



اَوْنِيُوْ سِيْتِي تِي كُوْلُوْ كِي مَارَا
UNIVERSITI
TEKNOLOGI
MARA

FACULTY OF MECHANICAL ENGINEERING
UITM CAWANGAN JOHOR CAMPUS PASIR GUDANG

MECHANICAL ENGINEERING DESIGN (MEC 332)

FINAL YEAR PROJECT (FYP)

TITLE:

BED WHEELCHAIR

SUPERVISOR'S NAME : NURRUL AMILIN BT ZAINAL ABIDIN

LECTURER'S NAME : ILYA IZYAN BT SHAHRUL AZHAR

GROUP : J4EM1105L (A2)

TEAM MEMBER :

NO.	NAME	STUDENT ID
1	AHMAD HANAA' BIN FARHAN	2018405844
2	MUHAMMAD HANAFI AFSHAL BIN ABDUL LATIFF	2018417838
3	MUHAMMAD ALIF AIMAN BIN ABU ZARIN	2018407786
4	MUHAMMAD ZULAZMAN BIN AZMIZAM	2018416598

ABSTRACT

Bed Wheelchair is an innovation prototype that was inspired by the typical wheelchair that are already existed. Wheelchair system is one of the common vehicles used by handicap or sick people are limited in its function, such as it needs human force to move it. It is also can't be use for a long period as the user tired in moving the chair using his or her own energy. In this current generation, a wheelchair is crucial equipment for a hospital or any healthcare facility to easily transport their patients to a certain destination. However, each patient was diagnosed with different kind of injuries or disabilities. Some of them could not sit straight on the wheelchair due to back injuries. This is a problem that people nowadays are not aware of. Thus, a solution is created to reduce and minimize the problems that had been facing by the patients. There are many types and models of wheelchairs with varying features and benefits, but they can broadly separate into manual wheelchairs and power wheelchairs. Manual wheelchairs include self-propelled wheelchairs, which are pushed by the user. Nowadays, senior citizens come to a point in their life when they realize they may need help walking. Assistance can be due to old injuries flaring up, arthritis, hip problems, parkinson's disease, multiple sclerosis and many other issues. While the realization that you need help to walk may be a difficult fact to accept, but there is a bright side to the situation. There are many benefits that wheelchairs provide to senior citizens such as wheelchairs provide freedom to move around. Most wheelchairs are designed to fit into small, tight spaces. This allows to move within your home easily giving you a more comfortable and active lifestyle. Other than that, wheelchairs also provide support for your back and comfortable seating. It will be able to be seated comfortably with strong support that encourages good posture. Through the existing of our prototype, we hope it will making a huge impact to the handicap, sick people and senior citizens that always facing problem and can reduce also minimize the problem that had been facing by the patients.

ACKNOWLEDGEMENT

Assalamualaikum w.b.t, we are from class J4EM1105L group A2 of Faculty Mechanical Engineering. Alhamdulillah, first of all we would like to thank the one who has always guided me to work on which is special for the supreme power the almighty God who is obviously always guided to work on the right path of our life as we finally able to finish our successful task that have been given as our final year project (FYP). In fact, without his agility, the project could not become an existence. Additionally, we would like to express our special thanks to our beautiful and gracious Supervisor, Madam Nurrul Amilin binti Zainal Abidin and also our Mechanical Design Engineering lecturer, Madam Ilya Izyan binti Shahrul Azhar. Our group consists of four big talented members which are Ahmad Hanaa' bin Farhan, Muhammad Hanafi Afshal bin Abdul Latiff, Muhammad Alif Aiman bin Abu Zarin and Muhammad Zulazman bin Azmizam. This final year project had been successfully done with all the group members even through have a little bit problem were happened while doing this extraordinary project. Luckily, all the problems can be settled down and we were able to adapt it properly and wisely.

Finally, thanks to all the group member that give all the commitment to stick together as a team and also work hard to produce a superb and outstanding final year project assignment. We hope all of our effort will give a lot of benefits. We would like to show our gratitude to University Teknologi Mara (UiTM) for giving us a good guideline for assignment throughout many consultations. Million thanks also we wish to our classmate that have gave us a lot of idea, comments and many suggestions on our project so that we could improve our skill and also to let us finish our contributed project.

Table of Contents

OVERVIEW OF THE PROJECT	1 - 2
CHAPTER 1: INTRODUCTION	2
1.1 PROBLEM STATEMENT.....	2
1.2 OBJECTIVES	2
1.3 SCOPE OF THE PROJECTS	2 -3
1.4 SIGNIFICANT OF THE PROJECTS	3
1.5 PROJECT MANAGEMENT.....	4
CHAPTER 2: DESIGN PROBLEM DEFINITION	5 - 11
2.1 MARKET ANALYSIS	5
2.1.1 TARGETED MARKET AND ESTIMATION OF MARKET SIZE	5 - 9
2.1.2 CUSTOMER NEEDS AND IDENTIFICATION.....	10
2.2 COMPETITIVE BENCHMARKING PRODUCT	11
2.3 FINAL PRODUCT DESIGN SPECIFICATION.....	12
CHAPTER 3: CONCEPT GENERATION AND SELECTION.....	13 - 21
3.1 FEASIBLE CONCEPT.....	13
3.2 MORPHOLOGICAL CHART.....	13 - 14
3.2.1 CONCEPT 1	15
3.2.2 CONCEPT 2	16
3.2.3 CONCEPT 3	17
3.2.4 CONCEPT 4	18
3.3 SELECTION OF FINAL CONCEPT	19
3.3.1 PUGH CHART	20
3.3.2 DISCUSSION.....	21
CHAPTER 4: EMBODIMENT DESIGN.....	22 - 29
4.1 PRODUCT ARCHITECTURE	22 - 24
4.2 CONFIGURATION DESIGN.....	25
4.2.1 LIST OF PARTS	25
4.2.2 DETAILS STANDARD PART SELECTION.....	26 - 28
4.3 PARAMETRIC DESIGN FOR CUSTOM PARTS	28- 29
4.4 ENGINEERING CALCULATION	30- 32

4.5	ENGINEERING ANALYSIS.....	33-
	37	
CHAPTER 5: DETAIL DESIGN.....	38 -	
79		
5.1	ACTIVITIES AND DECISION IN DETAIL DESIGN	
	3
8		
5.1.1	INCLUDE FINALIZED DESIGN (3D RENDER MODEL)	
	3
9		
5.1.2	DETAIL DRAWING OF MANUFACTURED PARTS.....	40 -
70		
5.1.3	ASSEMBLE DRAWINGS	71 -
74		
5.1.4	EXPLODED DRAWINGS	75 -
78		
5.2	BILL OF MATERIAL AND COSTING	
79		
CHAPTER 6: PROTOTYPING AND TESTING	80 -	
83		
6.1	FABRICATION OF PROTOTYPE	80 -
81		
6.2	PRODUCT MANUAL	
	8
1		
6.3	BREAK-EVEN ANALYSIS.....	82 -
83		
CHAPTER 7: CONCLUSION AND RECOMMENDATION	84 -	
85		
7.1	CONCLUSIONS ON DESIGNED PRODUCT	
84		
7.2	FUTURE WORKS	
85		
APPENDICES		
	8
6		