

# A BRIEF STUDY ON THE TYPES OF SHUTTERING AND THEIR COMPARISON

Syed Ahraz Ahmad<sup>1</sup>, Mr. Abhishek Kumar<sup>2</sup>, Mr. Afaque Khan<sup>3</sup>

<sup>1</sup>PG Student, Deptt. of Civil Engineering, BBDU, Lucknow, UP

<sup>2</sup> Assistant Professor, Deptt. of Civil Engineering, BBDU, Lucknow, UP

<sup>3</sup> Assistant Professor, Deptt. of Civil Engineering, BBDU, Lucknow, UP

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**Abstract:** Construction is one of the significant sectors of Indian economy and is an integral part of the development. Today India's urban population is the second largest in the world and its future development leads to increased demand for housing to cope with this problem India should desperately need to plan for acquisition of land and rapid creation of dwelling units. Construction is a complex process involving basically the areas of Architectural planning, Engineering & Construction. One of the most important factors in determining the success of a construction project in terms of speed, quality cost and safety of work is the formwork used in the project as it accounts about 40% of the total project cost of the structure.

Fortunately, some of the advanced technologies catering to faster speed of construction are already available in the country. For e.g. Prefabrication, autoclaved blocks, tunnel formwork, Aluminium formwork (MIVAN Technology) of construction etc. This paper describes a brief study on the types of Shuttering and their comparison and upon that their importance in the Construction.

**Keywords:** Shuttering, Formwork, Falsework, MIVAN Shuttering, Plywood.

## 1. INTRODUCTION

Shuttering is a term used to describe the process of building Formwork, or temporary containment structures, used in the process of pouring concrete. Concrete shuttering is done to help give the concrete a form while it is setting, thereby preventing leaking, cracking, or uneven surfaces. Wood can be used to shutter concrete, as can metal structures known as Roadform. The pieces of shutter material are kept in place with rods and other security components known as Falsework that can be removed once

the concrete has been set. Most formwork is temporary and will be removed once the concrete has taken shape.

The process of concrete shuttering starts long before the concrete is even poured. First a plan must be developed to determine where the pieces of formwork must be placed; this is usually done by drawing up a blueprint. Then it must be decided what type of shuttering will be used. Water-resistant plywood is a common choice, though in some cases, metal roadform can be used. Plywood is less expensive and usually easier to store and transport, so it is the more common choice for most projects. Once the plan has been developed, the formwork can be put in place and falsework can be used to secure the forms in place.

“For undertaking mass housing works, it is necessary to have innovative technologies which are capable of fast rate construction and are able to deliver good quality and durable structure in cost effective manner.”

## 2. SHUTTERING AND FORMWORK

Shuttering and formwork are both terms used to describe the process of creating a mould in which concrete can be poured and contained as it hardens. Shuttering usually refers to the process of using plywood to form the mould, while formwork is something of a broader term that is used to denote the forming process using a wide variety of materials. Shuttering and formwork both accomplish the same essential task, but the materials used to accomplish this task can vary. Sometimes there is no differentiation made between the two terms, and in some cases, shuttering may be considered one specific type of formwork.

### 3. TYPES OF FORMWORK

Several systems are adopted at different places in the world; eventually the systems which are reasonably economical and easy for operation with skilled labor are useful in India. Certain systems are in vogue and more and more contractors are trying to bring in new technologies. Following are the types of Formworks.

1. Conventional Formwork
2. Modern conventional Formwork
3. Semi-System Formwork
4. System Formwork

#### 3.1 CONVENTIONAL FORMWORK:

This is the oldest type of formwork used in the construction industry. This type uses timber, bamboo, masonry and carpentry in the construction. This type is very much suitable for small houses with two to three storeys and still they are in use for such constructions. But this is not suitable for the big projects or high-rise buildings. Low initial cost, low experience factor, low weight are some of the advantages of this type and poor finish, high labor requirement, skilled labor requirement and consume lot of time are some of the disadvantages.

#### 3.2 MODERN CONVENTIONAL FORMWORK:

This type is very much closer to the conventional formwork and in simple words this is one step advanced than the conventional type. The same technique has used in the both types and the only difference is the materials use for the formworks. In modern conventional formwork more advanced materials are used and they can reuse for several times. The differences of both types are that steel props and various types of jacks (U jacks, T jacks) are used as supports in the formwork instead of timber supports and ply wood sheets are used instead of timber planks on slab decks, beams and columns. This type of formwork could be categorized under the Cast-in-situ Method of Construction.

