

DESIGN AN ANALYSIS OF OPTIMUM CLEARANCE OF
AN OPEN SMALL THIMBLE BLANKING DIE

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DESIGN AND ANALYSIS OF OPTIMUM CLEARANCE OF AN
OPEN SMALL THIMBLE BLANKING DIE**

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Manufacturing Design) (Hons.)

by

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Design) (Hons.). The member of the supervisory is as follow:

.....
EN. BAHARUDIN BIN ABU BAKAR

ABSTRAK

Projek ini membincangkan pelepasan die optimum untuk blanking die bagi menghasilkan bidal kecil terbuka. Masalah yang berlaku adalah kecacatan selepas dikosongkan 5000 kali kosong. Keadah yang digunakan dalam menganalisis bahan kerja ubah bentuk adalah dengan menggunakan ANSYS . Objektif projek ini adalah untuk mereka bentuk semula die blanking untuk bidal kecil terbuka dan menganalisis pelepasan die optimum , berhubung dengan kuasa setem untuk mempunyai penamat blanking yang baik dengan menggunakan ANSYS . Dengan menggunakan Analisis Dinamik Explicit daripada perisian ANSYS , hasil daripada Finite Element Analysis untuk reka bentuk baru blanking die akan diperolehi dan dapat mengurangkan kecacatan itu. Hasilnya, reka bentuk baru akan mengurangkan kecacatan duri.

ABSTRACT

This project discusses the optimum die clearance for blanking die to produce thimble open small. The most problem that occurred is burr defect after blanking 5000 blank of workpiece. The most common method used in analyzing workpiece deformation is by using ANSYS. The objective of this project is to redesign the blanking die for thimble open small and analyze the optimum die clearance, in relation to the stamping force in order to have a good blanking finish by using ANSYS. By using Explicit Dynamic Analysis from ANSYS software, the result of the Finite Element Analysis for new design of blanking die will be obtained and able to reduce the defect. As a result, the new design will reduce the burr defect.

DEDICATION

To my beloved family, friends and that accompanying me along difficult pathway in my university life, thanks for your help and support.

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TABLE OF CONTENT

Abstrak	i
Abstract	ii
Dedication	iii
Acknowledgement	iv
Table of Content	v
List of Tables	ix
List of Figures	x
CHAPTER 1: INTRODUCTION	1
1.1 Background of Project	1
1.2 Problem Statement	2
1.3 Objective	2
1.4 Scope	3
CHAPTER 2: LITERATURE REVIEW	4
2.1 Sheet Metal Work	4
2.2 Manual Sheet Work	4
2.3 Metal Stamping	5
2.3.1 Coining	5
2.3.2 Bend Forming	6
2.3.3 Draw Forming	6
2.3.4 Deep Draw Forming	7
2.3.5 Blanking	8
2.4 Classifications of Dies and Application	8
2.4.1 Single Operations Dies	9
2.4.2 Compound Dies	9
2.4.3 Progressive Dies	10
2.4.4 Transfer Dies	11
2.4.5 Multi-slide, Four-slide, Wire Form Dies	12
2.5 Part of Blanking Die	14
2.5.1 Die Set	14

2.5.2	The Die Block	15
2.5.3	The Blanking Punch	15
2.5.4	Piercing Punch	16
2.5.5	Punch Plate	16
2.5.6	Pilot	17
2.5.7	The Back Gage	17
2.5.8	The Finger Stops	18
2.5.9	Automatic Stop	18
2.5.10	Stripper Plate	19
2.5.11	Fasteners	19
2.6	Fourteen Steps To Design a die	20
2.6.1	The Scrap Strip (Step 1)	20
2.6.2	The Die Block (Step 2)	21
2.6.3	The Blanking Punch (Step 3)	22
2.6.4	Piercing Punches (Step 4)	23
2.6.5	The Punch Plate (Step 5)	23
2.6.6	Pilots (Step 6)	24
2.6.7	Gages (Step 7)	24
2.6.8	The Finger Stop Finger (Step 8)	25
2.6.9	The Automatic Stop (Step 9)	26
2.6.10	The Stripper (Step 10)	26
2.6.11	Fasteners (Step 11)	27
2.6.12	The Die Set (Step 12)	28
2.6.13	Dimensions and Notes (Step 13)	29
2.6.14	Bill of Material (Step 14)	30
2.7	Characteristics of Metal in Sheet Forming	31
2.8	Blanking force	32
2.9	Area to Be Cut	33
2.10	Blanking Die of Thimble Open Small	35
2.11	Blanking Die Parameters of Thimble Open Small Die	36
2.12	Shear Stress	37
2.13	Normal Stress	37
2.14	Deformation	38

