

Difference Between Pretension and Post Tension



Pre-tensioning and Post-tensioning both methods are used under the pre-stressing process which has few edges over the orthodox non-stressed structures like greater span to depth ratio, higher moment, and shear capacity. These methods are generally adopted in the making of PSC girders, sleepers, etc.

pre-tensioning

- 1- In this method, the concrete is prestressed with tendons before it is placed in position.
- 2- This method is developed due to bonding between the concrete and steel tendons.
- 3- Pre tensioning is preferred when the structural element is small and easy to transport.
- 4- In this method, similar prestressed members are prepared.
- 5- Pre-tensioning members are produced in mold.

post-tensioning

- 1- In this method prestressing is done after the concrete attains its strength
- 2- This method is developed due to bearing
- 3- Post-tensioning is preferred when the structural element is heavy
- 4- In this method products are changed according to the structure.
- 5- Cables are used in place of wires and jacks are used for stretching.

For more information watch this video



Watch Video At: https://youtu.be/eKK7pA1C5_o

Figure 1.



Figure 2.



Figure 3.



Figure 4.







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What is Prestressed Concrete?

It is a method of applying pre-compression to control the stresses resulting due to external loads below the neutral axis of the beam.

Pre-compression resulting either no tension or compression.

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DIFFERENCE BETWEEN POST-TENSIONING AND PRE- TENSIONING

POST-TENSIONING

- Can be performed at the project site as well as at precast yards.
There is relatively less loss of prestress due to concrete shrinkage as at the time of prestressing concrete has already been cured.
- Corrosion of steel is less as compared to pre-tensioning.
- There is more flexibility in design. The prestressing tendons can be configured to almost any shape. As per requirements the tendons may be bonded or unbonded.
- They are more prone to anchorage failure as the compressive forces are transferred at the beam ends. Hence compressive stresses are concentrated.

PRE-TENSIONING

- Difficult to perform at site. Only done in precast yards.
- There is greater loss of prestress due to shrinkage of concrete.
- Concrete and steel tendons are in direct contact. So any moisture that slips through cracks in concrete will cause corrosion in steel.
- Tendons can only be straight or circular.
- Since the compressive forces are transferred over a certain length of bond, they are less prone to anchorage failure.

So to generalize post-tensioning is usually better than pre-tensioning. However this may not always be the case. Either method has its applications.

Pre-stressing

- Principles & Design Philosophy: Principles of pre-stressing, properties of high strength materials, Importance of high strength concrete and steel used in pre-stressing, Behavioral aspects of pre-stressed beams and comparison with reinforced concrete beams, post-tensioning and pre-tensioning techniques, Profiles of post-tensioned tendons, bonded and non-bonded tendons, comparison and hard-ware requirements.
- Pre-stress Losses: Pre-stress losses, immediate and time dependent losses, lump sum and detailed estimation of pre-stress loss.
- Analysis and Design: Simply supported pre-stressed beams for flexure and shear.

Types of Pre-stressing

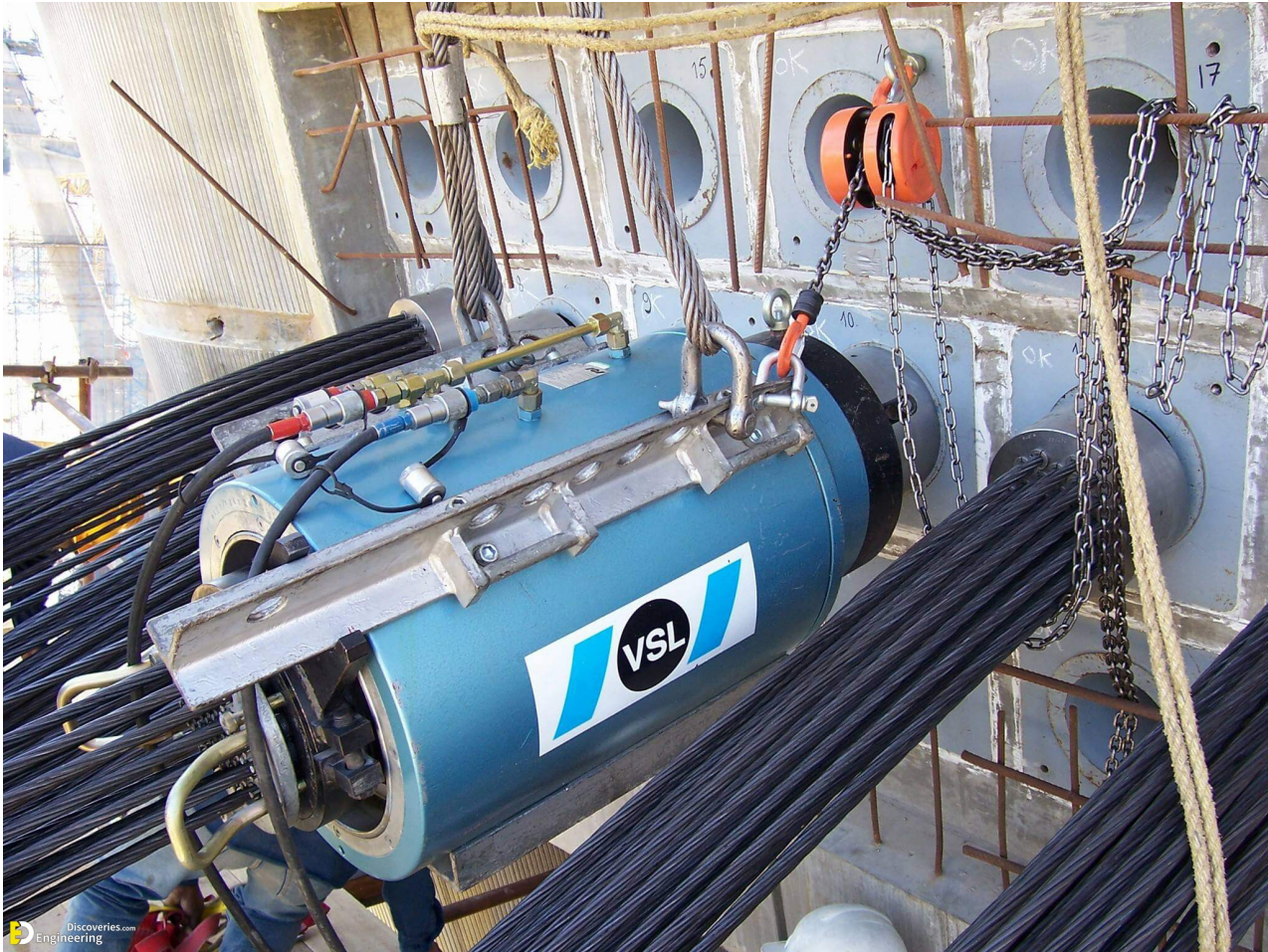
1. External or internal pre-stressing.
It is based on the location of the pre-stressing tendons with respect to concrete section.
2. Pre-tensioning or post-tensioning.
It based on the sequence of casting the concrete and applying tension to the tendons.
3. Linear or circular pre-stressing.
It based on the shape of the member pre-stressed.
4. Full, limited or partial pre-stressing.
It based on the pre-stressing force.
5. Uniaxial, biaxial or multi-axial pre-stressing.
It based on the direction of the pre-stressing member.



