Electrical Discharge Machining and Rapid Manufacture of Injection Moulding Tools

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To

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with greatest gratitude

Abstract

This thesis presents how rapid manufacture of injection moulding tools could be adopted in the New Zealand manufacturing environment.

The approach is to study about the conventional methods, machinery and the materials of moulding tools and their limitations, application of modern machinery, NC programming, CNC programming using commercially available software to generate NC codes, use of high level programming language to generate NC codes. Futher practical difficulties and limitations of modern methods of design and manufacture will be discussed. Finally, the application of electrical discharge machine in rapid manufacture of moulding tools will be studied as an alternative solution to overcome the difficulties in modern methods.

A study of an alternative moulding tool materials and EDM tool materials will be carried out.

Since there is no guidance in predicting the machining speed and the surface finish of the EDM process in most available manuals a special study has been carried out, to determine both machining speed and surface finish in terms of available EDM process variables.

Experimental design technique was used to collect data and graphical and statistical analysis has been used to identify significant factors. By collecting data after further experimentation and regression analysis using statistical software package called MINITAB release 10, relationships for machining speed, surface finish with available process variables have been established.

Finally some conclusions in rapid manufacture of injection moulding tools appropriate to New Zealand environment will be discussed in the last chapter of this thesis.

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