JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

# Design of Prestress Concrete Post Tensioned Slab

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**Abstract:** Post-tensioned (PT) flat slabs are a popular building technology in multi-story structures across the world. This is due to time savings from early formwork removal, as well as total cost savings when compared to typical reinforced concrete flat slabs. Approximate approaches offered by several codes of practice can be used to design PT slabs, but only for slabs with regular column arrangement. However, irregular structures with complicated geometries require various analytical methodologies, such as the finite element method (FEM). Several commercial programmers are used to analyze and create the PT flat slabs, and the results are not always consistent. In the design, several prestressing procedures are applied reputation system. Wiring Selection and Stress Element Construction for Flat Slab Systems It is determined by the designer's vision and experience. Post design was used in this investigation. A stretched flat slab was investigated. Finite element programs are used to create PT slab. The slab was examined, and the effects of various load behaviors were investigated. Calculation table of recommended tension ratios for various spans and loads The ratios of span to depth were displayed. Finally, the economic advantages of mail it is stretched over an existing reinforced concrete slab.

***Keywords:*** Reinforced concrete, Finite element method, Stress element construction, Stretched flat slab, Load behaviors, Tension Ratio, Span-to-depth ratios, Code of practice etc.

## Introduction

### 1.1 General

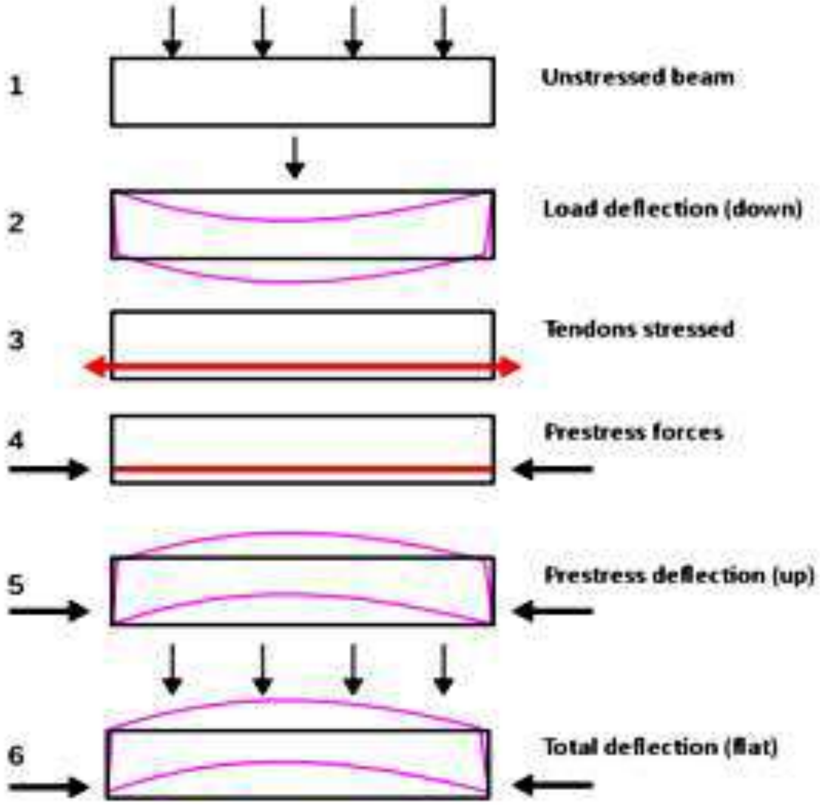
A post tension slab is a combination of regular slab reinforcement and additional projecting high-strength steel tendons that are stressed after the concrete has set. This hybridization helps to create a considerably thinner slab with a larger span and no column-free spaces.

### 1.2 Purpose

Prestressed concrete is utilized in a variety of construction and civil projects where its better performance allows for longer spans, decreased structural thicknesses, and material savings when compared to ordinary reinforced concrete. Applications: Typical uses include high-rise buildings, residential slabs, foundation systems, bridge and dam structures, silos and tanks, industrial pavements, and nuclear containment structures. Thus, this study outlines the PT Slab building approach.

### 1.3 Prestressed concrete structures

It is a kind of concrete that is used in building. While it is practically "prestressed" Produced in such a way that it strengthens against tensile pressures that may occur throughout service. High tension causes this compression. Alternatively, it is done next to concrete in order to boost the performance of the concrete service. A tendon can be made up of a single wire or many wires. Steel, carbon fiber, or aramid fiber are all options. The core of prestressed concrete is that after initial compression, the finished product has high tension properties. This increases the bearing capacity of the structure and facilitates maintenance. In many cases, it outperforms ordinary reinforced concrete. In prestress Concrete elements, internal stress due to impact to an appropriate degree.




### 1.4 History

Prestressed concrete was created in the late nineteenth century for prestressing as well as post stressing after the concrete was laid. In the United States, the first post-tension slabs were built in 1955 employing infinite electrostatic tension. Several post-stressed slabs were conceived and developed in the years that followed. Constructed in combination with the lifting plate process. Through theoretical study and tests on post-tension plates, efforts have been made to develop in-depth understanding. Too far, more than 50 million m3 of slabs have been post-tensioned in the United States alone.

### 1.5 Scope

The proposal given in the scope of this statement is how to create PT slabs to the required levels. Prestressing tendons are laid and placed in this scope prestressing slab for slabs.

### 1.6 Closure

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## Objectives

- To minimizes material usages and decreasing the economic span range without compromising quality of load carrying and distributing ability.
- To achieve the formation of a much thinner slab with a longer span devoid of any column free spaces.

