

INTRODUCTION

Malaysia has a lot of theft cases involving donation boxes in public places especially at mosques. Our team aspires to design an improved anti-theft donation box which would have sufficient space for money storing, keypad lock system as well as theft detection system. By incorporating these two additional systems, it may help to reduce the risk of theft and increase the overall security of the collected funds as well as to ensure the donations will be utilized for their intended purposes.

Objectives

- 1.To design a concept of anti-theft donation box to reduce the possibility of donation theft from the donation box with additional security implementation such as keypad lock and alarm system.
- 2.To apply engineering knowledge of technical project design and circuit system to create a working prototype design for the benefits of society.
- 3.To ensure a successful and efficient working prototype design by making proper research and discussions among group members.

ANTI-THEFT DONATION BOX

Group 30

Product Cost Analysis

- Plywood (RM100)
- Screws and nails (RM20)
- Arduino UNO controller (RM39)
- 16 x 2 LCD display with 12C adapter (RM15)
- Thin Film Pressure Sensor (RM23)
- Isolator relay (RM18)
- 12VDC power adapter (RM6)
- Keypad membrane matrix (RM3)
- Buzzer(RM2)
- Solenoid lock (RM20)
- Other materials + Operational Cost (RM42)

Manufacture Price : RM288

Selling Price : RM500

Market Price : RM571

Manufacture and selling price can be decreased through mass production to improve competitiveness in the market. There are no existing products in the market, but there are similar products with anti-theft features. Example : Anti-theft parcel box.

References

- Bernama, B. (2017, January 23). Three friends jailed for stealing from Mosque Donation Box. Malaysiakini. <https://www.malaysiakini.com/news/370265>
- Britain Express. (n.d.). Poor Box definition, Illustrated Dictionary of British Churches, History and Architecture. <https://www.britainexpress.com/church-history.htm?term=Poor+Box>

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Method

1. All the listed materials and apparatus was prepared, where some were bought and some of them were borrowed from the lab.
2. The dimensions of the box were finalised and the cutting procedures were started.
3. The wood cutter machine was used to ensure the accuracy of the cutting of the wood, with the tolerance of 0.2mm each piece. No auto-cutting machines were used.
4. All the wood pieces were combined using nails and screws.
5. The electrical components were all built separately before fixing it inside the prepared box design.
6. The prototype box, were softened and cleaned using sandpaper and sprayed on top. The wallpaper were stick on top of the box.
7. Once the prototype exterior(box) were done, all the electrical components were carefully inserted.
8. The whole function of the prototype was tested again and explained to the teammates with a few modification made to ensure the efficiency of its usage.

Conclusion

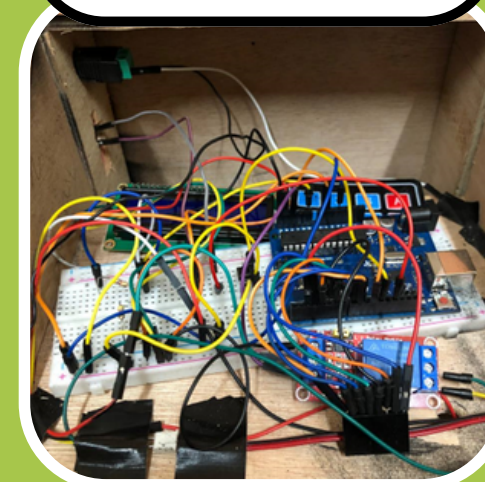
To conclude, the project aims to design a concept of anti-theft donation box with implementation of security features such as keypad and solenoid lock as well as anti-theft detection system. Hence, our team are able to built a working prototype of anti-theft donation box by applying engineering knowledge learnt. To improve our prototype, any limitations need to be fixed by conducting further research and brainstorming more significant idea.

Results

Front View of Prototype



Electronics of Prototype



Safe Box and Solenoid Lock of Prototype



Mode	Keypad Lock System	Theft Detection System	Results
A	Activated	Deactivated	User can retrieve money from donation box through opening of solenoid lock. Donations by donors will not cause the triggering of alarm.
B	Deactivated	Activated	Thief cannot retrieve money from donation box due to lock of solenoid lock. Change of weight act on pressure sensor is detected and will cause triggering of alarm.

The anti-theft donation box contains double-lock security systems and ample space of money storage to ensure the safety of donation box. The anti-theft donation box contains of two modes to enhance the capability and versatility of the prototype. The first mode is activated when the user is around, and the keypad lock system is activated to enable user to retrieve money from the safe box, while the theft detection system is turned off to prevent the alarm from triggering, since donation normally occur in the morning till late evening. The second mode is activated when the user is not around, and the keypad lock system is deactivated, so that the solenoid lock cannot be opened if the thief breaks through the first padlock through brute force, while the theft detection system is activated to detect any sudden change of weight acts on the pressure sensor to trigger the ringing of alarm.