



Analysis and Execution of R.C.C. Structure using Post-Tensioning Slab

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Introduction

A construction method in which the steel is in tension and the concrete is in compression when concrete is subjected to pressure by lateral pressure. If pressure is the force that breaks something, then pressure causes something to break. As a building material, concrete compresses very well. Steel can be very strong in tension. Mostly post-tensioning is used for tall structures, commercial buildings Parking lots, bridge decks and decks. One of the main causes of post tension is weight bending and cracking issues. Up to approx. 5 kN/m² live load for ranges of 7 to 12 m, flat or single-sided shallow beam slabs, double-sided beam slabs or waffle slabs without heads or slopes. Therefore, this article attempts to compare feasibility and cost savings. Post-stretch floor system with RC floor system. Comparison is possible only in terms of stone and metal. that uses alkali-resistant (AR) glass filaments along with fine sand, cement, polymer (typically an acrylic polymer), water, and other admixtures.

1.1 Properties

Post-tension slabs use high-strength tensile steel wire to compress the slab and hold most of the concrete in compression. This provides a highly efficient design compared to reinforced concrete, reduces material usage and reduces commercial permitting.

1.2 Factors Effecting Properties of Post-tensioning

- Post-stressing high-load structures
- Sliding joint required
- Additional fire protection
- Waterproof
- Concrete breakage and reinforcement
- Section drilling holes in stretch floor.

1.3 How the Post-Tensioning slab works.

Everyone knows that the compressive strength of concrete and the tensile strength of rebar are high, and that the effect increases exponentially when they are combined to withstand a load. When a structure is subjected to heavy loads, the concrete stretches, causing cracks and eventually deforming. In order to solve this problem, when placing concrete, install tension bars, and after placing concrete, apply tension with general reinforcing bars. When the rod is stretched after tension, the rock is compressed. That is, when a rock is compressed, the compressive strength of the rock increases, and when pulled, the tensile strength increases. As a result, the overall strength of the stone increases.

1.4 Application of PT Slab

This way you can save a lot of metal and stone.

- Less deflection compared to stronger concrete.
- This method exhibits good cracking behaviour and thus protects the steel from corrosion to some degree. Compared to conventional RC plates
- Availability is almost unchanged even if an overload occurs after the overload is removed. Explosion is temporarily reduced.
- High fatigue strength due to small pres-tressing stress range Steel under alternating loads.

- Stripping time is less than 10 days thanks to Posttension, resulting in a higher paper return rate and faster floor-to-floor time.
- Post-tensioning process increases the weight of this building by times compared to a reinforced concrete building with the same floors.
- This makes the base of the structure lower, which is better when seismically built for the area. The work/shop complex can easily be done with the PT.
- With PT, you can build longer supports that are not as sturdy and the soil is thin. Pre-tensioning is an ideal method for creating concrete expansion structures such as parking lots, courts, roofs, bridges and special structures.

1.5 Advantages and Disadvantages

The main advantages of post-stressed slabs over traditional reinforced slabs. Monolithic concrete slabs are available in the following formats:

- Longer Span.
- Total Construction Cost.
- Reduced Slab Height.
- No Slab Deflection.
- Waterproof Plate.
- Column And Foundation Design.

1.6 Review of literature

Dr. Sudhir S. Bhaduriya et al. (2017) reviewed a cost comparison of two types of bridge formwork. Reinforced Concrete Beams (SSB) and Pre-stressed Concrete Beams (PSC). For someone comparison, the analysis and design process was repeated for different spans (30m, 35m and 45m). Detailed cost estimates are provided to demonstrate the quality of the bridge; Work Complete. It was concluded that the PSC girder bridge is more economical than the reinforced concrete girder bridge with a span of 25 m or more.

Design work by Mary Beth D., Haste et al. (2012) Road bridges using precast pre-stressed beams for easy support. Target The purpose of this study is to evaluate basic application to pre-stress. Provide pre-stressing recommendations for girder bridges and Texas leg. Connection details of Precast Pre-stressed Concrete Beam Bridge investigated. The various methods used in the past to lengthen and extend the span of bridges made of pre-stressed concrete using slab beams are considered. Mohammad Omar Farooq Murad et al. (2016) investigated coupled long-span box beams. Pre-stressed inverse tee beams using the connection method. Full 3D analysis the post-stressed box section and the pre-stressed inverted tee section are built with vertical loads only in mind.

