POST-TENSIONING SYSTEMS
Advanced Reinforcement Technologies
**ACCREDITED SPECIALISTS**

**Mega Prefab** is a complete service provider of structural precast and post-tensioned concrete.

We are involved thoroughly in all the phases of the project. We will design, manufacture, deliver, and install our products.

With more than 16 years of experience in the business, we have optimized our structural elements to be efficient, safe and low cost.

The post-tensioning accessories are manufactured with the satisfaction of the quality control system and conforming to the requirements of international standards such as [PTI] and [BS 4447].

**Mega Prefab** post-tensioning systems have been approved for use by:

- Government departments
- Local authorities
- Engineering consultancies
- Multinational construction companies and organizations

**WHAT IS A POST-TENSION SLAB?**

Before a post-tension slab is poured, high-strength steel strands or cables, called tendons, are laid in a tight grid. These help support and give strength to the slab once the concrete has been cured and they have been tensioned at the proper pressure.
**SCOPE OF SERVICES**

Based on its extensive and proven experience in the highly specialized area of post-tensioning construction, **Mega Prefab** offers a comprehensive range of professional services including:

- Consulting services and designs covering all aspects of post-tensioned construction.
- Quality controlled post-tensioning Supply materials, products and equipments.
- Project feasibility study for post-tension application.
- Preliminary design and cost estimation.
- Final design and shop/working drawings.
- Complete supply and installation of post-tensioning systems.

**SYSTEM FEATURES AND PRODUCTS**

**Mega Prefab** post tensioning systems' significant features and advantages:

- Wide selection of anchorage types.
- Products are provided with full range of tendon sizes from single strand with up to 5 nos of 0.5"/0.6" strand. (Bigger tendon sizes are also available upon request).
- Anchorage adaptable for both strand of 0.5" (12.5mm) and 0.6" (15.7mm) according to standard ASTM A416 or BS 5896.
- Advanced stressing jacks equipped with automatic stressing heads and power wedge seating devices.
- The systems available in any number of stressing steps and sequences.
ADVANTAGES OF POST-TENSIONED SLAB SYSTEMS

_Mega Prefab_ slabs bring unique architectural freedom when compared to conventional building methods. They allow increased spans to be achieved with thinner concrete sections. By reducing the need for columns, the structure becomes more efficient and functional.

The main advantages of post-tension slab over conventional reinforced concrete slab, may be summarized as follows:

- Increased clear spans
- Thinner slabs
- Lighter structures
- Reduced cracking & deflections
- Reduced story height
- Rapid construction
- Better water tightness

These advantages can result in significant savings in overall costs. There are also some situations where the height of the building is limited, in which the reduced story height has allowed additional floors to be constructed within the building envelope. The following figures 1 and 2 on the right show the deflection of the slab before the post-tension forces were applied. The finite element analysis is done using Adapt Builder 2010.

BONDED OR UNBONDED TENDONS

Post-tensioned slab systems can be constructed using either bonded or unbonded tendons. The relative merit of the two techniques are subject to debate.

The following points may be in favor of each:

**BONDED TENDONS**

- Higher ultimate flexural strength
- Non-dependant on anchorage after grouting
- Localized damage effect
- Simple technique for demolishing or providing future opening in slab

**UNBONDED TENDONS**

- Smaller diameter
- Provides greater lever arm
- Reduces friction losses
- Simplifies prefabrications of tendons
- Grouting not required
- Faster Construction
SINGLE STRAND UNBONDED TENDON SYSTEM

The single strand system is adapted only for unbonded tendons. The strand is greased and PE coated for corrosion protection as well as reducing friction. The strand is gripped by a single strand anchorage type. To provide for a corrosion protection system the anchorage is encapsulated by a special plastic cap after the stressing and the strand end has been cut.

