.Z.C.D.C.	New Zealand Co-operative Dairy Company Limited
N.Z.D.B.	New Zealand Dairy Board
N.Z.D.R.I.	New Zealand Dairy Research Institute
R.O.	Reverse Osmosis
R.P.D.	Rangitaiki Plains Co-operative Dairy Company Limited
S.M.P.	Skim milk powder
Spec	Specification
U.K.	United Kingdom
W.M.P.	Whole milk powder
W.P.N.I.	Whey protein nitrogen index
N.C.	Numerical control

GLOSSARY OF MILK POWDER SPECIFICATIONS

Skim milk powder	600, 633, M301	Medium heat
	602, 607	Low heat
	662	High heat
	672	Heat stable
Whole milk powder	800	Basic, conventional
	801, 802, 803	Limited bulk density range
	821, 823	Vitaminised
Special (whole milk) products	900, 930, 934, SMA	