Frequently Asked Questions

Slab-On-Ground Construction

Answers from the PTI Slab-On-Ground Committee — *October 2003 • Issue No. 4*

QUESTION: When converting a ribbed slab to a uniform thickness slab, does the ribbed slab have to satisfy soil bearing stress requirements based upon the bearing area of the ribs alone before the conversion can be made?

ANSWER: No, the ribbed slab must satisfy moment, shear and differential deflection criteria before being converted (see Section 6.12), but it need not satisfy soil bearing stress requirements that are based upon the rib widths only. Bearing stress requirements under the uniform thickness slab must, of course, be satisfied based upon the full plan area of the slab.

QUESTION: Why does Section 7.3 of PTI's *Design and Construction of Post-Tensioned Slabs-On-Ground,* 2nd edition, require the use of encapsulated systems when the sulfate levels in the soil are considered high?

ANSWER: The requirement for encapsulation of tendons in elevated soil sulfate conditions was incorrect. This oversight was addressed during the PTI Slab-on-Ground seminar series presented shortly after the publication of the 2nd Edition. Since sulfates are not known to cause corrosion in steel, the presence of elevated levels of sulfates in the soil does not require the use of an encapsulated (aggressive environment) post-tensioning system. Elevated levels of chlorides in the soil, or environments in which the concrete is exposed to direct or indirect applications of deicing chemicals, seawater, brackish water, or spray from these sources, would qualify as an aggressive environment, requiring the use of encapsulated systems in post-tensioned slab-on-ground construction.

Please note that elevated levels of sulfates in the soil may require the use of higher strength concrete and sulfate resistant cements.

QUESTION: How much bare strand is allowed on a tendon before it needs to be repaired? What are the acceptable methods and materials that are to be used when repairs are required?

ANSWER: The purpose of the sheathing material is two-fold. First, it prevents the concrete from bonding to the prestressing steel so that it can be tensioned after concrete placement. Second, it contains the P-T coating (grease) and serves as a barrier against corrosion.

In an aggressive environment, where the designer has specified an encapsulated system, the requirements call for the tendon to be completely watertight from end anchor to end anchor. This is strictly interpreted that **no** prestressing steel is to be exposed and that **all** rips, tears, or gaps in the tendon sheathing are to be repaired using one of the methods described below.

In a non-aggressive environment, where the designer has specified the use of a *standard system*, as is the case with most slab-on-ground construction, the requirements are typically not as stringent as those referenced above for aggressive environments. Typically, for standard system applications, a maximum of 1 inch of exposed prestressing steel is allowed behind the stressing-end anchors and a maximum of 12 inches is allowed at the fixed-end anchors. In addition, rips and tears 1 inch or less in length may be left un-repaired; however, all gaps in the sheathing should be repaired as described below. In some non-aggressive environment applications, the engineer may specify more or less stringent requirements than those noted above.

Rips and tears in the sheathing greater than 1 inch in length should be repaired according to method #1 or #2 (described below) in order to protect the strand and prevent excess friction during stressing.

All gaps (total discontinuities) in the sheathing should be repaired using only method #1 described below.

Repair Method #1:

1. Restore tendon P-T coating in damaged area if needed.
2. Place a section of split tubing or a piece of the original tendon sheathing over the damaged area. It should overlap approximately 3 inches (75 mm) past each end of the original tendon's sheathing.
3. Spirally wrap the entire length of the repair area with tape and extend the tape past the end of the repair section by 3 inches (75 mm) in both directions.

Repair Method #2

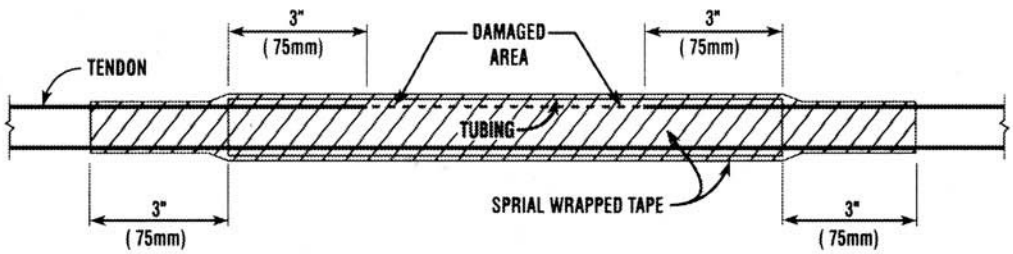
Taping can be used in place of method #1 to repair small rips and tears in the sheathing where no significant portion of the original sheathing is missing. Spirally wrap a minimum of two layers of repair tape extending a minimum of 3 inches (75 mm) past the damaged area in both directions.

Acceptable Material

PTI's *Specification for Unbonded Single Strand Tendons* states that the tape used should:

- be self-adhesive and moisture proof
- be non-reactive with sheathing, P-T coating, and prestressing steel
- have elastic properties
- have a minimum width of 2 inches
- have a contrasting color to the tendon sheathing.

Tests run by PTI have shown that various materials, including PVC pipe wrap tape, waterproof duct tape, and other PVC and polyethylene tapes, meet these requirements and perform as required. The testing revealed that the most important factor in the performance of any tape repair is that the application of the tape is smooth and that seams, joints, and tape wrinkles are kept to a minimum. Testing showed that tapes wider than 3 inches were very difficult to properly apply without wrinkles and still maintain the watertight seal that is required.



POST-TENSIONING INSTITUTE
8601 North Black Canyon Highway, Suite 103
Phoenix, Arizona 85021
(602) 870-7540 Fax (602) 870-7541
www.post-tensioning.org