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Instant Fire Extinguishers (I.F.E)

Muhammad Thaqif Aqil Ismail, Muhammad Syahwal Fitri Mohd Sufian Syah, Alisha Mohd Fadzli, Irdina Wani Fatini Abd Zaini, Muhammad Danish Zainal Akma and
*Nurkhaizan Zulkepli

Centre of Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor,
Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia

*Corresponding author: khaizan2821@uitm.edu.my

ABSTRACT

Instant Fire Extinguishers (I.F.E) are one of the effective methods to operate in severe disaster situations. Fire disasters have become a serious issue in recent years, causing countless deaths and injuries. Common fire extinguishers often suffer from various malfunctions like rust, or at worst, frequently missing pins. Considering the problems, an Instant Fire Extinguishers (I.F.E) prototype was made in this research, to represent a futuristic fire extinguisher for firefighting purposes. I.F.E's intention is to be less time consuming, be maintained easily and reduce the amount of fatalities at its best. This product also was crafted from match "head", austenitic steel, hydroxyl-terminated polybutadiene, biodegradable plastic, acetone, hydrogen peroxide, hydrochloric acid, monoammonium phosphate powder and gunpowder. The idea to make this product eco-friendly and safe was prioritised as this product was set to be used limitless on all ages. High authorities of the government worldwide were expected to get hold of I.F.E as it may reduce casualties during fire breakouts. In summary, I.F.E was created to save lives and maximise the termination of fire.

Keywords: fire extinguisher balls; disaster; emergency.

1. INTRODUCTION

Nowadays, fires in Malaysia are becoming more prevalent especially in home, forest and industrial areas. Fire is a destructive force that can cause great damage to property and pose a serious threat to human safety. In order to fight fires effectively, it is important to understand the principles behind fire extinguishers. Normal fire extinguishers cannot withstand environments with extreme temperatures, humidity, or excessive vibrations (QRFS, 2019). Not only that, improper maintenance can cause rust and leakage (QRFS, 2019). When the fire extinguisher was used for a very limited time, the extinguishing agent may clog the pipe of the fire extinguisher and prevent it from coming out, leading to disturbance during future use (QRFS, 2019). This product acts as an alternative for these fire extinguishers applications. Our objective in making this is to achieve a fire extinguishing success rate exceeding 80%, minimise maintenance requirements, and reduce preparation time for tackling severe fire situations.

2. METHODOLOGY

From our observations, common fire extinguishers often exhibit drawbacks alongside their benefits. To counter the drawbacks effectively, we came out with an innovation of this product, Instant Fire Extinguishers (I.F.E). Our goal is to achieve a fire extinguishing success rate

exceeding 80% while minimising maintenance requirements compared to common fire extinguishers. We also aim to reduce the preparation time for firefighting.

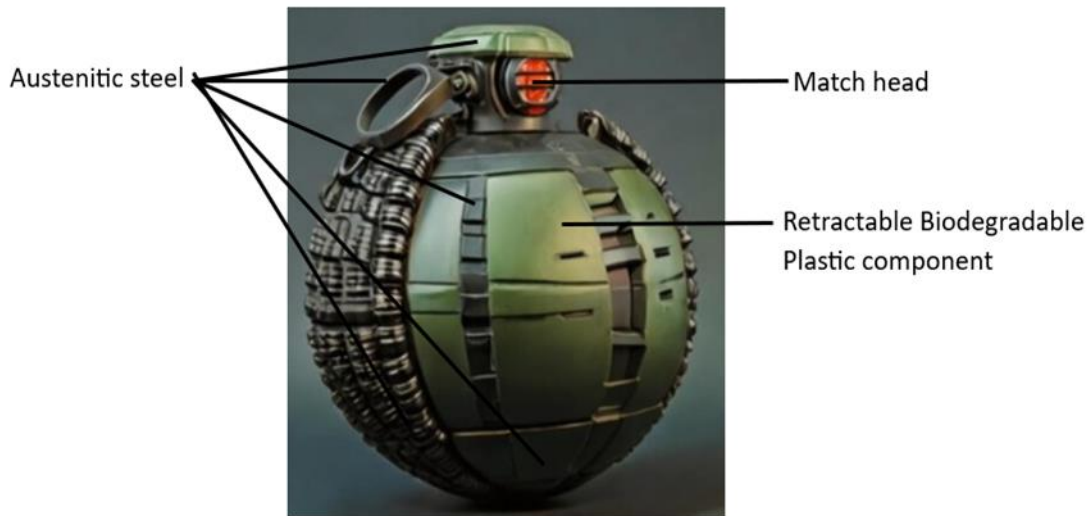


Figure 1. Innovation Prototype

Austenitic steel, the key component, has a high specific heat capacity and corrosion resistance, ensuring durability (Kumar S. & Tushar J, 2018). The shell can withstand high pressure during explosion, allowing only the monoammonium phosphate powder to seep out through the pit. We use a match “head” to ignite the I.F.E, as friction produces a spark to ignite the TATp mixture. A protective cap is added on the match “head” to avoid it getting ruined by moisture and heat.

3. RESULTS AND DISCUSSION

I.F.E is a convenient product that could be used easily by anyone. It is decided that our main target market is the government. I.F.E should be mandated in government buildings for enhanced fire protection, as its ease of use makes it accessible to all. Exporting this product worldwide can help minimise fire damages globally and contribute to boosting our country’s economy. I.F.E has a high marketability among the government. Thus, we believe that I.F.E will receive high demands from the government as I.F.E can effectively save citizens and their belongings during a fire break out.

4. CONCLUSION

In conclusion, I.F.E has the potential to increase the fire extermination success rate as short preparation time is needed. Fires can be put out quickly and reduce the risk of fire injuries. Furthermore, I.F.E is well-secured to maintain the content inside and minimise the amount of maintenance needed compared to common fire extinguishers. There are ways to improve this product in the future. Firstly, to ensure the functionality in small spaces, we would like to make a smaller version of I.F.E. Next, replace the match “head” with a detonating cord to increase efficiency as it gives a longer time interval before I.F.E explodes.

ACKNOWLEDGEMENT

We would like to thank Allah SWT for guiding us through a challenging project. They benefited from guidance from our lecturer, fellow teammates, and family support. We brainstormed ideas for innovative products, ultimately developing Instant Fire Extinguishers (I.F.E). We believe this product will benefit the industry and reduce victims of fire events. We also thank Universiti Teknologi MARA Dengkil for supporting the project. The team believes this product will significantly impact fire depletion.

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