

FABRICATION OF DRY PAINTING BOOTH FOR MAKMAL PROTOTAIP DAN
INOVASI, JABATAN REKA BENTUK DAN INOVASI, FAKULTI
KEJURUTERAAN MEKANIKAL.

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I hereby declare that I have read this thesis and in my opinion this report is sufficient in terms of scope and quality for the award of the Bachelor of Mechanical Engineering (Design-Innovation).

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I declare that this report entitled "FABRICATION OF DRY PAINTING BOOTH FOR MAKMAL PROTOTAIP DAN INOVASI, JABATAN REKA BENTUK DAN INOVASI, FAKULTI KEJURUTERAAN MEKANIKAL." is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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ACKNOWLEDGEMENT

Alhamdulillah, with His Mercy and Blessing, this project was finally successfully. I would like to express deepest gratitude and appreciation to my supervisor, Mr. Hambali Bin Boejang Faculty of Mechanical Engineering, UTEM, for his tremendous help, advice, inspiration guidance to me until complete the thesis.

Beside that, I would like to express my sincere thanks to Mr. Rizal Alkahari that mostly help and guide as a panel presentation. Then, I would like to wish express our most gratitude to all technicians especially to Mr. Junaidi for his fully guidance, supervising lab and giving variety of practical training to enhance my fabrication of Painting Booth.

Lastly, I would like to express my appreciation to my parents, Mr. Wan Nashar Bin Wan Su and Mrs. Wan Aznah Bt Wan Kader, all my friend and those who had given support and help in any way whether directly or indirectly manner.

ABSTRACT

Painting booth is a place to paint or spray product or part after the part was assembled. Painting booths are usually used in some application for example in automotive, product consumers and in education. Almost every product that is designed follows the customer specification and target specification. The used of product design and development process will make the product achieve for the customer need and specification. The designs of this product are used 3D solid modeling which are CATIA and solidwork CAD software. These softwares are useful in the designing of the product especially for the detail design. This project also covered the structure analysis which is Finite Element Analysis (FEA) is used for the structure analysis. The structures that are consider in this analysis is bracket of the tray painting booth. So by the end of this project, the finished product is sprayed in order to prevent the product corrosion and be more attractions.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	ADMISSION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	CONTENT	v
	LIST OF TABLE	x
	LIST OF FIGURE	xi
	LIST OF SYMBOL	xiv
	NOMENCLATURE	xv
	LIST OF APPENDIX	xvi
CHAPTER 1	INTRODUCTION	
	1.0 Introduction of project	1
	1.1 Project Aim	2
	1.2 Objective	2
	1.3 Scopes	3
	1.4 Flow chart of PSM 1	4
	1.5 Flow chart of PSM 2	5
CHAPTER 2	LITERATURE REVIEW	
	2.0 Introduction	6
	2.1 Painting booth	6

CHAPTER	TITLE	PAGE
	2.1.1 Application of painting booth	7
2.2	Painting and painting equipment	8
	2.2.1 Spray application equipment	8
2.3	Painting hazards	9
	2.3.1 Spray painting booth hazardous	10
	2.3.2 Way to control hazards	10
2.4	Spray booth fan	11
	2.4.1 The suggested air blower	12
2.5	Material properties	14
	2.5.1 Euler's formula for pin end columns (material selection)	15
2.6	Introduction to CAD	17
	2.6.1 Introduction to surface modeling	19
	2.6.1.1 Application of freeform Surface Modeling	20
	2.6.2 Introduction to solid modeling	21
	2.6.2.1 Application of parametric Solid Modeling	22
	2.6.2.2 Advantages of parametric Solid Modeling	22
2.7	Introduction to CAE	23
	2.7.1 CAE in automotive industry	24
2.8	Introduction to FEA	24
	2.8.1 Application of Finite element analysis	25
	2.8.2 Overview of finite element analysis.	25
2.9	Summary of this chapter	27

