

An Experimental Study on Buoyant Foundation

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Abstract

Flood is the largest scale of destruction. It is a natural process that cannot be restricted and efficient precaution must have to taken to minimize the damages. It is based on the principle of buoyancy. Through this technique the occupants live in the low-land areas will be safeguarded and provide safer shelter. This structure helps the building to float in water.

Keywords: Amphibious house, buoyancy, Floating House

1. Introduction

The major causes of flooding are climate change and global warming. We can't stop natural disasters but we should prevent the houses by adopting the buoyancy principle.

1.1 Buoyancy definition

Buoyancy means the ability to float something in the water. So, we are adopting buoyancy principle to float the house.

1.2 Buoyant foundation

The buoyant foundation is a type of amphibious foundation in which an existing structure is to float high as necessary during the flood. But, In normal condition, it can be stable in the ground. Amphibious means the structure functioned as both in water and land.

1.3 Need for buoyant foundation

The people who are all living from low lying areas are mostly affected during a flood. So, adopting this type of foundation is helpful to people. This type of foundation is also increasing the elevation of the house during a flood.

2. Methodology

This type of house should withstand both in land and water. So The house must be retrofitted to an exist building or a new building which is slightly elevated off the ground and supported by piers or any piles. Due to this the house remain in ground at normal condition and will float under the flood condition.

Normally Various lightweight materials such as polystyrene, precast blocks, buoyancy blocks and prefabricated materials are used.

For economical and People living on low lying area should be recommended to use large barrels and Drum.

2.1 People living in low lying area

The reason for people living in low lying areas is the cost of land. It is very cheap in flood zones. So a maximum of industries is constructed in flood zone

areas. Hence, people working in that organization also shift their house on that location. Over the past 17 years, nearly 27100 people were killed during the flood and more than 300 million people were affected. The best example is the Kerala flood (Aug 16, 2018) kills more than 480 people and nearly 140 people are missing. The flood was occurred due to heavy rainfall during the monsoon season.



2.2 Floating house

Floating houses designed in New Zealand, Netherland and other countries also but they are using steel structures and reinforced concrete structures only. But in recent technologies, they are using buoyant blocks or expanded polystyrene filled with hollow concrete blocks instead of these blocks we are introducing water barrels that are filled with hollow concrete blocks which are more economical comparing the use of steel structures.

Figure: Floating House

3. Advantages & Limitations

The main advantage of this type of house is that the residents can stay in their homes during the flood. Temporarily elevates the house to exactly the required height.



It avoids the collapse of the structure during flood times. The chance of settlement is reduced. The total weight structure is equal to the weight of excavated soil hence there is no

settlement of the foundation. It is Cost economical.



Some of the limitations are: It cannot be applicable to the multistoried buildings. It is subjected to strong external loadings such as wind, rain, and other environmental conditions. The size and shape of the house are limited and restricted to the aesthetic view.

4. Conclusion

Amphibious buildings are proven low impact flood protection strategy that gives a community enhanced flood resilience and improves its ability to recover from disaster. The rise of water level due to global warming increases the sea level over the land surface. Floating houses reduce the damage due to property and human life significantly. The amphibious foundation is a proven, low cost, low impact flood protection strategy that can increase a flood-prone community's resilience in the face of disaster. The long term view that is necessary for taking account of climate change also enables us to view other issues with the same horizon of opportunity facilitating new solutions to spatial planning and the location of settlements, best practice in building design, infrastructure development, and environmental flood defense.

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