## Literature review:

| Sr N0 | Authors | Years | Finding |
|---|---|---|---|
| 1 | Sang-Hyun Kim, Sung Yong Park, Sung Tae Kim and Se-Jin Jeo | 2022 | Using the produced Smart Strands, the fluctuation in PF distribution during tensioning and anchoring was investigated. Short-term prestress losses in the sequence of friction loss, anchorage seating loss, and elastic shortening loss influenced these PF distributions. |
| 2 | Ruilin You , Jijun Wang , Na Ning , Meng Wang | 2022 | Manufacturing quality assurance.<br>Use adaptation to environmental conditions.<br>Precast concrete sleeper structural design guarantee.<br>Monitor status advancement |
| 3 | Henrk Becks, Josef Hegger, Martin Classen**.** | 2022 | Because the strain profile is greatly impacted by local influences when measuring strain growth over fatigue life in inhomogeneous materials such as concrete, typical SG might lead to a misleading assessment.<br>The designed externally prestressed bending test may be used to investigate the process of compressive fatigue degradation of structural concrete components. |

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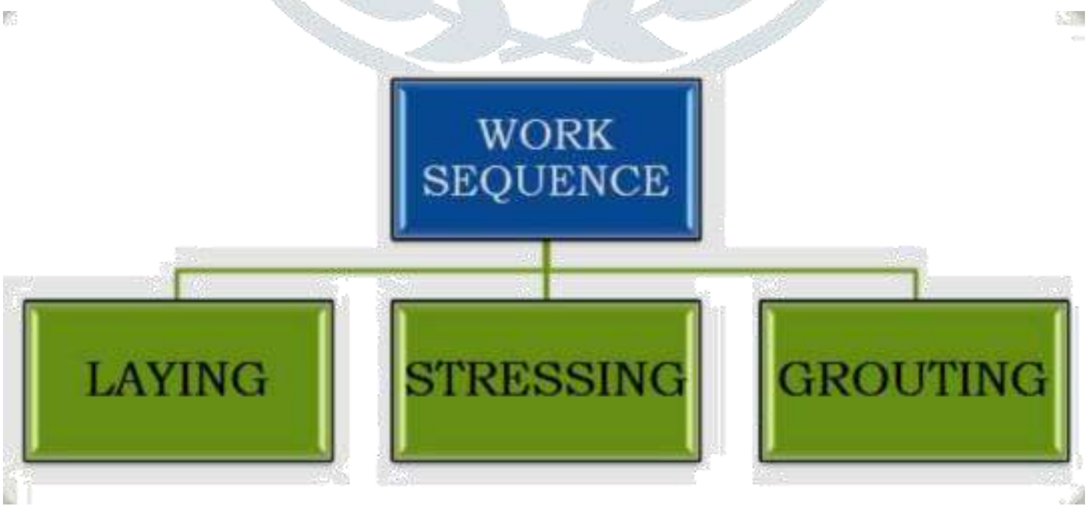
## Methodology:

### 1.1 General

The slabs must be post-tensioned in accordance with:

The post-tensioning bonded flat slab system will be made up of 12.7mm (0.5) diameter high tensile strands contained in an 80mm x 20mm flat GI duct. Each strand is wedged and carefully pressed with a monostands jack. The pre-stressing force is transferred to the concrete by a flat
anchoring. The static depth of the slab is more efficiently utilized when a flat duck is used for the same number of strands as when a circular duct is used.

### 1.2 Work Sequence




➢ **LAYING**

- Formwork completion per shop drawing.
- Bottom reinforcement completed with adequate bar diameter and uniform spacing.
- Supporting bars should be used to secure the anchorage to the end form work.
- Laying and fastening the GI duct to the end anchoring with the help of a vent coupler, and wrapping it with OPP tape to prevent extraneous particles from entering.
- De-coiling the HT strand and cutting the strand to the necessary tendon size.
- Putting the strands in the duct.

- Bursting reinforcement should be secured in place at the end anchoring.
- The profile chair should be attached to the tendon according to the shop design.
- Grout hose installation in both the live and dead ends, as well as the intermediate vent.

➢ **STRESSING**

- Concrete should have a minimum strength of 28N/mm2.
- A strip should be formed during casting.
- The wedge plate and wedges have been fastened.
- To reduce slack, 25% of the original load is utilised.
- Mark each thread with the marker.
- To raise the multi jack, a chain pulley should be utilised for numerous tendons.
- All strands must be threaded through the jack guide pipe.
- Record the strand elongation in 10 Mpa increments and let go of the jack when it reaches the desired weight.

➢ **GROUTING**

- The mix is made using a W/C ratio of 0.4 - 0.45 depending on the site circumstances and a 0.2% (Weight of the cement) addition.
- Fill the tendon inlet hose with grout.
- Close the outlet hose once the grout has run out.
- Check to ensure that the grout pushed out is of the same consistency as the grout put in.
- Secure the inflow pipe after the necessary pressure (3-5 bars) is obtained.

