UNIVERSITI TEKNOLOGI MARA

DESIGN AND FABRICATION OF A HELMET WASHING MACHINE

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Dissertation submitted in partial fulfillment
of the requirements for the degree of
Diploma
(Mechanical Engineering)

College of Engineering

Feb 2025

ABSTRACT

Helmet is a protective headgear worn by individuals who ride motorcycles to protect the head from the impact or collisions. It is crucial to maintain a proper hygiene of a helmet to avoid any bacteria or unpleasant smell. However, the unique shape and attachment method of the interior of a helmet would make the cleaning process quite challenging. Therefore, this project is specifically designed to simplify and expedite the process of washing the helmet's inner part, ultimately saving time and effort from the user. The project adopts a methodical approach, involving concept generation by collecting all required information, followed by concept evaluation to add some improvements, product design using SolidWorks, meticulous material selection, prototyping, thorough testing, and adherence to safety standards. The significance of this project lies in its capacity to streamline the helmet cleaning process, eliminating the need for lengthy and burdensome procedures.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Mr. Miqdad bin Khairulmaini.

Finally, this dissertation is dedicated to my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulilah.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

A helmet is a safety device designed to minimize the effects of momentum transfer from an impact to the head [1]. It functions by employing principles of mechanics, particularly those related to impulse and conservation of momentum. The outer shell of the helmet serves as a barrier, distributing the force of an impact over a larger surface area and increasing the duration of the collision [2]. This helps decrease the force on the head, making injuries less likely by slowing down how quickly momentum changes [1]. Additionally, the inner padding of the helmet functions to absorb and dissipate kinetic energy, further decreasing the effects of the impact on the head [4]. By extending the time interval over which the momentum transfer occurs and by reducing the magnitude of the forces involved, the helmet helps to protect the wearer's skull and brain from potentially severe trauma [6]. However, regular helmet cleaning is necessary in order to reach its best quality in terms of hygiene, safety, longevity and comfort [2]. Helmets can accumulate sweat, oils, and dirt over time, creating an environment conducive to bacterial growth and unpleasant smells. Regular cleaning helps prevent skin irritation, infections, and foul smells, promoting better overall hygiene and comfort for the wearer [2]. Moreover, clean helmets are more effective at providing protection in case of accidents and have a longer lifespan. Dirt and debris buildup can compromise the integrity of the helmet material and its ability to absorb impact energy, reducing its effectiveness in preventing head injuries and lead to premature wear and tear [4]. In essence, this helmet washing machine is a combination of several mechanical engineering knowledge. Its ability to clean up the interior part of a helmet without going through the long and hard process will encourage the regular helmet cleaning routine, contributing a healthier, safer, and more comfort towards helmet users. For this project, a sufficient amount of fluid mechanic knowledge is required to design the suitable fluid flow inside this machine [3].