Modular movable container homes

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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

INTRODUCTION

The Introduction 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.

LITRETURE REVIEW

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.

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.

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.

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.

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.

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.

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

METHODOLOGY

- Each shipping container starts with a big roll of steel, which is unrolled and cut into several sheets. This is done in dedicated factories with technically advanced machinery systems.
- Surface preparation of these steel sheets is then carried out using sand blasting and priming to remove rust, dirt, contaminants etc.
- The sheets are then corrugated to improve the overall strength.
- Roof panels and floor braces are separately made and sheets for wall panels are then welded together.
- Square tubing is welded on the top of the walls.
- Once this is done, floor panels are assembled to form a floor frame.
- Door assembly and corner post assembly are also separately prepared.
- The door assembly is then installed on the floor frame followed by installation of wall panels.
- The corner posts, wall panels and door assembly are welded.
- The roof panel is then assembled and welded.
- Priming and painting is carried out.
- Wooden frames are varnished and prepared for flooring.

- Once they are installed in to the container floor, holes are drilled to attach flooring panels.
- The door hardware is finally installed along with rubber seals for watertight doors.
- The container bottom is then made waterproof followed by watertightness testing.
- The box is finally inspected to ensure watertightness or any other problem.

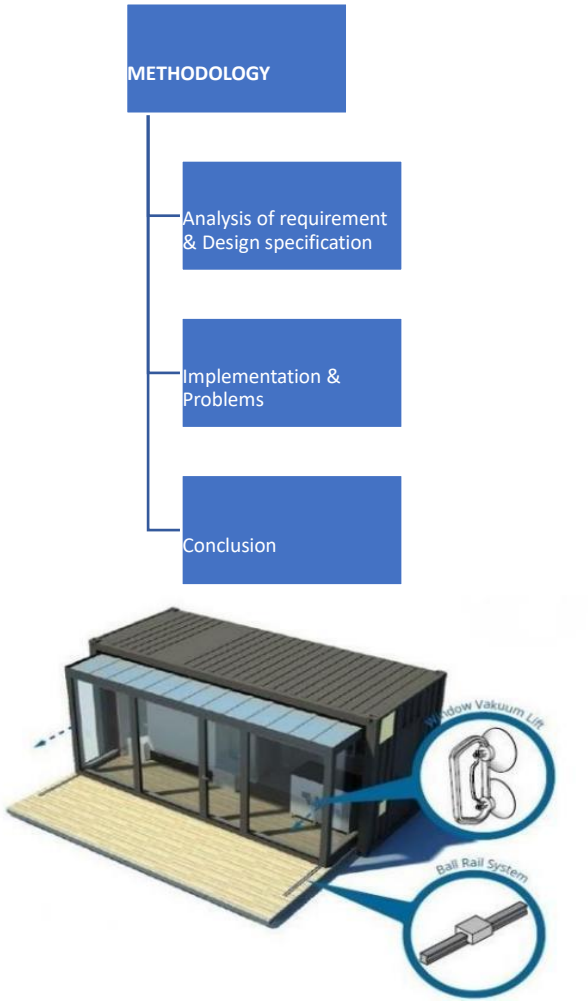

FIG 2.1 : PULLOUT EXTENDABLE MODULE

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CONCLUSION

There is a limited research done so far in the field of ship- ping 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.

REFERENCE

[1] AH Radwan, Containers Architecture-Reusing Shipping Con tainers in making creative Architectural Spaces, International Journal of Scientific & Engineering Research, Volume 6, Issue 11, November-2015 ISSN 2229-5518.

[2] Intermodal Steel Building Units and Containers Homes, ISBU Association, Specification Details-Shipping Containers/ISBU, http://www.isbu-association.org/specifications-shipping-containers.htm, Accessed 05/03/17

[3] M. Ismail, K. M. Al-Obaidi, A Malek, A Rahman and M Ahmad, Container Architecture in the Hot-Humid

[4] Tropics: Potential and Constraints, Proceedings of the 4th ICERT 2015: International Conference On Environmental Research And Technology: Exploring the Frontiers in Environmental Science and Technology Research, 27-29 May 2015, Malaysia/ Editors: Teng Tjoon Tow, Yusri Yusup, Widad Fadhlullah. ISBN 978-967-394-211-4

[5] JTW Consulting, Oneesan Container Housing Project, Report Prepared for: Atira Women's Resource Society, March 16, 2014.

[6] http://www.growing empowered.org/wp-content/uploads/2016/02/How-To-Build-a-Shipping-Container-Home. pdf, Accessed 05/03/17

[7] JD Laukkonen What is Monocoque Construction?, http://www. crankshift.com/ monocoque/, September 18, 2013, Accessed:15/03/2017