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SLIP FORMWORK

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***Abstract*— Slip forming is one of the most effective processes for constructing unconventional structures such as cooling towers, chimneys, and silos, as well as roadway and bridge construction. Formwork made using slips techniques used on a construction with a height of more than 16 meters and its unique design. Techniques for erection that are both quick and cost-effective. Slip forming takes into account. The fastest erection is 7.2 meters per day. procedure. They have a variety of components, and when they're finished, they're ready to use. It was elevated up and further by the hydraulic jack of curtain height concreting. It's possible to undertake some concreting. As a result, these methods are quick and efficient. Savings; cost-effective; and fewer workers are required.**

***Keywords*— Formwork, Timber, Concrete.**

I. INTRODUCTION

Concrete is poured and shaped into a temporary mould called formwork. Traditional formwork is made of wood, but it can also be made of steel, glass fibre reinforced polymers, and other materials. materials. The term "slip form" refers to a construction procedure in which concrete is poured into a mould. poured over the top of a constantly moving formwork As far as the concrete .When the concrete is poured, the formwork is elevated vertically at a rate that permits the concrete to settle. Before the concrete can be removed from the bottom formwork, it must harden. For projects with more than seven stories, such as skyscrapers, slip form is the most cost-effective option. Because it is the quickest form of vertical building, bridges and towers are used. horizontally reinforced concrete constructions, but it can also be employed for vertically reinforced concrete structures. Roadways are examples of structures. The concrete that will be used must be workable enough to be poured into the form and solidified by vibration, but also quick-setting enough to emerge from the form with strength. Concrete must be poured. To ensure that the forms are not being tampered with, it is regularly monitored for its setting rate. elevated too quickly. The formwork usually comprises three platforms: -

• The upper platform is used for storage and distribution.
• Middle platform: Located at the top, this is the major working platform.
• Lower platform: This allows for concrete finishing to be done.

The middle supporting platform must be rigid in order for all of the other components to work properly. Parts of the structure move at the same time. If the shuttering is slow, it can take a long time. The rate at which the data is collected is inconsistent.

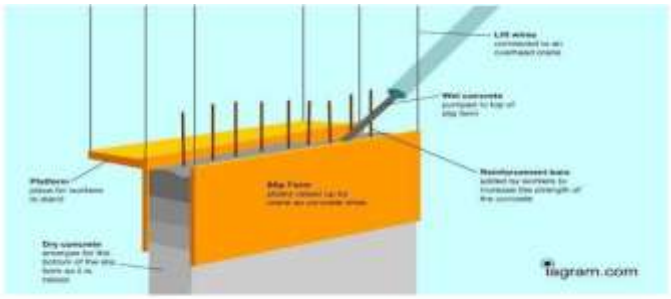

Fig 1 - Slip Formwork

SLIP FORMWORK HISTORY: In 1910, America discovered the slip forming technology for building silos, grain elevators, and cooling towers.

• In Skylon, the slip formwork process was used for the first time. The Niagara Falls Tower, which was constructed in 1965, is Located near Niagara Falls, Ontario.
• For the Sheraton Waikiki, another remarkable structure was built. In 1969, a hotel in Hawaii was built.
• In the 1990s, slip forming was also used for paving in the United Kingdom. includes the addition of slip resistance to highways, bicycle paths, and kerbs equipment for paving Furthermore, slip form paving was used. Airport aprons, taxiways, and runways are paved using this material.

Slip forming entails building a wall-shaped form at the structure's base that is approximately 1.0 to 1.2 metres high. A belt of forms, one for each surface, is used in this sort of formwork. Usually around 1.2m (4ft) broad and built of wood or steel. These surface shapes are found on both the inside and outside of a wall. Chimneys, cooling towers, and other structures The shape is deposited as the concrete is poured is slowly and steadily lifted using jack screws, hydraulic jacks, or a combination of the two Pneumatic jacks are a type of pneumatic jack. The taper of the shape can be varied as the

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form is lifted. As needed, adjust the construction and wall thickness. The rate of change in the form is raised is between 5 to 30 cm/hour as per requirements. This around the clock operation results in a construction rate between 1.2 to 7.2 m/day, which cannot be attained by any other construction method.

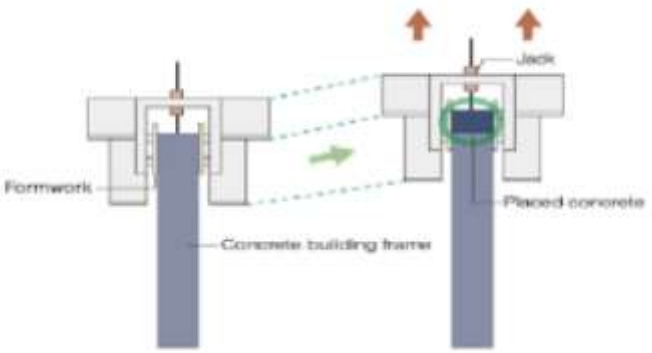

Fig 3 :- Constructing Wall Shaped Slip Formwork

II. PROPOSED ALGORITHM

Page 14: Slip Formwork Components
Some of the Important Slip Form-work Components are listed below.

