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“PLASTIC FORMWORK IN PLACE OF CONVENTIONAL FORMWORK”

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Abstract

Formwork is a sort of temporary construction provided for laying cast-in-situ concrete to required shape. Formwork is use for constructing various structural elements such as slab, beam, column, footing, etc. It plays an important role in construction works. The demand of formwork in construction fields is increased day- by- day. In construction industry, the use of conventional formwork that is timber, plywood, aluminium and steel has found some disadvantages during its use. The increase in amount of deforestation has occurred in recent few years which responsible for environmental imbalance to our ecosystem. For solving this problem an alternative to wood formwork as a preventive measure to stop deforestation, Substituting wood formwork with steel formwork in construction work, after some days it results in corrosion. Hence, for this purpose the new concept of 'PLASTIC FORMWORK', the new innovation in formwork industry. Plastic formwork is good solution for such a problem as it is reusable, recyclable and environment friendly alternative. It is water resistant hence it avoids leakage problem, bleeding etc. The special quality of plastic formwork is light weight, less time consuming, speedy construction as it takes less time for erection, dismantle and handling. This new innovation is mostly preferable for the projects where there is requirement of reducing completion period. It is use for monolithic in high rise building as it is easy for handling and cleaning & makes finishing of construction work easy. In this paper the main emphasis is that to introduce plastic formwork as better substitute in place of conventional formwork, advantages of plastic formwork over conventional formwork and gives brief idea about types of plastic formwork system.

KEYWORDS: Plastic Formwork, Conventional Formwork, Reusable, Recyclable, Construction Industry

1. INTRODUCTION

Formwork is the base of any civil engineering work. It is a vital element in concrete construction which holds and supports the wet concrete till it gains sufficient strength. The main objective of formwork system is quality safety and economy. It should be strong enough to withstand all types of dead and live loads such as self weight, weight of reinforcement, weight of wet concrete, loads due to workmen, construction equipments, other incidental loads and forces caused by placement of concrete, imposed upon it during and after casting of concrete structure. And therefore it plays a crucial role in construction operation. Conventional formwork involves use of timber,

plywood, aluminium and steel in construction work. Timber is most commonly used material for formwork. But today has found some disadvantages such as dry timber may absorbs water from wet concrete which results in reduction of the strength in concrete structure, it may create leakage problem and it has limited usage. Steel can also be used as the formwork material. It is very expensive but it can be used for more number of times than others. This type of formwork provides excellent finish to the concrete surface. For structures like bridge, dams, etc. steel formwork is so strong and safe. But it's cost very much higher, heavy in weight and requires lifting equipment for large structure formworks, in this corrosion will occur when there is frequent contact with water. The

selection of type of formwork mainly depends on requirements and type of particular project. Now-a-days, as the construction industry is rapidly growing hence there is a need of change in formwork system too. For this point of view plastic formwork is a new substitute over conventional system of formwork. Plastic is an another type of formwork material which is used for construction of various structural element such as slabs, columns, Rcc walls etc. It has many good qualities such as light in weight, durability, flexibility, reusable.

2. LITERATURE REVIEW

Imtiyaz Mohi U Din.et al[1] In this paper, an attempt is made to have a comparative study of established conventional formwork technology with Plastic formwork which are currently not used much in Indian construction industry. Plastic formwork systems have been used up-to some extent in recent times because of its advantages including flexibility, durability and cost-effectiveness. Due to its light weight ABS plastic formwork is easy in handling and easy in transportation, which decreases the labour work. Cost effectiveness and light weight have been the highest driving factor for the acceptance of plastic materials in Indian construction industry.

Elemuo Peter Onyekachukwu.et al [2] This paper is to review the advantages of plastic formwork over traditional and steel formwork. Plastic formwork can be easily installed because of its light weight, the accuracy is achieved. Plastic formwork is more economical. Thus use of plastic formwork system also solves the problem of deforestation around the globe and makes the environmental friendly.

Abhishek Balvir Patil .et al [3] In this paper, has been discussed plastic formwork system has been introduced and all the aspects of plastic formwork. In our country plastic formwork has been used on many construction projects and it has been proved to be economical. Plastic formwork has been widely used in Gulf countries, Europe, Asia as well as all other parts of world.. Due to its light weight ABS plastic formwork is easy in handling and transportation, which increases labour productivity.

Raju Prajapat[4] In the context of concrete construction, the falsework supports the shuttering moulds. The timber,steel, aluminium formwork system is used but some disadvantages are observed over plastic formwork. The construction of formwork takes time and involves the expenditure upto 20 to 25% of the cost of the structure or even more. This system gives more than 100 repetitions; hence running cost is low. The work gets a smooth finish with minor joint line which does not require plaster.

One can do putty and paint it. Hence it is cost effective. Hence it is very easy in installing, dismantling and transportation It replaces plywood's which consumes trees and M.S. which consumes iron ore from our planet earth.

3. PLASTIC FORMWORK SYSTEM

The system is made up of special grade of plastic that neither chemical reaction between material takes place nor placed materials adhered to it and consequently there will be no any patch on the surface of RCC elements. Water or freshly placed concrete leakages from different part of formwork is avoided because of the perfect fitness of various parts of this system. Added to that, it is most labour friendly system because its installation and dismantling is easy compare with other due to its light weight. The plastic formwork can be easily cleaned with water and as it brakes due to bad handling, low voltage hot air gun is used to seal it.

