

AGENDA

PTI M-10 Unbonded Tendon Committee

Tuesday, April 26, 2016, 1:00 PM - 5:00 PM

Renaissance Long Beach - Long Beach, CA

Voting Members Present (xx of 21)

Douglas Schlegel, Chair	Consultant
Mauro Barbosa	Dywidag-Systems International USA, Inc.
Muhammad Cheema	Walter P Moore
David Harrison	Suncoast Post-Tension, Ltd.
Norris Hayes	Precision-Hayes International
Neel Khosa	AMSYSCO, Inc.
Rattan Khosa	AMSYSCO, Inc.
Marc Khoury	CCL USA, Inc.
Larry Krauser	General Technologies, Inc.
Thomas Mathews	Precision-Hayes International
Harley Nethken	Tech-Con Systems, Inc.
Russell Price	Suncoast Post-Tension, Ltd.
Steve Ross	Lubricating Specialties Company
Pete Scoppa	PT USA, LP
Felix Sorkin	General Technologies, Inc.
Todd Stevens	Gerdau
Bob Sward	VSL
Slava Tkachuk	Ready Cable, Inc.
Dan Williams	VSL
Michael Williams	Builders Post-Tension
Rashid Ahmed, TAB Contact, NV	Walker Parking Consultants
Miroslav Vejvoda, NV	PTI Staff
Doug Rohrman, NV	DFR, Attorney at Law

Associate Members Present

Noli Alarcon	Timothy Haas and Associates, Inc.
E.T. Bradley	EBAA Iron, Inc.
Sam Carnell	General Technologies, Inc.
Robb Dietrich	Dywidag-Systems International, USA, Inc.
Ron Douglas	Associated MetalCast, Inc.
Bobby Field	Precision-Hayes International
William Fossing	LSA Design, Inc.
Roger Frenn	Dywidag-Systems International, USA, Inc.
Joe Harrison	General Technologies, Inc.
Andy Kochis	Ready Cable, Inc.
Anoop Kumar	Royal Manufacturing Company, L.P.
Hee-Taik Lee	Korea Institute of Nuclear Safety
Bonnie McBride	Precision-Hayes International
Martin Mikula	Mikula Group, Inc.
Sivakumar Munuswamy	Thornton Tomasetti
Rob Paderofsky	VSL
Michael Pedraza	Harris Rebar North Carolina
Nandish Ramesh Pethani	Nektor Engineers PT
Danny Sohal	Unigel, Inc.
Mark Sterling	Martin Specialty Products

Visitors Present

ACTION ITEMS FROM LAST / THIS MEETING

Item #	Subject	Action	Responsible	Deadline / Completed
1	PT coating	Add experts to TG; review and analyze existing PT coating testing requirements; report to EX Com	TG on PT Coating	ASAP
2	Encapsulation	Develop performance specification for tendon encapsulation and a method of field verification.	TG on Encapsulation	ASAP; WM by 11/6/15
4	Field Procedures Manual	Prepare responses to TAB comments and initiate letter ballot.	Chair / Staff	10/20/15
5	Specification for Unbonded Single Strand Tendons	Ballot resolution of negative votes received on the Ballot M-10-1502	Chair / Staff	10/20/15
6	Guide for Maintenance and Repair of Barrier Cables	Finalize draft for M-10 review and balloting.	TG on Barrier Cable	ASAP
D.2	Specification Section 1.6.2.3c – Shipping	Draft new language for this section for the future edition of the Specification.	Rattan Khosa	ASAP

Agenda Item	Expected Outcome / Actions Taken
A. General A.1 Call to Order A.2 Introductions A.3 Committee Roster Changes A.4 PTI Antitrust Policy (Exhibit A.4)	A.1 Meeting Called to order at A.2 Quorum: Minimum number of Voting Members for a Meeting Ballot: 9 A.3 A.4
B. Agenda & Minutes B.1 Approval of Agenda B.2 Approval of Minutes from 10/8/2015, (Meeting ballot)	B.1 Changes to the agenda: B.2 Vote on approval of Meeting Minutes from 10/8/15: Motion / Second: Name / Name Result: 0-0-0 (Y-N-A)

Agenda Item	Expected Outcome / Actions Taken
<p><u>C. Actions Taken Between Meetings</u> <u>C.1 Letter Ballots</u> C.1.1 Ballot M-10-1503, Specification for Unbonded Single Strand Tendons, Resolution of Negatives on Responses to TAB Comments; Ballot Summary (Exhibit 5.1)</p> <p>C.1.2 Ballot M-10-1601, Field Procedures Manual (FPM) – Responses to TAB comments Ballot Summary (Exhibit 4.1)</p> <p><u>C.2 Web Meetings</u> (none)</p>	<p>C.1.1 Ballot did not pass neither the ½ nor the 2/3 rules. Ballot failed.</p> <p>C.1.2 See item 4.1 to finalize ballot.</p>
<p><u>1. Action Item 1: TG: PT Coating Specifications and Testing</u> 1.1 Update from TG The TG members: S. Ross (leader), M. Williams, B. Manson, S. Taylor; D. Sohal and M. Sterling.</p> <p>1.2 EX Com direction to M-10: (a) Add experts on the subject to the TG who are independent with no vested interest, possibly with members from the ASTM committees responsible for the currently required test methods, and academics. Regular approval process for members applies. (b) When TG membership is finalized, TG is to review the existing specification requirements on PT coating testing. The goal is to either confirm the appropriateness of the currently required ASTM test methods or determine what testing would better reflect the performance requirements for the PT coating. (c) Report findings to the EX Com. (d) EX Com will determine the appropriate action at that point.</p>	<p>1.1</p>
<p><u>2. Action Item 2: Performance Specification for encapsulation anchorage and verification</u> 2.1 Update from TG TG was created at the Houston meeting on 4/28/15 with members from M-10 (L. Krauser, H. Nethken, T. Mathews, T. Stevens, and Rob Paderofsky) and from DC-70 (D. Schlegel (leader), R. Price, and A. Baxi). The charge for this TG is:</p>	<p>2.1 Pending outcome of item 2.2.</p>

Agenda Item	Expected Outcome / Actions Taken
<p>Create a performance specification for the encapsulation anchorage and a method of field verification by September 30, 2015, in an effort to find PTI consensus before taking it to ACI 423.7.</p> <p>2.2 EX Com initiative to overcome committee impasse on encapsulation language in the M10.2 Specification: (a) TG WM on 2/29/16: Items to include (b) Draft distributed to M-10 on 4/6/16 (Exhibit 2.2)</p>	2.2
<p><u>3. Action Item 3: Specification for addition of UV stabilizer to sheathing</u></p> <p>3.1 At the Houston meeting on 4/27/15 it was decided to include the following in the M-10 specification: “A minimum of 1 year UV protection is required for all sheathing and anchorage encapsulation components.”</p> <p>A lack of a specification requirement was also identified in a public comment on the Unbonded Tendon Plant Certification manual. Public comment: “Recommend providing a specification for acceptable UV Stabilizer material before making it a requirement. This would apply to extruded strand and encapsulated anchorage components”.</p> <p>3.2 Incorporate performance requirements for UV protection in the specification before publication.</p> <p>These items will be considered as new business in the next specification cycle.</p>	
<p><u>4. Action Item 4: Field Procedures Manual, responses to TAB comments</u></p> <p>4.1 Resolve negatives on Ballot M-10-1601: Ballot Summary (Exhibit 4.1).</p> <p>4.2 Adopt encapsulation language from item 2.2.</p>	4.1
<p><u>5. Action Item 5: Ballot M-10-1502 Resolution</u></p> <p><u>5.1 Specification for Unbonded Single Strand Tendons, Resolution of Negatives on Responses to TAB Comments: Ballot</u></p>	5.1

