EFFECT OF PUNCHING FORCE ON CUTTING TOOL IN FORMING PROCESS USING FEA APPROACH

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STUDENT'S DECLARATION

I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. The project has not been accepted for any degree and is not concurently submitted for award of other degree.

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To my beloved parents

WAHAB BIN MAMAT
ROKIAH BINTI ABDUL MANAF

To my supervisor
Madam Mas Ayu binti Hassan

To my Academic Advisor
Mr. Rosdi bin Daud

To all FKM's staffs and lecturers

To all my classmates

And all my friends out there

Thank you for your supporting and teaching.

Thank you for everything that you gave during studies and the knowledge that we shared.

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ABSTRACT

This thesis deals with sheet metal forming process. There are two main objectives of this research, firstly, to analysis the cutting tool wear in different force of punching and clearance and the second objective is to predict the critical part or part that will wear first on the cutting tool. In sheet metal forming process, quality of product and minimize the production cost is very important. The tool wear will affect the quality of product and increase the production cost of manufacturing. In the ALGOR simulation, the tool wear will determined by analyse stress on cutting tool. In addition, the wear tool would be high as stress at the cutting edge was extremely high. This project will considered punch force and clearance between punch and die to analysis the tool wear. The punching force used for this project are 100kN, 140kN and 180kN. The range of percentage used for clearance between punch and die used in this project are between 1.70% to 3.3%. These two parameters which are the punch force and clearance is very important for tool life and the final product.

ABSTRAK

Tesis ini membentangkan tentang proses pembentukan kepingan besi. Terdapat dua tujuan utama dalam kajian ini,pertama,untuk menyelidik kehausan alat pemotong dalam tekanan pukulan dan tempat lapang yang berbeza dan tujuan kedua adalah untuk meramalkan bahagian yang genting atau bahagian yang akan mula-mula haus pada alat pemotong. Dalam proses pembentukan kepingan besi, hasil yang berkualiti dan meminimumkan kos penghasilan adalah sangat penting. Kehausan alat akan memberi kesan pada kualiti hasil dan meningkatkan kos penghasilan pembuatan. Dalam simulasi ALGOR, kehausan alat akan dikaji dengan menganalisis tekanan pada alat pemotong. Dalam tambahan, kehausan alat akan tinggi apabila tekanan pada tepi pemotong terlampau tinggi. Dalam projek ini hanya menimbangkan tekanan pukulan dan tempat lapang antara pemukul dan blok logam untuk menyelidik kehausan alat. Tekanan pemukul yang digunakan untuk projek ini adalah 100kN, 140kN dan 180kN. Jarak peratusan yang digunakan untuk tempat lapang antara pemukul dan blok logam adalah di antara 1.7% hingga 3.3%. Dua parameter ini yang mana tekanan pukulan dan tempat lapang adalah sangat penting untuk jangka hayat alat dan hasil terakhir.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS/ABBREVIATIONS

CNC	Computer Numerical Control
CAD	Computer Aided Design
FEA	Finite Element Analysis
FYP	Final Year Project
CMM	Coordinate Measure Machine
IGES	Initial Graphics Exchange Specification