3.1 COMPARISON BETWEEN PLASTIC FORMWORK AND CONVENTIONAL FORMWORK

Items	Plastic formwork	Timber formwork	Steel formwork
Water resistant	Yes	No	No
Recycled	40%	No	No
Size	Any size can possible	Restricted	Restricted
Corrosion Resistant	Excellent	Bad	Bad
Deformation Condition	No	Yes	Yes
Weight	Light	Fairly Light	Heavy
Storage	Any Environment	Dry Environment	Dry Environment
Handling	Easy	Average	Difficult

3.2 TYPES OF PLASTIC FORMWORK SYSTEM

The types of plastic formwork system are as follows:

3.2.1 SISCON PLASTIC FORMWORK

It is commercially available type of plastic formwork which can be used to construct various structural elements such RCC walls, columns, slab, etc. The construction work and

overcome the scarcity of skilled workmen, SISCON has come up with an innovative solution in the form of plastic formwork.

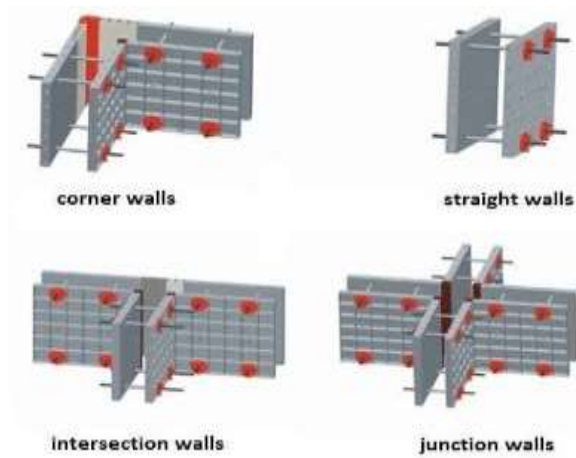


Fig.1 SISCON PLASTIC FORMWORK FOR RCC WALLS

It controls the cost by making construction very easy while delivering reliable quality. Siscon formwork has a plain surface hence surface of concrete is also plain. At any open place siscon formwork can be stored, it does not need a dry environment for storage.

3.2.2 NOVA PLASTIC FORMWORK

Nova Plastic Formwork is made of high-resistant plastic. Nova formwork is revolution in the area of shuttering, made from composite plastic material. The Nova panels are interlocked by using Nova plastic handles. The panels are interlocked orthogonally in different positions, creating a “star”-shaped formwork of various sizes



Fig.2 NOVA PLASTIC FORMWORK

Nova plastic has been used in construction like pile caps, foundations, shear walls, retaining walls, walls, beam, slab etc. Without any damage in salt and fresh water, Nova Formwork can be used. Nova Plastic Formwork is light-weighted, durable, temperature change resistance.

3.2.3 MOLADI PLASTIC FORMWORK

Moladi Plastic Formwork is patented injection moulded formwork system that has been developed to overcome much inefficiency, related with traditional timber and steel formwork. The Moladi Formwork is entirely boltless, freestanding and does not require struts or bracing to erect.



Fig.3 MOLADI PLASTIC FORMWORK

It is lightweight hence allows easy transportation and assembly of components becomes speedy. The components of formwork are fully interlocking and can be easily adjusted to any dimensional desired structure. The modular components are assembled to panels which are configured into a mould of the desired structure. The panels are joined together to form wall configurations of suitable length and height having wall cavity of 100 mm or 150 mm. Before the wall cavity being filled with mortar mix, the reinforcing of steel, window and door block outs and other fittings are positioned prior. A smooth off-shutter finish wall without any plastering, beam filling or chasing is developed. Moladi Formwork can be reused 50 times, yet highly suited for use in repetitive housing construction schemes. Once the pre-assembled formwork panels have been removed they can be re-erected on adjoining sites and can be used repeatedly.

4. ADVANTAGES OF PLASTIC FORMWORK OVER CONVENTIONAL FORMWORK

- **Light weight:** Plastic formwork is light in weight and hence it is easy for installation and transportation.
- **Reusable:** It can be use number of times.
- **Easy handling:** It is very easy to handle by single labour due to its light weight.
- **Superior finish:** It gives a good surface finish of the slabs, beams, columns, walls, etc.
- **Environmental friendly:** It reduces the deforestation which makes it environment friendly.
- **Water resistant:** It does not get affected by water.
- **Storage:** Special space is not required for storage.
- **Easy cleaning:** There is no need of using shuttering oil as cleaned with water.
- **Plaster cost saving:** Plastic formwork gives smooth finishing hence plastering is not necessary.
- **Labour cost saving:** There is no need of skilled labours instead of normal unskilled labours for installation work.
- **Safety:** Due to its light weight it prevents accidental condition during set up & dismantling and provide safe working condition.
- **Leakage proof:** No leakage occurs between joints, due to its good locking.
- **Time saving:** Due to its fast set up, it saves a lot of time & hence reduces the completion period of work.

5. DISADVANTAGES OF PLASTIC FORMWORK

1. Plastic is weak against the heat.
2. It does not take much load when compared to others.
3. It is not economical during its manufacturing.

6. CONCLUSION

The use of plastic formwork system is more advantageous than other formwork system. The increase in amount of deforestation has occurred in

recent few years which are responsible for environmental imbalance to our ecosystem. For solving this problem an alternative to timber formwork as a preventive measure to stop deforestation plastic formwork is used. Timber formwork has less accuracy and its installation and dismantling period is very high and thus results in time delay. The accuracy of steel formwork is easily achieved but due to its corrosive nature it gets erodes and because of its heavy weight it requires major transportation resulting in increase in labour productivity and delay in construction. Comparatively Plastic formwork is easy to handle and easy to transport and install because it is light weighted and durable.

The final work results in a smooth finish which does not requires plaster, one can do putty and paint also. Hence, it is cost effective. Thus it can conclude the plastic formwork technology gives more accurate results and good quality of construction in optimum cost and minimum time. Plastic formwork is highly corrosion resistance, eco-friendly and economical.

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