

Review Paper on Sustainability of Floating Structure and Their Construction Techniques

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Abstract- *The world has all the resources necessary to meet the needs of all living things, including people, plants, and animals. However, it is human avarice that is utilising these resources to sate its never-ending needs. According to projections, the population will increase significantly over the coming decades, reaching up to 10.9 billion people by the end of the twenty-first century from an estimated 8.5 billion in 2030. Because of the expected and actual exponential expansion. population, there will soon be a shortage of available land, necessitating the creation of infrastructure for residential, commercial, industrial, and agricultural usage. The metropolitan areas are growing quickly, and the anticipated population growth is forcing these cities to keep growing by constantly increasing their limits. Engineers, architects, and urban planners have been tackling the problem of providing more space and energy resources for people as well as addressing the harm that human civilization has caused to the environment and natural resources. One approach is floating architecture. By minimising the exploitation of land as a resource, the construction of these floating structures has the potential to transform how we view architecture and urban planning in the future and have a significant environmental impact. Comparing the preconception of just constructing on the soil and the current conservative construction restrictions, floating cities and buildings represent a new paradigm. This might be the only method for human civilization in the near future to adapt to expanding populations and shifting climatic conditions. We can say with certainty that idealistic ideas for a sustainable city will persist and that hope does indeed float.*

Keywords- Floating building , energy efficiency , renewable , built environment, Vlfs (very large floating structure)

I. INTRODUCTION

One of the environmental challenges is the rapid growth of the human population, global warming, the depletion of energy resources, and the rise in water levels. Such a dilemma has an impact on the ecosystem and biological variety; this needed to be taken into account with appropriate design techniques and creative solutions. Due to

the increasing urbanization and population increase in island nations, land scarcity became a problem. Due to the ongoing, rapid population expansion, many additional countries may have similar issue in the future, along with others like land shortages.

City planners, the engineers and architect's sector must take into consideration all environmental issues due to worries about the environment and energy. Thus, it is possible to state that "extremely huge floating structures" will be the engineers', architects', and city planners' futuristic solution to meeting people's basic need for shelter. Therefore, the concept of floating architecture might be presented as a creative response to the issues that climate change poses for construction. It can invent new architectural styles and connect the built environment with offshore renewable energy sources. It also has an impact on the nation's economy, either directly or indirectly.

Very large floating structures (VLFS) are artificial floating lands in the ocean. It appears as though huge slabs are sitting on the ocean's surface. VLFS can be divided into pontoon and semisubmersible types. When the river or sea bed is exceptionally soft or the water depth is high, they are an affordable choice. A floating building is a type of structure that has a floating base that enables it to float on water.

Built to be positioned in a body of water, floating and amphibious homes are made to adjust to changing water levels. Amphibious homes are designed to float as the water level rises, while floating homes are continuously submerged in water. Both types of homes are often attached to flexible mooring poles and rest on concrete foundations. Consequently, when the water level rises, they float and migrate upward.

II. OBJECTIVE

- To study construction technique's use in floating structure.
- To study the material's use in floating structure.
- To understand the sustainability of floating structure.

- To know the characteristics of floating structure.
- Understand the types of floating structure.

III. REVIEW OF LITERATURE

In this connection the following literature has been reviewed.

VERY LARGE FLOATING STRUCTURE: APPLICATION, ANALYSIS AND DESIGN

“E.WANTANBE, CM . WANG, T.UTUSONOMIYA AND T.MONA [2004]

Engineers, architects, and city planners are interested in large floating constructions because they provide a pleasant and environmentally friendly way to transform a body of water into new land. For floating cities, floating airports, floating piers, floating hotels, floating stadiums, and floating fuel storage facilities, VLFS are very helpful. Thanks to considerable improvements in building technology, a range of unique solutions can be used to enhance the mooring system and structural integrity of VLFS. Safety rules are essential in VLFS to prevent environmental damage as well as property damage. A floating structure can function for up to 100 years if it is built to meet serviceability and safety standards.

FLOATING BUILDING OPPORTUNITIES FOR FUTURE SUSTAINABLE DEVELOPMENT AND ENERGY EFFICIENCY GAINS

“SHAHRYAR HABIBI “ { 2015 }

One of the key components of the floating structure is sustainable design. There are numerous ways to make floating structures sustainable in order to satisfy demand. Due to creative solutions, floating building construction offers fantastic prospects for production that is more economical and an environmentally friendly energy-efficient solution. Since this floating structure has the potential to be endowed with sea energy and made self-supporting, self-sustaining, and self-sufficient, wave energy and sea power technologies are new forms of environmentally friendly, economically advantageous power generation.

FLOATING STRUCTURE

AMIT ROY, REHAN WAGLE, RONAK VAGHASIYA, PRANIT WADEKAR.