Agenda Item	Expected Outcome / Actions Taken
<p>Summary (Exhibit 5.1)</p> <p>Remaining issue is the encapsulation language; see item 2.2 for resolution.</p>	
<p>6. Action Item 6: TG-Barrier Cable</p> <p><u>6.1 Guide for Maintenance and Repair of Barrier Cables:</u></p> <p><u>6.2 Specification for Seven-Wire Prestressing Steel Strand for Barrier Cable Applications:</u></p> <p><u>6.3 Guide for Barrier Cable Design and Installation:</u></p>	<p>6.1</p> <p>6.2</p> <p>6.3</p>
<p>D. New Business</p> <p>D.1 Specification Section 1.6.2.2a – Storage prior to shipping; Negative received on M-10 responses to TAB comments. It was unrelated. Comment is in (Exhibit D.1).</p> <p>D.2 Specification Section 1.6.2.3c – Shipping; Negative received on M-10 responses to TAB comments. It was unrelated. Comment is in (Exhibit D.2).</p> <p>When the next edition of the unbonded tendon specifications is developed, wording for this item needs to be drafted and inserted into the appropriate section of the specifications. Rattan Khosa to draft new language.</p>	
<p>E. Next Meeting</p> <p>E.1 2016 PTI Committee Days – Tucson, AZ, October 5-7, 2016</p> <p>E.2 Web Meetings:</p>	<p>E.1</p> <p>E.2</p>
<p>F. Adjourn</p>	<p>F. The meeting was adjourned at</p>

EXHIBITS

Exhibit #	Subject
A.4	PTI Anti-Trust Policy

2.2(a)	M-10 Anchorage Connection Proposal
2.2(b)	M-10 Proposal Questions
2.2(c)	Overlap Spec Proposal – Summary of Changes
4.1	Field Procedures Manual – Responses to TAB Comments – Ballot Summary
5.1	Specification for Unbonded Tendons – Responses to TAB Comments – Ballot Summary
D.1, D.2	New Business Items

At a meeting on October 8, 1980, the Board of Directors first discussed the Institute's status and policies regarding compliance with antitrust laws. After review of both the internal and external compliance procedures, the following resolution was approved:

"The staff, officers, directors and members of the Post-Tensioning Institute are reminded that they are required to comply with the spirit and specific requirements of the antitrust laws on all activities within the scope of, and related to, the official functions of PTI. Further, this restated position, along with appropriate explanatory material, should be placed in all meeting folders/books periodically, beginning with the 8th of October meeting of PTI."

On July 24, 2012 and again on October 7, 2015, the Executive Committee authorized Legal Counsel to review and update this Policy Statement in the perspective of the Department of Justice Business Review Letter of July 30, 1997 and current case law. As a continuing guide for your participation in PTI's meetings, please review and continue to adhere to the following "Legal Limitation on Discussions at PTI Meetings."

LEGAL LIMITATION ON DISCUSSIONS AT PTI MEETINGS AND EVENTS

A free exchange of ideas on matters of mutual interest to the members is necessary for the success of all meetings. Indeed, such an exchange of views is essential to the successful operation of every trade association and the law specifically allows legitimate exchange of views pertaining to, e.g., quality control, safety, building design and construction integrity, etc.

It is not the purpose of this memorandum to discourage the exploration in depth of any matters of legitimate concern to meeting participants. Nevertheless, to ignore certain antitrust ground rules, either through ignorance or otherwise, is to create a civil and criminal hazard businessmen simply cannot afford.

It is for these reasons that PTI provides you with a reminder that certain areas of formal and informal communication between competitors or between manufacturers and their suppliers and customers must be avoided, as posing potential antitrust problems.

The Sherman Antitrust Act, the Clayton Act, the Federal Trade Commission Act, and the Robinson-Patman Act comprise the basic federal antitrust laws, which set forth the broad areas of conduct considered illegal as restraints of trade. In general, agreements or understandings between competitors that operate as an impediment to free and open competition are forbidden. Federal antitrust prohibitions forbid any "agreement or understanding...to substantially lessen competition or tend to create a monopoly in any line of commerce." An important point to keep in mind is that communications and discussions between competitors or between sellers and customers, about matters which may be considered anti-competitive, often comprise the evidence from which courts infer antitrust violations. ***It is the policy of the Post-Tensioning Institute that such agreements, understandings or communications shall not be tolerated at any formal or informal meetings or social events of the Institute.***

The general prohibitions contained in the federal antitrust laws, have been particularized in the form of a series of consent decrees, originally entered against a number of member companies of various trade associations and the associations themselves. It is important to note that these laws not only apply to PTI members, but also to PTI itself. Often trade associations have been and are presently co-defendants in cases brought by the Justice Department and the Federal Trade Commission ("FTC"). Recently, the FTC has stated: *"Because trade associations are by their nature collaborations among competitors, the Commission and courts have long been concerned with anti-competitive restraints imposed by such organizations under the guise of codes of conduct. Competing for customers, cutting prices, and recruiting employees are hallmarks of vigorous competition. Agreements among competitors not to engage in these activities injure consumers by increasing prices and reducing quality and choice."* Similar "codes" or policies and requirements that encourage directly or indirectly members' unlawful activity are strictly forbidden by PTI in the course of its business with its members.

SPECIFIC EXAMPLES OF ACTIVITIES AND PRACTICES PROHIBITED

AT ALL PTI MEETINGS AND EVENTS:

Included in activities and practices which are forbidden, and are contrary to the policy of the Institute, both under the general antitrust laws and the consent decrees, subject to the said Business Review Letter, are the following:

- Agreeing to allocate markets, customers or suppliers among competitors, classify certain customers or suppliers being entitled to preferential treatment by manufacturers, and establish geographic trading areas.
- Participating in any plan designed to induce any manufacturer or distributor to sell or refrain from selling, or discriminate in favor of, or against any particular customer or class of customers.
- Agreeing in any manner to fix or otherwise establish bids, prices (including price increases, decreases, standardization or stabilization), profits, costs, contract terms affecting price (such as discounts and credit terms), etc. because, e.g. prices were too low, with the exception of certain resale pricing agreements between manufacturers and retailers or distributors.
- Agreeing in any manner to limit or restrict the quality of products to be produced (e.g., restrictions on selling coated strand to certain customers).
- Participating in any plan which has the effect of discriminating against, or excluding competitors, suppliers or customers.

These examples are provided to guide you in your discussions during formal and informal PTI meetings and social events. If the occasion arises, more specific advice will be provided by legal counsel, who is required by Article IV, Section 7 of the PTI By-Laws to be present at all meetings of the Board of Directors and the Executive Committee.

M-10 Unbonded Tendon Specification

Anchorage Connection Proposal

2.4.1.1 – Anchorage-to-sheathing connection

Any component used to connect the sheathing to any anchorage or coupler enclosure shall conform to the following:

- 1) The connecting components shall:
 - a. Be watertight in conformance with Section 2.5.8.
 - b. Conform to the same requirements as the sheathing for durability during fabrication, transportation, handling, storage and installation.
 - ~~c. Have a minimum thickness of 0.050 in [1.25 mm].~~
 - d. Have a watertight, positive mechanical connection to the anchorage protection or coupler enclosure and a watertight connection at the tendon sheathing. The watertight connection shall be achieved by either a sheathing overlap system meeting the requirements of Section 2.4.1.1.a, a sheathing restraint system meeting the requirements of Section 2.4.1.1.b, or a combination of both. Encapsulation systems which rely on both sheathing overlap and sheathing restraint to provide a watertight connection shall meet the requirements of both 2.4.1.1.a and 2.4.1.1.b.
 - ~~e. Have a minimum 4 in. [100 mm] overlap and maintain a seal between the end of the extruded sheathing covering the prestressing steel and the watertight connection at the tendon sheathing.~~
 - f. ~~Be translucent or have other method of verifying compliance with Sections 2.4.1.1.1.e and 2.4.1.1.2.~~
- 2) Within the connecting component or enclosure, prestressing steel shall be either covered by sheathing for its full length, or be in full contact with PT coating in conformance with Section 2.2.3 where sheathing is not present.

