

# Hexagonal Capsule Hotel Building made up of GFRG panel

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**Abstract-** A hexagonal capsule hotel building made up of GFRG (Glass Fiber Reinforced Gypsum) panels could be a unique and innovative design. GFRG panels are strong, lightweight, and fire-resistant, making them an ideal material for construction. The hexagonal shape could provide a visually appealing and structurally stable design, while the capsule hotel concept would allow for efficient use of space and resources.

Capsule hotels are small, self-contained sleeping quarters that are popular in Japan and other parts of Asia. They typically feature a bed, a small workspace, and basic amenities, all contained within a small, modular unit. By using GFRG panels to construct the capsule units, the building could be constructed quickly and efficiently, with minimal environmental impact.

The hexagonal shape of the building could provide several advantages. It would allow for more efficient use of space, as hexagons tessellate (fit together without gaps or overlaps) more efficiently than squares or rectangles. The hexagonal shape could also provide better structural stability than a circular or square design.

Overall, a hexagonal capsule hotel building made up of GFRG panels could be a unique and innovative design that offers efficient use of space, minimal environmental impact, and visually appealing aesthetics.

**Keywords:** Hexagonal capsule hotel, GFRG panel, Building construction, Prefabricated panels, Modular design, Lightweight materials, Space-saving design, Sustainable architecture, Eco-friendly building, Innovative structure.

## I. INTRODUCTION GFRG PANEL CONSTRUCTION:

GFRG (Glass Fiber Reinforced Gypsum) panels are manufactured by combining gypsum plaster with glass fibers, which are then molded into large panels using various techniques. Here are the basic steps involved in GFRG panel construction:

### Mixing the materials:

Gypsum plaster is mixed with glass fibers and other additives to improve its strength and durability.

Molding the panels: The mixture is poured into molds or sprayed onto a surface to create the desired panel shape. The panels are then left to dry and harden.

### Finishing the panels:

Once the panels are dry, they are trimmed and sanded to ensure a smooth and even surface. The panels can also be painted or coated with a finish to enhance their appearance and durability.

Installation: The GFRG panels are then installed on the building's structure using various methods such as adhesive, mechanical fasteners, or suspension systems.

GFRG panel construction can be done on-site or off-site, depending on the project's requirements. Off-site construction involves manufacturing the panels in a factory and then transporting them to the construction site for installation. This method can save time and labor costs, as well as provide higher quality control. On-site construction involves creating the panels directly on the construction site, which can be more flexible and suitable for complex designs.

Overall, GFRG panel construction offers several advantages such as ease of installation, durability, and design flexibility, making it a popular choice for modern construction projects.

## II. LITERATURE SURVEY:

"Capsule hotels: a brief introduction and literature review" by Jungwon Woo and Junghwa Park (2018)

This paper provides an overview of capsule hotels and their historical development. The authors also present a review of the literature on capsule hotels, including the advantages and disadvantages of capsule hotels as an accommodation option.

"Design and Construction of a Modular Capsule Hotel: A Case Study in Taipei" by Shih-Ping Lin and Wei-Hsiang Lin (2019) This paper presents a case study of a modular capsule hotel in Taipei, Taiwan. The authors discuss the design and construction of the hotel, including the use of prefabricated modules and the advantages of this construction method.

"The design and development of a capsule hotel in Japan" by M. Azizul Islam, M. Lutfar Rahman and

Md. Abu Naser Bikas (2018) This paper presents a case study of a capsule hotel in Japan, including its design and development. The authors discuss the unique features of capsule hotels and the advantages of this type of accommodation.

"Designing Capsule Hotels with User Experience in Mind" by Shao-Jie Chen and Wen-Ting Chuang(2018)  
This paper discusses the importance of considering user experience in the design of capsule hotels. The authors present a case study of a capsule hotel in Taipei, Taiwan, and discuss the design elements that were incorporated to enhance user experience.

"The Development and Design of a Capsule Hotel for Tourists" by Baochun Wang and Yaping Xiong(2020)  
This paper presents a case study of a capsule hotel designed for tourists in China. The authors discuss the design considerations, including the use of a hexagonal structure to maximize space efficiency, and the advantages of this type of hotel for tourists.

