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A survey on prefabricated and modular building

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Abstract

Modern methods of construction aim to industrialize the construction process by moving most of the manufacturing of the building to factories. Unitization and standardization of layout and design increases the opportunity for offsite prefabrication of buildings and building components. In this study a literature review has been conducted on different prefabricated buildings, their requirements and improvements with technology. Since World War II, prefabrication has been extensively explored as a method of constructing houses in some countries. With growing public acceptance, in spite of the challenges, modular construction is a less costly, faster, and simpler means of construction with wide applications across many building needs. Prefabrication relies upon social and cultural context: labor, factory ability, knowledge base, and especially market to determine what is developed.

Keywords: Prefabrication, modern methods of construction, Offsite construction

1. INTRODUCTION

In the early twentieth century, both domestically and abroad, architects and engineers were grappling with the question of how to efficiently and simply house a rapidly growing population**.** Modern methods of construction aim to industrialize the construction process by moving most of the manufacturing of the building to factories**.**

Prefabrication is the practice of assembling components of a structure in a factory or other manufacturing site, and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located. As a sustainable construction method, prefabricated construction is increasingly being adopted worldwide to enhance productivity and to alleviate the adverse environmental and social effects as a result of conventional construction activities [1]. The theory behind the method is that time and cost is saved if similar construction tasks can be grouped, and assembly line techniques can be employed in prefabrication at a location where skilled labor is available, while congestion at the assembly site, which wastes time, can be reduced. These principal benefits drive the wish to prefabricate buildings and elements of buildings in factories [2].

2. STANDARDIZATION IN CONSTRUCTION

Standardization is the widespread and systematic use of processes and components with repeated regularity in construction and engineering projects with the conscious objective of achieving optimum economy, quality and functionality. Unitization and standardization of layout and design increases the opportunity for offsite prefabrication of buildings and building components. "Standardization" is a major characteristic of prefabrication [3].

When repeatable processes are incorporated in offsite production, additional time and resource can be applied to the design process, development, testing and manufacturing set-up, all of which reduces the unit cost and increases the product performance.

These are the principles increasingly being applied in all industries, often described as 'mass customization', which enables them to reduce design, manufacturing and tooling costs as well as simplifying the processes and reducing the reaction times to new trends and demands.