2.4.1.1.a Sheathing Overlap Connection

1. Have a minimum thickness of 0.050 in [1.25 mm].
2. After fabrication and up until shipment to the jobsite, have a minimum 4 in. [100 mm] overlap and maintain a seal between the end of the extruded sheathing covering the prestressing steel and the watertight connection at the tendon sheathing.
3. Be translucent or have other method of verifying compliance with Sections 2.4.1.1.a.1 and 2.4.1.1.2.

2.4.1.1.b Sheathing Restraint Connection

1. The sheathing-anchor connection shall resist movement of the sheathing due to handling and temperature change, and maintain a seal between the end of the extruded sheathing covering the prestressing steel and the watertight connection at the tendon sheathing.
2. Shall be tested in accordance with and meet the requirements of Section 2.5.9.

2.5.8 -- Hydrostatic test

Representative couplers and anchorages shall be tested to ensure a watertight encapsulation of prestressing steel and all connections in conformance with Sections 2.5.8.1 through 2.5.8.3. ~~Stressing-end, intermediate, and fixed-end anchorage- assemblies shall each be tested.~~ Three tests are required for each assembly. Tests shall be performed, or observed and certified by an independent testing laboratory accredited under ASTM C1077. ~~with all three passing for the system to pass.~~

Retesting is required every five years or whenever a component of an assembly changes or the testing criteria changes.

Encapsulated systems using components from different manufacturers are acceptable provided they are tested in accordance with Sections 2.5.8.1 through 2.5.8.3.

2.5.8.1 Encapsulation System Using Sheathing Overlap Connection

2.5.8.1.a – Samples: *Sheathing Overlap Connection*

Representative samples from production runs, selected and assembled by the manufacturer shall be used in testing. ~~Stressing-end, intermediate, and fixed-end assemblies shall each be tested.~~

2.5.8.1.b – Assemblies: *Sheathing Overlap Connection*

The sheathing shall be pulled and withdrawn from the anchorages so that a maximum of a $\frac{3}{4}$ -inch (+ 0 or – 1/8-in) overlap of the sleeve over the sheathing remains. Anchorage assemblies with the $\frac{3}{4}$ -inch overlap shall be arranged in a position to ensure a uniform hydrostatic pressure of no less than ~~1.25~~ 10 psi [0.~~0086~~ 0688? MPa] for a period of 24 hours.

2.5.8.1.c -- Test procedure: *Sheathing Overlap Connection*

During the test procedure, the following steps are required to detect the presence of moisture:

- 1) Add white pigment to the PT coating;
- 2) Use a colored dye in the water that will contrast with the white color of the PT coating; and
- 3) After 24 hours, the encapsulated system shall be removed and the color of the PT coating shall be noted.

~~No colored dye staining inside the encapsulated system anywhere on the white PT coating is permissible.~~

2.5.8.2 Encapsulation System Using Sheathing Restraint Connection

2.5.8.2.a – Samples: *Sheathing Restraint Connection*

Representative samples from production runs, selected and assembled by the manufacturer shall be used in testing. Anchorage assemblies shall first be subjected to the Sheathing Restraint Test in accordance with Section 2.5.9 and then used for the Hydrostatic Test.

2.5.8.2.b – Assemblies: Sheathing Restraint Connection

Anchorage assemblies shall be arranged in a position to ensure a uniform hydrostatic pressure of no less than 10 psi [0.0086 0688? MPa] for a period of 24 hours.

2.5.8.2.c -- Test procedure: Sheathing Restraint Connection

During the test procedure, the following steps are required to detect the presence of moisture:

- 1) Add white pigment to the PT coating;
- 2) Use a colored dye in the water that will contrast with the white color of the PT coating; and
- 3) After 24 hours, the encapsulated system shall be removed and the color of the PT coating shall be noted.

2.5.8.3 – Acceptance Criteria

Anchorage shall remain watertight for the duration of the test. For an encapsulation system to pass, no colored dye shall be visible on the white PT coating inside of the encapsulation system. No colored dye staining inside the encapsulated system anywhere on the white PT coating is permissible. All three tests for each anchorage assembly shall pass for the system to pass.

2.5.9 – Sheathing Restraint Test

This test is applicable to anchorages and couplers that use a sheathing restraint connection as part of the encapsulation system. Representative anchorages and couplers shall be tested to ensure the effectiveness of the sheathing restraint connection in conformance with Sections 2.5.9.1 through 2.5.9.4. Stressing-end, intermediate, and fixed-end anchorage assemblies shall each be tested. Three tests are required for each assembly. Tests shall be performed, or observed and certified by an independent testing laboratory accredited under ASTM C1077.

Retesting is required every five years or whenever a component of an assembly changes or the testing criteria changes.

Encapsulated systems using components from different manufacturers are acceptable provided they are tested in accordance with Sections 2.5.9.1 through 2.5.9.4.

2.5.9.1 – Samples

Representative samples from production runs, selected and assembled by the manufacturer shall be used in testing.

2.5.9.2 – Assemblies

Test Specimen – anchorage with sheathing restraining device and 36” of sheathed strand. Sheathing restraining device retains sheathing at one end. Sheathing at opposite end is held by some kind of gripping system, with the end of the gripping device 30 inches (+ or – ½ in.) from the bearing side back of the anchorage. A loading device shall be used to pull the sheathing away from the anchorage, and a load cell is used to measure the force.

2.5.9.3 -- Test procedure:

During the test procedure, the following steps are required:

1. Measure the distance of the end of the gripping device from the bearing side back of the anchorage and record the value.
2. Gradually apply load to the end of the sheathing by pulling on the gripped sheathing.
3. Slowly apply load until sheathing elongates a minimum of 1 inch, and a minimum force of 150 lbs is achieved. If the sheathing should break prior to achieving both criteria, a new test specimen shall be prepared and retested.
4. Once both criteria have been met, hold the force for 15 seconds.
5. Measure and record the distance of the end of the gripping system from the bearing side back of the anchorage.
6. Record the force shown on the load cell.
7. Inspect the anchorage and the connection to the sheathing. Note any movement of the sheathing away from the anchorage, and/or any damage.
8. Tested specimens shall be retained for use in the Hydrostatic Test in accordance with 2.5.8.

2.5.9.3 – Acceptance Criteria

For the sheathing restraint test to pass, there shall be no ~~if the tested specimen does not have any~~ observed movement of the sheathing away from ~~the~~ its connection at the anchorage nor any damaged sheathing., the test is passed. All three tests for each anchorage assembly shall pass for the system to pass.

3.2 – Inspection

Conduct a visual inspection to ensure the requirements of this Specification and Contract Documents are met. This inspection shall be performed by personnel certified in accordance with PTI's Level 2 Unbonded PT Inspector program or as otherwise specified. Submit documentation of inspector certification. Inspection shall include, but not be limited to:

- Material cleanliness;
- Location and quantity of materials;
- Corresponding material and stressing equipment certifications;
- Stressing of prestressing tendons;
- Length of strand tails;
- Installation of encapsulation caps, sleeves and sheathing-anchor connections; and
- Filling of stressing pockets.