In his research, Dr. Manmohan R. Kalgal explains that economic development requires additional stress. The main advantage of pre-tensioning is that it is economical and saves a lot of concrete and steel. Post-tension panels offer larger openings and more flexibility. The construction time is shortened due to the progress of the mold.

1.7 Aims and objectives

Aim :- To Analysis & Execution of R.C.C. Structure using Post-Tensioning Slab.

Objectives :- • To Analysis R.C.C structure on Etabs.

- To check the load combinations
- To Execute the R.C.C. structure on site as per Indian Standard method.

2. Methodology

2.1 Material –

Concrete floor after tension. All materials needed for rebar and concrete, strong magnets and special post-tensioning equipment is used. The post-tensioning support of the material, concrete is the same in all respects. Reinforced concrete type. high strength steel used as a support rod The tension is 460A / mm², and the flexibility standard is 200aN / mm². The toxicity rate is 0.3 and the coefficient of thermal expansion is 12.5 x 10⁻⁶ degrees Celsius. The strength of high-strength steel is affected by temperature, from 100% at 300 degrees Celsius to only 5% at 800 degrees Celsius. Manufacturing, commitment and optimization are well known and is not covered here. Only features that are important for posttensioning are taken into account. Ordinary thick concrete has a density of 2400 kg / m³, with post-tensioning method. However, the light stone has some advantages in nature. Made in both separate

sessions. The properties of the two types of stone are very different and it is not practical to use both. Near Fluctuations and differences in elasticity, shrinkage, and creep coefficients can be problematic.

2.2 Grade of concrete

We are using M40 grade of concrete for the whole project Design mix.

Design mix

We are performing M40 design mix from RMC plant. Design mix content are mentioned below

Table 3.1 DESIGN MIX OF M40

INGREDIENTS	UNITS		SSD BATCH WEIGHT per M3	CORRECTION	CORRECTED BATCH	TRIAL BATCH
CEMENT OPC	Kg		360		360	9.720
FLYASH	Kg		110		160	4.320
MICROSILICA	Kg		0		0	0.000
M.Sand	Kg		740	24.050	716	19.331
COARSE (10MM)	1 Kg		444	6.216	438	11.820
COARSE (20MM)	2 Kg		635	9.525	625.5	16.888
WATER	Kg		150	39.791	189.791	5.124
ADMIX -1	Kg		4.7		4.7	0.127
Density			2444			

4. Methodology

All the operations performed during the construction of the building are shown in the following figure

flowchart:

- Architectural Planning
- ETABS Modeling
- Multiple Load Assignment
- Analysis of Structures
- Model Design

4.1 Design

The design criteria used for PT floors are IS 456:200, Plain Concrete and IS Reinforced Concrete. 1343:2012 Prestressed concrete. SP 34: 7987 This application guide should include: Detailed information, including information about fitting work and storage, Manufacturing and assembly, welding and laying of fittings. Meets Indian Standard IS 456:2000 . PT floors are manufactured according to IS 456:200 plain concrete and reinforced concrete IS. 1343: 2012 Prestressed Concrete. SP 34: 7987 This application guide should include: Detailed information, including information about fitting work and storage, Manufacturing and assembly, welding and laying of fittings. Meets Indian Standard IS 456:2000 . Below are the results obtained with CSI Detail software for post-tension plate detailing. To do this, the analysis model created by CSI ETABS must be imported into CSI Detail. software.

Table 4.1 List of materials for 8th story using CSI detail software

Sr. No	ITEMS	QUANTITIES	UNITS
1	Slab area, A	1,438.97 S	SQ. M
2	Concrete volume, V	313.535	CU. M
3	Average thickness, T=V/A	218	MM
4	Rebars per area, W/A	3.084	Kg/SQ. M
5	Rebars ratio, W/V	14.1541	Kg/CU. M

5. Conclusion

Designers now prefer buildings with taller floors. High in the job market, and in need of businesses uninhabited free space. Posttension is a good extension method. For slabs over 8 m, post-tensioning is an effective and economical method. Muscle length has a positive impact on the overall cost of a post-stress pre-stress plate. Others affect the overall cost of the slab to some extent.

For this reason, it's always a good idea to get an idea of your total cost from a tension expert. An office that also accepts contract workers after stretching. Generally, floor systems, suspended ceiling floor systems and the beam system of the floor are used to increase floors to reduce flooring costs. total height of two consecutive I have a few questions about the floor , what the floor is for, what building is under construction, and more. Sensing determines the floor and the total height of the two floors. floor. In high-rise construction, determine the type of floor system when: Attendance is based on the feasibility of the project and the time required to complete the following: to give.

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