Slipform Technique of concrete pouring

Slipform Construction Technique refers to casting concrete in dynamic or moving formwork in contrast to the most commonly used formwork that needs dismantling & re-installing at frequent intervals. This system of construction ensures that the entire formwork system keeps moving upwards steadily even as the concreting progresses. This method is quite suitable for large diameter silos, chimneys or similar structures. For small-scale work of similar nature, however, jumpform system may have an edge over slipform technique both from time as well as economic point of views. Practically, silos, chimneys etc. with base diameters of more than 60 – 70m are ripe for adoption of this method of casting. Apart from ensuring continuous, monolithic pour of concrete, it also renders jointless, smooth outer appearance.

Slipform technique of concreting necessitates round the clock pouring including during weekends. Nevertheless, for a tall structure which tapers substantially as it's height increases, breaks in concreting may be needed in order to facilitate reduction of forms which becomes necessary as the diameter decreases considerably at greater heights. Such breaks are carefully pre-planned and are subjected at suitable elevations depending on the quantum of taper and the height of the structure.

Slipform technique demands careful preplanning, especially concerning production, placing & curing of concrete; control of setting time of concrete; control on lifting, changing of stack parameters like diameter, wall thickness, inclination of stack etc.; selection of materials for slipform; operation & maintenance of the slipform equipment and so on.

Some of the salient components of a typical slipform equipment are:

* Several units of steel forms of suitable size. The number of forms is a function of the bottom diameter of the structure. So, if the length of each form is, say 2.5m, then the total number of forms required comes to bottom circumference divided by 2.5m. Height of forms can normally be 1m. Dimensions may vary also, but forms with abovementioned dimensions are quite suitable for a tall structure.

* An inside ring that holds together the whole slipform assembly. After arriving at the number of the slipform units, the inside rimg is fabricated accordingly.

* Hydraulic jacks of suitable diameter. 6 ton jacks can be quite workable for a reasonably tall & big structure.

* Trusses to bear the entire load of the slipform structure. Several steel trusses are required, the number of which depends on the size of the slipform structure or the design of the trusses etc. Six medium sized trusses could be good enough for a reasonably big chimney, tower or a silo.

* A concrete lifting arrangement on top of the platform supported by the trusses, normally provided at the centre of the structure.

* One winch just outside the structure to lift reinforcement steel.

* The slipform assembly may have three decks for different purposes. The top deck is used for concrete pouring. Intermediate one is for fixing re-bars. It can also be used for checking various dimensions of the structure at required elevations in order to maintain correct profile of the same. The lowermost deck is normally used for finishing work.

* A plumb arrangment in order to keep checking the verticality of the structure. The frictional forces between the forms & concrete plays bit of a spoilsport due to which the whole assembly may tend to loose verticality that is required to be maintained. Hence, the same needs to be checked & ascertained using a plumb or similar aid at regular intervals (say, half a meter) of heights and necessary corrections are done promptly using the jacks. Normally, water levels are attached to the yokes to ensure uniform lifting of the entire slipform unit.

* Suitable lifting arrangement is provided usually just outside the structure for smooth movement of workers, engineers etc.

* Proper curing facility: It can be ensured by ring shaped sprinkler pipes along the lowermost deck.

* Efficient communication system between top of the structure & ground staff is vital. A good telephone system serves the purpose well.

* An excellent safety arrangement is a must for these kinds of work. Apart from the usual helmets, safety belts & shoes etc., a strong safety net or a similar aid must be provided around the circumference of the lowermost deck.

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