#### 3.3 SEMI-SYSTEM FORMWORK :

This type is much more advanced than the modern conventional type. In this type there are pre-fabricated formwork items such as pre-fabricated formworks for slab panels and supports and ply wood should be used additionally for slab deck, beams and columns for the

surface. There are other forms of semi system formwork such as table forms, flying forms etc. DOKA is the most famous brand for this type of formwork and some people know about this type only as "DOKA formwork". These type of formworks can be categorized under the Composite Construction method.

#### 3.4 SYSTEM FORMWORK:

System formwork has prefabricated modular components with casting panels. The system formwork is fabricated as it suits the required shape. The biggest advantage of this type is the speedy and quality construction. But the high initial cost is the main disadvantage and hence it is not economical to use in low – rise buildings. But this is the most economical form of formwork type to be used in high-rise building construction when it is having few typical storeys.

### 4. COMPARISON

This is to be very clear that in a country like India where technologies are no doubt is developing day by day but still we are lacking in the skilled labor around. Especially city like Lucknow, Uttar Pradesh, skilled labors are present but most of them are related to the Conventional Type of Construction and Formwork and especially in Plywood. So keeping this in mind this comparison has been made.

Basically the comparison has been done on the basis of presence of the material, cost-effective nature, usage and skilled labor and most importantly finishing. So comparison between Plywood and MIVAN Formworks are:

1. One can easily make the desired shape of the Formwork on the Plywood whereas this is not possible under the MIVAN or Metal Formworks.
2. Plywood could be fixed accordingly whereas MIVAN has a pre-formed structure which one can't change just for one site.
3. Plywood are man-made whereas MIVAN are pre-casted.
4. Plywood are not made for heavy or high-raised buildings whereas MIVAN are especially designed for these types of tasks.
5. Most of the time the finishing of Plywood formwork leads to honeycombing or bubbling undoubtedly because of slumps but this abatement could be reduced under the usage of MIVAN.
6. After the continuous functioning and usage of these shuttering equipment they started deteriorating. In Plywood we use protective film or shuttering or Veneer as for layering and give a smooth surface to the Plywood

whereas in MIVAN we need to scrub the surface using special type of scrubbers which is no doubt, costly.

### 5. RESULT

A place like India where every day a constructional site is being started and finished continuously or even the ratio must be much greater, but the point is where the construction is so ubiquitous it is important to find out the ways to make the thing much better and cheaper in upcoming days. Accordingly there are some proportions that could be present which shows the usage of types of constructions held in India with what ratio. The given below is the chart according to my estimations and survey done on the internet.

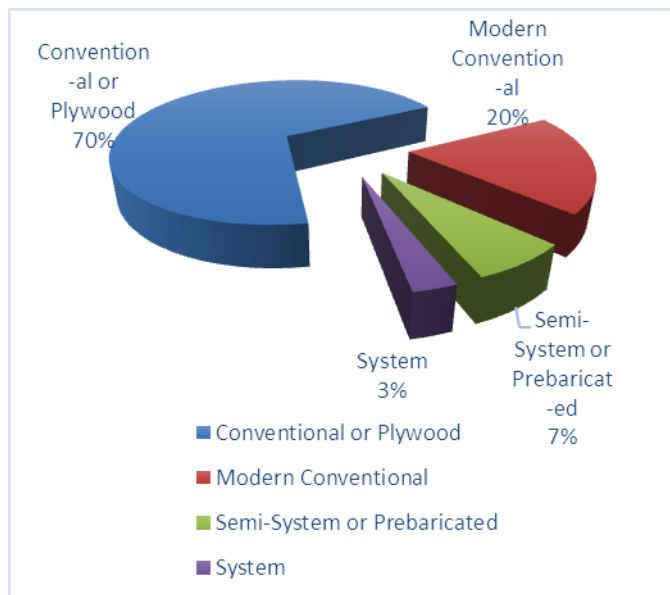


Fig: Building Cost Saving

### 6. CONCLUSION

From the Pie-chart drawn, we came to a conclusion that undoubtedly Indian construction has got its wings but on other hand we have to admit the fact that we are still lacking behind in the skilled worker in the field of any other construction method else than on the Plywood. So, it is important to use the other types of Shuttering in the very field of construction which will definitely give a good output along with the Plywood which will affect the constructional site in the parameter of Cost, Quality as well as Time positively.

Still we need to lessen out the misconception regarding the too high cost while using other types of Formworks, we need to focus on the Quality and the time taken by the project. According to me, one should try to use each type of Shuttering while constructing a site keeping in mind the usage and essentiality accordingly.

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