### 1.3 Strands

It is advisable to use two sizes of seven-wire stress-relieved strand.

| | |
|---|---|
| Nominal diameter | 12.7 mm (0.5)/ 15.2mm (0.6) |
| Nominal area | 98.7mm2 / 140mm2 |
| Nominal weight | 0.775 kg/m/ 1.102kg/mm2 |
| Min. Ultimate strength | 1860 N/mm2/1770N/mm2 |
| Modules of elasticity | 195 kN/mm2 |
| Min Breaking load | 183.7 KN/260.7KN |
| 0.2% Proof Load | Min 165.3 |
| Elongation (%) | Min 3.5% |

### 1.4 CLEANING

Tendons must be free of loose rust, oil, grease, tar, paint, dirt, and any other potentially hazardous substances.
Wipe the strand with a towel to remove any grease or dust before installing it.
1. If any oil trances are found on the steel to avoid corrosion, they must be removed before to the grouting operation.
2. To clean and wet the surfaces of the duct walls, clean portable water is flushed into the ducts.
3. Empty the water into the lowest vent pipe.
4. Before injecting grout, keep all outlet points, including vent apertures, open.
5. Before beginning the grouting procedure, remove all air from the pump and hose.

### 1.5 STRAIGHTENING

High tensile steel strand must be supplied in coils of sufficient diameter to allow tendon to retain their physical properties. The wire or strands must straighten themselves when uncoiled. Tendons of any kind are not authorized to be used if they are damaged, fractured, or bent.
The packaging of the pre-stressing strand must be promptly removed before designating the cable for duct installation. To facilitate strand uncoiling without damaging the steel, an appropriate foundation must be provided. Precautions must be taken to prevent coming into touch with the ground.

### 1.6 SHEATHING

It is necessary to employ spiral-corrugated GI ducts. Unless otherwise specified, galvanized steel strips of grade D according to IS 513 shall be used. The thickness of the sheathing must be specified on the design but must be less than 0.3 mm.

To minimize site storage time, the GI ducts must be built at the project site using appropriate machinery or in the factory and delivered to site in line with the approved programming schedule. To avoid cement slurry penetration during concreting, sheathing duct couplings must be sealed with adhesive sealing tape.

### 1.7 Anchorage

Oil or grease for the anchor heads' wedges and wedge holes prevents corrosion of the gripping and anchoring mechanism. Oil, grease, and other corrosion inhibitors are not aggressive or deteriorating in any way. Light rust is permitted on the other anchoring components.

Post-tensioning methods for bonded tendons include the following anchorages:

S5 - 4 & S5 - 5) & S6 -5 anchorage stress Anchorage has reached a stalemate.

The anchoring materials must be tested and certified by the system provider. Damaged anchors should not be used. Steel components must always be kept corrosion-free. Threaded components must be lubricated, and tapped holes must be protected with suitable plugs until they are used. Debris and loose rust must be maintained away from the anchoring components.

All bearing surfaces of the anchors must be cleaned prior to concerting and tensioning. Anchorages must be appropriately positioned and maintained during concreting such that the duct's centerline passes axially through the anchoring assembly. Anchorages must be set back from the concrete surface by at least 100 mm or as specified in the building plans, whichever is larger.

Untensioned steel reinforcing and anchoring shall be in line with the specifics of the pre-stressing system and as indicated on the design.

### 1.8 Storage and Transportation of pre-stressing Materials

All stressing materials must be bought from authorized manufacturers on the approved vendor list.

All pre-stressing steel, sheathing, anchorages, and couplers must be protected throughout shipping, handling, and storage. The following procedures must be followed:

- `To handle high tensile strand in coil form, crane wire slings must be employed.
- Sheathing ducts are flexible and should be handled carefully to avoid damage or distortion caused by incorrect handling.
- Sheathing ducts and anchorages, for example, must be stored in dry and sheltered places. They should be stored at least 100 mm above ground level to avoid rusting.
- Jacks, pumps, and hoses must all be protected.
- Over raised platforms more than 300 mm in height, high tensile strand should be pursued and covered.
- To avoid catastrophes, use adequate measures when uncoiling the HT strand coil, and cut strands to the desired lengths with an abrasive cutting wheel mounted on a grinder.
- We do not connect the strands since we cut them to the length given in the image on-site.

➢ **Placing of Post-Tensioning Material –**

The overall work sequence should be as follows:

a. After the bottom shuttering is complete, place the bottom layer of rebar in the slabs and beams.

b. Tendon post-tensioning to alter profiles.

c. In the slabs and beams, install the top layer of rebar.

Note; Open connections should be utilised for edge beams where tendons are fixed. After the tendons are put, top longitudinal rebar and closing links will be attached.

➢ **Placement Procedure of tendons –**

Tendons are frequently constructed on-site. The procedures are as follows.

- For straining anchorages to edge formwork or creating joint formwork, use block-out placement and fastening.
- Cut a hole in the edge formwork for each anchoring to permit protruding strands.
- Place the tendons according to the tendon arrangement.
- Production of dead-end anchorages.
- Lay tendons to exact profiles using support bars and chairs.

➢ **Measures to maintain design profiles of tendon during laying and concreting –**

The procedure for attaching and keeping the steel in the formwork mould should be such that it does not shift during the placing or compaction of the concrete or during steel tensioning. The fittings used to portion the steel must be of such a design that friction is not more than that anticipated.

### 1.9 Arrangement of Tendons

All prestressing steel must be put carefully and exactly in the locations specified in the design documents. The maximum allowable tolerance in the position of the prestressing tendon is + 5 mm. Any curves or bends needed by the designer in the prestressing tendon should be gradual, and the prestressing tendons shall not be pushed around severe bends exceeding 1 in 6 in plan and elevation, or be created in any manner likely to cause undesired secondary stresses. (In accordance with IS1343:2012)

IMPORTANT

- The formwork level must be used for all tendon profiles.
- Tie bars and form work should never be utilised to cause duct damage.
- Avoid walking on any ductwork that has been installed.
- Visually verify the axis of the ducts and the fastening at the supports before pouring concrete.
- Repair any damage using tape.
- Pour the concrete with caution to prevent vibrators from harming the ducts and profile.
- Tolerance of the tendon profile is advised as follows: If the aforementioned tolerance for the slab tendon is exceeded, the design engineer should be informed. Formwork is required for all tendon profiles.

