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Study on Lifting of Residential Structures

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Abstract: *-This project explains the detail study of house lifting. Lifting of House is the process of separating a building from its foundation and temporarily raising it with hydraulic screw jacks. The reason why we are choosing this project is the increasing of road level due to overlay. Many people can suffer a lot of problems in future due to overlay and they don't know how to overcome this problem mainly in rainy season. Therefore we decided this project. If our house is below the street level and sewage water regularly flows in, relocation is not the best solution. With today's technology we can easily raise the level of our house and that too without any risk. It's time to save money and live in the same house which you are used to living in. Being more specific, houses that are put up in low-lying areas often face a big issue. This problem is never-ending during the cloudburst seasons when there is profound rainfall and a heavy inflow of water into the low-lying lands. Specialize in lifting the houses without any damage and raising their level with the help of Jack, with this scientific technique, in the project can help many people. By opting for this cheap and effective method, they can save lakh of rupees and their valuable time.*

Keywords: - *House Lifting Technology, Relocation, Low Lying area, Heavy Inflow of water.*

I. Introduction

One of the most common retrofitting methods is elevating a house to a required or desired Flood Protection Elevation (FPE). When a house is properly elevated, the living area willbe above all but the most severe floods (such as the 500-year flood). Several elevation techniques are available. In general,
they involve some following two conditions to apply this technique:-

1. Lifting the house and building a new, or extending the existing, foundation below it or,
2. Leaving the house in place and either building an elevated floor within the house or adding a new upper story.

This technique was introduced for the first time in Philadelphia, Pennsylvania 1799 for the purpose of moving a building. London's famous monument marble arch built in 1847 was originally the entrance to the newly rebuilt Buckingham palace. It was found to be narrow for the state coach, and was moved to its present location of Hyde Park in 1851.

II. Need For The Study

Many people's house in Nagpur is below the street level. For this case house lifting is the best technique. So the reasons of house lifting for preventing water damage, fixing a foundation already ruined by water damage, or building an additional floor. While there are several reasons we may need to lift a house, the main reasons are usually to maintain the road level and house level should be the same from that we can keep our house dry and protect against erosion and water damage. Lifting a house is a challenging project that requires precise skill, measurements, manpower and equipment.

III. Scope And Objectives

A house is one of the greatest assets which anyone possesses and constructing one's dream home is a very tricky and difficult task. Building a house is quite intricate and puts us through quite a lot of issues and obligations more to the point; construction planning is one such complicated task, in case if you are constructing a dream house then you need to consider numerous aspects to construct a safe and secure home that stands tall for several Years to come. Rebuilding involves great amount of money time and materials. This is not possible for everyone. Moreover people have emotional attachment with their buildings. Today citizens are facing various problems like entering of sewage water during rains due to lowering down on road levels. Rainy water directly enters into the house and shop and destroys the property and create great nuisance. For this problem house lifting is the best and effective technique. It will substantially reduce the flood risk to the house and its contents. It does not require any additional land for the working process. It can reduce the loss of life, economic and environmental.

IV. Accessories And Equipments Used In Technique

Hydraulic jack: -In 1838 William Joseph Curtis filed a British patent for a hydraulic jack. In 1851, inventor Richard Dudgeon was granted a patent for a "portable hydraulic press" - the hydraulic jack, a jack which proved to be vastly superior to the screw jacks in use at the time. Hydraulic jacks which are used to lift house are called as a house jack, also called a screw jack, is a mechanical device primarily used to lift buildings from their foundations for repairs or relocation. A series of jacks is used and then wood cribbing temporarily supports the structure. This process is repeated until the desired height is reached. The house jack can be used for jacking carrying beams that have settled or for installing new structural beams. On the top of the jack is a cast iron circular pad that the jacking post rests on. This pad moves independently of the house jack so that it does not turn as the acme-threaded rod is turned with a metal rod. This piece tilts very slightly, but not enough to render the post dangerously out of plumb.

Fig. 1 Hydraulic jack.

Wooden block: -Wood has been used as a building material for thousands of years in its natural state. Today, engineered wood is becoming very common in industrialized countries.Wood is a product of trees, and sometimes other fibrous plants, used for construction purposes when cut or pressed into lumber and timber, such as boards, planks and similar materials. It is a generic building material and is used in building just about any type of structure in most climates. Wood can be very flexible under loads, keeping strength while bending, and is incredibly strong when compressed vertically. There are many differing qualities to the different types of wood, even among same tree species. This means specific species are better suited for various uses than others. And growing conditions are important for deciding quality.

Fig. 2 Wooden blocks.

Channel beams: - The structural channel, also known as a C-channel or Parallel Flange Channel (PFC), is a type of (usually structural steel) beam, used primarily in building construction and civil engineering. Its cross section consists of a wide "web", usually but not always oriented vertically, and two "flanges" at the top and bottom of the web, only sticking out on one side of the web. It is distinguished from I-beam or H-beam or W-beam type steel cross sections in that those have flanges on both sides of the web.

