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# TECHNOLOGY OF HOUSE LIFTING FOR RELOCATION PURPOSES

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## ***Abstract:***

Lifting and relocating houses is not only a tradition but now it is a technology that people use for some unavoidable reasons. For example, people relocate their houses because of soil erosion and flood problems. Those who faced this problem not only live in rural areas, but some live in the cities as well. The method used to lift and relocate houses are different for each area. Relocation is also needed because of capital improvement made by the government, to prevent from buying new houses and also to move and rotate houses for aesthetic purposes. Thus, the objectives of this study is to understand the method of lifting and relocating house, to identify problems of the methods used, and to propose a new concept in lifting technology. The methodology used in this research is through desk study by making some critical review based on previous and latest research. From the stated problem, it is concluded that this study requires suggestions on the new concept of lifting and relocating houses technology as it is different for urban and rural areas. It is hoped that the results and findings of this study may be useful in the construction industry.

**Keywords:** House; Lifting and relocating; Method; Rural areas; Urban areas

## **1.0 INTRODUCTION**

A house is one of the greatest assets which anyone possesses and constructing one's dream home is a very complex and challenging task. Peoples' intention in building a house are varied whether for self-occupied or business purposes. Constructing a house needs to consider numerous aspects of safety to secure the home and stand tall for several years to come (Makwana, 2013). A house constructed with very detailed handling by a professional contractor can last and stand long. However, due to external factors like soil structure, weather and surrounding environment, the house may not last long. These factors will cause severe damage to the home and that is the reason homeowners need to find solutions to the problem.

When it comes to solutions, relocating the house to another place by lifting and relocating is one of the methods which is not only cost effective but also saves operating time. However, the material of the house itself also has to be considered so that the house can last long and is durable. Relocation operations will only be done if the house needs a new place because of some factors and problems which cannot be avoided. Thus, the objectives of this study is to understand the method of lifting and relocating house, to identify problems of the method used, and to propose a new concept in lifting technology.

## **2.0 LITERATURE REVIEW**

### ***2.1 Method and technology used in lifting and relocating house.***

The first method of moving building is by using a team of horses in the late of 1800's. This was first implemented by the Davis Family which is known as Davis Construction Building Movers in the year 2011 (Davis Building Movers, 2018). Other conventional methods were still used by some Filipino and Malay societies to lift and relocate houses by carrying the house on the shoulders that involve a large group of people to carry out such activities. It sounds like a tremendous effort, but the traditional

Filipino house, the ‘bahay-kubo’, can be relocated using wooden poles which are carried from the old place to the new one (Eagle, 2016). Now, new technology and equipment have been invented to conduct lifting and relocating house activity. These include radio remote-controlled hydraulic dollies and secure transport vehicles. People nowadays only need to call the house movers company to set an appointment in order to lift or relocate their house. Therefore, in Section 4.2 of this paper provides details of the method and technology used by stating its characteristics, advantages and disadvantages.

### 2.2 *Issues and Problems with the methods and technologies used.*

Both conventional and new methods used to lift and relocate houses have their own advantages and disadvantages. People invent new methods to improve the old practice of lifting and relocating houses so that it becomes easier. However, they forget that people in the old days created their own methods because they had no space as they lived in rural areas. Additionally, they also made such methods as they were not professionals and lacked machineries.

By inventing new technology, in fact, one must consider several factors so that it can be used in both urban and rural areas. The factors depend on the distance, limitation to the size and structure of the house, move route, and also external factors. Therefore, Table 1 on the factors that need to be considered for urban and rural areas for the suitability of technology in lifting and relocating houses is provided below.

Table 1: Factors that need to be considered for the suitability of technology used in lifting and relocating house

Areas Factors	Urban	Rural
Distance of move	There will be no distance problem for moving houses in urban areas because people there relocate their houses by vehicles and radio remote-controlled hydraulic dollies.	The distance to move the house will be considered because in rural areas, residents move the house manually by carrying it on their shoulders.
Limitation to the size and structure of the house	Size of houses can vary for urban areas since they use vehicles that can transport the whole house to the new place. However, there will be a limitation to the house with additions like wings, or bump-outs.	There will be no limitation to the size of the house since it will be carried manually by people in that area. However, it is limited to timber houses only.
Move route	Some additional structures of the house may need to be cut into smaller pieces to fit the route.	Flexible moving route since the house will be relocated manually.
External factors	Transporting houses in rainy weather will pose a risk to vehicles because the slippery road conditions.	The activity of lifting and relocating house can be done at any time and should not necessarily only done during rainy weather.

### 2.3 *Proposing new concept in lifting and relocating house.*

From the issues, problems and factors in Section 2.2 hence this study proposes a new concept in lifting and relocating house which is suitable for both urban and rural areas. In the new concept, the parts of a house can be dismantled one by one from one element to the other. The elements of the house must be created with lightweight material for easy handling. Hence, when there is a problem that requires the house to be lifted and relocated to other places, only dismantle the elements of the building, load them

into a lorry or truck, deliver it to the new places and assembly them again. Further explanation about the concept and material will be explained in Section 4.3.

### **3.0 METHODOLOGY**

Desk study is a research technique which involves collecting data from any relevant research available. Hence for this study, desk research is undertaken to critically review several methods and technology used in lifting and relocating houses which resulted in four findings. Next, this critical review also identified the problems and issues regarding lifting and relocating houses.