➢ **Measures to prevent tendons from corroding:**

This system's prestressing steel is enclosed in corrugated HDPE duct. After the tendon has been stretched, cementation grout is placed in the duct. It creates an alkaline environment that prevents prestressing steel against corrosion. There will be no issues with protection if the grouting operation is carried out appropriately. The active end anchor block-out is filled with cement mortar to protect it from the outside environment.

## 2. Working Methodology

I) After-Tensioning

According to the designs, the pre-stressing tendon must be shaped and kept in place both vertically and horizontally. Tendons should be positioned such that they have a smooth profile with no severe bends or kinks. The pre-stressed cable arrangement must be such that it enables for straightforward installation and shaking of concrete between the tendons. All ways of squeezing the dead anchorages are legal. The minimum spacing between tendons and edge distance should be as defined by the system supplier and/or in the designs. Sheathing must be properly placed, and at approximately 1.0m intervals, appropriate ladders / spacers constructed of 4- or 5-mm diameter rod may be provided.
The method of supporting and securing should be such that vibrations, wet concrete pressure, employees, or construction traffic do not affect the profile of the cables. Tenders should be handled with caution wherever possible to avoid harm or infection of the tendon or sheathing.

In general, the task must follow IS 1343 - 2012 or a comparable standard.

ii) Fixing of Slab Reinforcement

- The reinforcement must be of approved fabrication, and the steel grade must be as stated in the design.
- Before cutting and bending reinforcement, a bar bending schedule should be prepared and thoroughly reviewed in line with the permitted drawing.
- BBS and related IS regulations should be followed while cutting and bending reinforcement.
- A suitable scaffolding construction must keep the reinforcing bars snugly in place and free of sway.
- To provide enough reinforcing cover, a sufficient number of cover blocks must be given.

iii) Slab shutter installation

- Formwork for the slab should be completed using steel shutter or plywood attached in an MS frame with enough lateral support, in accordance with the designer's proposal and drawings.
- Based on the design and stiffness, the formwork should be braced and propped against each other, and a suitable supporting system should be supplied.
- The surveyor should examine the shutter alignment and certify that it is within tolerance limits before casting.

iv) Concrete Pouring

- A professionally staged platform will be provided for concerts.
- A concrete pour card in the right format must be generated and preserved for each pour, signed by the client and the general contractor.
- Slabs must be poured in 200mm thick layers, with each layer being vibrated appropriately.
- Pouring concrete requires the use of a tower crane and a bucket with sufficient capacity.
- To receive the concrete, a sufficient number of skilled and unskilled labourers must be available.
- Proper lighting systems must be installed for night work.
- To achieve optimal compaction, a suitable number of vibrators are given. Concrete should not be poured until the layer below it has been sufficiently vibrated.

- If the concrete supply is suddenly cut off, appropriate shear keys must be provided promptly, or the sloping surface of the concrete will make the construction joint rough.

v) Removal of PT Slab Side Shutter

- The side shutter of the slab should be removed after the final setting time of the concrete, and curing will be done either with water or with curing compound and hessian cloth. The time required for concrete to set should be mentioned in the design mix.
- Once the shuttering is removed, all loose unwanted things should be removed as quickly as possible.

vi) Concrete Curing

- Curing procedures should commence soon after the concrete is set.
- Cement mortar will be applied to the top surface of the slab band to create water ponging for curing. Hessian cloth should be evenly distributed throughout the slab surface.
- The curing period should be at least 10 days, according to IS guidelines.

vii) Emphasizing

1. Tendons that are stretched at both ends might be stressed from one end to the other. The total theoretical length is compared to the sum of the elongation at both ends.
2. Unless otherwise indicated, do not start straining concrete until it has achieved a compressive strength of at least 30 Mpa of its anticipated strength, as demonstrated by field cured test cubes.
3. After tests confirm that the concrete has reached the required strength, tension the tendons using hydraulic jacks equipped with calibrated pressure gauges with a range that allows the stress in the tendons to be measured at any time.
4. According to IS 1343-2012 Clause number 19.5.1, the maximum tensile stress immediately behind the anchorages should not exceed 76 percent of the strand's ultimate tensile strength at the moment of first tensioning. 4. Pre-stress force is determined in design by taking into account the IS code standard value of elasticity and strand area.
5. As a consequence, the actual value of the strand area and modulus of elasticity were updated during the stressing activity in line with the material test certificate in order to compute the changed pre stressing force. The same may be stated of the hectic schedule.

