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Analysis of aluminium extrusion dies and recommendations for prolonging their lifespan.

ABSTRACT

The subject of the following dissertation is the analysis of the aluminum extrusion process and finding ways to extend the lifetime of an extrusion die. The main purpose of this paper was to analyze the extrusion process and locate the problems and issues associated with extrusion dies. Finally the goal was to provide suggestions and ideas to minimize any problems that exist.

Chapter 1 analyzes all the different techniques used for aluminum extrusion as to the way they operate. Chapter 2 explains the metal flow during extrusion. Chapter 3 follows die analysis further and investigates how it works, post extrusion handling, and also other important factors that influence a dies lifespan.

In chapter 4 important parameters during the extrusion process such as friction, ram pressure, dead metal zone and forces are examined.

Moving on to chapter 5 the 4 major types of problems associated with the dies and the process itself are analyzed.

Continuing on to chapter 6 work is shown associated to the model for extrusion design and construction of a testing ring .The forces and pressures on the testing cylinder and die are evaluated through simulation using Solidworks software.

In chapter 7 all the necessary drawings and pictures associated to the build are presented.

Finally in Chapters 8 and 9 the results from the experiments that took place are analyzed together with all the conclusions regarding this paper followed by suggestions and ideas to prolong the lifetime of an extrusion die.