

Application of the Various Prefabrication Techniques & Other Aspects for Low Cost Housing

Avnish Singhal¹, Rashmi Chamoli²

Department of Civil Engineering

Women Institute of Technology, Uttarakhand Technical University, Dehradun

1. INTRODUCTION

Affordable housing is a term used to describe dwelling units whose total housing cost are deemed Affordable to a group of people within a specific income range. In india, the technology to be adopted for housing component should be such that it should suit the requirement of living and economicity of availability under metropolitan, urban and rural conditions Housing is a poutrimary need of mankind. Consequently building materials are necessitated for all strata of the society but the poorer sections of the community remains handicapped. In as much as the materials constitute about two-third of the total cost of construction and one-third goes for the labour. Thus these have to be on prices where a commom man is able to bear . The objective of development of building materials is to meet the basic need of great majority of population of the developing countries and the structures should behave durable and functionally more comfortable.

Type of materials

The various materials available can be grouped into four types

- a) Traditional materials
- b) Conventional materials
- c) Modern materials
- d) Innovative materials

Traditional materials are those materials which serve the basic needs of the great majourity of the population of any society. These materials are usually cherectrised by the presence of the useful properties. However, it may be possible to modify them through appropriate changes in the process of production as well as in the techniques of application so that they may become structurally more durable and functionally more adequate Conventional matrials are those which have been obtained from the technologies of developed countries. Initially they are used in more sophisticated type of construction but as the time passes they are adopted by other sections of the so The modern type of the materials are the fruits of the research of recent times and they are propagated by the multinational companies. It may even be possible that these materials are introduced and then allowed to develop through local talent and fruitify in their utilization according to the requirements of the local people. The innovative materials are brand new materials and have

recently being introduced. They may have not been tested by time but may be endowed with very superior qualities. In india, all these type of materials are available. However, in the contest of low cost, conventional, modern and innovative materials are most important because the cost of construction can be reduced by using a substitute material in place of traditional material. India shares with almost all developing countries the s forhortage of building materials. The estimates of the quantities for the present availability and demand of the building materials in india shows staggering gaps which appear difficult to fill. The problem of housing for the economically weaker sections of the society, including the landless in the villages and the slum dwellers and squatters in the urban areas, has been increasing the attention of the government and the professionals alike for some time.

The continuous inflow of the people from the rural areas to the lardger cities in the search of the job, is also one of the reason for aggrevating housing suitation, bringing more land under slums which is not suitable for human habitation. Even proper and pacca houses constructed by the public agencies and allotted to poor people get converted into slums due to overcrowding and misuse by the occupants. It is estimated that the housing shortage in India is about 90 million units, if each household in the country is to be provided with a pacca dwelling house.

In this topic, the main focus is to use prefabricated and precast units in place of in-situ modulation and to use conventional materials together with innovative materials

2. OPTIMATION OF DESIGN AND REDUCING CONSUMPTION OF CEMENT

The following measure are suggested:

- a) Instead of adopting nominal mixes of cement concrete, a rational concrete mix may be designed on the basis of material available and the strength and performance desired.
- b) Structural design(particularly for multi-Storey construction) may be optimized for minimum consumption of cement concrete.
- c) Adopting rational structural systems and architectural configuration which would economize on consumption of material without sacrificing functional utility.
- d) Adopting appropriate structural shape for economy in materials.
- e) Using lighter weight materials such as hollow concrete blocks, light weight aggregates, cellular concrete, aerated concrete etc particular in multi-storage structures.
- f) Using lower cost masonry cement in steel stead of OPC or PPC for construction of masonry.
- g) Adopting ready mixed concrete. This would ensure higher quality, durability, reliability and lower consumption of cement.NCB as already developed a technology for ready mixed concrete suitable for the Indian condition.

- h) Adopting prefabrication for mass housing to be provided in the shortest possible time industrialize which prefabrication of building components appears to be the most appropriate solution which has been extensively adopted in other countries. Quality of products can be assured in the factory and the consumption of materials can be minimized by adopting optimized design. The cost of prefab construction can be significantly reduced if appropriate scale of operation is ensured, facilities for transportation and handling are created and activities are efficiently managed.

3. CONCLUSION

The important point emphasis in this paper is the need for bringing about a union b/w modern technology and the local available conventional material for constructing low cost houses. A judicious combination of this would be able to produce a low cost houses having durability and comfort condition of a more permanent type of construction in introducing these techniques there is a need to give training to the people in the rural areas. Who would also contribute free level for constructing their own houses, which would further reduce the cost of construction. Some promotional work will have to be carried out by expert agencies the cost and performance aspects of the type of construction suggested and for generated adequate confidence in the mind of the rural folk or the city dwellers whose service are to be utilize for constructing the dwelling units. The second point in this paper relates to the control of environmental pollution by recycling wastes and converting into useful building materials. The NCB technology for manufacture of fly ash bricks has considerable commercial potential and one such bricks are produce on a larger scale of the degradation of fertile land for extraction of clay could be reduced and the fly ash bricks utilize for construction in dwelling units, particularly under slum development scheme. Another point covered in this paper relates to the unavoidable use of modern material like cement and cement-based products for construction purpose and consequently, the need for reducing their cost and consumption by the ration use and optimization of design and industrialization of construction activities. These measure are essential not only for achieving low cost housing where such product are used, but also for achieving economical in all construction activities irrespective of their nature and size.

REFERENCES

- [1] B. Carnahan, H. A. Luther, and J. O. Wilkes (1969), *Applied numerical methods*, John Willey & Sons, New York.
- [2] Egyptian Code for the design and construction of reinforced concrete structures (ECP-203) (2007), Cairo, Egypt.
- [3] R. Park and T. Paulay (1975), *Reinforced Concrete Structures*, John Wiley & Sons, New York.
- [4] V. I. Obozov and H. A. El-Gohary (2008), Comparison of *deformation of RC bending elements in the codes of different countries*, Journal of structural mechanics and design of structures, No. 2, Russia.