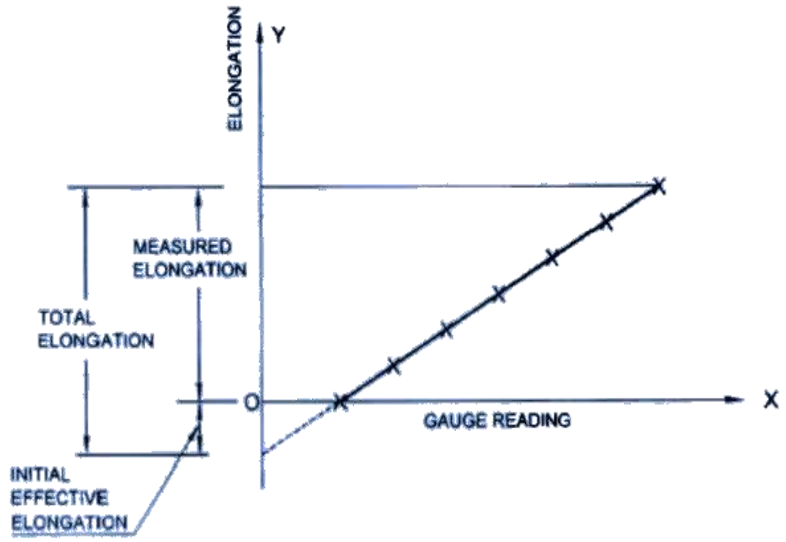
The steps in the strenuous activity are as follows.

a. 50 kg/sq.cm initial application pressure
b. Take out the jack.
c. The first marking on the wedges' faces.
d. Applying pressure at various intervals as described in the stressing report type given.
e. Send the readings to the design office for assessment.
f. The design office will review and submit the preliminary and final elongation.
g. Adjust force restressing or force elongation as needed.
h. If the elongation differs by more than 10% of the design elongation, corrective action will be taken.
i. After 24 hours of straining, any slide loss must be recorded.
j. The slab can be de- shuttered once the design office has validated the stressing report.
k. Grouting should be done as soon as possible following a tendon strain, but no later than two weeks.

Where this criterion cannot be met, temporary steel protection and ultimate adhesion of the injected grout should be assured until grouting.
After achieving the ultimate tension force, total elongation relative to the original marking is recorded.

6. The size of the first effective elongation corresponding to the first tension applied to eliminate slackness should be computed from the recorded and linearized component of the measured tension elongation, according to the code. Relationship is then added to the measured to produce the total Elongation.

Alternatively, as shown in, the same modification may be made graphically.




- No elongation measurements are performed during the initial straining. Measurements collected at this stage would be erroneous due to the varying degree of slack in each thread.
- Proceed with 100% stressing when the concrete has acquired the desired strength.
- The length would then be calculated. The measurement would only indicate the strand's elongation from 25% to 100% because the "datum" mark is from the preceding 25% straining.
- The measurement in item, i.e., x mm, should include an additional 6mm due to the wedge draw-in when the jack pressure is removed.
- The measurement is extrapolated to obtain the total length of the strands:
- Actual Elongation = (x+6mm) multiplied by 75% (0%-100%) = 1.333 x (x + 6mm).
- The formwork for raised slab construction can be dismantled when the slab has been thoroughly strained. If the estimated next above slab construction/design load is more than the finished floor slab, intermediate supports at 2.00 m intervals must be supplied. However, prior to removing any formwork, the resident engineer/design engineer/consultant on site must be consulted.

NOTE: Theoretical strand elongation is used as a reference rather than an acceptance criterion for tendon lengths less than 10 meters.

viii) Strand Cutting

The extra length of strands must be chopped off with a grinding disc or fiber disc cutter at least 20 mm from the edges where the tendon will be held by the anchors after the stressing works have been completed and the stressing records have been approved by the authorized representative/consultant.

ix) Tendon Report on Stress

The stressing outcome for each tendon must be noted during the process. Copies of the documents must be given to the authorized representative or consultant who will sign off on them or provide feedback.

x) Tendon Stressing Report Interpretation

A perfect record of all the stressful procedures and problems experienced, if any, should be preserved, precisely in the forms suggested for each tendon.

### 3.1 Grouting

- Grouting material, mixing sequence & quantities
- Water/cement ratio: 0.45
- CEBEX-100: 0.4% weight of cement (additive)
- Mixing time: 2-3 mins
- Mixing sequence: water-cement –additive
- According to specifications, compressive strength of cube shall be after.7 days: min.25N/mm2
- 28 days: min.35n/MM2

### 3.2 Grouting Equipment's

Grout colloidal mixer / Agitator - It is vital that the grout be kept homogenous and of consistent consistency throughout the grouting process by utilizing a suitable agitator.

Grout Pump - The pump should have positive displacement and be capable of continuously injecting grout rather than in pulses. A pressure gauge must be installed on the grout pump so that the injection pressure may be adjusted. If the built-up pressure exceeds 10 kg/cm2, the pump must incorporate a release device that allows the grout to be bypassed.

Following the completion of all tests and the selection of the right mix, preparation for tendons grouting may commence.

The primary contractor must repair anchorage block-outs before grouting, as specified in the designs.
The ducts must be thoroughly cleaned with water or compressed air before to grouting, as advised by professional post tensioning organizations.
At various highpoints and anchorages, grout vents are put on the ducts.
Grout vents at alternate high points are frequently put 200-500 mm apart from the highest point.
We provide HDPE sheathing per actual length to eliminate seams, and we examine ducts for any holes or openings.

