Post-Tensioning Slab

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Abstract— According to nowadays construction procedures of high rise buildings Post tension slabs and Flat slabs are both important cases of structure. PT slabs are able to carry almost all amount of dead load due to its tensioned tendons, which helps to carry out live load acting on slab and makes it's safer than conventional slabs. On the other hand Flat slabs with drop panels are having advantages like reduced building height, ease of formwork and faster construction procedure. Combination of Post-tensioned slab and Flat slab will be much more effective than usual slabs. These types of slabs also have advantages over conventional as per recent projects like high rise structures and long span frames as those are safe as per designing and give an aesthetic view for commercial or residential projects.

Keywords: Tension Slab, flat slab, compressive strength

I. Introduction

Post-tensioned construction has for many years occupied a very important position, especially in the construction of bridges and storage tanks. The reason for this lies in its decisive technical and economical. Steel tendons are stressed after the concrete has been placed and gained sufficient strength at the construction sites sufficient. Stress into a concrete during the construction process in order to counteract the external loads applied when the structure is put into strength.

II. Literature Review

The buildings in which slab is directly supported by columns and drop panels have been considered in many buildings. Also, it has the benefit of being a reduction in the floor to floor height. Thin beams placed at regular intervals in perpendicular directions, thick slab used in case of the conventional slab. Considering the economic point of view, the PT flat slab is the most economical among all systems. If we compare the PT flat slab and conventional flat slab then the amount of reinforced concrete is around 15% greater and cost will be 30% greater than the post-tensioned flat slab. From both prospective PT floor systems flat slab is much better than the PT slab with reinforced concrete beams in case of economy point of view. The required reinforcement in case of a post-tensioned slab with reinforced concrete beams is more due to the provision of the beam which carries more load and need more reinforcement. Considering quantity of concrete required for a single floor is also more in case of a post-tensioned slab with reinforced concrete beams while it is least for the post-tensioned flat slab system. Considering construction period and formwork PT flat slab is advantageous than conventional slab Because In the case of the post-tensioned slab with reinforced concrete beams, the formwork of slab can be removed earlier but the formwork for the reinforced concrete beams cannot be removed earlier. In the case of post-tensioned slab some factored amount of dead load has been carried out and that is between 0.6 to 0.8.

III. Comparative Study between Conventional and PT Flat Slab

The comparative study of conventional and post-tensioned flat slab have been described. Net weight of Post-tensioned Flat slab is quite low as compared to conventional slab structure. PT Flat slab structure is more economical than that of conventional slab structure as the cost of PT flat slab type structure is less than conventional slab type structures. Also Post- tension Flat slab structure leads to an aesthetic view which gives more floor height and it allows the architectural freedom of form works as compared to flat slabs.

A. Post-Tensioned Slab Benefits

- For span having length above 6 to 6.7 meters, PT slabs are often more cost effective. Concrete quantity reductions up to one fourth i.e. 25%, and typical rebar up to 65%.
- In this case shoring and formwork can be removed as soon as the tendons are stressed or tensioned. This reduces the construction period by getting faster access to the lower floor.
- Detailed construction of post-tensioned slab results less permeable and less cracking.
- Span length up to 9 meters are commonly used for 2-way PT slab systems which allows more spacing of flexible tenant and better sightlines.
- Building net dead load and lateral-force-resistance structure which includes shear walls, columns and foundations are less because of thinner and lighter Post-tensioned slabs.

IV. Conclusion

Comparing conventional slab to post-tensioned flat slab, we getting results as PT flat slab is much more beneficial over beam column type conventional slab structures. It's economical, ease in construction, better for long span slabs, gives an aesthetic view, slab thickness maintained, more resistant towards live load, more seismic resistant and durable than conventional.

As per nowadays projects of high rise commercial or residential buildings, it's necessary to construct as per safety and as per workability of structure. The post-tensioned flat slab has more overall benefits compared to other types of slabs.

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