# Modular Movable Container

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**Abstract— Shipping Containers have been viewed as prefabricated modular units for various architectural applications, especially for housing. For project housing, shipping container can serve as ready to modulate prefabricated units that can be assembled quickly on site and disassembled and reused somewhere else after the project is over. The retired cargo containers can be up cycled through architectural intervention and used for housing purpose. Thus, it reduces environmental impact of steel container by extending its useful life A modular container house built from shipping containers makes a fantastic addition to your property. There are a number of good reasons why you might be thinking about adding a guest house, after all. Perhaps you often have family and friends visiting, and need additional room or just a more private space for longer-term guests. Or maybe you're an empty nester, and now that you're kids have moved out, you're thinking of downsizing and renting out your main house while you live in what would otherwise be the guest cottage in your backyard. Some of you are probably even thinking entrepreneurially and planning to generate some extra income with Airbnb or other platforms as a host of short term rentals. Regardless of your reasoning, using a shipping container as the basis for a modular container house is something you should strongly consider. It is often cheaper and more flexible than a conventional home addition while still giving the extra space you need. If you've been looking at how to go about building a guest house on your property, this article is for you. We'll go over many of the pros and cons and then let you decide if using shipping containers is a good fit for your situation**

**Key Words: Shipping Container, design parameters, Modular, Residential.**

## INTRODUCTION

The Introducation of the standard container in the early 60's completely changed freight transportation replacing manual labour with highly automated container vessels' ,charring thousands of standard 40' container , loaded and unloaded at a dazzling speed The first shipping container were manufactured by japan ,Europe, then later, korea, hongkong, and Twins accounting for about 90% of all shipping container production. shipping container architecture is a form of architecture using steel intermodal containers (shipping containers) as structural element, because of their inherent strength, wide availability and relatively low cost Shipping containers are tough - built from weathering steel. Designed to withstand stacking, stuffing and strapping and are reused over and over. There are estimated 17-20 million of these containers scattered around the world today. Today, as many as 1 million shipping containers may be sitting around unused. The surplus is especially profound in the United States, northern Europe and China.

A shipping container is a steel frame-usually cuboid-with a suitable strength to support large cargo transits and stowage. There are various types of containers, varying from refillable to universally standardized. For global trade, the term container is directly associated to a shopping container which can be loaded onto a great number of transportation options without requiring unpacking of its contents.

- They can be more cost-effective than traditional housing**.** You can purchase a container home for as low as $10,000. They are typically more cost-effective than conventional housing because they require fewer building materials and labor to construct. You can lower the cost of customizing your container housing by renovating the dwelling using your DIY skills.
- They're modular homes. Shipping container homes are easy to modify. You can build a home with a mix of 20- and 40-foot containers. You can also combine multiple containers to create a larger home with a living room, dining room, extra

bedrooms, a second floor, or even a container guesthouse.

- They're durable. Manufacturers typically use corten steel to build shipping containers. This self-healing steel protects cargo during transport across bodies of water. Shipping container homes made from weathering steel can likely withstand inclement weather conditions better than traditional housing.
- They can be mobile. You can use a dedicated shipping transportation service to pick up and relocate an off-the-grid single-container house anywhere in the world.

Shipping containers available in plenty It is too expensive to ship a container back after Export On November 23 1987 Phillip C Patented the technology in USA. In 2006, in California, Peter De Maria designed the first 2 storey shipping container home under building codes. Squeezed out of her Texas condo by the hidden costs of homeownership, such as maintenance and homeowners association fees, Hathman, 29, sold the place and moved into her 60-square-foot van. "I wanted financial freedom," she says. But living in a van is only one step toward Hathman's ultimate goal: living in a shipping container. "What I really want is to be able to save up enough money to buy a container home for myself," says Hatham. "It would be much more affordable for me than a condo or larger house." A container home is a dwelling made from recycled steel shipping containers that may have been used as a cargo carrier on a ship, train, or truck. Because they're small and repurposed, container homes are seen as environmentally friendly. And though they come with unique costs, like permits and land ownership, they can be much cheaper than a traditional home. Small homes and affordable housing seem to go hand in hand, and an increasingly popular tiny living option is container homes. If you're among those who are considering a container home, here's what to know before you buy one.

Problem Statement

- Controlling heat inside is a major concern.
- The probability for rusting is very high.
- Aware of toxic exposure when repurposing

Aim

" Reusing and recycling of materials is considered as an essential value in sustainable design."

Objectives

- They are extremely easy to build into a home.
- Fastest to Construct.
- It is durable for long time.
- Easy to recycle and redesign.
- Most important part is the green part (i.e you can reduce the use of wood and steel).

Analysis of Container Homes:

Documents Required: The following documents are to be submitted by the insured to enable the insurance company to settle the claims expeditiously:

1. Original Insurance Policy or Certificate
2. Copy of Bill of Lading
3. Survey report/Missing certificate
4. Original Invoice and Packing List together with shipping specification or weight notes
5. Copies of Correspondence exchanged with the carriers or bailees
6. Claim Bill. Precautions: While procuring insurance, exporter should observe the following

precautions:

1. Amount of insurance is 110% of C.I.F. value of goods. 10% covers anticipated profits. In other words, exporter is allowed to take a policy to cover profits up to a maximum amount of 10% of CIF value.
2. Insurance document is not later than the date of shipment.
3. Amount insured must be in the same currency invoice to take care of the exchange fluctuations.
4. Insurance document is issued by the insurance company or its agents or underwriters. The document issued by the brokers is not a good document.