### 3.4 The Routing Sequence

After the stressing procedure, the grouting must be completed within two weeks. When this condition cannot be reached due to unavoidable circumstances, appropriate interim corrosion protection of the strand should be used until grouting.
Cut the protruding length of strand outside the bearing plate when the stressing process is finished.
The anchoring pockets should then be sealed using cement mortar.
Once the mortar has attained a suitable strength, the grouting procedure should commence.
Then, using a w/c ratio of 0.45, mix cement grout. 225 g CEBEX-100 or analogous additive per cement bag (50kg)
The temperature of the grout must not exceed 25 degrees Celsius. Reduce the temperature of the grout by using chilled water or laying ice outside the grout storage container to increase its workability.
An agitator is used to mix the grout. After mixing, the grout should be kept to allow for future mobility.
Inject grout into the stressed end from the input. Grouting should start with a low injection pressure of up to 3 kg/cm2 and progressively rise until the grout comes out the other end.
Once the grout has flowed to the outside end through the air vent, inspect the consistency of the grout. Inspect the output hose pipe. Allow the grout to flow freely from the other end until the consistency matches the consistency of the grout at the injection end. When the grout pours out the opposite end, shut the valve and maintain a pressure of roughly 5 kg/cm2 for a few seconds.
Then disconnect the intake and go to the next anchor.
The air vent pipe can be compressed and severed when the grout has dried.

### 3.5 Interruption of Grouting Operation

Maintain a flawless record of the grout flow reading, w/c ratio, admixture concentration, pump pressure, and lock pressure for each set cables in required format for all operations.

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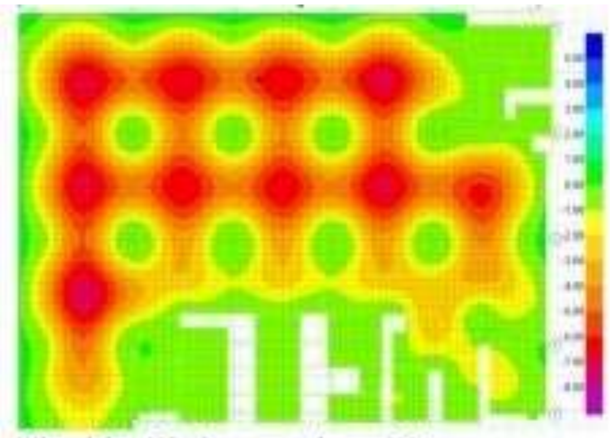
## Discussions

Two studies were carried out to investigate the structure's behavior and cost compression.

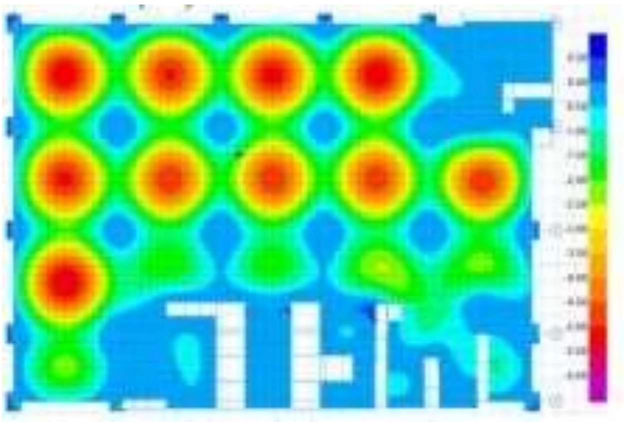
### 1.1 displacement

The seismic zone behavior of the structure was examined, and data were taken in relation to displacement. When displacement for PT slab and conventional Slab was tested, the results were as follows.

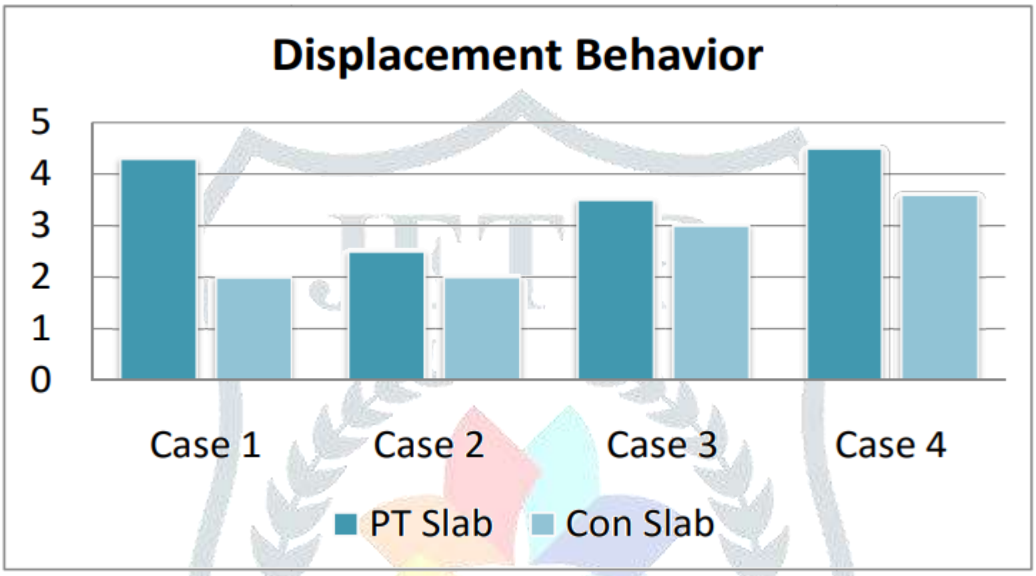
PT slab - X dir. = 35.5mm
Y dir. = 27 mm
Conventional slab – X dir. = 23mm
Y dir. = 21mm