"Design of a hexagonal grid shell roof for a hotel building" by Yuanxiu Chen, Xiaolong Wang and Zhen Chen (2017)

### III. EXISTING PROJECT

One of the most well-known capsule hotels is the Capsule Inn Akihabara in Tokyo, Japan. Here's a case study on this capsule hotel.

The Capsule Inn Akihabara was first opened in 1979 as one of the first capsule hotels in Japan. The hotel is in the Akihabara district of Tokyo, which is known for its electronics and anime culture. The hotel has a total of 232 capsules, each measuring 2 meters in length, 1 meter in height, and 1.25 meters in width. The capsules are stacked two units high in a two-level layout.

#### Design and Facilities:

The hotel's exterior is a sleek, modern design with a minimalist facade. The lobby area is located on the first floor, and guests can store their luggage in lockers provided by the hotel. The capsules are located on the upper floors, accessible by an elevator. Each capsule is equipped with a bed, a small television, a radio, and an alarm clock. There is also a mirror, a light, and a small storage space for personal belongings. The capsules are designed to provide privacy for guests, with a sliding door that can be locked from the inside.

The hotel also has communal facilities such as a shared bathroom with shower stalls and a sauna. There is also a lounge area with vending machines and a microwave for guests to use.

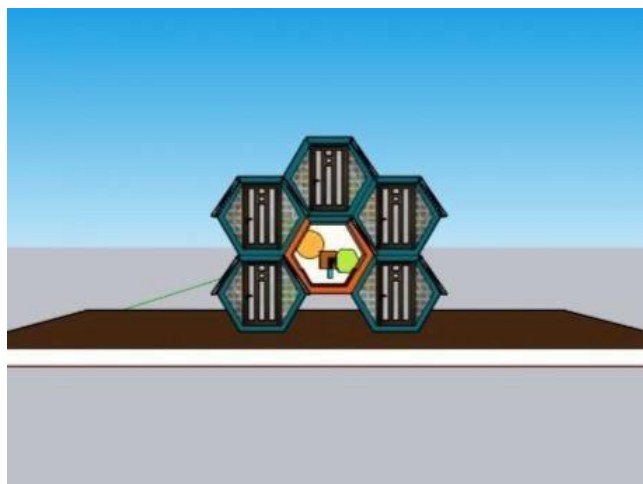
#### Target Market:

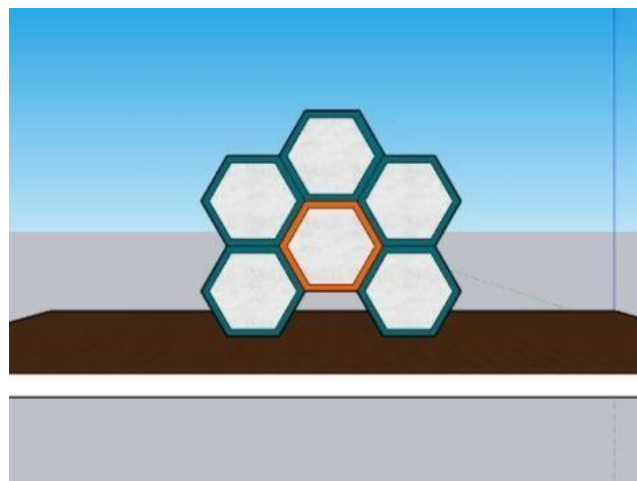
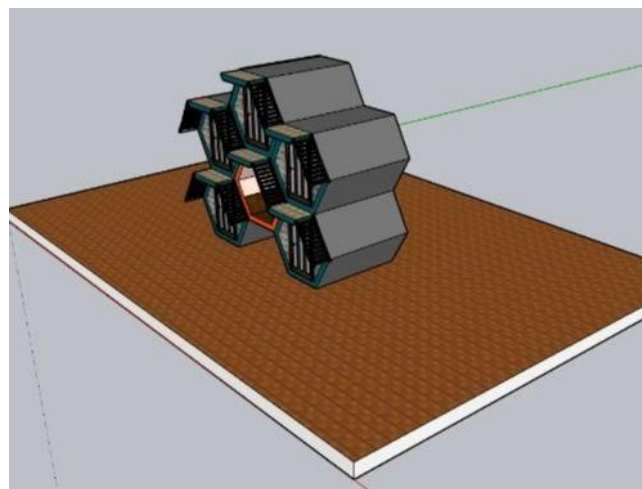
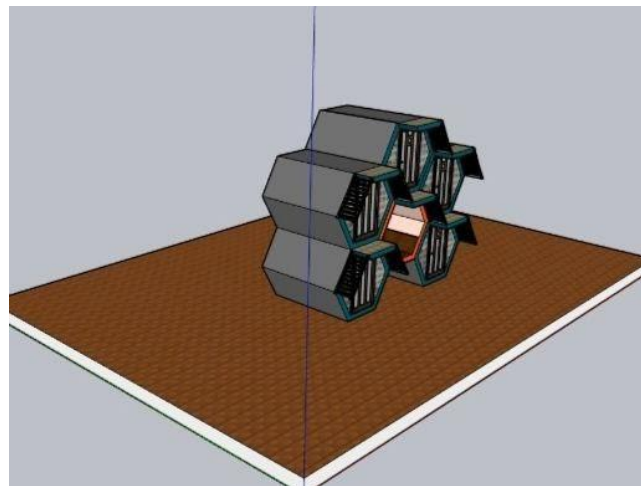
The Capsule Inn Akihabara primarily targets budget travelers, businessmen, and locals who need a place to stay overnight. The hotel is especially popular with travelers who are looking for a unique and affordable accommodation option in Tokyo.

