

ABSTRACT

Modular construction is widely used for single and double storey as well as multi-story residential buildings. Modular construction technique has played an important role of producing construction elements quickly and efficiently. The modules are produced in a factory, and are then transported to the construction site being prepared and then assembled. Modular construction of houses is an innovation that has potential to tackle issues related to environmental and sustainability concerns at a rapid rate, mechanizes the construction process, enabling mass manufacture of affordable houses in a short time period.

KEYWORDS: prefabrication, transportability, modules, flexibility.

INTRODUCTION

Modular construction technique is a process in which a building is constructed off-site, under controlled environmental conditions, and it uses the same materials and design structures to the same codes, standards and building bye-laws as conventionally built facilities but in a short time as compared to conventional house construction. Buildings are manufactured in “modules” that when put together on site, they look exactly like conventional built.

Modular construction can be used for building temporary or permanent building such as construction of camps, schools and classroom, civilians and also for military facilities as well as industrial facilities. Modular buildings are a perfect solution in remote and rural areas where conventional construction may not be possible to be built. Other uses of modular construction technique include churches buildings, healthcare facilities and retail shops, fast food joints, etc.

At this time modular construction for buildings or facilities today can be build to any specification and any size from a simple one to a complex one. Once the building elements are manufactured, they are then be transported to the site for their final installation. One of the big advantages of modular construction is that it is very rapid and it can be less expensive than a site-build structure. Also modular construction cannot be limited by issues like severe weather and modular buildings are more likely to resist earthquake forces since they are manufactured under control plant conditions.

Modular construction concepts can be applied for all types of buildings such as construction of offices, commercial, residential, hotels, etc.

Structurally, modular construction makes buildings stronger than conventional construction because each module is engineered to independently withstand the rigors of transportation and craning onto foundations.

CONSTRUCTION PROCESS OF MODULAR HOUSE

The modules for modular house construction are typically constructed off-site. The module fabrication can take little time depending on the material is to be used and then transported to the building site where equipments like cranes can be used to assemble the modules together. The assembly of these modules can take less time compare to the conventional house construction and also once the modules are assembled together it can be difficult to differentiate between a modular house construction and the traditional or on-site building construction.



Image Courtesy: Google

Modular construction techniques can be the same like assembly line for car manufacturing. Typically, four stages make up a modular house construction project. First, design development by the developer and plan approval by any regulating authorities if the house is to be built in Rajasthan, Jaipur: Jaipur Development Authority (JDA) has to approve it first before the next stage begins.

Secondly, manufacturing of module components in a factory (off-site) to a required depth and sizes after the approval of the design and drawing from the concerned authority (JDA).

Thirdly, transportation of modules to the project site will commence and then finally erection of modular elements to make the building.

Modular manufacturing companies or contractors manufacture the buildings at off-site locations. They may also operate as general contractors on projects, coordinating the delivery, installation, site preparation and finishing of the building or the modular contractor will be responsible for construction, delivery and installation of only the modules and an overall general contractor will be responsible for the whole project. Construction of modular building elements primarily takes place in the factories away from bad weather conditions preventing damage to building materials and allowing builders to work in comfortable conditions. Modular construction technique allows manufacturing of building elements and site preparation to take place at the same time, hence saving time. This may allow for earlier occupancy of the building and also contributes to a shorter construction period, reduced labor, finances and supervision costs.

Furthermore, modular house construction can allow a project manager or site engineer to save some time as construction of modular house can occur simultaneously with site work such as preparation of sub-structure.

USES/APPLICATIONS OF MODULAR CONSTRUCTION TECHNIQUES IN CONSTRUCTION INDUSTRY

Modular construction techniques can be adopted in the construction sector of civil engineering for a variety of uses.

1. Modular construction technique can be used to build large modular buildings such as office complexes, retail shopping centers, churches, temples, mosques, government facilities, fire stations, schools, medical and health complexes, etc
2. Modular construction technique can also be adopted for building medium residential buildings as well as high rise buildings, cafeterias, public toilets and other uses that are usually associated with brick and mortar buildings.
3. As modular construction technique saves time, it can be used for disaster management such as earthquakes, hurricanes, and other World calamities that require emergency shelters and housing for displaced persons as in the case of Refugees crises in some parts of the world that require emergency shelters, hence modular construction technique is best suited to address shelter problems as the process is faster compared to on-site construction technique.

ADVANTAGES OF MODULAR CONSTRUCTION TECHNIQUE IN CONSTRUCTION INDUSTRY

1. Modular construction technique saves time as modules for modular building are normally manufactured in a factory and then transported to the site for installation; hence this technique saves time and money because site preparation and manufacturing process of the modules can occur simultaneously.
2. Also modular construction technique has flexibility in design as the modular buildings can be dismantled, reassembled and relocated to another place since the technique can be apply in both temporary and permanent structures.
3. Modular construction technique can saves some money because there will be decreased in labor and materials and also the off-site manufacturing of modules components will only maximize labor efforts and quality while materials purchase and waste can be minimize.

CONCLUSION

Modular construction technique is a technique that uses prefabricated modules/units and it is a technique that has perfect solution in remote, rural and urban areas where conventional or traditional construction may not be possible. Modular construction technique should be adopted for construction of buildings such as churches building, temple, mosque, medical and healthcare facilities and retail shops, fast food joints, etc. also the modular construction technique generate less waste on-site because building elements are prefabricated in the factory and then transported to the site for their final installation; therefore, saving time and money. Therefore modular construction technique is much more efficient and sustainable.

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