**PT SLAB**



CONVENTIONAL SLAB

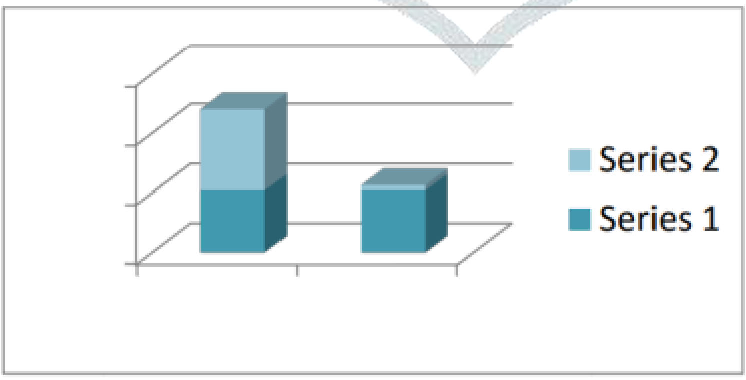



**1.2 The load combinations**

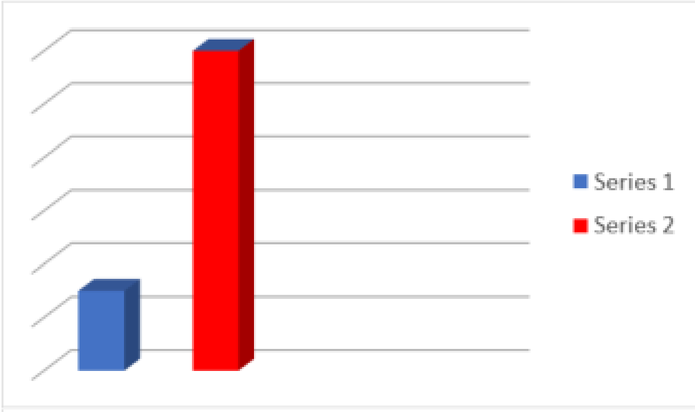
The test was performed to determine the load combinations. The load forces examined were axial force and shear force.

When compared, the axial force for PT was larger than that of standard slab.

when the shear force occurring in PT is less than that of a typical slab




AXIAL FORCE



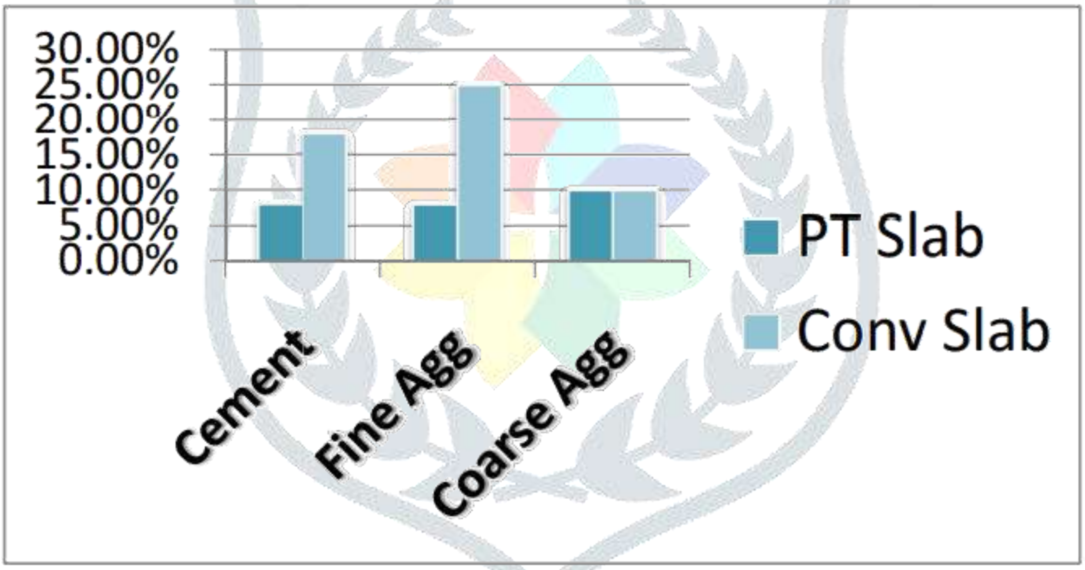

**SHEAR FORCE**

### 1.3Analysis of Costs

The analysis was intended to investigate the utilization of materials and compare the overall cost.

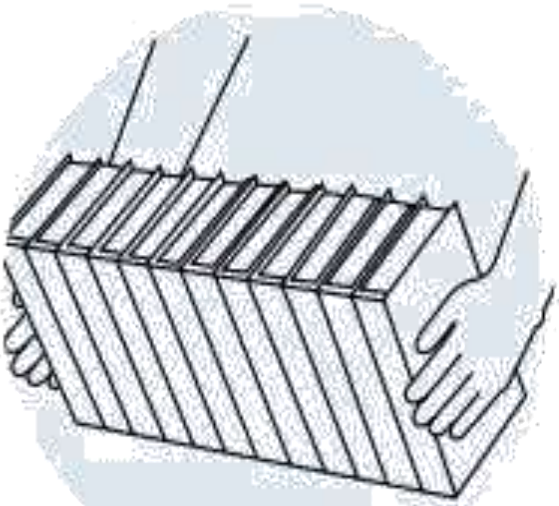
And the results demonstrate that the amount of cement used is 9% less than for a normal slab. Fine aggregate is 18% less expensive than conventional Slab. In coarse aggregate, there was no noticeable change. As a consequence, the total cost was calculated, and it is 15% less than the normal slab.