3.7.5 – Stressing anchorages

3.7.5.6 – Encapsulation

Prior to concrete placement install all components of the encapsulation system following the PT supplier's instructions to completely seal the anchorage from moisture. For encapsulation systems which utilize a sheathing overlap connection per Section 2.4.1.1.a, the sleeve shall

overlap the sheathing by a minimum of one inch at all times prior to concrete placement. For encapsulation systems which rely on a sheathing restraint connection per Section 2.4.1.1.b, the sheathing of the tendon shall be firmly engaged into the restraint device. The connection between the encapsulation components and the sheathing shall be watertight meeting the requirements of Section 2.4.1.1. Encapsulation caps shall be installed as soon as possible but within 8 hours after the cutting of the tendon tails. An independent inspection agency shall verify the proper installation of the encapsulation system ~~caps prior to filling the stressing pockets.~~

3.7.5.7 – Encapsulation cap cover

Unless otherwise specified, concrete cover from the exterior edge of the concrete shall not be less than 1 in. [25 mm] to the encapsulation component.

3.7.6 Intermediate anchorages

3.7.6.5 – Encapsulation

Prior to concrete placement install all components of the encapsulation system following the PT supplier's instructions to completely seal the anchorage from moisture. For encapsulation systems which utilize a sheathing overlap connection per Section 2.4.1.1.a, the sleeve shall overlap the sheathing by a minimum of one inch at all times prior to concrete placement. For encapsulation systems which rely on a sheathing restraint connection per Section 2.4.1.1.b, the sheathing of the tendon shall be firmly engaged into the restraint device. After stressing, complete the intermediate encapsulation by installing the intermediate components following the PT supplier's instructions to completely seal the wedge cavity from moisture. The connection between the encapsulation components and the sheathing shall be watertight meeting the requirements of Section 2.4.1.1.

Encapsulation components shall be installed within 8-hours after stressing.

3.7.7 – Fixed anchorages

3.7.7.4 – Encapsulation

Cap the wedge cavity with an encapsulation cap and ~~install sleeves and seals~~ connecting sheathing to anchorage to completely seal the area against moisture. For encapsulation systems which utilize a sheathing overlap connection per Section 2.4.1.1.a, the sleeve shall overlap the sheathing by a minimum of one inch at all times prior to concrete placement. For encapsulation systems which rely on a sheathing restraint connection per Section 2.4.1.1.b, the sheathing of the tendon shall be firmly engaged into the restraint device. The connection between the encapsulation components and the sheathing shall be watertight meeting the requirements of Section 2.4.1.1. ~~The previous sentence highlighted in aqua needs to be the same color font as the sentence before it. This has been added since the document was approved.~~ The encapsulation cap shall be installed after coating the strand tail and wedge cavity with PT coating meeting the requirements of Sections **2.2.1** and **2.2.2**.

M-10 Spec Proposal
Questions for the Committee

- Does the force level (150 lbs) and the elongation (1-in.) criteria for the restraint test seem reasonable for the HDPE being used?
- Will the sheathing continue to elongate as the load is held for 15 secs.?
- Is 5 years a reasonable time for retesting?
- Should the hydrostatic test be conducted on samples under load for encapsulation systems relying on a sheathing restraint connection? (not presently part of the proposal)
- Is the 1-in. minimum overlap requirement reasonable for the field?

M-10 Spec Proposal

Summary of Changes

- Permit the watertight connection to be made either by using a sheathing overlap (i.e. sleeve), by a sheathing restraint device or by both.
- For systems that rely on sheathing overlap for the encapsulation, maintain the minimum 4-inch overlap requirement for fabrication; check during certification inspections
- For systems that rely on sheathing overlap for the encapsulation, maintain minimum overlap (1 in.) for construction up until concrete placement.
- For systems that rely on sheathing overlap for the encapsulation, revise Hydrostatic (watertightness) test to test specimens using the minimum specified overlap for the field (1-in.) less ¼-in. (i.e. ¾ in. overlap for testing.)
- For systems that rely on sheathing restraint for the encapsulation, introduce a test that evaluates the effectiveness of the restraint system.
 - Test to be conducted by an independent laboratory
 - Three tests of each anchor and coupler assembly
 - Anchor with 36+ inches of sheathed strand
 - Pull on sheathing 30 inches from the back of the anchor so that:
 - A minimum force of 150 lbs is applied, and
 - The sheathing elongates at least 1 inch
 - Once both force and elongation has been met, hold force for 15 sec.
 - Retain test specimens for use in hydrostatic test
- Increase hydrostatic test pressure to 10 psi to reflect ACI 350 Environmental Structures code requirements
- Require hydrostatic test to be conducted by an independent laboratory
- Require hydrostatic and restraint tests to be redone every 5 years

PTI Committee: M-10 Unbonded Tendon Committee	Ballot: M-10-1501	Ballot Start Date:	March 7, 2016
Document Title: M10.3-16, Field Procedures Manual for Unbonded Tendons – Responses to TAB		Ballot End Date:	April 7, 2016
Comments			Extended to April 14, 2016

Ballot Summary:

Ballot Item	Yes	No	Abs/No Vote	Meets ½ Rule	Meets 2/3 Rule	Item Passes	Voting Participation
3	11	1	9	Yes	Yes		Number of voting members: 21 Ballots not received from: Barbosa, Cheema, Douglas, Draginis, D. Harrison, J. Harrison, Khoury, Nethken, Stevens Ballot received from associate members: Alarcon, Krauser
13	11	1	9	Yes	Yes		
30	11	1	9	Yes	Yes		
37	11	1	9	Yes	Yes		
57	11	1	9	Yes	Yes		
68	11	1	9	Yes	Yes		
84	11	1	9	Yes	Yes		
87	10	2	9	No	Yes		
89	11	1	9	Yes	Yes		
120	11	1	9	Yes	Yes		
129	9	3	9	No	Yes		
142	11	1	9	Yes	Yes		

Voting: Y – Approve; Y-E – Approve with Editorial Comment –N – Negative; A – Abstain.

PTI Committee: M-10 Unbonded Tendon Committee	Ballot: M-10-1501	Ballot Start Date:	March 7, 2016
Document Title: M10.3-16, Field Procedures Manual for Unbonded Tendons – Responses to TAB		Ballot End Date:	April 7, 2016
Comments			Extended to April 14, 2016

Voting Members /Section	3	13	30	37	57	68	84	87	89	120	129	142
Schlegel												
Barbosa												
Cheema												
Douglas												
Draginis												
D. Harrison												
J. Harrison												
N. Khosa												
R. Khosa									N			
Khoury												
Mathews	N	N	N							N	N	
Nethken												
Price						N	N	N			N	N
Ross												
Scoppa												
Sorkin					N			N			N	
Stevens												
Sward												
Tkachuk												
D. Williams												
M. Williams				N								

PTI Committee: M-10 Unbonded Tendon Committee	Ballot: M-10-1501	Ballot Start Date:	March 7, 2016
Document Title: M10.3-16, Field Procedures Manual for Unbonded Tendons – Responses to TAB		Ballot End Date:	April 7, 2016
Comments			Extended to April 14, 2016

Associate Members /Section	3	13	30	37	57	68	84	87	89	120	129
Alarcon*											
Carnell*											
Deitrich*											
Field*											
Fossing*											
Frenn*											
Hayes*											
Kochis*											
Krauser*					N			N			N
McBride*											
Mikula*											
Paderofsky*											
Pedraza*											
Pethani*											
Sohal*											
Sterling*											
Taylor*											