### **4.0 ANALYSIS AND FINDINGS**

#### ***4.1 Issues and Problems for the purpose of lifting and relocating house.***

##### **4.1.1 Soil erosion and flooding issues**

Many people live near water such as wetlands and natural protection areas, or low-bank sound or Oceanside properties. These areas are sometimes prone to floods. In many of these cases, there is a need to move a house back from the potential high-water zones to prevent a future loss, or as a preventative measure so that, if a flood occurs, the house will be safe from the floodingbros (Bros, 2016).

##### **4.1.2 Capital improvement by government.**

Capital improvement programs consist of major upgrades to infrastructure through the widening of roadways, realignment of highways, and the addition of rail transit lines. To make way for these projects, homes are taken by eminent domain – government appropriation of private property for public use. Sometimes these houses are put on public auction or virtually given away a little or no cost to encourage relocating them (Paravalos, 2006).

##### **4.1.3 Cheaper than buying new house.**

Relocating a house can be a cheaper option than buying a new one. It only takes about half the cost of new building as it can avoid all the costs of real estate fees, land transfer tax, legal fees & moving costs (Bros, 2016).





##### **4.1.4 Relocation for aesthetic purposes.**

House-relocating is done to move and rotate the structure for aesthetic purposes. For instance, buildings are sometimes rotated to avoid the unpleasantness of nearby highways or commercial structures. Houses may also be rotated to fine-tune when and where different parts of the house receive sunlight (Gromicko, 2018).

#### ***4.2 Lifting and relocating technology***

From this study, it is seen that there are many methods of lifting and relocating houses because when it comes to ‘tradition’ it means that, it does have a conventional method that people had used and also of course there will be some revolution to the methods as people nowadays live in the era of globalization. Based on the critical reviews of the various methods of lifting and relocating houses, Table 2 provides the characteristics, advantages and disadvantages of each technology.

Table 2: Types of methods and technology used in lifting and relocating house

No.	Types of method or technology	Description	Advantages	Disadvantages
1.	<p>Team of horses</p>  <p>Lifting and relocating house using horses</p>	<p>The house was lifted and placed on a platform of wheels, and then pulled by several horses.</p>	<p>Requires only a small amount of money for the service. Flexible moving route for delivering.</p>	<p>Requires a number of people and horses to lift and relocate the house. Risks to injury Slow method of lifting and relocating houses.</p>
2.	<p>Team of people</p>  <p>Lifting and relocating house by a group of people</p>	<p>Large groups of men use wooden poles as support to carry the house on their shoulders.</p>	<p>Does not require any charges at all. Flexible moving route for delivering. Requires small spaces to relocate the house.</p>	<p>Requires large number of people to lift and relocate the house. Risks to injury. Slow method of lifting and relocating houses.</p>
3.	<p>Hydraulic dollies</p>  <p>Lifting and relocating house using hydraulic dollies</p>	<p>Use radio remote controlling system to move the house (Wolfe House and Building Movers, 2018).</p>	<p>Provide an easy means of relocating houses. Fast method of delivering. Reduce injury to the workers</p>	<p>Require professionals and skilled worker. High cost charged due to sophisticated technology used. Inflexible moving route as the size of the house has to fit the route.</p>
5.	<p>Transport vehicles</p>  <p>Lifting and relocating house using transport vehicle</p>	<p>The house is being lifted and placed onto a big truck, then it is transferred to the requested area.</p>	<p>Provide an easy means of relocating houses. Fast method of delivering. Reduce injury to the workers.</p>	<p>Require professionals and skilled worker. Transportation cost needed. Inflexible moving route as the size of the house has to fit the route.</p>

### 4.3 New concept in lifting and relocating house

From the analysis and findings in Section 4.2 a new concept of house using composite building materials by TasBlock is introduced TasBlock brings a new unique composite material solution for green building industry's need for sustainable materials. TasBlock also can be called "Lego bricks" where it can be easily and quickly assembled plus it also can be removed and disassembled again.

Since the concept of TasBlock is like Lego bricks, it does not require any cement or iron to be installed, hence this will contribute to a clean and safe construction method (Tasblock, 2013).

However, instead of using bricks, the same type of material is suggested but it uses the Lego concept in a piece of panel. By using the "Lego panel", it is easy to build because the large panel area can fill a lot of space and speed up the installation process instead of bricks. Thus, it will require minimal tools and labour where it can be built faster, resulting in higher efficiency, higher margins and cost savings. Besides, the material also can act as good insulation and resistance to sound, high temperature, rain, water and fire (Tasblock, 2013).

Having discussed installation efficiency, another new concept of installation is proposed by using bricklayer robot or also called Semi-Automated Mason (SAM). SAM is a bricklayer robot that can semi-automate the construction of brick walls or panels. This robot is able to lay 3000 bricks a day while the mean of a worker is 500 bricks a day. What makes the robot incredibly attractive is its speed by using a combination of a conveyor belt and robotic arm (Monino, 2017).

To sum up, the Lego panel can be used as a new material to the house because of all its advantages, most importantly the panels can be assembled and disassembled when needed. In addition, with the use of SAM, the assembling and disassembling process will be faster and more efficient. Moreover, with the small design and flexible features of SAM, it is suitable to use at rural areas due to small and less working space than urban areas. Thus, this can be used for the new concept in lifting and relocating houses.

## 5.0 CONCLUSION

In conclusion, lifting and relocating houses may be one of the best options when dealing with home-related problems such as floods, soil erosion, capital improvement, cost management and aesthetic purposes. As there are many technologies invented today, the conventional method of lifting and relocating houses is becoming increasingly unused. This is because people have found more efficient ways by using new technology to conduct such activity. The main problem is, the invented technology cannot be used at rural areas because of space and skilled worker's constraints. Therefore, a new concept in lifting and relocating house technology is being proposed to solve this problem.

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