

The 11th International, Invention, Innovation & Design 2022



Ushering in the Age of Endemic

**THE 11TH INTERNATIONAL INNOVATION,
INVENTION & DESIGN COMPETITION
INDES 2022**

EXTENDED ABSTRACTS BOOK



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HOME DESIGN MODIFICATION FOR DIY (DO-IT-YOURSELF) INSTALLATION OF INSPECTION PIT IN THE CAR PORCH

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ABSTRACT

The high cost of living and economic downturn can lead to a financial crisis and increase the burglary crime rate. Expensive house prices and shrinking house sizes can increase the stress level of people who live in the city. To deal with the challenging economic environment, creativity plays a major role in helping people to be more productive and effective in their daily lives. DIY activities are one of the alternatives which can increase knowledge and develop skills for economic benefits. The cost-saving activity may positively reduce the impact of the cost of living. Introducing an inspection pit at the terrace houses' car porch area may encourage house owners to practice DIY activities in car maintenance without paying the professionals. Besides, proper modification and dimension of the trench give the advantage of safe storage space to combat the problem of burglary and limited indoor space of typical Malaysian residential buildings in the urban area. A mild steel plate covers the inspection pit to avoid falling into the trench and create defensible space to prevent burglary when the trench is used as storage. It improves home security and offers households, options for dealing with current issues. In conclusion, home design should focus on and promote a sustainable way of life rather than just a shelter.

Keywords: Burglary, Cost of Living, DIY (Do-it-Yourself), Home Design, Inspection Pit

1. INTRODUCTION

The high cost of living is a global issue faced by people worldwide. The rising food, housing and transportation prices are the major causes of the high cost of living in the cities. The same trend is happening in Malaysia, especially in Kuala Lumpur, which has widened the economic imbalance between high and low incomes. Modern society works differently and therefore affects their basic need. For example, in the digital era of the 21st century, the use of smartphones and the internet are essential for households and increase the total expenditure of the family for communication purposes. This will indirectly change their spending patterns and lifestyles or add additional costs to their daily expenses (Wahab et al., 2018). To deal with this challenge, DIY (Do-It-Yourself) approach is suggested to reduce the impact of the cost of living where the household can use the cost-cutting intention as a motivation. The DIY approach is not only economical but also can give satisfaction to the consumer (Khademi-Vidra & Bujdosó, 2020; Williams et al., 2011)

The DIY store in Hungary, which was established 34 years ago, is a good example. The DIY store aims to various groups of consumers such as; i) normally homeowners who are interested in renovation and decoration and always apply their skill in that particular work themselves

either because of financial barriers or creativity reasons, ii) homeowners who love technical innovations and always choose to buy the latest tools for hobby activities, iii) a group of experts who normally buy materials from a factory but visit DIY stores irregularly when the materials are out of stock (Khademi-Vidra & Bujdosó, 2020). DIY may also allow consumers to try new things, learn new skills, and create a feeling of enjoyment in the user towards a successful outcome. With all the benefits offered, it is recommended that building designers design the buildings or houses creatively to encourage the house owner to be involved in DIY activities.

Malaysia is a developing country with fast economic growth. Highly educated people will earn more money and be categorized as high-income people. The high salary of educated people may attract housebreakers; therefore, precautions should be taken to prevent burglary. Generally, burglary motivation is affected by many variables, such as the type of residential property, the accessibility to the property, security, and the burglar's behaviour (Chiew et al., 2020). Home burglar alarm systems, padlocks and fences are physical security tools everyone should use to enhance the house's security (Moreto, 2010). However, sometimes it is insufficient to protect belongings such as bicycles or motorcycles even though they are kept inside the house boundary. Therefore, the lack of a safe place to store the goods outside the house becomes an issue for the household.

The population increase due to the expansion of housing development can concurrently increase the problem of stealing due to poor building design and environment. Housing development without considering the user's living conditions may increase the burglary crime rate (Kim et al., 2019). Malaysian typical residential buildings of terrace houses also expose to theft; therefore, crime prevention measures should be taken to create a safe house (Abdul Mohit & Elsawahli, 2017). This study recommends the application of an inspection pit which can serve two purposes; i) for simple car maintenance activities and ii) for storage of bicycles/motorcycles when the inspection pit is unused. Hopefully, installing the pit in the car porch can encourage DIY activities and improve the defensible space for storage to prevent burglary.

2. PROBLEM STATEMENT

The rising cost of living and the increase in the price of building materials hinders the opportunity for people, especially in urban areas, to buy a house. The situation is getting worse due to urbanization or modernization in the city, which causes difficulty for the developer to construct affordable houses for low and middle-income groups (Nor Malina et al., 2017). Besides, incidents of theft in terraced housing areas also occur due to the employment of low-skill or low-paid foreign workers who work in the construction and manufacturing sector in urban areas (Chiew et al., 2020). In this case, the element of security is very important in the housing area, and therefore, physical security features are essential and must be considered during planning and building design (Md Sakip & Abdullah, 2018; Mohd Salleh & Ahmad Latiffi, 2021; Tahir et al., 2012).