*nonvoting members

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ALL	ALL	ALL	Alarcon Y		I agree with all proposed resolution to TAB comments.	
ALL	ALL	ALL	N.Khosa Y		I agree with all proposed resolution to TAB comments.	
ALL	ALL	ALL	Ross Y		I agree with all proposed resolution to TAB comments.	
ALL	ALL	ALL	Sward Y		I agree with all proposed resolution to TAB comments.	
ALL	ALL	ALL	Tkachuk Y		I agree with all proposed resolution to TAB comments.	
ALL	ALL	ALL	D. Williams Y		I agree with all proposed resolution to TAB comments.	
3	5	12	Mathews N	E	Add Materials and installation should also comply	OK The last sentence of this paragraph should be deleted as it repeats the first part of the sentence beginning on line 10.
4	5	19	PRICE Y-C	E	Change “Post-Tension” to “Post-Tensioning” This should be done throughout the document.	OK What is being furnished by the PTI Company Member is “post-tensioning materials”; everywhere in the document where there is a reference to the <u>Post-Tension (PT) supplier</u> , this should be changed to “post-tensioning (PT) material supplier” and can be referred to as “PT supplier” throughout the document.
5	5	20	PRICE Y-C	E	Add “govern” after “Documents”. Eliminate the rest of the sentence.	OK We see many examples of specifications and/or LDP Notes that are simply wrong. This change makes it so that there is no resolution of conflicts – the CD’s

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						govern. Needs to be changed to “ ... governs unless modified by addenda, RFI or other document change procedure.”
9	6	14	Mathews Y-C	T	... minimum of 4 in. (100mm) between	For the Unbonded PT Specification, the committee initially proposed 2 in. overlap between the sheathing and the transition tube, but was unable to reach consensus during resolving negatives on responses to TAB comments for the Unbonded Tendon Specification, requiring the old 4 in. overlap. The Specification went to Public Review with the old 4 in. overlap as there was no consensus to change it. The PTI Executive Committee scheduled a web meeting to possibly resolve this issue. M-10 agrees to use the same language in the Field Procedures Manual that will be used in the PTI Unbonded PT Specification. The 4” requirement was developed through the committee process and TAB direction. This requirement should be maintained until the next revision of the specification through the same process.
10	6	14	Mathews Y-C	E	Need space between “of_2”	OK Add space, but change 2 to 4.
11	6	14	Mathews Y-C	T	Require 4” overlap to be consistent with ACI 423.7 See also comment #9.	See reply to comment #9. See comments above.
12	6	14	Mathews Y-C	E	Change to “There should be a 4” (100mm) minimum overlap...”	See reply to comment #9. See comments above.
13	6	18	Mathews N	E	should be either continuously covered by the sheathing	OK In order to be consistent with the M-10 spec, this sentence should read: “Within the connecting component or enclosure, prestressing steel shall

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						be either covered by sheathing for its full length, or be in full contact with PT coating
28	7	26	PRICE Y-C	E	Change “but” to “and”.	OK Also delete the comma “,but” and replace with “and”
29	8	4	PRICE Y-C	T	Add:They should be readily available for reference when needed and should be furnished to the Architect/Engineer in accordance with the contract documents. Sample certification for strand is	OK Change to “and should be furnished with all deliveries of PT materials in accordance with the contract documents.”
30	8	11	Krauser E	E	Replace following statement as follows: Calibration is required within the past 6 months, unless superseded by project requirements. Jacks should be calibrated every six months unless superseded by project requirements and it is recommended that freshly calibrated jacks should be used at the start of a new project.	OK Suggest changing “freshly” to “recently”.
30	8	11	Mathews N	E	Replace following statement as follows: Calibration is required within the past 6 months, unless superseded by project requirements. Jacks should be calibrated every six months unless superseded by project requirements and it is recommended that freshly calibrated jacks should be used at the start of a new project.	OK “Freshly” may be too inexact. Recommend: “Jacks and gauges should be calibrated at intervals not exceeding every six months unless superseded by project requirements. And it is recommended that freshly calibrated jacks and gauges should be used calibrated at the start of a new project.”
30	8	11	PRICE Y-C	E	Replace following statement as follows: Calibration is required within the past 6 months, unless superseded by project requirements. Jacks should be calibrated every six months unless superseded by project requirements and it is recommended that freshly calibrated jacks should be used at the start of a new project.	OK Replace “freshly” with “newly”.
33	9	11	PRICE	E	Change “but” to “and”.	OK

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			Y-C			See item #28; change to be consistent in document
37	9	24	M. Williams N	E	Eliminate “stored in an unpaved area”.	Remain as written
43	10	7	PRICE Y-C	E	Change “noting the transaction for traceability purposes” to “documenting the change”.	OK There needs to be a stated reason for requiring this – “.purchaser is responsible for documenting the change for traceability purposes.
45	10	9	PRICE Y-C	T	It will be beneficial if some specific direction can be given about what extreme cold is.	Modified: “is too low, fluid viscosity is high. At low temperatures, the fluid often reaches the point where it actually congeals and will no longer flow (pour point). Hydraulic fluid freezes around -70 F (-57 C)”. This is too much information. Suggest “Store stressing equipment in a secure, clean, and dry place protected from extreme cold. Stressing equipment with hydraulic fluid should never be exposed to an ambient temperature is below -70 F (-57 C)”.
49	11	16	PRICE Y-C	T	Revise as follows: Pre-installation review of all pertinent documents (specifications, structural drawings – general notes and PT details, PT installation drawings), procedures and coordination with other trades.	OK Revise as follows: Pre-installation review of all pertinent documents (specifications, structural drawings and PT installation drawings), procedures and coordination with other trades.
50	11	21	PRICE Y-C	E	What is Appendix B.1? There is a table in appendix B but no B.1. What is meant by “Check your Work”. Please clarify this bullet.	Modified: “ Change to: “Review installation prior to inspection. Refer to checklist in Appendix B”.
50	11	21	Schlegel Y-C	E	What is Appendix B.1? There is a table in appendix B but no B.1. What is meant by “Check your Work”. Please clarify this bullet.	Modified: “Refer to checklist in Appendix B”. Suggested wording: “Review installation prior to inspection by referring to checklist in Appendix B.”

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55	12	2	PRICE Y-C	E	Add: ductwork begins, but after the installation of the edge forms	OK Change to “ ... ductwork begins and after the ...”
57	12	4	Krauser N	T	Add following: Typically, the headed shear stud reinforcement (stud rails) should be installed at columns prior to installing the tendons.	OK Does headed shear stud reinforcement take precedence over pt tendons? This is now not clear.
57	12	4	Mathews Y-C	T	Add following: Typically, the headed shear stud reinforcement (stud rails) should be installed at columns prior to installing the tendons.	OK I think Stud Rail is a trademark and I recommend excluding the term in parenthesis.
57	12	4	PRICE Y-C	T	Add following: Typically, the headed shear stud reinforcement (stud rails) should be installed at columns prior to installing the tendons.	OK Change to : “Typically, headed shear stud reinforcement (shear rails), if required, should be installed prior to installing the tendons.”
57	12	4	Sorkin N	T	Add following: Typically, the headed shear stud reinforcement (stud rails) should be installed at columns prior to installing the tendons.	OK Does headed shear stud reinforcement take precedence over pt tendons? This is now not clear.
64	13	16	Mathews Y-C	T	Add section and details for anchorages at curved edges	OK; will add plan view with 45 and 60 degree pocket former 45 and 30 degree
64	13	16	Schlegel Y-C	T	Add section and details for anchorages at curved edges	OK; will add plan view with 45 and 60 degree pocket former. For truly curved edges maybe need to add a detail of a standard pocket former inserted into the anchor with “pipe” foam rubber to butt up against the pocket former and then cut at the other end to match the curve of the slab edge.
67	14	7	PRICE Y-C	E	Rephrase as follows: Lay out and mark on the deck forms the locations of support bars, marking at each location the chair height. Layout and mark the location of the support bars on the deck forms and mark the chair heights.	OK Change to “Mark the location of the support bars, including the chair heights for each bar location, on the deck forms.”

