Prestressed Concrete – Design of Flexural Member

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Abstract- *In its most straightforward structure, cement is a blend of cement and aggregates, or stones. The glue, made out of portland bond and water, coats the surface of the fine (little) and coarse (bigger) aggregates. Prestressed cement is a strategy for conquering solid's normal shortcoming in pressure. It can be utilized to deliver pillars, floors or extensions with a more extended range than is useful with standard strengthened cement. It is regularly utilized as a part of business and private development as an establishment piece. Prestressing tendons (for the most part of high rigidity steel link or poles) are utilized to give a cinching load which delivers a compressive anxiety that adjusts the ductile anxiety that the solid pressure part would somehow encounter because of a bowing load.Traditional fortified cement depends on the utilization of steel fortification bars, rebars, inside poured concrete. Prestressing can be expert in three ways: pretensioned concrete, and reinforced or unbonded post-tensioned cement. The prestressing of concrete has a few favorable circumstances when contrasted with conventional strengthened concrete without prestressing. A completely prestressed solid part is generally subjected to pressure amid administration life. This corrects a few insufficiencies of concrete like reduction in occurrence of cracks, increase in shear capacity etc.*

I. INTRODUCTION

Definition of Prestress: Prestress is characterized as a technique for applying pre-pressure to control the burdens coming about because of outside burdens underneath the nonpartisan hub of the bar strain created because of outer burden which is more than the passable furthest reaches of the plain concrete. The precompression connected (might be pivotal or capricious) will affect the compressive anxiety underneath the unbiased hub or in general of the bar c/s. Coming about either no pressure or pressure.

Essential Concept: Prestressed cement is essentially concrete in which inward burdens of an appropriate size and circulation are presented so that the anxieties coming about because of the outside burdens are neutralized to a coveted degree.

Terminology:

1. Tendon: An extended component utilized as a part of a solid individual from structure to confer prestress to the solid.
2. Port: A gadget for the most part used to empower the tendon to give and keep up prestress in cement.
3. Pretensioning: A strategy for prestressing concrete in which the tendons are tensioned prior to the solid is put. In this strategy, the solid is presented by security between steel and cement.
4. Post-tensioning: A strategy for prestressing concrete by tensioning the tendons against solidified cement. In this strategy, the prestress is granted to concrete by bearing

II. MATERIALS USED

Cement - The cement used should be any of the following
(a) Ordinary Portland cement conforming to IS269
(b) Portland slag cement conforming to IS455. But the slag content should not be more than 50%.
(c) Rapid hardening Portland cement conforming to IS8041.
(d) High strength ordinary Portland cement conforming to IS8112.

Concrete - Prestressed concrete requires concrete, which has a high compressive quality sensibly early age with similarly higher elasticity than common concrete. The concrete for the individuals should be air-entrained concrete made out of Portland bond, fine and coarse totals, admixtures and water. The airentraining highlight might be gotten by the utilization of either air-entraining Portland concrete or an affirmed air-entraining admixture. The entrained air content should be at the very least 4 percent or more than 6 percent.

Steel - High tensile steel, tendons, strands or cables are used in prestress concrete. The steel used in prestress shall be any one of the following:-
(a) Plain hard-drawn steel wire conforming to IS1785 (Part-I & Part-III)
(b) Cold drawn indented wire conforming to IS6003
(c) High tensile steel wire bar conforming to IS2090
(d) Uncoated stress relived strand conforming to IS6006

III. CLASSIFICATIONS AND TYPES OF PRESTRESSING

Prestressed solid structures can be characterized in various routes relying on the element of outlines and developments.

Pre-tensioning - In which the tendons are tensioned preceding the solid is set, tendons are incidentally tied down and

tensioned and the prestress is exchanged to the solid afterit is solidified.

Post-tensioning - In which the tendon is tensioned after cement has solidified. Tendons are put in sheathing at reasonable spots in the part before throwing and later subsequent to solidifying of cement.