CHAPTER 3: METHODOLOGY	39
3.1 Flow Chart	39
3.1.1 Phase 1: Planning	41
3.1.2 Phase 2: Concept Development	41
3.1.3 Phase 3: Detail Design	41
3.1.4 Phase 4: Analysis & Refinement	42
3.1.5 Phase 5: Report Submission & Presentation	42
3.2 Process to produce thimble open small	42
3.3 Concept Generation	44
3.3.1 Blanking concept Generation	44
3.4 Concept Selection	46
3.5 Workpiece	47
3.6 3D-Modeling	47
3.7 Punch Force	48
3.8 FEA Simulation	49
3.9 Expected Result	51
CHAPTER 4 : PROCEDURE OF SOLIDWORKS DRAWING AND EXPLICIT DYNAMIC ANALYSIS	52
4.1 Procedure 3D Modelling	52
4.1.1 Upper Die	
4.1.2 Raw Material	57
4.1.3 Spring Giude	58
4.1.4 Spring	59
4.1.5 Lower Die	60
4.2 Assembly of Blanking Die	62
4.3 Create Analysis System	63
4.4 Engineer Data	66
4.5 Geometry	67
4.6 Define Connections	68
4.6.1 Contact Regions	

4.7	Meshing	70
4.8	Establish Analysis Setting	70
4.9	Fixed Support	71
4.10	Displacement	71
4.11	Solve	72
4.12	Review Result	72
CHAPTER 5 : RESULT AND DISCUSSION		75
5.1	Result of Tensile Test	75
5.2	Result for Each Conceptual Design	78
5.2.1	Displacement parameter	78
5.2.2	Blanking Analysis	80
5.2.2.1	Conceptual Design A	80
5.2.2.2	Conceptual Design B	83
5.2.2.3	Conceptual Design C	86
5.2.2.4	Conceptual Design D	88
5.2.2.5	Conceptual Design E	92
5.2.2.6	Summary result of total deformation for blanking analysis	97
5.2.2.7	Summary result of shear stress for blanking analysis	97
5.2.2.8	Summary result of structure for blanking analysis	98
5.3	Propose Design for Blanking Die	99
CHAPTER 6 : CONCLUSION		99
6.1	Conclusion	99
6.2	Recommendation	100
6.3	Sustainability	100
REFERENCES		101

LIST OF TABLES

2.7	Characteristics of Metal in Sheet Forming	31
2.8	Shear Strength for Various Materials	33
5.1	Dimensions involved in ASTM-D638 standard	76
5.2	Result obtained for tensile test sample	76
5.3	Standard tabular data of displacement	77
5.4	Result of tensile test of sample	79
5.5	Content of Blanking Analysis	80
5.6	Total deformation in a form of tabular of conceptual design A	80
5.7	Shear stress for blanking analysis of conceptual design A	82
5.8	Total deformation in a form of tabular of conceptual design B	83
5.9	Shear stress for blanking analysis of conceptual design B	84
5.10	Total deformation in a form of tabular of conceptual design C	86
5.11	Shear stress for blanking analysis of conceptual design C	87
5.12	Total deformation in a form of tabular of conceptual design D	89
5.13	Shear stress for blanking analysis of conceptual design D	90
5.14	Total deformation in a form of tabular of conceptual design E	92
5.15	Shear stress for blanking analysis of conceptual design E	94
5.16	Analysis of depth of cut	95
5.17	Analysis maximum shear stress versus time	96
5.18	Structural result of blanking analysis	97
5.19	Summary result of blanking analysis	98