CHAPTER	TITLE	PAGE
CHAPTER 3	PRODUCT DESIGN AND DEVELOPMENT	
3.0	Introduction	28
3.1	Identifying customer needs	28
3.2	Benchmarking	30
	3.2.1 Type of benchmarking	30
	3.2.2 Benchmarking process	31
3.3	Product specification	32
	3.3.1 Establish specification	32
	3.3.2 Target specification	32
	3.3.3 Final specification	33
3.4	Concept generation	34
3.5	Concept selection	36
	3.5.1 Method of concept selection	37
	3.5.2 Benefits of structured method	37
	3.5.3 Overview of Methodology	38
3.6	Summary of this chapter	40
CHAPTER 4	PRODUCT DEVELOPMENT	
4.0	Introduction	41
4.1	Flow Chart of Product Development	41
4.2	Product Specification	43
4.3	Target Specification	44
4.4	Product Reference	49
4.5	Concept Generation	50
4.6	Concept selection	51
4.7	Summary of this chapter	54

CHAPTER	TITLE	PAGE
CHAPTER 5	ANALYSIS AND RESULT	
5.0	Introduction	55
5.1	Finite Element Analysis using CATIA V5 R16	55
	5.1.1 Procedure of using CATIA FEA	57
5.2	Finite Element Analysis using COSMOSWork Designer	65
	5.2.1 Procedure of using COSMOSWork Designer FEA	66
5.3	Summary of this chapter	74
CHAPTER 6	PROTOTYPE	
6.0	Introduction	75
6.1	Material used	75
6.2	Material costing	76
6.3	Detail design	77
6.4	Painting booth fabrication process	78
6.5	Summary of this chapter	80
CHAPTER 7	CONCLUSION AND RECOMMENDATION	
7.0	Conclusion	81
7.1	Recommendation	82

CHAPTER	TITLE	PAGE
	REFERENCES	83
	APPENDIX	86

LIST OF TABLE

NO.	TITLE	PAGE
2(a)	Specification of 6” inline Duct fan	13
4(a)	List of customer needs	43
4(b)	The needs-metrics matrix	45
4(c)	list of Metric for painting booth	46
4(d)	Competitive benchmarking information	47
4(e)	Competitive benchmarking based on perceived satisfaction of needs	48
4(f)	The concept of screening matrix	52
4(g)	The concept scoring	53
5(a)	List of material properties 1	57
5(b)	List of material properties 2	67
6(a)	List of material	76
6(b)	Material costing	77

LIST OF FIGURE

NO.	TITLE	PAGE
1(a)	Flow chart of PSM 1	4
1(b)	Flow chart of PSM 2	5
2(a)	In line Duct fan	12
2(b)	Interactions of Function, Material, Process and Shape	14
2(c)	Before buckle	16
2(d)	After buckle	16
2(e)	The CAD Process	18
2(f)	A design drawing for an engine using CAD	19
2(g)	Example surface pole map	20
2(h)	The model of solid modeling	22
2(i)	Visualization of finite element analysis	24
3(a)	Step in concept development activities	29
3(b)	Type of benchmarking	30
3(c)	Benchmarking process	31
3(d)	The five step of concept generation method	35
3(e)	The relate of concept selection between concept generation and testing due to the concept screening and scoring methods	36

NO.	TITLE	PAGE
4(a)	Flow chart of product development for PSM 1	42
4(b)	Flow chart of product development for PSM 2	42
4(c)	Benchmarking product of painting booth	49
4(d)	Five concept generations	50
4(e)	Four concept selection	51
5(a)	Bracket placed in CATIA V5 R16	57
5(b)	Bracket of painting booth	58
5(c)	Material properties	59
5(d)	Mesh properties	59
5(e)	Mesh Visualization	60
5(f)	Mesh active or deactivate	61
5(g)	Distributed force	62
5(h)	Analysis run	62
5(i)	Displacement result result from CATIA V5 R16	63
5(j)	Von Mises stress result from CATIA V5 R16	64
5(k)	Principle stress result from CATIA V5 R16	65
5(l)	Bracket placed in COSMOSWork Designer	66
5(m)	COSMOSWork environment	68
5(n)	Applying restraint	68
5(o)	Applying force	69
5(p)	Material library	69
5(q)	Appling mesh	70

NO.	TITLE	PAGE
5(r)	Result analysis	70
5(s)	Displacement result from COSMOSWork	71
5(t)	Von Mises stress result from COSMOSWork	72
6(a)	Isometric view using CATIA V5 R16	78
6(b)	Flow process of painting booth fabricate	79
6(c)	Finished prototype of painting booth	79