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68	14	9	PRICE N	T	<p>Cannot place bottom mat before placing tendons otherwise the low point CGS may not be achieved.</p> <p>Revise as follows: 4.4.8 In a two-way flat plate, place all bottom reinforcing steel parallel to the distributed tendons first. Orthogonal direction rebar may be placed at those locations where they go under the distributed tendons. Orthogonal direction rebar in the low point region of the distributed tendons should be placed after all the distributed tendons have been placed so that the desired CGS of the distributed tendons is achieved. This same concept applies to the bottom rebar in the banded direction between the banded tendons.</p>	<p>OK</p> <p>Change to: “If a bottom mat of rebar is required, check the PT installation drawings to determine if there is a conflict between the rebar and the tendon profile requirement at the low point. If there is no conflict, install the bottom mat. If a conflict exists, place the bottom reinforcing steel in the direction parallel to the conflict first and then install the bar in the perpendicular direction omitting the bars in the middle 1/5 of the bay. Install the tendons. Finally place the bars in the middle 1/5 of the bay on top of the tendons. This procedure can apply to conflicts at the low point in either the distributed or banded tendon direction or both.</p>
69	14	13	PRICE Y-C	T	<p>Add “A common method is to” in front of sentence to read:</p> <p>A common method is to place distributed tendons over each column (inside the column steel) first (a minimum of two). Then roll out the banded tendons followed by the remaining distributed tendons. Unroll the tendons in the proper location beginning from the fixed anchorage (if any) and uncoil them toward the stressing anchorage.</p>	<p>OK</p> <p>This is only applicable if the LDP’s design has the same CGS in both directions at the column. There are many designs that account for the conflict at the high-point. Revise to read: If the design shows the same CGS for the banded and distributed tendons at the column, it is a common method to place distributed tendons over each column (inside the column steel) first (a minimum of two). Then roll out the banded tendons</p>
70	14	13	PRICE Y-C	G	<p>Fig 4.2 is confusing due to sequence of placement referenced in line 13 – 4.4.11</p> <p>Clarify detail (show the distributed tendons under the banded tendons over the columns).</p>	<p>Fig. 4.2 will be redone to show distributed tendons under banded tendons over the columns.</p> <p>Comment: If you make this modification to the detail, the title needs to be changed to “Distributed tendon”</p>

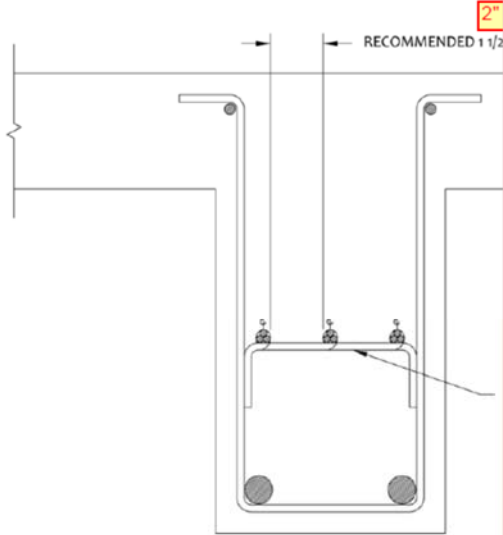
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						support detail at columns". "for two-way flat plate" is not needed since the detail is in this section.
72	15	Fig 4.2	PRICE Y-C	T	The text on P15-L13 states that at columns, place distributed tendons first then banded tendons. This is in contradiction to what is shown on Fig 4.2. In the figure the distributed tendons are placed on top of banded. The figure needs to be revised to reflect text.	Fig. 4.2 will be redone to show distributed tendons under banded tendons over the columns. See item #70
73	15	16	PRICE Y-C	E	Revise as follows: less normally will require reinforcement in accordance with the ACI 318 code as shown in Fig. 4-3a, or with a similar detail using closed	OK Change last sentence to "An alternate detail using shear rails is shown in Fig. 4-3b."
74	16		PRICE Y-C	T	Revise Fig. 4-3a as follows: - Show corner bars in hairpins and add a note pointing to them "Add bars as required to support hairpin in place"; - Add on the end of the #4 backup bar callout, "and placed between hairpin and bearing surface of anchor". - Remove the note "Distributed tendons"; - In plan view, reduce spacing between anchors to show typical placement side-by-side; keep the note about anchorage spacing; remove note "in contact to 1/2 h from..."	OK The #4 back-up bars should extend a minimum of 12-inches beyond the last anchor for full embedment development length or have 90-degree hook at slab corner.
79	17		PRICE Y-C	T	Modify Fig. 4-3b: - Use term "headed shear stud reinforcement" per 318; - Show concrete cover under headed shear stud plate; - Add on the end of the #4 backup bar callout, "and placed between hairpin and bearing surface of anchor". - Reduce spacing between anchors in plan view to show typical placement side-by-side; keep the note about anchorage spacing.	OK The #4 back-up bars should extend a minimum of 12-inches beyond the last anchor for full embedment development length or have 90-degree hook at slab corner.

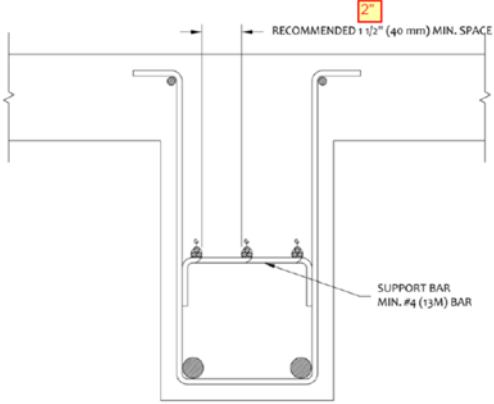
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82	19	3	PRICE Y-C	G	Lines 3-4: This section needs to be reviewed and rewritten. Recommend: "Caution: Ensure that no electrical, mechanical, and railing sleeves are placed after the PT inspection and just before concrete placement".	OK "Electrical, mechanical, and railing sleeves are not to be installed after the PT inspection".
84	21	7-8	PRICE N	T	If closed stirrups are shown, these could should be changed to open top with closure caps in some instances if approved by LDP.	OK It is impractical to install tendons in an element with closed stirrups throughout its full length. This has to be changed to open top with full development caps and this is where this need to be addressed. Revert to original text.
87	21	13	Krauser N	T	Recommend following:	OK Why 2" – it should be 2 x size of concrete aggregate

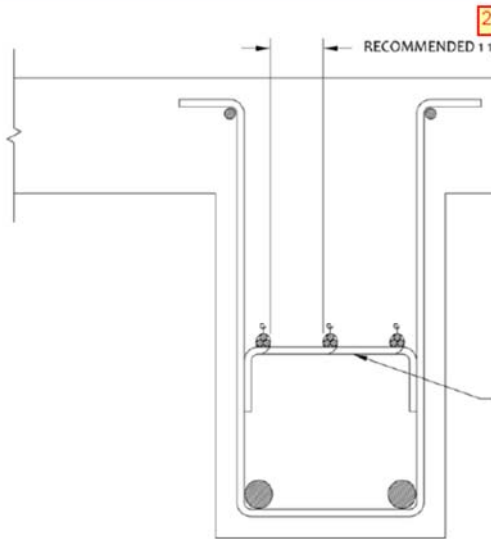
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					 <p>Fig. 4-8 Beam tendon support</p>	
87	21	13	PRICE N	T	Recommend following:	OK Aggregate size in concrete mixes is 1-inch or less, so the 1-1/2" minimum spacing between bundles is correct. The space for the tendon bundles is critical given the number of tendons and the width of the beam in most projects. The extra 1/2" space is necessary to make everything "fit" and does not provide any better chance for consolidation.