LISTS OF FIGURES

1.1	The Defect Burr	2
2.1	Coining Die and product	5
2.2	Die Forming	6
2.3	Draw Forming	7
2.4	Deep Draw Forming	7
2.5	Blanking Die	8
2.6	Single Operations Dies	9
2.7	Compound Die	10
2.8	Example of Progressive Die	11
2.9	Transfer Die	12
2.10	Four-slide Die	13
2.11	Part of Blanking Die	14
2.12	Die Set	14
2.13	The Die Block	15
2.14	The Blanking Punch	15
2.15	Piercing Punch	16
2.16	Punch Plate	16
2.17	A Pilot	17
2.18	The Back Gage	18
2.19	A Finger Stops	18
2.20	Automatic Stop	19
2.21	Stripper Plate	19
2.22	Fasteners	20
2.23	Material strip as it appears at the bottom of the press stroke	21
2.24	View of the die block and material strip	22
2.25	View of the assembly with the blanking punch added	22
2.26	View of the assembly with the piercing punches added	23
2.27	View of the assembly with the punch plate added	23
2.28	View of the assembly with the pilots added	24
2.29	View of the assembly with the back gauge and front spacer added	25

2.30	View of the assembly with the finger stop added	25
2.31	View of the assembly with the automatic stop added	26
2.32	View of the assembly with the stripper added	27
2.33	View of the assembly with fasteners added	28
2.34	View of the assembly including die set	29
2.35	View of the complete die with dimension and notes	29
2.36	The complete die drawing, including the bill of material	30
2.37	Drawing that illustrates area subjected to shear.	34
2.38	Drawing that illustrates area subjected to shear in blanking	34
2.39	Variable and Feature of Blanking Die	36
2.40	Variable in blanking die	36
2.41	Shear Stress cross section	37
2.42	Bar in tension and compression stress	37
3.1	Flow chart of PSM I and PSM II	40
3.2	Flow chart making thimble open small	43
3.3	Concept Design	44
3.3a	Concept A with clearance 0.00	45
3.3b	Concept B with clearance 0.05	45
3.3c	Concept C with clearance 0.10	45
3.3d	Concept D with clearance 0.20	46
3.3e	Concept D with clearance 0.30	46
3.4	Workpiece	47
3.5	Flow of 3D modelling for thimble open small	48
3.6	FEA Simulation using Explicit Dynamic Analysis in ANSYS software	50
4.1	Starting 3D Modelling	53
4.2	The sketch in drawing	53
4.3	Sketch a rectangle	54
4.4	Extrude boss 1	54
4.5	Sketch of shape	55
4.6	Extrude Boss 2	55
4.7	Position of circle	55
4.8	Extrude cut	56
4.9	Fillet position	56

4.10	Upper die after fillet	56
4.11	Sketch of rectangle	57
4.12	Extrude boss	57
4.13	Extrude boss of circle	58
4.14	Position of circle	58
4.15	Extrude boss of circle	59
4.16	Variable pitch of spring	59
4.17	Profile and path	60
4.18	Extrude boss 1	61
4.19	Sketch of shape	61
4.20	Extrude cut 1	61
4.21	Sketch of shape	62
4.22	Extrude cut 2	62
4.23	The assembly design of the blanking	62
4.24	The process flow of the Explicit Dynamics Procedure	63
4.25	The project schematic in ANSYS	64
4.26	Engineering data cell	64
4.27	Import Geometry to attach	65
4.28	Mesh the geometry model	65
4.29	Engineering data	66
4.30	Geometry object	67
4.31	Contact region setting	69
4.32	Fractional automatically contact setting	69
4.33	Analysis settings	70
4.34	Fixed support choosen	71
4.35	Displacement setting	72
4.36	The result in Mechanical Application	73
4.37	Result of total deformation in a form of analysis structure	73
4.38	Graph displacement versus time	74
5.1	ASTM D-638 standard	76
5.2	Graph of stress versus stroke strain for sample	77
5.3	Graph displacement versus time	79
5.4	Structure analysis	79

5.5	Graph displacement versus time for conceptual A.	81
5.6	Structure analysis for conceptual A.	81
5.7	Graph Shear stress displacement versus time for conceptual A	82
5.8	Shear stress in a form of structure analysis for conceptual A	82
5.9	Graph displacement versus time for conceptual B	83
5.10	Structure analysis for conceptual B	84
5.11	Graph Shear stress displacement versus time for conceptual B	85
5.12	Shear stress in a form of structure analysis for conceptual B.	85
5.13	Graph displacement versus time for conceptual C	86
5.14	Structure analysis for blanking analysis conceptual C	87
5.15	Graph Shear stress displacement versus time for conceptual C	87
5.16	Shear stress in a form of structure analysis for conceptual C.	88
5.17	Graph displacement versus time for conceptual D	89
5.18	Structure analysis for blanking analysis conceptual D	90
5.19	Graph Shear stress displacement versus time for conceptual D	91
5.20	Shear stress in a form of structure analysis for conceptual D	91
5.21	Graph displacement versus time for blanking analysis conceptual E	93
5.22	Structure analysis for blanking analysis conceptual E	93
5.23	Graph Shear stress displacement versus time for conceptual E	94
5.24	Shear stress in a form of structure analysis for conceptual E.	95