- Vertical shapes or sheathing
- The country of Wales
- The yokes
- The Jacks
- Rods jacks

1. Vertical Forms or Sheathing:
Vertical forms, also known as sheathing forms, are built of wood. metal, plywood, glass- fiber reinforced plastic, or a mix of these materials of these resources When employed individually, each substance has its own unique qualities.

2. Wales:
job is to keep the vertical shape in place till it hardens.
As a result, it is regarded as a crucial component of vertical slip. It can also be relied upon to support various platforms and scaffolding. can transfer yoke lifting force to other components and elements of shape.

3. Yokes:
Yokes are used to connect and support wales with legs at regular intervals. It's a part of the vertical slip formwork system. Yokes can transmit lifting forces from the jacks that are employed. During the formwork dismantling in Wales. It may also be able to withstand the plastic concrete lateral force within the form.

4. Jacks:
Jacks are attached to a jack rod, which is secured to the yokes beam. It functions as a slip lifter, providing the necessary force to lift the slip.

5. Jack Rods:
Components discussed above are climbed using Jacks. Jacks are themselves mounted on Jack Rods.

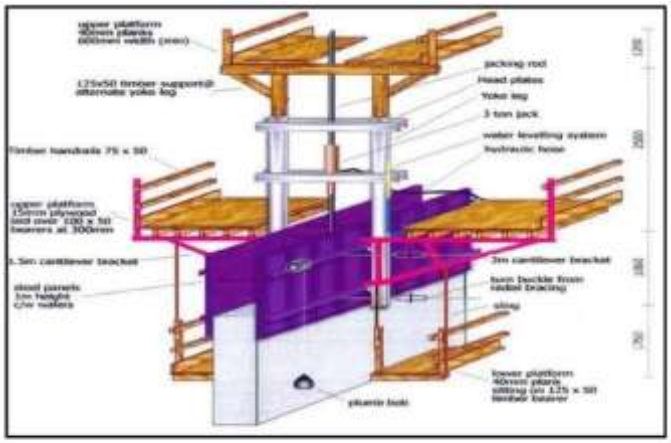

Fig 4 :- Components of Slip Formwork

• Benefits:
1. Provides a joint-free structure.
2. A reduction in shuttering material waste, both initially and over time.
3. Scaffolding isn't necessary.
4. Concreting is completed in a very short period of time. It's at least four times faster than before.
5. Improved concrete finishing.
6. Labor costs are lower.
7. Using a slip form eliminates the need for a crane, reducing crane usage.
8. There is no need for plastering.
9. Accuracy entails more than just standard formwork. Strength encompasses a wide range of abilities. Formwork that is consistent.
10. Keep all of the formwork materials. Above a particular point, it's cost-effective to build a structure.

• Negative aspects:
1. More time is necessary for the assembly of various components.
2. Material storage on the job site is problematic.
3. It is necessary to have good coordination and site organisation.
4. A large amount of equipment (for example, generators, lighting systems, and so forth) are required.
5. Requirements of the labour force

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III. EXPERIMENT AND RESULT

1. Construction of regular core high-rise structures:
The slipform construction technique will be utilised to construct high-rise buildings by vertically extruding reinforced concrete. piece of concrete Core structures and buildings with regular shapes are simple to construct. This procedure is used to create.

2. Chimney Construction Using the Slipform Technique:
The slipform technique, which is used to build enormous chimneys, Tapered slipform refers to cooling towers and piers. This method is effective. used to build vertical constructions with different wall thicknesses, or sizes or shapes

3. Steel Tank Construction:-
The slipform construction method aids in the construction of enormous volumes. cost-effectively install cisterns in enterprises and factories

4. Water Tower Construction:-
The slipform technique aids in the construction of water tank walls. evenly and of higher quality Tanks

SPECIFIC REQUREMENT OF CONCRETE:-
1. The concrete is semi-plastic at the time of deshuttering since it leaves the forms at a young age (4 to 8 hours) and requires a wet surface to get a good surface finish.
2. The concrete should be strong enough to sustain the pressure after 4 to 8 hours the horizontal forces and the vertical load of the concrete column above Wind and other loading on slip form shuttering causes this.
3. After the shuttering has been completed and the design strength has been determined, the time limit is 28 days.
4. The concrete should be workable enough to allow for installation. The form and compaction are simple to achieve.
5. The aggregates used in the mix should not be abrasive.
Having enough tiny particles and a

IV.CONCLUSION

The advent of the slip forming technique resulted in significant cost savings in terms of labour and interest due to the technique's faster completion of work. There are no drawbacks to this method. against quality control and structural homogeneity. The cost savings will not show as a result of the slide. The technique of forming has been employed this approach has a wide range of applications. Enhancements However, it can be modified to fit a tall framed structure. For the purpose of slipping forming work using conventional concrete of M20 and M25, but rarely M30 For the most part, Portland cement is utilised in the construction of concrete. Cement with a quick set time During the winter, particular instances are worked on, and slip form progress is picked. After When the slip form components are dismantled, they can be used for spans of more than one metre.

Thus slip form system involves:
• EXCELLENT CONSTRUCTION.
• COST-EFFECTIVE CONSTRUCTION.
• BUILDING AT A FASTER RATE

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