IV. ADVANTAGES OF PRESTRESSED CONCRETE

The utilization of high quality cement and steel in prestressed members results in

1. Lighter and slim individuals than is conceivable with RC individuals.
2. In completely prestressed individuals the part is free from malleable burdens under working burdens, consequently entire of the segment is successful.
3. In prestressed individuals, dead loads might be offset whimsical prestressing.
4. Prestressed solid part groups better imperviousness to shear strengths because of impact of compressive hassles nearness or unpredictable link profile.
5. Utilization of high quality cement and flexibility from breaks, add to progress strength under forceful ecological conditions.
6. Long traverse structures are conceivable so that sparing in weight is huge and hence it will be monetary.
7. Processing plant items are conceivable.
8. Prestressed individuals are tried before use.
9. Prestressed solid structure redirects obviously before extreme disappointment, subsequently giving plentiful cautioning before breakdown.
10. Weakness quality is better because of little varieties in prestressing steel, prescribed to progressively stacked structures.

V. DISADVANTAGES OF PRESTRESSED CONCRETE

1. The accessibility of experienced developers is sparse.
2. Introductory hardware expense is high.
3. Accessibility of experienced architects is inadequate.
4. Prestressed segments are fragile
5. Prestressed solid segments are less fireproof.

VI. PRESTRESSING SYSTEM

Pretensioning system - In the pre-tensioning frameworks, the tendons are initial tensioned between unbending anchor blocks cast on the ground or in a section or unit –mould sorts pretensioning bed, before the throwing of cement in the mold. The tendons involving singular wires or strands are extended with consistent whimsy or a variable flightiness with tendon mooring toward one side and jacks at the other. With the structures set up, the solid is thrown around the focused on tendon.

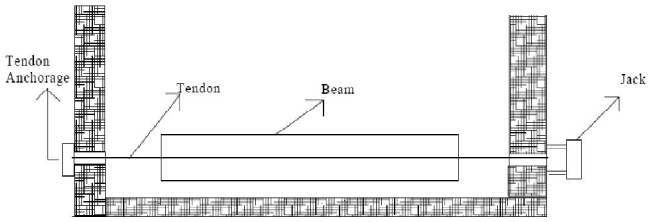

Figure 1 - Prestressing System (Beam With Straight Tendon)

Post-tensioning system - In post-tensioning the solid unit are first thrown by joining pipes or notches to house the tendons. At the point when the solid achieves adequate quality, the high-ductile wires are tensioned by method for jack bearing on the end of the substance of the part and moored by wedge or nuts. The powers are transmitted to the solid by method for end dock and, when the link is bended, through the spiral weight between the link and the conduit. The space between the tendons and the conduit is for the most part grouted after the tensioning operation.

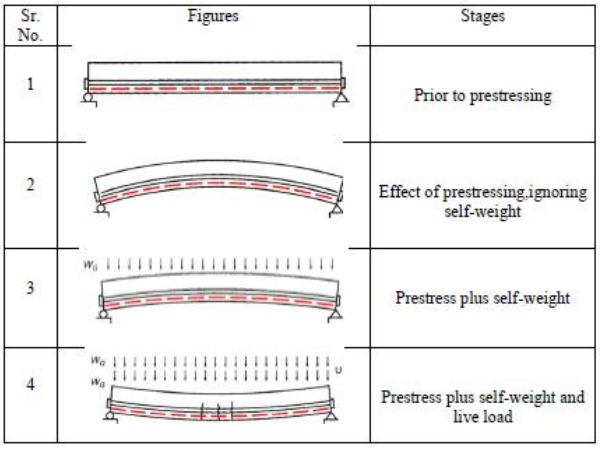

Figure 2 - Prestressing System (Beam With Straight Tendon)

VII. CONCLUSIONS

Snippet of resistance of prestressed solid part is more than RCC part.

For more traverse prestressed solid individuals turns out to be prudent one.

Outline of post tensioned prestressed solid part require information of codes.

Communication diagram created can be helpful for configuration of post tensioned light emission range with certain change.

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