

Prefabricated Rcc Structures

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Abstract: This project deals with the prefabrication techniques for residential building using a system of precast units for columns, beams, roof and walls. Precast R.C.C. planks and partially Precast R.C. joists are considered for flooring/roofing system in this paper and special types of precast wall panels are recommended. Prefabricated columns with a specific configuration, beams and staircase units are considered in this paper. Special emphasis has been made with respect to the various joints and connections and the details of these are discussed. A comparison of the cost of construction of precast system with that of a conventional construction unit has also been made. Finally, identified that large scale adopting of such a precast systems will eventually result in considerable cost reduction with the added advantages of execution speed.

Keywords: Prefabricated building, Precast slab, Wall, Stairs.

1. INTRODUCTION:

Prefab is related to prefabricated construction. The word "Prefab" is not an industry term like modular homes, manufactured homes, panelized home, or site-built home. The term is an amalgamation of panelized and modular building systems which is well planned & designed before the initiation of construction and placement of structure as per detailed design at work site. In industry these are called Pre Engineered Building (PEB). Prefabricated homes and modular homes are dwellings manufactured in a factory in advance, usually in sections that can be easily transported to the site and integrated. Prefabs are made of composite materials which are manufactured by combination of materials containing different properties such as plastics, concrete and steel. These are specifically designed for longer period of applications or usage. Pre Engineered Buildings (PEBs) are extremely durable, weather as well as termite proof. Due to their longer life of utility and affordable cost, manufactured homes can be used for permanent, semi-permanent or temporary applications. Prefabrication is the practice of assembling components of a structure in a factory or other manufacturing site and transporting complete assemblies to the construction site where the structure is to be located. Prefabricated building is the completely assembled and erected building of which the structural parts consist of prefabricated individual units or assemblies using ordinary or controlled materials. Prefabricated construction is a new technique and is desirable for large scale housing programmes.



Literature Review :

Elias IssaSaqan (1995) studied the evaluation of ductile beam-column connections for use in seismic resistant precast frames. Four types of ductile connections were considered in this study. Four half scale models of prototype precast beam-column connections subjected to reversed cyclic loads have been constructed and tested. The experimental study demonstrated that it is possible to design and construct precast beam column connections, where beams and columns are joined with ductile connecting elements, to withstand severe inelastic deformations resulting from earthquake forces.

Bindurani, P, A. Meher Prasad, Amlan K. Sengupta (2013) Analysis of Precast Multistoreyed Building A Case Study, International Journal of Innovative Research in Science, Engineering and Technology (ICEE 2013), 2013: This study presents the modelling of connections in a wall type precast building system. A case study on a 23-storeyed building, made up of precast wall panels and slabs, to study the modelling of vertical joints in terms of shear transfer.

R. Vidjeapriya and K.P. Jaya (2011), Behaviour of Precast Beam-Column Mechanical Connections under cyclic loading, ASIAN JOURNAL OF CIVIL ENGINEERING (BUILDING AND HOUSING) VOL. 13, NO. 2 (2012), 2011: Experiments were conducted on 1/3 scale models of two types of precast beam column connections and a monolithic connection. The precast connections considered are the beam column connection in which beam is connected to column with corbel using (i) J-bolt and (ii) cleat angle. The specimens were subjected to reverse cyclic loading. The experimental results of the precast specimens were compared with those of the monolithic connection.

P. K. Aninthaneni and R. P. Dhakal (2014), Conceptual development: low Loss Precast Concrete Frame Building System with Steel Connections, 2014 NZSEE Conference, New Zealand, 2014, Schematic development of a sustainable demountable precast RC frame system, in which the precast members are connected with steel angles/plates, steel tubes/plates and high strength friction grip (HSFG) bolts, is discussed. The concept of this system allows a mechanical pin to be used in the gravity frame connections such that only the seismic frames share the lateral force imposed by earthquakes and the gravity frames do not damage at all in earthquakes. In the proposed precast structural system, damaged structural elements in seismic frames can be easily replaced with new ones; thereby rendering it a definitely repairable and low loss system, despite not being a damage avoidance solution.

Objective:

- To improve in quality as the components can be manufactured under controlled conditions.
- To speed up construction since no curing is necessary.
- To effect economy in cost.
- To use locally available materials with required characteristics.
- Workability, thermal insulation and combustibility etc.

2. METHODOLOGY:

Prefabrication in India began with the emergence of the Hindustan Housing Factory. The company was developed by the first Prime Minister of India, Pandit Jawaharlal Nehru, as a solution to the housing crisis that resulted from the influx Housing Factory pioneered the production of pre-stressed concrete railway sleepers to replace dilapidated wooden sleepers on Indian Railways. The company changed its name shortly thereafter to reflect the diversity of its operations. It is now known as the Hindustan Prefab Limited or HPL. Located in Delhi, today the government run company prefabricates primarily precast concrete for architectural and civil projects throughout greater India.

3. CONCLUSION:

In this project an extensive study is to be done on the precast structures in India. The concept of prefabrication/ partial prefabrication which are adopted for speedy construction, better quality components and saving in material quantities and costs are to be studied. The major emphasis is to be given on the cost comparison between precast/ prefabricated structures and cast in-situ structures. Thereafter, it will represent the present housing approach in India and its extension to prefabricated housing. This project will also highlight the sustainability of prefabricated housing units and the implementation of prefabricated housing units in major disaster prone areas. Futuristic housing techniques using precast units and their advantages related to time and economy will also be discussed using certain case studies of major precast structures. The reduction of waste due to use of precast structural units and utilisation of energy using prefab structures will be studied and represented.

4. REFERENCES:

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