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					 <p>Fig. 4-8 Beam tendon support</p>	<p>Note – Move the outside bundles shown in the detail to the interface between the stirrup & support bar and show 4-bundles.</p>

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87	21	13	Sorkin N	T	Recommend following:	OK
					 <p>Why 2" – it should be 2 x size of concrete aggregate</p>	
89	23	7	R. Khosa N		Placing temp. tendons within the kern will introduce another layer of reinforcement which gets disturbed by ironworkers walking on it. Furthermore, it will add to the cost through extra support bars and chairs. Over more than three decades, most times the temp. tendons have been placed over the main slab tendons with good result. Why change what works. I recommend that temp. tendons should be placed on top of the main slab tendons.	

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						<p>NOTES: 1. TEMPERATURE TENDONS SHOWN IN CENTER HEIGHT OF SLAB, BUT THEY MAY BE PLACED IN THE CENTER THIRD OF THE SLAB THICKNESS. 2. SEE FIGURE 4-2 FOR TYPICAL TENDON SUPPORT DETAILS</p> <p>the centroid of the temperature tendons must fall within the kern (middle third) section of the slab</p> <p>placement of temperature and distributed tendons</p> <p>Fig. 4-11 Details for temperature tendons in beam and one-way slab construction</p>		<p>Modify notes as follows (instead of markups of figure):</p> <ol style="list-style-type: none"> 1) Temperature tendons are shown at mid depth of slab but they may be placed on top of the slab tendons if the centroid of the temperature tendons is maintained within the middle one third of the slab thickness. 2) See Fig. 4.2 for typical tendon support details <p>Fig. 4-11 Details for placement of temperature and distributed tendons in beam and one-way slab construction</p> <p>Recommendation: Show two separate figures, one for distributed tendon placement with separate supports at highpoints and the other for placement of temperature tendons. OK; will make changes and separate figures.</p>

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92	23	13	Schlegel Y-C	T	This sentence should have a separate section. 4.5.5 Anchorage zone reinforcing steel is required to prevent concrete failure in the highly stressed region behind the anchorages during stressing. This reinforcement is critical and should be installed exactly as shown on the PT installation drawings.	OK If item #91 is section 4.5.5 then this section should be 4.5.6.
100	26	10	PRICE Y-C	E	Change “operate properly” to “malfunction”.	OK Change “not operate properly” to “malfunction”.
100	26	12	Scoppa Y-C			Add “not” to deleted” words if you change “operate properly” to “malfunction”.
103	26	15	Mathews Y-C	T	Add following: Verify that the stressing equipment was calibrated within the required period of time, not to exceed 6 months. It is recommended that freshly calibrated jacks should be used at the start of a new project.	OK It is recommended that freshly calibrated jacks and gauges should be calibrated used at the start of a new project.
103	26	15	PRICE Y-C	T	Add following: Verify that the stressing equipment was calibrated within the required period of time, not to exceed 6 months. It is recommended that freshly calibrated jacks should be used at the start of a new project.	OK Replace “freshly” with “newly”
103	26	15	Schlegel Y-C	T	Add following: Verify that the stressing equipment was calibrated within the required period of time, not to exceed 6	OK To incorporate item #102, revise the proposed sentence to “...within the required time period, not to exceed 6 months. It is recommended....”

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					months. It is recommended that freshly calibrated jacks should be used at the start of a new project.	
106	26	23	PRICE Y-C	E	Eliminate “phase of the stressing”.	OK Change to “... foreign material which could prevent the wedges from seating properly causing the strand to slip through the anchor during or after wedge seating.”
107	26	24	PRICE Y-C	E	Eliminate “operation”.	OK See item 106
110	28	10	Schlegel Y-C	E	6.3.10 Check that the stressing equipment is used only by trained and qualified personnel:	OK The revised sentence is not the original intent of the sentence. However this sentence is good but needs to be modified to read: “The stressing equipment should be checked and used only by trained and qualified personnel:” The sentence on line #11 then replaces the intent of the first sentence.
112	30	2	PRICE Y-C	E	Need “.” At end of sentence	OK “This platform should have a minimum width of 24-inches and be clear of excess material, debris and other obstructions that will prevent access to all stressing locations.” Place this sentence before “Do not reach...”
115	37	23	Schlegel Y-C	E	same marking device against the concrete or initial reference surface,	Modified: “After removing the jack from the tendon tail, place the same marking device against the concrete surface or initial reference point, and measure the distance from the marking device or reference point to the reference mark on the strand to the nearest 1 /8 in”. Sentence is good but replace “strand” with “tendon tail”
116	39	12	PRICE Y-C	T	Add following sub-section:	OK Correct spelling from “gage” to “gauge”.

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					e. Damaged gauge. Make sure that the gage starts at a zero reading. Any reading above or below the zero gage dial may result in over or under-stressed tendons.	Change “dial” to “reading”
119	42	12	PRICE Y-C	G	Should be “cut <u>away from the face</u> ”	Modified: “The tendon tail should be cut at a specified distance from the face of the anchor casting for a particular PT system as shown on the PT installation drawings so that the protruding strand tail does not interfere with proper seating of the encapsulation cap.” Change modification to: “The tendon tail should be cut at the specified distance from the face of the anchor casting for the particular PT system used as shown on the PT installation drawings so that the protruding strand tail does not interfere with proper installation of the encapsulation cap.”
120	42	24	Mathews N	E	Encapsulation caps should are to be installed within 8-hours after cutting the tendon tails and is to should be verified by a qualified inspector.	OK The M-10 spec uses “shall” for both of these requirements so imperative language should remain.
122	43	1	Krauser E	E	Fill the stressing pocket with a chloride free nonmetallic, non-shrink grout within 1 day after tendon tail cutting or as specified in the contract documents.	OK Confirm wording is consistent with FAQ 11
129	44	1	Krauser N	G	Not clear “have been approved, have the	Modified: “After the measured elongations have been approved, have the tendon tails been cut off to the proper length? Strand tail length after cutting should not be less than ½” (13 mm). Strand tail length protruding from the face of the anchor casting should be as specified by the PT supplier. An excessively long strand tail may cause the encapsulation cap to puncture and/or not fit and seal properly. Unless

PTI Committee: M-10 Unbonded Tendon Committee	Ballot: M-10-1501	Ballot Start Date:	March 7, 2016
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Comments			Extended to April 14, 2016

#	Page #	Line #	Your Name & Vote: Y / Y-C / N	TAB Comment G / T / E	Y = Yes Y-C = Yes with Comment N = No (Must include a reason and proposed solution)	Proposed TAB Comment Resolution / Your Comments & Negatives
						otherwise specified, concrete cover to the encapsulation component should not be less than 1 in. for slabs and 1 ½ in. for beams, and concrete cover to the wedge cavity (depth of stressing pocket) should not be less than 2 in.” Where did 1-1/2” for beams come from?
129	44	1	Mathews N	G	Not clear “have been approved, have the	Modified: “After the measured elongations have been approved, have the tendon tails been cut off to the proper length? Strand tail length after cutting should not be less than ½” (13 mm). Strand tail length protruding from the face of the anchor casting should be as specified by the PT supplier. An excessively long strand tail may cause the encapsulation cap to puncture and/or not fit and seal properly. Unless otherwise specified, concrete cover to the encapsulation component should not be less than 1 in. for slabs and 1 ½ in. for beams, and concrete cover to the wedge cavity (depth of stressing pocket) should not be less than 2 in.” M-10 spec makes no distinction between beams and slabs. The standard should be 1” regardless.
129	44	1	PRICE N	G	Not clear “have been approved, have the	Modified: “After the measured elongations have been approved, have the tendon tails been cut off to the proper length? Strand tail length after cutting should not be less than ½” (13 mm). Strand tail length protruding from the face of the anchor casting should be as specified by the PT supplier. An excessively long strand tail may cause the encapsulation cap to puncture and/or not fit and seal properly. Unless