CHAPTER 1

INTRODUCTION

This chapter describes the introduction about blanking die for producing the thimble open small. In this part, begin with the introduction of the background, followed by translation of problem statement objectives, scope, and structure of the research are discussed.

1.1 Background of Study

Nowadays, demand for open small thimble has increased in the electric company especially in Tenaga Nasional Berhad (TNB). Thimble used to form the eye of the loop before the rope is secured. Steel thimbles, offer added protection from wear and tear of direct contact and deformation of the eye, extending the service life of the wire rope or wire rope sling.

Blanking die is a one method used for a shaping an open small thimble. The concept of blanking is a cutting process in which a piece of sheet metal is removed from a larger piece of stock by applying a great enough shearing force.

Jati Beringin Sdn. Bhd (JBSB) is a one company used blanking and bending die to produce thimble open small. Blanking die at JBSB is used to blank the raw material to produce specific shape that is given from TNB Company. Blanking die has used one types of concept in producing the thimble open small that is using blanking process from raw material into specific shape. For bending die is used to produce the thimble open small that want to supply for TNB Company. Bending die has used two different types of concept in producing the thimble open small that is bending from

the plate into the U shape and bending from plate into the V shape. All the concept and process to making thimble open small are analyzing in this project.

1.2 Problem Statement

There are few problems occurred that affect the product like tear and burr after producing large volume of thimble open small. Figure 1.1 show the burr defect. If the defect always occurred, the daily productivity cannot achieve the target demand. It take some time to rework and the cycle time is increased. At the same time, the cost of the productivity of production will increased.

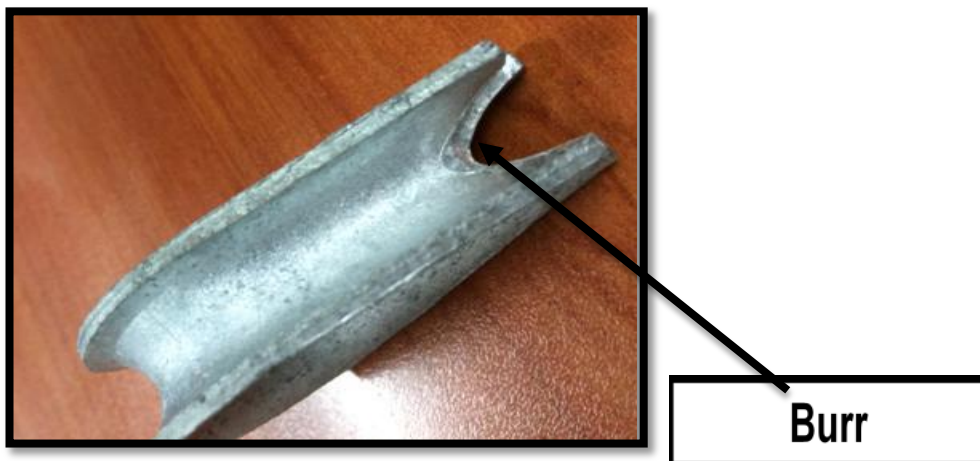


Figure 1.1 : The Defect Burr

1.3 Objectives

The objectives of this research are:

- (a) To redesign the blanking die for thimble open small.
- (b) To analyze the optimum die clearance, in relation to the stamping force in order to have a good blanking finish by using ANSYS.

1.4 Scope

Few necessary elements needs to be considered to guarantee the objectives of the research achieved. Besides that, the blanking die is analyzed by using Finite Element Analysis (FEA). This research investigates the die parameter base on literature study from many sources. The parameter that consider is force, deformation, displacement, time and energy. Subsequently, FEA from ANSYS software with actual specification from the industry for the thimble open small will be used to analyze the optimum force that will be applied in blanking die to get good surface finish. Besides that, ANSYS also used to analyze difference clearances in new design of bending and blanking die.