Advantages of pre-stressed concrete.

- Factory products are possible.
- Long span structure are possible so that saving of wt is significant & thus it become economical.
- Pre-stressed member are tested before use.
- Dead load are get counter balanced by eccentric pre-stressing
- It has high ability to resist the impact.
- It has high fatigue resistance.
- It has high live load carrying capacity.
- It free from cracks from service loads and enable entire section to take part in resisting moments.
- Member are free from the tensile stresses.

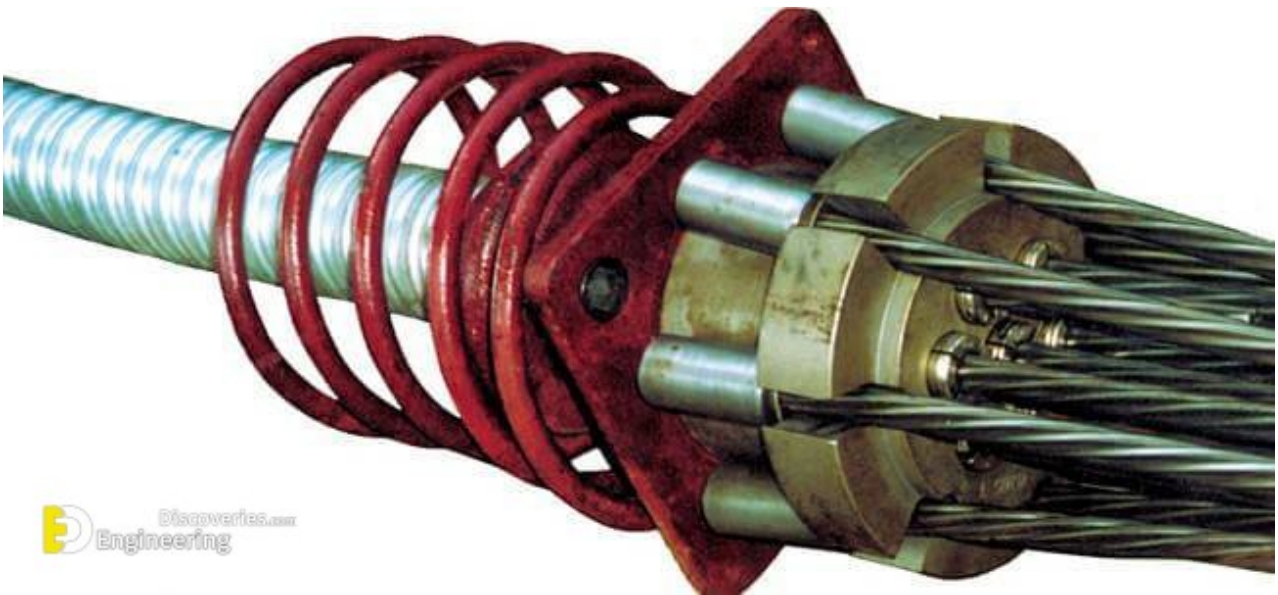








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