The situation causes homeowners to feel insecure about storing relatively expensive items such as bicycles and motorcycles in the car porch area. Therefore, the house residents sometimes decide to keep such valuables inside the house. However, the limited indoor space of the house causes discomfort. The housing space shrinking problem is getting crucial due to the increasing price of land for development and building materials as well as the high population. As a result, houses are designed to be smaller in size to make them affordable to low and medium income groups of people (Foye, 2017; Kim et al., 2019).

Designing the house creatively might be a good plan to overcome the current challenges of cost of living, theft problems, and the small size of houses. Modifications need to be done to the house design as a strategy to reduce the problems of limited indoor space for urban residents. By forming creative space, it can motivate residents to be productive even when they stay at home. Furthermore, urban families are advised to adopt a sustainable way of life by spending wisely to reduce the pressure of rising prices and cost of living (Nor Malina et al., 2017). One of the alternatives to save money is by practising DIY (Khademi-Vidra & Bujdosó, 2020). This innovation project suggests a simple inspection pit in the car porch area. A few simple modifications to the inspection pit will create more defensible space for storage where the house owner can keep their belongings (such as bicycles or motorbikes) when the inspection pit is unused. On the other hand, the suggested pit can also inspire the house owner to practice DIY for simple car maintenance activities, saving their time and money.

3. METHODOLOGY

The inspection pit is a hole with a dimension of 0.9-meter width x 5.5-meter length and 1.5-meter depth. The pit is normally 1.5 to 1.6 meters below floor level and is made from solid reinforced concrete. It is designed for car inspection and maintenance work. The inspection pit installed in the car porch provides the easiest way to check the car's underside without lifting it and inspires residents to implement DIY with their own hands.

The design looks friendly to the residents as there is no cost incurred to purchase the car-jacking component and preparation of the wiring system. In addition, the open space of the car porch can avoid hazards due to the emission of smoke from the vehicle. A mild steel plate will cover the inspection pit for safety purposes to avoid falling into the trench. The tough and durable properties of the mild steel plate make it ideal as a pit cover and work as a safety barrier to protect the belongings stored underneath when the pit is unused. To create an openable pit cover, the mild steel plate is hinged to the sidewall of the inspection pit at one side and locked/unlocked to the mild steel angle plate embedded in concrete on the other side.

To move a bicycle or motorcycle down into the base of the pit from the floor level of the porch, the trench is sloped downward with 23° gradient of the concrete ramp. The slope of the concrete ramp takes into account the depth and flat surface required for storage and working space inside the inspection pit. It is suggested that the inspection pit is designed with 0.9-meter width to accommodate a single person or at least one motorcycle while the space is used for car

maintenance works or storage. The proposed inspection pit must also have a minimum 2-meter length flat base surface for bicycle or motorcycle parking space or storage of other stuff.