#### Unique Features:

One of the unique features of the Capsule Inn Akihabara is its location in the Akihabara district, which caters to the interests of its target market. The hotel also offers a variety of amenities such as a sauna, which is not typically found in other capsule hotels. Another unique feature is the capsule design, which provides guests with a private and comfortable space to sleep in. The hotel's use of a two-level layout also maximizes space efficiency.

### IV. 3-DIMENSIONAL DIAGRAM:





#### V.CONCLUSION:

A hexagonal capsule hotel building made up of GFRG panels is an innovative and sustainable design solution that offers a unique guest experience. The use of GFRG panels reduces the environmental impact of the project, while the modular design allows for flexibility and easy disassembly. The honeycomb pattern and hexagonal shape of the capsules create a striking and memorable aesthetic that sets the hotel apart from traditional accommodations.

#### REFERENCES:

1. "Capsule Architecture" by Pauliina Seppälä. This book examines the development of capsule hospices in Japan and their design and armature.
2. "The Capsule Hotel in Japan Samples of Minimal Urban Living" by Kimie Tada. This composition discusses the design

- and function of capsule hospices in Japan.
3. " The Capsule Hotel Phenomenon Container Minimalism" by Rong Zhao. This paper provides an analysis of the design and armature of capsule hospices and their artistic significance.
  4. " The Capsule Hotel a Typical Japanese Space" bySou Fujimoto. This composition explores the conception of the capsule hostel as an exemplification of Japanese civic living and the architectural principles behind it.
  5. " Sleeping in a Capsule Exploring the Phenomenon of Capsule hospices" by James.W Rhoads. This composition discusses the designand armature of capsule hospices and their part inJapanese society.
  6. Kuldeep Kumar(2020) Critical Review of use of Glass Fiber Reinforced Gypsum( GFRG) Panels incasing in India,
  7. International Journal of Engineering Research & Technology (IJERT) ISSN 2278- 0181 <http://www.ijert.org>
  8. Glass Fiber Reinforced Gypsum Panel System, Building Accoutrements & Technology Promotion Council Ministry of Housing
  9. & Urban Poverty Alleviation Government of India.
  10. BMTPC, 2014. Prospective Construction Systemsfor Mass Housing. structure Accoutrements & Technology Promotion Council.
  11. Ratih Widiastuti<sup>1</sup>; Eddy Prianto<sup>2</sup> and Wahyu Setia Budi<sup>3</sup> Performance Evaluation of Vertical auditoriums International
  12. Journal of Architecture, Engineering and Construction Vol 5, No 1, March 2016, 13- 20
  13. " With 50 sq ft, India's first cover hostel opens inMumbai". dna. 3 March 2017. recaptured 3 March
  14. 2017.
  15. Tabuchi, Hiroko." For Some in Japan, Home Is a bitsy Plastic Bunk", The New York Times,2010- 01-01. recaptured on2010-01-18.