LIST OF SYMBOL

Π	Pi
I	Moment Inertia
P_{cr}	Critical Load
L	Length
F	Force
E	Modulus Young
$\bar{\sigma}_{all}$	Allowable Stress
Pa	Pasca
I_{GG}	Moment Inertia of Column
A	Area
B	Stress

LIST OF NOMENCLATURE

3D	3 Dimensions
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CATIA	Computer Aided Three Dimensional Interactive Application
FEA	Finite Element Analysis
FEM	Finite Element Method
NURBS	Non Uniform Rational B-Spline
PPE	Personal protective equipment
PSM	Projek Sarjana Muda
VOC	Voice of Customer

LIST OF APPENDICES

NO	TITLE
A-1	GANTT CHART PSM 1
A-2	GANTT CHART PSM 2
A-3	CUSTOMER SURVEY FORM
A-4	CONCEPT A DESIGN
A-5	CONCEPT B DESIGN
A-6	CONCEPT C DESIGN
A-7	CONCEPT D DESIGN
A-8	CONCEPT E DESIGN
A-9	ISOMETRIC VIEW OF DESIGN
A-10	DETAIL VIEW OF MAIN PART
A-11	DETAIL VIEW OF BOTTOM PART
A-12	RESULT ANALYSIS FROM CATIA V5 R16
A-13	RESULT ANALYSIS FROM COSMOSWORK DESIGNER

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION TO THE PROJECT

Projek Sarjana Muda (PSM) is one of knowledge that related to student disciplines. This particular final year project is vital and compulsory as to meet the Bachelor Degrees requirement. The main objectives are to train the student to be more skilful, competent and independent.

This project has been divided into three categories:

1. Design project should based on certain design and finally could end with product design
2. Technical and concept analysis that related to student disciplines themselves.
3. The case study project is more on study research on certain case or topic.

By the end of this project, student should come with solution of the problem. This final year project title is “Fabrication of dry Painting Booth” for Makmal Prototaip dan Inovasi, Jabatan Reka bentuk & Inovasi (JRI), Fakulti Kejuruteraan Mekanikal. So by the end of this project, a new design of painting

booth will be propose in 3D surface modeling and will be used as the guide line for fabrication process.

1.1 PROJECT'S AIM

The aim of the thesis was to use the modern development tool such as CAD, RP and design analysis of FEA to design and develop a new product. The product that is described in this thesis is a dry painting booth for Makmal Prototaip dan Inovasi, Jabatan Reka bentuk & Inovasi, Fakulti Kejuruteraan Mekanikal. The design analysis of FEA is used to determine the factor failure of the painting booth tray bracket due to the maximum load applied

1.2 OBJECTIVE

The objectives of this project are:

- To study the characteristic of dry painting booth
- To design and fabricate the new dry painting booth
- To make design analysis using Finite Element Analysis software
- Know the main concept of dry painting booth and it usage.
- To be common with the CAD programming especially in surface and solid modeling

1.3 SCOPES OF PROJECT

Scopes of this research is important stages as an element to researcher know what actually needs in their project or research. In this project, dry painting booth scopes can be divided by eights, which are:

- Explanation of dry painting booth and concept
- Material selection
- Benchmarking
- Application of painting booth
- Advantage and disadvantages of painting booth
- Safety issue
- Surface and Solid modeling