Growth of population has leads to unmanageable of that that leads to the destruction of environment. due to increasing in population day by day scarcity of land also increasing that by the architect's, the engineer and the city planner had to attracted to use of floating structure for the development of country. this paper is briefly description of

general characteristics of floating structure and energy resources which is produced by tides / water waves. floating structure is not only for environmental benefit it's also benefit for the economical aspect of that area. floating structure carry a light weight construction material's. the process of manufacturing and installing is simple, its suitable for any type of water body, its can no limitation in shape and size there maintenance is low, it's also be a self-supporting, self-sustaining and self-sufficient.

VERY LARGE FLOATING STRUCTURE: APPLICATION, RESEARCH AND DEVELOPMENT

C.M. WANG, Z.Y.TAY.

VLFS are artificial floating islands that float in the ocean. Different kinds of pontoon-style VLFS platforms rest on the water's surface. When the water depth is greater than the river or sea bed, they are an affordable alternative. By concentrating on the design of mooring systems for connector design and hydro elastic reactions, VLFS technology is developed. It is not necessary for VLFS to be rectangular in shape; irregular shapes can give buildings a more contemporary appearance while also reducing hydro elastic response.

This paper provides a comprehensive description of a low-cost floating home plan for a low-lying region. To offer sanitation, a toilet can be attached to the building, giving it an eco-friendly appearance. Utilizing locally accessible materials like golpata and chhon will enable the floating house to be cost-effective. From an architect and engineer's perspective, bamboo could be used based on its accessibility and robustness. Landless people and gypsies will utilise these kinds of houses, where electricity is generated by solar power.

IV. SCOPE OF WORK

Goa is located in the western part of the India region. It has an about 104 km long shoreline and 250 km of land-based waterways. Rivers have created many estuaries and creeks along the coast.

The major section of the services industry is tourism, which is also renowned as a tourist haven for its natural richness. According to records, Goa welcomed 282,022 foreign visitors and 876,358 visitors from all over India this year, which is less than the previous year due to COVID-19 restrictions.

In [KALA ACADEMY TO AGUADA FORT], we can construct a floating hotel, a floating building, and a floating bridge, which will boost the local economy.

- The same in Mumbai Due to Mumbai's ongoing population growth and the rising movement of people for urban development, floating buildings must be built in seaside areas in the future.
- In addition to Kolhapur, several villages in Maharashtra are situated along the banks of the Krishna River's tributaries, which flow through four states of India: Malprabha, Venganga, Mon, Panchganga, Sina, Borinala, Nira and Verna this are tributaries of Krishna in Maharashtra. When a natural disaster occurred in this area, many livestock also died and it also affected nearby homes, businesses, and tourists.

Need

- Amphibious house is necessary in flood area.
- It reduces problem of scarcity of land.
- Its use for transport by decreasing the distance by floating bridges

Benefits of Floating structure

- It's increased the economics of the area.
- It's is economical that the concrete one.
- It's have-low density but there's strength gives high strength.
- It's have-unlimited size.
- No restriction on shape and size.
- Use of low- cost material.
- Floating structure help in environmental benefit by use of sea energy and make self-supporting, self-sustaining and self-sufficient.
- The major advantages of floating house is resident can stay in home during flood.

A. Demerit of floating structure.

- Height limitation in mooring post.
- Mooring connector technology is still to explored.
- High skilled labours required and high equipment's are required.

V. CONCLUSIONS

By comparing and study project various case study and research paper that human civilization is faced with challenges in every facet of everyday life to finally recognise and address the worry about the future of our mother earth and how it's possible that the scenery on earth today may radically alter in some years. The implications, however, must be

addressed in due course and range in size from the tiniest to the largest, much like the growth of these landscapes.

After carefully examining the history of floating architecture, the development of these structures starting in the early 20th century, the contemporary factors supporting the need for these structures, the construction and structural analysis of floating architecture, and finally the surveys on the various target populations to understand the psychology of people and their knowledge of floating architecture in great detail.

The architecture of floating buildings allows a variety of options for energy-efficient designs, such as harnessing wind, tidal, and photovoltaic cells on the ocean floor that can be used to produce electricity. Additionally, building a floating structure and giving the user that experience can have a positive impact on their way of life.

Although one can draw the conclusion that there are few actual problems related to floating architecture in terms of the exploitation of another resource and that it is a new paradigm compared to the idea of construction on land through a variety of existing case studies and through the current knowledge attained on these structures. However, by building and developing these structures, we may be able to decrease the rate of climate and land deterioration while also regenerating the ecosystem by utilising the appropriate technologies to make these structures energy efficient.

By comparing and using project management methodologies we found out that it serves various purposes like reducing manufacturing time, reducing defects, increasing profit and also provides better visibility of ongoing project. These methodologies are very helpful in streamlining the processes and reducing legal as well as management risks.

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