



اَبُو سَيِّدِي تَيْكُونُو لَوِي مَارَا
UNIVERSITI
TEKNOLOGI
MARA

MECHANICAL ENGINEERING DESIGN (MEC 322)

FINAL REPORT

NAME OF PROJECT:

PWP SPRAYER

FACULTY : FACULTY OF MECHANICAL ENGINEERING

SEMESTER 5

PROJECT TITLE : PWP SPRAYER (POISON WHEEL PUMP SPRAYER)

PREPARED FOR : SIR AHMAD NAJMIE BIN RUSLI

GROUP MEMBERS :

NO	NAME	STUDENTS ID
1.	NUR AZAREENA BINTI AZMAN	2017227948
2.	MUHAMAD HAIQAL BIN HIPUL	2017227866
3.	MUHAMMAD HAFIZUDDIN BIN MUHAMAD HARIS	2017220534
4.	MUHAMMAD HAZIQ NAQUIDDIN BIN HAMKA	2017227892

ACKNOWLEDGEMENT

On behalf of the team, I would like to express my gratitude to those who have been contributed in making this PWP Sprayer. First, I would like to thank to my supervisor which is Sir Haszeme bin Abu Kasim who have been supporting our team and had given many creative ideas in planning the project design. Secondly, I would like to thank my MEC 322 lecturer, Sir Ahmad Najmie bin Rusli as he had also given many problems that needed to solve which is good in creating a great machine. Thirdly, I would also like to praise myself for being able to do all the presentations slide, reports and also the machine. Next, I would like to thanked Muhamad Haiqal bin Hipul as he had contributed very well in this team. He is the backbone of this team because they had played many important roles to this team such as creating ideas on what type of machine that needed to be created and also design the machine. Besides that, I would like also thanked Muhammad Haziq Naquiuddin bin Hamka because of his solving problems skills and his brilliant ideas in planning the machine. To delve into this a bit more, thanks to Muhammad Hafizuddin bin Muhamad Haris as he had given many sacrifices such as transportation to buy the material, deposited all the money to buy the materials. Lastly, I would like to thank the UITM Pasir Gudang to give me and my teammates chance to perform in this kind of activity as we can gained a useful experience for the future. Last but not least, I would like to thank everyone who has assisted directly and indirectly in the success of producing the PWP Sprayer.

NUR AZAREENA BINTI AZMAN
Student of Mechanical Engineering
Class B
Faculty of Mechanical Engineering

ABSTRACT

In Malaysia, Farmers are the backbone that contributes in increasing the economy of this country. However, farmer had given less and less priority in inventing a model that would make their work easier and good for their health. For example, for the backpack poison sprayer, the farmer had to carry it everywhere that he needs to use the poison for his plantation and also, they need to pumped it manually and repeatedly to pump out the poison. This kind of thing is not good for the farmer's health as they tend to get backpain and easily gets tired. In our project, we innovate something new based on the old pump which we called it as PWP Sprayer. PWP Sprayer stands for Poison Wheel Pump Sprayer. PWP Sprayer had been innovate specially for farmers to prevent them from getting backpain and also to reduce their work to poison. PWP Sprayer is a manual machine that do not need motor or another electrical component to generate it. It is 100% manual as it generates the power to pump out the poison through the rotation of the front wheel. The torque of the wheel affects the power to pump out the poison. Plus, the power to pump out the poison affect the amount of poison sprayed out. PWP Sprayer works when we pushed it forward to the direction that we needed to sprayed. The farmer now can simply push the machine and this can save a lot of work and time. The tank is located at the middle of the machine. Moreover, the farmer cannot have to carry the tank at their back anymore and this kind of thing can prevent them from getting back pain.

Table of Contents

Chapter 1: Introduction.....	1
1.1 Problem Statement	
1.2 Objective	
1.3 Significance of the Problem	
1.4 Project Management	
Chapter 2: Design Problem Definition.....	9
2.1 Market Analysis	
2.1.1 Target Market and Estimation of Market Size	
2.1.2 Customer Needs and Identification	
2.2 Competitive Benchmark Product	
2.3 Final Product Design Specification	
Chapter 3: Concept Generation and Selection.....	18
3.1 Feasible Concept	
3.2 Morphological Analysis	
32 cept 1	
32 cept 2	
33 cept 3	
34 cept 4	
35 cept 5	
3.3 Selection of Final Concept	
31 Pugh Chart Analysis	
Chapter 4: Embodiment Design.....	27
4.1 Product Architecture	
4.2 Configuration Design	
4.2.1 List of Parts	
4.2.2 Detail Standard Part Selection	
4.3 Parametric Design for Custom Parts	

Chapter 5: Detail Design.	40
5.1 Engineering Drawing	
5.1.1 Detail Drawings of Manufacturing Parts	
5.1.2 Assembly Drawings	
5.1.3 Exploded Drawings	
5.1.4 Bill of Material	
5.2 Costing Evaluation	
5.2.1 Break Even Analysis	
Chapter 6: Prototyping and Testing.	48
6.1 Fabrication Process	
6.2 Testing of Design: Theoretical Calculation and Simulations	
6.3 Results and Discussion	
Chapter 7: Conclusion and Recommendation.	57
7.1 Conclusion on Designed Product	
7.2 Future	Works
References	59
Appendices	60