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A BRIEF STUDY ON TABLE MOULD SHUTTERING IN HIGH RISE BUILDING

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Abstract – *India is a developing country, construction acts as backbone to boost economy, more the construction, more the infrastructure, more the development.*

Construction is not possible without the use of formwork; at many places we use different types of formwork such as conventional formwork, mivan formwork, plastic formwork, steel formwork etc. This paper describes a brief study on the table mould shuttering, its component, and design consideration as compared to other types of shuttering. Table mould formwork is generally use in typical floor of high rise buildings, since the floor is typical we can shift table to next floor as concrete gains sufficient strength and able to withstand it's self-weight and other's dead & live loads.

Key Words: Shuttering, Table mould, Design consideration, Economy, Infrastructure.

1.INTRODUCTION

Formwork is a mould to shape and support the concrete until it attains sufficient strength to carry its own weight. Important aspects in construction of tall structures include type of formwork system, method of concreting, geometric control, material handling etc.

The process of concrete shuttering starts long before the concrete is even poured. First a plan must be developed to determine where the piece of formwork must be placed; this is usually done by drawing up of blue print. Then it must be decided what type of shuttering is used. Table mould shuttering is a type of formwork which is used for horizontal shuttering such as, flat slab, two way slab etc.

2. TABLE MOULD FORMWORK

Table mould formwork is a hybrid type of formwork. It consists of aluminum beam and plywood which are supported by telescopic props.

Fig -1: Top View of table arrangement.

Fig -2: Table arrangement for column drop.

In market different types of formwork are available such as traditional timber formwork, plastic formwork, steel formwork, mivan formwork.

Table mould formwork is widely used in Bangalore, Delhi, Chennai, Hyderabad and in different cities of India. Generally it is used in office tower, hotel blocks etc. where floors are repetitive nature. The major component of table mould formwork are-

1. Primary Beam.
2. Secondary Beam
3. Plywood
4. Telescopic Props

2.1 PRIMARY BEAM

We generally use Aluminium Beam of depth 150mm, two beams are joined together to form single beam. The beams are of Jindal Aluminium section 29021. Its area is 1223mm^2, perimeter is 750.7mm and weight is 3.308kg/m.

Beams are arranged in bottom portion in lateral dimension, generally we use 4Nos i.e. two beams at one place and other two at other place to support secondary beams. According to calculation and checking shear failure, bending moment failure and failure in deflections, we decide the number of required beam. These calculations give us the number of primary beam. It also provides us the spacing between two primary beams.

2.2 SECONDARY BEAM

Secondary beams are fixed on primary beams in longitudinal direction by placing screw in both sides of primary beams. Its sectional properties are same as primary beams, we use aluminum beam of depth 150mm. The beams are of Jindal Aluminium section 29021. Its area is 1223mm^2, perimeter is 750.7mm and weight is 3.308kg/m. We use single beam. The numbers of beams are calculated based on table size and calculating the minimum span in shear, bending & deflection. Generally we provide 400mm spacing center to center in many cases.

2.3 PLYWOOD

We generally use either 15mm plywood or 18mm plywood on site. In market the standard size of available plywood is 1220x2440mm. We need to arrange plywood on secondary beam in such a way that wastage of plywood should be minimized. We select the thickness of ply according to load calculation. We need to refer IS 875- Part 1 & IS 875- Part 2 for the calculation of dead load, live load, Plant and machinery vibration and impact load.

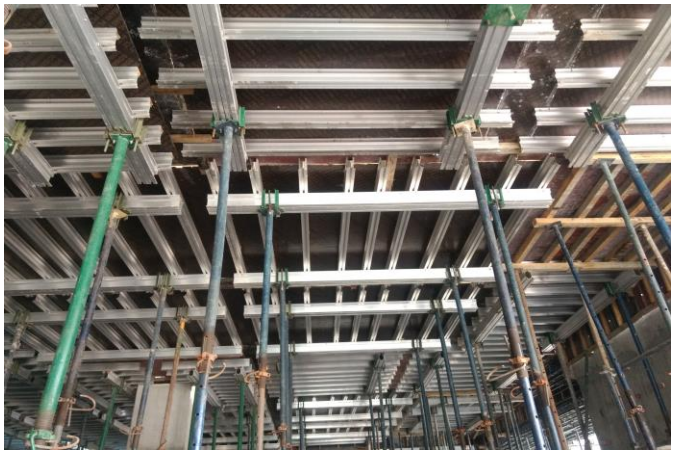

Fig -3: Secondary beam followed by primary beam supported by telescopic prop.

2.4 TELESCOPIC PROPS

The telescopic prop consist of two pipes, one inside the other with a locking pin to adjust the height. The diameters of the telescopic and base pipes are 63mm (5mm thick), 76mm (4mm thick) respectively. The telescopic pipes and base pipes are also known as male pipe and female pipe at site respectively. There is a threaded portion on the top of base pipe, which is used for adjustments in heights.

A slot is provided in the threaded portion for incorporating the locking pin, which is fastened using a lever nut. The telescopic props allow the height adjustments in the range of 2.3m – 4.3m. On the top of telescopic pipe base plate is available to support primary beam, also the bottom portion of base pipe consists of base plate to transfer to total load to ground. According to the test report conducted by IIT Madras on Scaff India telescopic prop. After applying factor of safety 2 in closed position i.e. 2.3m high telescopic prop. It can take 68.2KN of load and again in extended 4.1m telescopic prop it can take 48KN load.

3. SELECTION OF TABLE MOULD

After receiving the structural and architectural drawing, we have to look for the arrangement of table in that place. Points to be considered while selecting table arrangement are as follows:

1. Arrange the tables in such a way to minimize the types of table mould.

2. The filler ply used between the tables should be of uniform width and check to minimize the wastage of plywood at site.

3. Arrangement should be done in typical manner so that the repetition of same table can be done on above floors also.

4. Selection of size of table should be done in such a way that, it could attain proper stability of its own and easy to handle at site.

4. DESIGN CONSIDERATION

We have to check the load on plywood. The load is calculated after referring code book IS 875- Part 1 & IS 875- Part 2, it include dead load, live load, load due to vibration of machineries. After adding all loads on plywood including self-weight of formwork, we get the design load.

After getting design load we check the permissible bending moment and permissible shear strength of plywood as data received from manufacturer. For designing of secondary beam, we need to check span based on deflection, bending moment and shear and considering minimum value out of all three values. This will give us the center to center spacing between two secondary beams. According to the size of table we calculate number of secondary beams.

Now coming to primary beams, we need to calculate moment of inertia, section modulus of aluminum beam and considering design load; we will find minimum span based on deflection, shear and bending moment. The minimum values out of these three values will give us center to center spacing between two primary beams. Ultimately the load will transfer to telescopic prop. So, the number of props is again decided by the load taking capacity of one prop to the total design load on one table. We consider factor of safety as 2. The arrangement of each and every component of formwork should be done in proper alignment to avoid any accident at site.

Fig -4: Table mould arrangement at site.

3. CONCLUSIONS

Table mould shuttering is widely used in construction project. It is hybrid type of shuttering which is the combination of aluminum shuttering and plywood shuttering; it is more economical and easy to use at site. Its durability is high and component can be reuse for different buildings and design. It is easily available and easy in assembling.

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