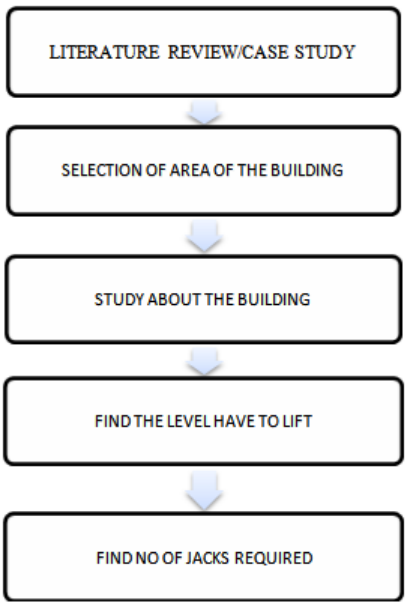
Fig. 3 Channel beams.

Wooden plank: -A plank is timber that is flat, elongated, and rectangular with parallel faces that are higher and longer than wide. Used primarily in carpentry, planks are critical in the construction of ships, houses, bridges, and many other structures. Planks also serve as supports to form shelves and tables. Usually made from sawed timber, planks are usually more than 1 1⁄2 in (38 mm) thick, and are generally wider than 2 1⁄2 in (64 mm). In the United States, planks can be any length and are generally a minimum of 2 in (51 mm) deep by 8 in (200 mm) wide, but planks that are 2 in (51 mm) by 10 in (250 mm) and 2 in (51 mm) by 12 in (300 mm) are more commonly stocked by lumber retailers. A plank used in a building as a horizontal supporting member that runs between foundations, walls, or beams to support a ceiling or floor is called a joist.

Fig. 4 Wooden plank

V. Methodology

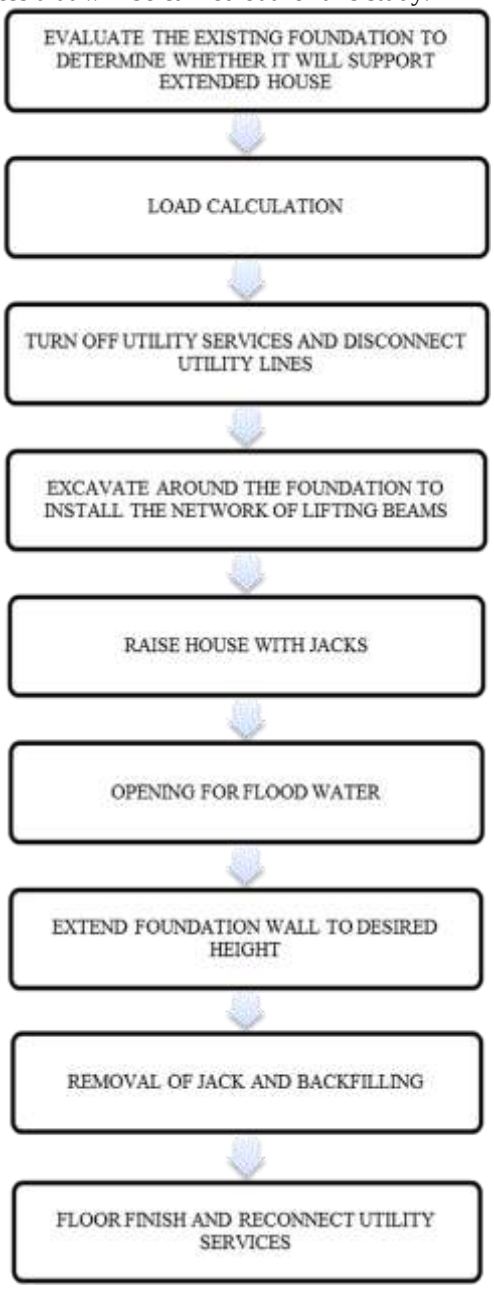
The methodology that can be adopted for elevating the house involves some step in it, therefore following is a flow chart that involves the steps required to elevate the houses.



Flow chart 1.

VI. Process Carried Out For Lifting Of House

This flow chart explains the process that will be carried out for this study.



Flow chart 2.

VII. Conclusion

Finally the house is raised by using hydraulic jacks without any damage to the structure. Then the level of house is above than the street level. Hence it will be safe in future against flooding. House lifting Technologies are cheap and effective and saved lakhs of rupees and valuable time. The house lifting task is completed by a team of certified professionals who know how to use equipment and those that have experience in handling such a project. Construction by method of house lifting is cheaper than usual construction method and saving time. Hence, it is preferred to use house lifting method for repairing of foundation and increasing plinth height for residential building. This method also helps to save construction material which indirectly helps in saving the natural resources of environment.

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