UNIVERSITI TEKNOLOGI MARA

FABRICATION OF MINI FIREFIGHTING DEVICES

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ABSTRACT

These days, automation is embedded in our everyday life. This does not exclude our firefighters. Firefighters named as on of the most dangerous job in the world. They need to force themselves into a confined spaces and oftenly they can't get out and sadly died on scene. This project aiming to enhance readily available product in the market. The problem with those product, it oftenly to big and weirdly shaped. This product will counter act that because of the small and simply shaped body can easily penetrate tight rubbles. This product also will reduce human response time because of the flame sensor used. It does not need any human interference to push a button so the water can be sprayed. The parts that will be used are cheap and easily accessible. It made the manufacturing and maintaining easier. This project is to design a mini firefighting device using SolidWorks 2021 and manufacture it using suitable method. Not just that, it also done to reduce weight and enhance the portability of the readily available product. 3 main mechanical process will be used in this project such as bending process, joining process and cutting process. The results that can be expected are nimbler device that also can be easily controlled by the user. The Arduino centered device will hopefully encounter human error that often being found during intense scene moment.

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INTRODUCTION

1.1 Background of Study

Firefighter is a widely known as an honourable job. In Malaysia alone there is more than 380 teams that consist of volunteer firefighters. Firefighters considered one of the most needed services in Malaysia where Selangor ranked first with 5136 cases of fire without considering other cases such as natural disaster as of 16 May 2023. 9 September 2021 noted as highest daily response with 697 cases.[1] This number will be higher on normal years without Covid-19 pandemic.

As we know, being a firefighter comes with a great danger. According to National Fire Protection Association (NFPA), death of firefighters because of rapid fire progress covered by 13%, asphyxia including smoke inhalation cover 4% and structural collapse covers 2% totalled from 48 cases in United States during 2020.[2]. This number was gathered during Covid-19 era, during normal years case of fatality will be higher. Firefighter also exposed to multiple occupational hazards, where one of the hazards is chemical hazard that can affect the respiratory system.[3]

To encounter this, Fire Departments around the world already adapted high-tech technologies such as HAZMAT (Hazardous Material) unit. In Malaysia this unit was established to counter attack chemical danger and they will use special gears such as HAZMAT handling suit, respirator gear and water shower after the case. To handle fire in confined spaces, firefighters are using big and robust tank-like robot to enter and exit the fire fastly. Even with all of these high technologies, there will be always room for improvements.

The aim of this project is to encounter common problem with current technologies. Usage of Arduino software will enhance the usability of current product available in industry and make it more user friendly. This product will use simple material and parts so that the maintenance will be lower. By integrating sensor such as fire sensor, it will give fast response that human can’t reach.