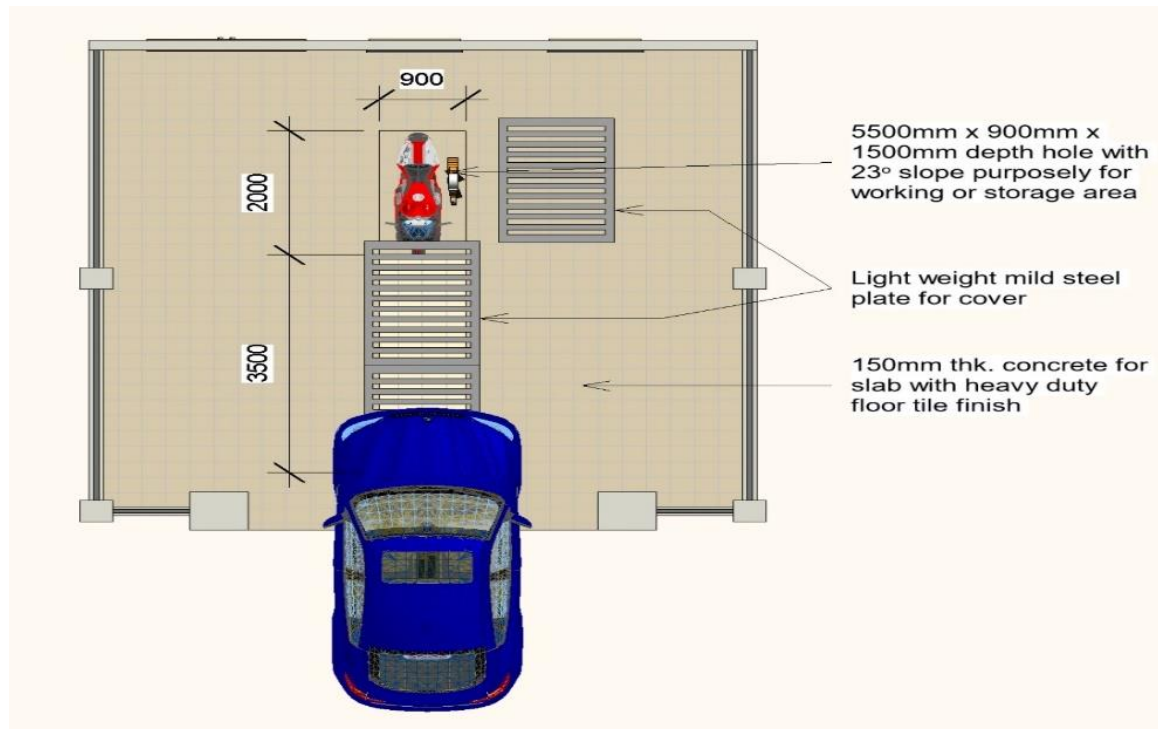


Figure 1 Plan of the Inspection Pit

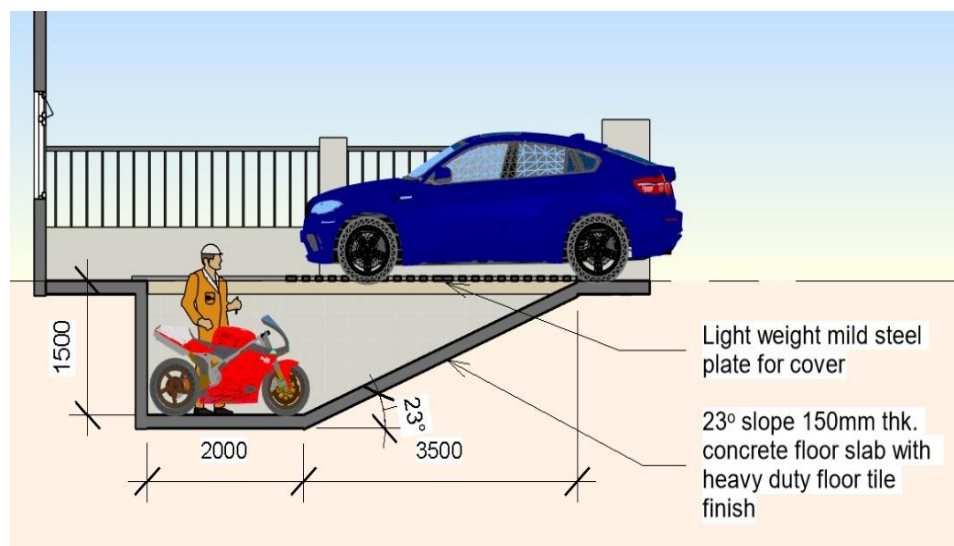


Figure 2 Cross-Section of the Inspection Pit from the Left Side.

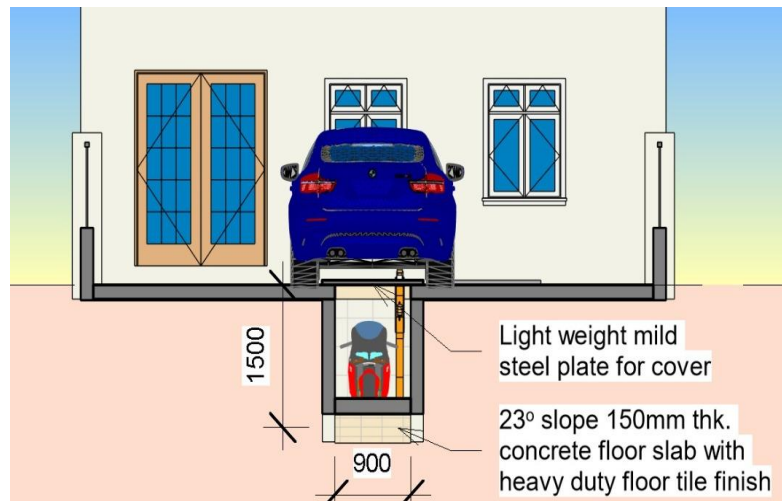


Figure 3 Cross-Section of the Inspection Pit from the Front Side

4. SIGNIFICANCE OF STUDY

One of the main purposes of innovative ideas is to increase productivity and efficiency with the minimum possible cost. In developed countries, DIY activities are increasingly popular and have been practised for more than 36 years for money-saving and self-satisfaction. The application of an inspection pit in the porch not only give motivation to the house owners to implement car maintenance works on their own, thus benefiting them financially but also will give more options to the house owners to develop their creativity and offer the consumers to try out new things and learn new skills.

In addition, this simple layout of the inspection pit offers more space for storage outside the house without compromising the safety of the property. The inspection pit, covered by mild steel plate when unused, provides defensible space and helps bring down the issue of stealing the stored property. This simple design can give modern society great potential for a more sustainable and economical lifestyle.

5. CONCLUSION

In conclusion, an inspection pit is one of the suitable alternatives in building design to offset the current issue of the cost of living and limited space of houses. Inspection pit offers an economical way of life where residents can conduct the car maintenance work DIY during their free time and smartly help them practice a sustainable lifestyle. Moreover, the pit can also be used as storage with better defensible space to avoid thievery.

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