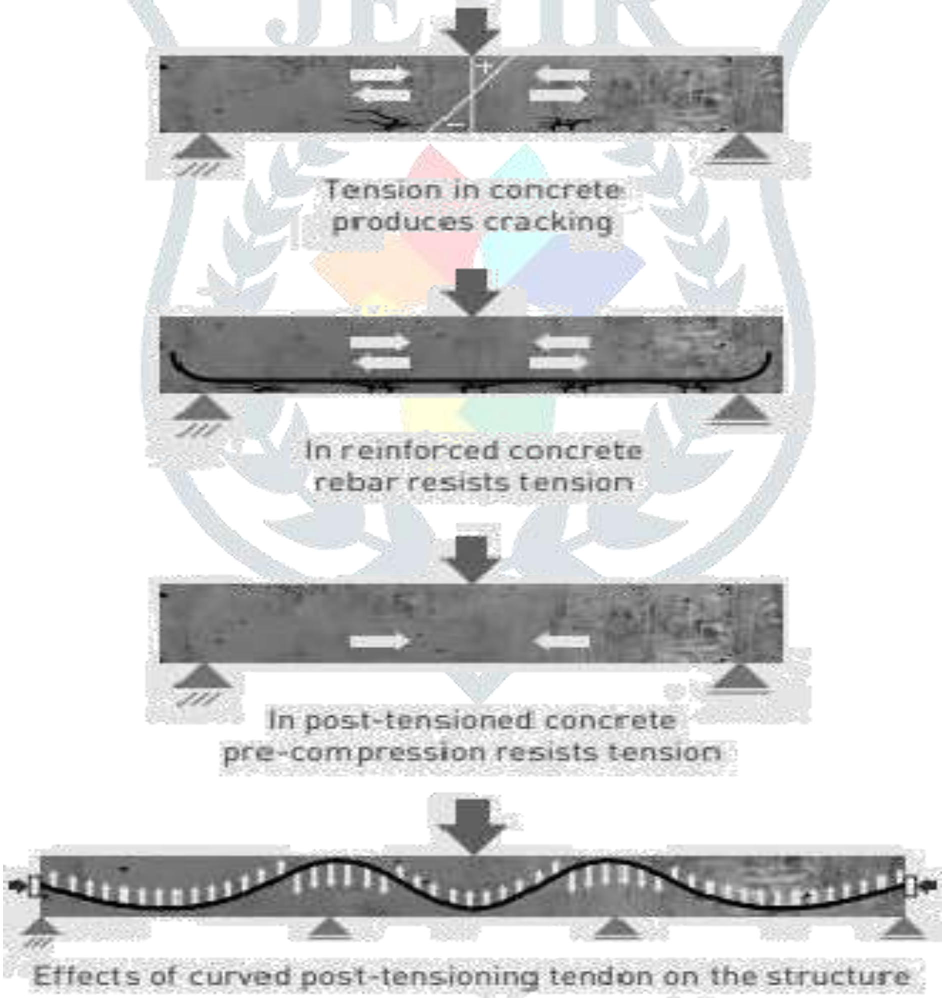
**Data observation**




Post-tensioning allows you to take use of concrete's intrinsic strength in compression while overcoming its natural weakness in tension. The principle is clearly seen when compressing many books together laterally. To maintain its integrity under such force, the entire row stiffens and strengthens. In concrete structures, this is performed by introducing high-tensile steel tendons/cables into the element before to casting. When the concrete has reached the required strength, the tendons are pulled taut by specially constructed anchorages attached to each end of the tendon.

This causes compression along the structural member's edge, improving the concrete's strength and resistance to tension strains. Tendons that have been correctly twisted to a certain profile will exert additional force. Compression along the perimeter results in a helpful upward set of forces that the applied loads, alleviating the structure of certain gravity effects.






### 1.3 Outcome

a) There is higher displacement, but only to a limited extent before failure; hence, once a substantial seismic load is applied, the structure will restore to its original shape.
b) When the axial and shear loads were assessed, the PT displayed the best behaviour to these stresses.
c) The cost research also favoured PT because the total cost was 15% less than the standard slab.

### 1.4 Conclusion/Discovery

The main purpose of this project was to build a low-cost structure by minimizing material consumption and decreasing the economic span range without affecting load bearing and distributing capacity quality.

Following various findings and investigations, it was found that PT was the best option. Buildings constructed utilizing the PT technique, on the other hand, offer improved load distribution and are more resistant to external forces. Furthermore, as compared to other types of constructions, the overall cost is cheaper, and the structure's life (wear and tear) is larger.

Because of the numerous benefits of this strategy, the industry is experiencing a spike in the adoption of this architectural type. Furthermore, because of its popularity, the materials are less expensive.

## CONCLUSIONS

The article that follows provides examples of realized and potential long span prestressed slab designs:

a) It has been shown that element design that exceeds span length and span depth ratios is feasible.
b) We also want to create a low-cost structure while not reducing the quality or qualities the structure will deliver.
c) By utilizing this technique, a larger span may be cased, hence decreasing construction time.
d) According to our findings, structures designed employing the PT technique are more stable and resistant to seismic stresses.
e) Furthermore, the load distribution along the axis is more in PT, which aids the overall structure's resistance to external stresses.
f) The project's overall cost is 15% less than that of traditional reinforced slabs, making it more cost effective.
g) The building is architecturally friendly since it provides more space.
h) A thinner slab can be constructed; an on-site thickness of 200 mm was used.
i) Additionally, building time is shortened since larger spans may be casted more rapidly.

## Scope for future work

Because of its benefits, as well as being more architecturally friendly and affordable, this type of construction has a lot of potential. Engineers now use this method since it saves time. Materials are more easily available and less expensive as a result of their growing use.

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