ANCHORAGE COMPONENTS
- Pocket former
- Wedge
- Anchor plate casting
- Anchorage Bursting-Reinforcement
- P.E. connector
- Unbonded strand greased and P.E. coated
- Encapsulated plastic anchor cap

The same anchorage for stressing can be used as intermediate stressing anchorage and dead end anchorage. For dead end anchorage, the wedge is pre-seated in the anchorage by applying nominal force to the strand using the stressing Jack.

Alternatively a loop dead anchorage can be used in which case the strand is formed in loop shape around the loop bearing plate and stressing anchorage are used at the stressing ends of the loop tendon.

A nominal reinforcing bar of 212 grades 40 is normally provided behind the stressing anchorage to act as bursting reinforcement in the anchorage zone.

SINGLE STRAND UNBONDED TENDON SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>STRAND DIAMETER</th>
<th>0.5&quot; [12.5 MM]</th>
<th>0.6&quot; [15.7 MM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of strands</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Type of anchorage</td>
<td>SF 105</td>
<td>SF 106</td>
</tr>
<tr>
<td>Section per tendon (cm²)</td>
<td>0.93</td>
<td>1.5</td>
</tr>
<tr>
<td>Stressing force at 0.75 U.T.S. (Tons)</td>
<td>13.0</td>
<td>20.9</td>
</tr>
<tr>
<td>Jack type</td>
<td>V 16</td>
<td>V 24</td>
</tr>
</tbody>
</table>

ANCHORAGE DIMENSIONS (MM)

<table>
<thead>
<tr>
<th>STRAND DIAMETER</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 105</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>SF 106</td>
<td>125</td>
<td>75</td>
</tr>
</tbody>
</table>
MULTISTRAND UNBONDED TENDON SYSTEM

The multistrand flax duct systems are normally adapted for bonded tendon. The strands are individually gripped in one flat anchor head unit and transmit their prestressing forces by mean of flat type anchor plate casting unit. The strands are stressed individually by mean of a mono strand jack. The strands are contained in one flat duct which is made of corrugated galvanized or non-galvanized metal.

To ensure corrosion protection and to give adequate bond strength, the tendons are filled with suitable cement grout mix after complete stressing of the strands.

ANCHORAGE COMPONENTS
- Pocket former
- Wedges
- Anchor head type SF
- Anchor plate casting type SF
- Grout vent
- Corrugated metal flat duct
- Anchorage bursting reinforcement

The same anchorage for stressing anchorage can be used as dead end anchorage in which case the wedges are presented in the anchor head unit by applying nominal force to the strand using the stressing jack.

Alternatively a bulb dead end anchorage can be used with simpler solution and more cost effective. In this case each strand is formed into a bulb shape by means of special bulb forming jack.

Bursting reinforcement should be provided at the anchorage zone for both stressing anchorage and dead end anchorage type. It can be placed longitudinally or transversally.

### MULTISTRAND UNBONDED TENDON SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>STRAND DIAMETER</th>
<th>0.5” [12.5 MM]</th>
<th>0.6” [15.7 MM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of strands</td>
<td>205 2</td>
<td>305 3</td>
</tr>
<tr>
<td>Anchorage head type</td>
<td>SF 205</td>
<td>SF 305</td>
</tr>
<tr>
<td>Section per tendon (cm²)</td>
<td>1.86</td>
<td>2.79</td>
</tr>
<tr>
<td>Ultimate tensile force per tendon. Stressing force at 0.75 U.T.S. (Tons)</td>
<td>25.9</td>
<td>38.9</td>
</tr>
<tr>
<td>Flat duct inside dimension mm x mm</td>
<td>63.5 x 20</td>
<td>63.5 x 20</td>
</tr>
<tr>
<td>Jack type</td>
<td>V 16</td>
<td>V 24</td>
</tr>
</tbody>
</table>
APPLICATIONS

The use of post-tensioned slab systems has been consistently growing in the recent years. Typical applications have been:

- Private residential housing
- Offices
- Car parks
- Shopping centers
- Hospitals
- Hotels and apartments
- Industrial buildings
- Transverse pre-stressing of bridge deck slabs.
Hollow core slab th= 20 cm