

BOX TYPE RCC BUILDINGS USING ALUMINIUM WALL FORMS UPCOMING TREND FOR HIGH RISE BUILDINGS

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ABSTRACTION

Construction technology is fast evolving in the Indian real estate market. Construction industry is a major contributor to the country's GDP and one of the largest employment generators that currently employs around 33 million people. The real estate market which was primarily revolving around the Tier I cities which fundamentally constituted of vertical developments majorly due to lack of space in the recent years has moved exponentially to the suburbs.

The exponential growth in the real estate development comprising of the high-rise buildings have been observing a long gestation period primarily due to the current conventional construction system being extremely time consuming and costly. These continuous delays resulted in cost escalation which was borne by developers who ultimately had little choice than to escalate the price of property. This in turn resulted in these properties being unattainable to many. Coupled with escalating costs and acute shortage of skilled man power led the developers to look at alternate technologies apart from time-tested

Aluminum wall forms shuttering were the ones which suited this particular change. Proven to be economical as well as satisfactory for the overall construction environment, this technology is now used in countries like Europe, Gulf, and Asia including India and hence study of aluminum wall forms is necessary now days and hence This paper will give brief idea about the BOX TYPE RCC BUILDINGS USING ALUMINIUM WALL FORMS

Keywords: Box Type RCC Structure, Aluminum Forms

I. INTRODUCTION

Indian population is nearly reached to 1.252 billion (2013 Census) and accordingly the country is facing problem of availability of land and houses as well and hence High rise buildings are being constructed in every metro Politian cities to fulfill the demand of ready houses, it is one of the best solution to accommodate number of families in consumption of very less area.

As High rise building structures is the solution to overcome the need of houses in less consumption of land, the speed of construction work using conventional construction techniques is the major problem on another hand. And hence it is necessary to go for analysis and adopting some advanced techniques of construction of high rise buildings.

Fast construction of High rise building is possible by adopting Box type RCC Structure using aluminium forms. Which gives a very fast speed of construction with a great accuracy? As this type of structures are pre engineered all the material (forms) required for the construction is prefabricated as per requirement of the site and hence the construction activity is very less time consuming.

This structure is built with very high precision as no manual work in casting is involved, only reinforcement placing, formwork erection and pouring of concrete through RMC is involved and hence the quality of work is assured and structures built by this kind of methodology is having smooth surfaces hence does not require any kind of finishing to the surface. this technique is very effective to construct high rise building in short period of time.

II. HISTORY OF FORMS

The most important factor in terms of cost, quality and speed in a high-rise building construction project is the type of the formwork used in the project. The first formwork type to be used is the conventional type formwork where the timber planks were supported on timber columns. With the advancement of technology it developed gradually and people used ply wood sheets instead of timber planks and steel pipes with jacks were used to support the ply wood. Then people invented small units of formworks and connect the repeating units in the construction. The larger units were invented like formworks for slab panels, formworks for columns, beams...etc. when the same elements are repeating. Then finally the whole system of formwork is made and initially the material used to it was steel and it was very heavy. Then the aim was to reduce the weight of the system and the materials for formwork have extended to aluminium, plastic, fiber glass... etc.

III. ALUMINUM FORMS

Forms made from aluminium are in many respects similar to those made of steel. However, cause of their lower density, aluminium forms are lighter than steel forms, and this is their primary advantage when compared to steel. As the strength of aluminium in handling, tension and compression is less than the strength of steel, it is necessary to use large sections. The formwork turns out to be economical if large numbers of reuses are made in construction.

As this formwork is prefabricated at factory and required to use multiple times on the site the proper planning of size (length and width) is to be done to maintain the flow and accuracy of the construction work.

3.1 Component parts of Aluminum Formwork

Aluminium form wall panel

Aluminium beam components

- a) Beam panel
- b) Prop head for soffit beam
- c) Beam soffit panel
- d) Beam soffit bulkhead

Aluminium Deck components

- a) Deck Panel

- b) Prop length
 - c) Deck mid beam
 - d) Soffit length
 - e) Deck beam bar
- Other Aluminium Form Components
- a) Internal soffit corner
 - b) External soffit corner
 - c) External corner
 - d) Internal corner
 - e) Rocker
 - f) Kicker

IV. PROCEDURE FOR CONSTRUCTION

As construction technique is pre Engineered all the formworks are made available at site by fabrication at factory itself and hence the construction procedure using aluminium formwork will be somewhat different than conventional technique and hence it is sub divided into following categories.