1.4 FLOW CHART OF PSM 1

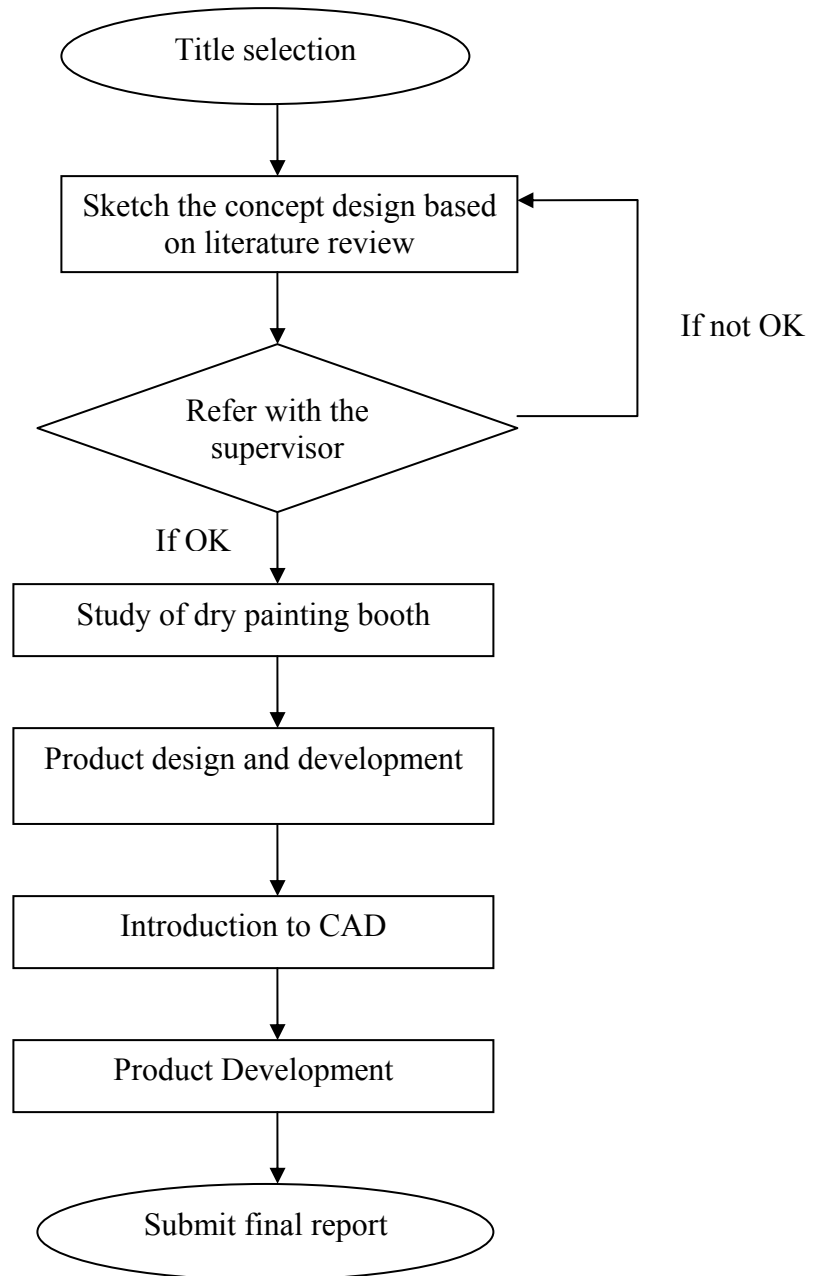
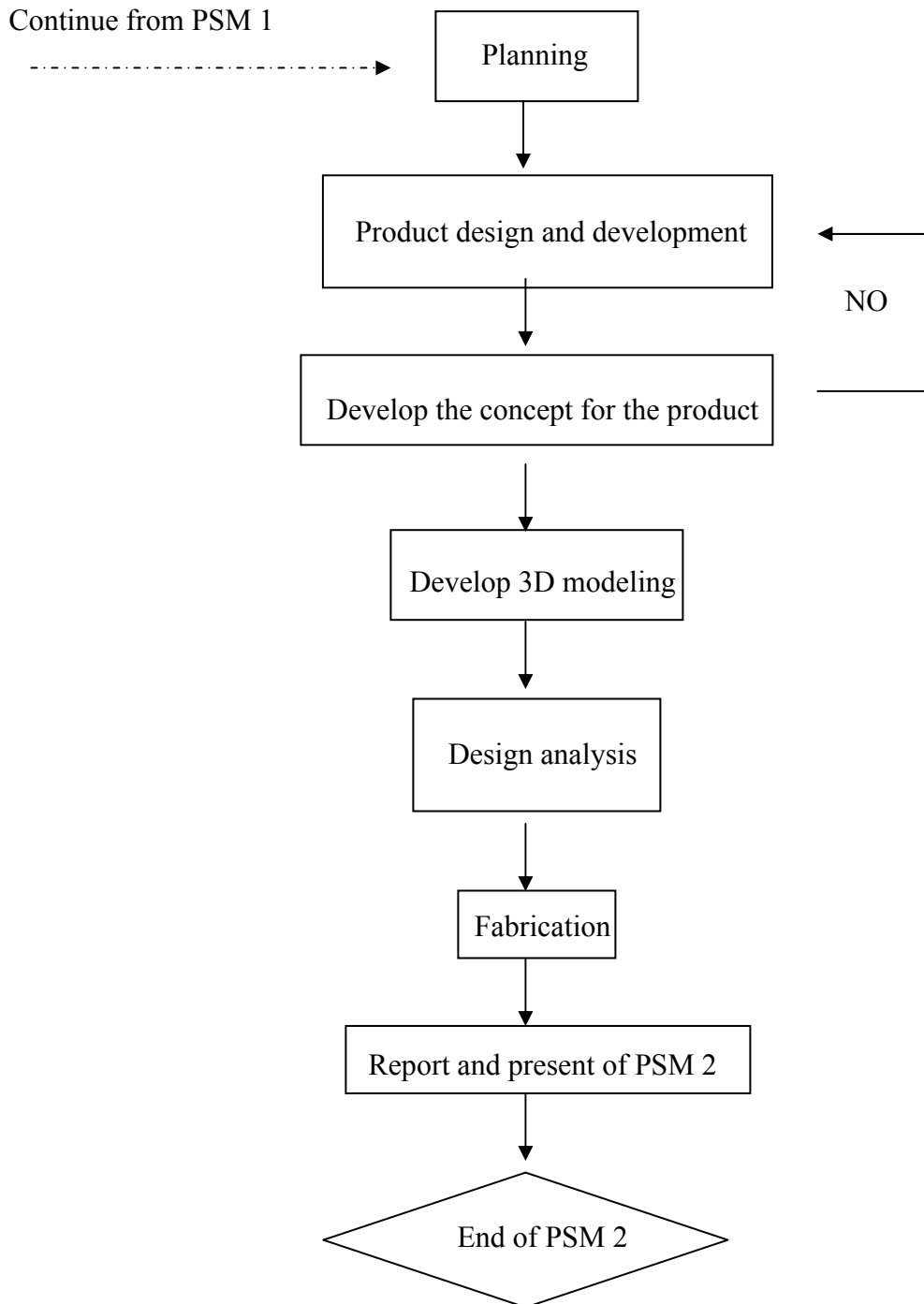