Quality control :

The following are some of the objectives of quality control*

1. Promoting and ensuring the image of Indian goods exported to other countries.
2. Ensuring goods of assured quality only move into the export market.
3. Sustaining the foreign markets where Indian goods are already favoured and developing new markets with qualitative edge.
4. Inspiring confidence in the minds of buyers, with the assurance provided by reputed third party guarantee.

5. Adhering strictly to the technological requirements accepted by the foreign buyers of the product.
6. Ensuring sound and safe performance, without causing any health or safety hazards.
7. Observing conformity of rules and regulations of the importing country.
8. Maintaining proper packing for the safety of product during transit.
9. Eliminating the causes for complaints from the foreign buyers and making every effort to spread quality consciousness in the country to improve overall quality of Indian products.
10. Maximising production and effecting economies by standardisation.

## LITERATURE SURVEY

1] Miska Hanninen (2016) :
The Paper mainly focused on impact of According to Truman 2016 various factors determine the sustainable outlook of using shipping containers as modular housing in recent years. With any new development, container homes are viewed as challenging to work with due to their lack of space and simplistic design. However, the problem here consists of how to innovate them enough to be used as contemporary housing This will reflect well on the public's perception and gain more interest in the openness of living in a more minimalistic and affordable housing environment.

2] Ahmed Hosney (2015) :
To study on the Reusing and recycling of materials is considered as an important value in sustainable design and architecture that prolonged among many historical ages, from reuse of stone, wood, marble columns etc the previous decades witnessed the use of many materials in creating spaces that can host various functions not only for economic or financial reasons but also for environmental reasons in addition to the expenses of getting rid of these materials or reprocessing them by any mean From re-use of paper till reusing steel shipping containers, various attempts have been made to explore the possibilities, opportunities and examples of creating many functions projects or even large buildings been constructed in this way, the wide increase of these applications lead to the emerging of a type of architecture called afterwards containers Architecture.

3] Nick Socrates (2012) :
This paper offers of literature on the Shipping Containers as Building Components for Home Construction. No two building projects are the same. Even with modular kit applications, variations due to location and climate, site factors such as grading and slope, and home owner preferences (to name a few factors) create substantial diferences between projects. There is no single perfect shipping container home design solution, and the most important thing in any home building project is preparation

4] Dr. Mai Madkour (2016) :
This research aims to provide the assessment of feasibility using shipping containers as a way to find some solutions for building economic buildings towards green architecture through investing weather using shipping containers as a modular component in buildings construction is more economical than building using traditional methods. This comparison focuses on established planning & design goals, define and evaluate space requirements, review benchmark standards & guidelines, thermal comfort, alteration issues, and construction cost as a way to provide an overview of the performance of shipping containers buildings

5] Prof. Jin Young (2015) :
This project uses worn-out shipping containers as the main structure of the building. The building is used as a small factory with a gallery on the ground loor to display work. This project was also a result to tackle the growing problem of shipping containers. This project used two shipping containers, in which one of them is cut and placed by carefully planning the hatches. To save the worn-out appearance, the architects had used a timber frame inside and treated the container as the skin. This project is also designed to be a disaster shelter.

6] Prof. Jan A.Wium (2013) :
The study aims to answer whether shipping containers can sustainably be used in housing projects instead of conventional homes. To achieve this the study first researches the housing situation of South Africa to define the central challenges that inhibit the decrease in the formal housing backlog. After the challenges are identified, the possibility of using containers is investigated. Container-based residential projects are scarce in South Africa, and thus there is insufficient data for building a feasibility comparison solely out of case studies.

7] Mukhesh (2014) :

The modular shipping container is one of the 20th century's most revolutionary products. The design development and integration of a standardised shipping container into the global transport system continues to transform the world's economy. High value products such as sensitive electronic equipment, antiquities, perishable food products, spirits and pharmaceuticals can be sealed inside specialised containers, loaded and unloaded with unique dockside cranes and arrive at their destination safely and intact.

## CONCLUSION

There is a limited research done so far in the field of shipping container architecture since this field is relatively new. With the overview of studio outcome and case studies in India, it can be concluded that there is a lot of scope for explore and research in this field. Looking at the opportunities for container architecture in India and the incentives it can bring, there is need to explore this form of architecture in India. Also, a study of post occupancy evaluation of container users is required to be done in Indian context to understand the issues related with users' comfort and preferences. This study will give insight into users' perspective of container architecture. The current study was limited to exploration of unit, cluster and neighborhood design using containers and especially to ascertain whether housing as per Indian space requirements and typology is possible to be designed using this prefab unit. The studio amply demonstrated that housing using an cycled containers can be explored in practice as a viable option in India.

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