- 01) Pre Concrete Activities
 - a) Receipt of equipments (formwork & accessories)
 - b) Level surveys
 - c) Setting out
 - d) Control / correction of deviation
 - e) Reinforcement Placing
 - f) Erect wall forms (Fig.no.01)
 - g) Erect Deck Formwork
 - h) Setting kickers

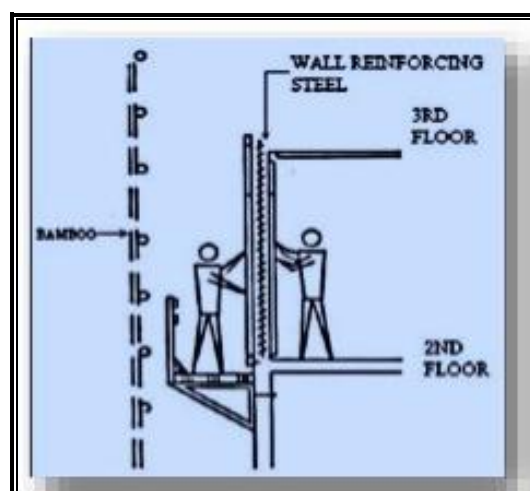


Fig. No. 01 Erection Of Wall Forms

02) On Concrete Activities

- a) Checking pins
- b) Checking joints of aluminium forms
- c) Checking support

03) Post concrete activities

- a) Strike wall forms (Fig.no.02)
- b) Strike deck forms
- c) Strike kicker formwork
- d) Strike wall

Post concreting activities will be followed by cleaning and removing the ties from walls and sequentially proceeding for the next floor

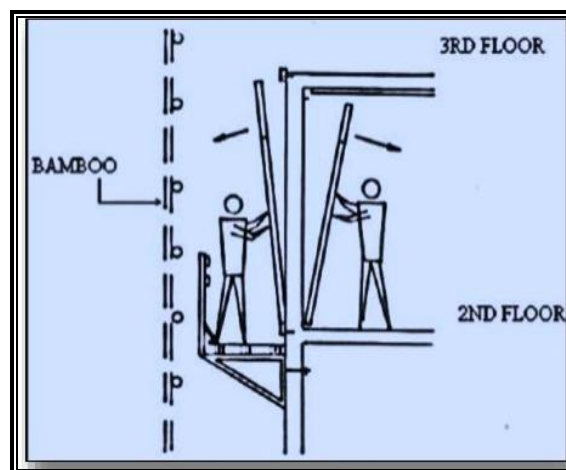


Fig. No. 02 Strike Of Wall Forms

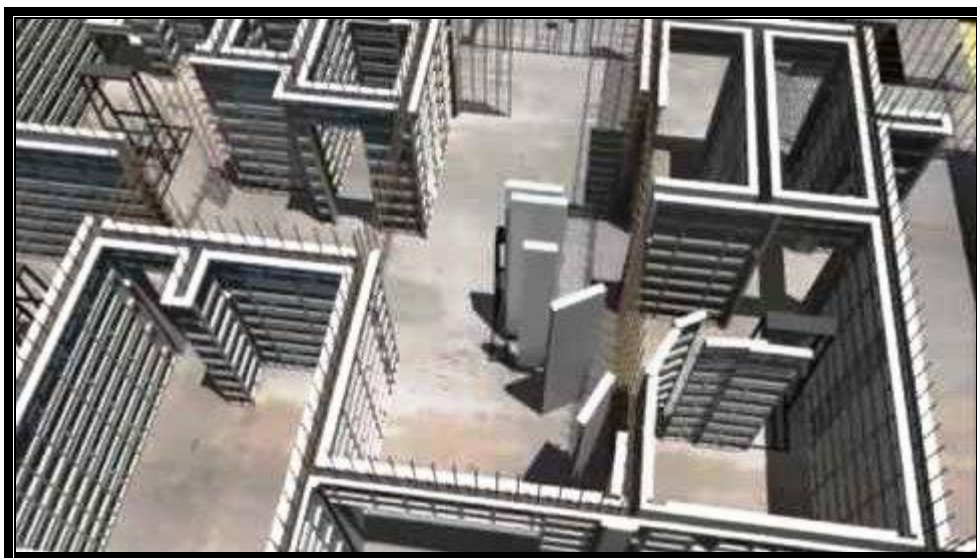


Fig. Shows The Complete Set Up of Aluminium Forms For Any Kind Of Structure

4.1 Advantages of The Aluminium Formwork

1. total system forms the complete concrete structure
2. Custom designed to suit project requirements.
3. Unsurpassed construction speed.
4. high quality finish
5. cost effective
6. Panels can be reused for more than 250 times.
7. can be erected with the help of unskilled labours
8. Easy to handle due to low weight.
9. High tensile strength and very hard material of formwork
10. Saving on overhead expenses due to speedy construction.
11. Monolithic crack free structure.
12. Doesn't require timber or plywood for construction activities so it saves environment.
13. Earthquake resistance of structure increases as structure is made of shear walls

4.2 Disadvantages of the Aluminium Formwork

1. Concealed services become difficult due to small thickness of components
2. It requires uniform planning as well as uniform elevations to be cost effective.
3. Modifications are not possible as all members are cast in RCC
4. Large volume of work is necessary to be cost effective i.e. at least 200 repetition of the forms should be possible at work.
5. Architectural changes not possible on the structure
6. The reinforcement will be congested in the lower floors and hence will require max slump of 200mm
7. due to tremendous speed of construction, working capital finance needs to be planned in advance
8. due to box type structure shrinkage cracks are likely to develop
9. Heat of hydration is high due to shear walls

V. CONCLUSIONS

From the analysis and study we can conclude that this type of construction could be used to overcome the need of housing in India. The main thing is that this type of construction is economic in case of repetitive construction of typical plans and designs.

Mass housing projects like low cost housing scheme can be done very effectively using such box type RCC structure.

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