Figure 1(a): Flow chart of PSM 1

1.5 FLOW CHART OF PSM 2



CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter will describe the literature review of Painting Booth project which is had been discover with via internet, journal, benchmarking product and paper work. All information that used in the fabrication of the Painting Booth can be explained in this chapter.

2.1 PAINTING BOOTH

Painting booth is a place to paint products or part after the assembly process is done. In the manufacturing of automotive parts for example radiator and condensers, painting booth is use to spray the parts to prevent the corrosion. In painting process, these parts are sprayed through a painting spray booth to make sure the part is full sprayed and dry fast. Almost every production is limited by the time require for the paint to dry. Spray booth are frequently used to confine paint overspray and evaporated solvent and to reduce drying time [1].

2.1.1 Application of Painting Booth (industry and education)

Nowadays, painting process is very important in our life due to the development of technology in various sectors. The use of painting booths will give many advantages to the user to get a best quality of surface product in spraying the paint. Here some example of application in painting booth that currently used in several industries [2]:

- **Automobile**

In automobiles, production is limited by the time required for the paint to dry. In order to increase the number of automobiles that can be painted in a given time, the use of painting booth will decrease the drying time that each automobile must spend to dry.

- **Product consumer**

For the product consumers, the use of dry painting booth will make easily for them to spray product without need to worry for painting preparation for example the painting place. Usually, painting area must follow the characteristic likes prevent from the wind blow and paint dry fast.

- **Education**

In an education painting booth is very useful in this sector. This is because with painting booth, student can used to make analysis of the overspray during the painting process. It also can be used to spray prototype that was produce or fabricate by some machines for example Rapid Prototyping process, CNC process, Lathe process and others.