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						<p>otherwise specified, concrete cover to the encapsulation component should not be less than 1 in. for slabs and 1 ½ in. for beams, and concrete cover to the wedge cavity (depth of stressing pocket) should not be less than 2 in.”</p> <p>The cover requirement to the cap should be 1-inch for both beams & slab tendons.</p>
129	44	1	Sorkin N	G	Not clear “have been approved, have the	<p>Modified: “After the measured elongations have been approved, have the tendon tails been cut off to the proper length? Strand tail length after cutting should not be less than ½” (13 mm). Strand tail length protruding from the face of the anchor casting should be as specified by the PT supplier. An excessively long strand tail may cause the encapsulation cap to puncture and/or not fit and seal properly. Unless otherwise specified, concrete cover to the encapsulation component should not be less than 1 in. for slabs and 1 ½ in. for beams, and concrete cover to the wedge cavity (depth of stressing pocket) should not be less than 2 in.”</p> <p>Where did 1-1/2” for beams come from?</p>
134	49	3	PRICE Y-C	G	Add a sentence about installer filling grease into translucent tubes	<p>Modified: “After job site attachment of fixed or intermediate anchorages, inspect the anchorage for any damage to the sheathing, translucent tubes, or any other parts of the encapsulation system and repair, if necessary. This may also require injecting PT coating into the tubes. Install the encapsulation cap</p>

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						over the strand tail following the instructions of the PT supplier to meet the encapsulation requirements”. Change modification to: “This may also require injecting PT coating into any tubes that are part of the encapsulation system. For fixed-ends, install the encapsulation cap over the strand tail following the instructions of the PT supplier to meet the encapsulation requirements”.
n/a	App A.2	62	Tkachuk		I would like to add one thing to page #62. The Unbonded Tendon Stressing Record chart also needs to include, a column for “Lift-Off Pressure” and a column at the end for “Remarks	
142	App B		Krauser E	T	Somewhere in the checklist include the following: <ul style="list-style-type: none"> - is there no bear steel exposed where the strand enters the encapsulation sleeve at fixed ends. - Is there no bear steel exposed where the strand enters the encapsulation sleeve at stressing ends. - Are there a minimum of 2 strands within the column vertical reinforcing bars in the banded and distributed tendon directions. 	Modified: Add 2.3.13: “Is there no bear steel exposed where the tendon enters the encapsulation sleeve at stressing and intermediate anchorages?” Add after 2.4.7 and renumber: “Is there no bear steel exposed where the tendon enters the encapsulation sleeve at fixed ends?” Add 2.5.13: “Are there a minimum of 2 tendons within the column vertical reinforcing bars in the banded and distributed tendon directions?” Change “bear” to “bare”.
142	App B		Mathews Y-C	T	Somewhere in the checklist include the following: <ul style="list-style-type: none"> - is there no bear steel exposed where the strand enters the encapsulation sleeve at fixed ends. - Is there no bear steel exposed where the strand enters the encapsulation sleeve at stressing ends. 	Modified: Add 2.3.13: “Is there no bear steel exposed where the tendon enters the encapsulation sleeve at stressing and intermediate anchorages?” Change “bear” to “bare”.

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					<ul style="list-style-type: none"> - Are there a minimum of 2 strands within the column vertical reinforcing bars in the banded and distributed tendon directions. 	<p>Add after 2.4.7 and renumber: "Is there no bear steel exposed where the tendon enters the encapsulation sleeve at fixed ends? Change "bear" to "bare"."</p> <p>Add 2.5.13: "Are there a minimum of 2 tendons within the column vertical reinforcing bars in the banded and distributed tendon directions?"</p>
142	App B		PRICE N	T	<p>Somewhere in the checklist include the following:</p> <ul style="list-style-type: none"> - is there no bear steel exposed where the strand enters the encapsulation sleeve at fixed ends. - Is there no bear steel exposed where the strand enters the encapsulation sleeve at stressing ends. - Are there a minimum of 2 strands within the column vertical reinforcing bars in the banded and distributed tendon directions. 	<p>Modified:</p> <p>Add 2.3.13: "Is there no bear steel exposed where the tendon enters the encapsulation sleeve at stressing and intermediate anchorages?"</p> <p>Add after 2.4.7 and renumber: "Is there no bear steel exposed where the tendon enters the encapsulation sleeve at fixed ends?"</p> <p>Add 2.5.13: "Are there a minimum of 2 tendons within the column vertical reinforcing bars in the banded and distributed tendon directions?"</p> <p>Change modification to:</p> <p>Add 2.3.13: "Is there a minimum 4-inch overlap between the end of the tendon sheathing and the end of the sleeve at stressing and intermediate anchorages?"</p> <p>Add after 2.4.7 and renumber: "Is there a minimum 2-inch overlap between the end of the tendon sheathing and the end of the sleeve of the encapsulation sleeve at fixed ends?"</p>
142	App B		Scoppa Y-C	T		I believe that you want to use the word "bare" steel.

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Document Title: M10.2-xx: Specification for Unbonded Single Strand Tendons – Review of Response to TAB Comments		Ballot End Date:	September 11, 2015

Ballot Summary:

Ballot Item	Yes	No	Abs/No Vote	Meets ½ Rule	Meets 2/3 Rule	Item Passes	Voting Participation
1	13	0	8	Y	Y	Y	Number of voting members: 21 Ballots not received from: Barbosa, Douglas, D. Harrison, Ross, Scoppa, Stevens, Sward Ballot received from associate members: Alarcon, Krauser, Sohal, Sterling
2	13	0	8	Y	Y	Y	
3	13	0	8	Y	Y	Y	
4	13	0	8	Y	Y	Y	
5	13	0	8	Y	Y	Y	
6	13	0	8	Y	Y	Y	
7	13	0	8	Y	Y	Y	
8	13	0	8	Y	Y	Y	
9	11	2	8	Y	Y		
10	11	2	8	Y	Y		
11	13	0	8	Y	Y	Y	
12	13	0	8	Y	Y	Y	
13	13	0	8	Y	Y	Y	
14	13	0	8	Y	Y	Y	
15	13	0	8	Y	Y	Y	
16	13	0	8	Y	Y	Y	
17	13	0	8	Y	Y	Y	
18	11	2	8	Y	Y		
19	13	0	8	Y	Y	Y	

Voting: Y – Approve; Y-E – Approve with Editorial Comment –N – Negative; A – Abstain.

PTI Committee: M-10 Unbonded Tendon Committee	Ballot: M-10-1502	Ballot Start Date:	August 11, 2015
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Voting Members /Section	1	9	10	17	18
Schlegel	Y	Y	Y	Y	Y
Barbosa					
Cheema	Y	Y	Y	Y	Y
Douglas					
Draginis	Y	Y	Y	Y	N
D. Harrison					
J. Harrison	Y	N	N	Y	Y
N. Khosa	Y	Y	Y	Y	Y
R. Khosa	A	A	A	A	A
Khoury	Y	Y	Y	Y	Y
Mathews	Y	Y	Y	Y	N
Nethken	Y	Y	Y	Y	Y-E
Price	Y	Y	Y	Y-E	Y
Ross					
Scoppa					
Sorkin	Y	N	N	Y	Y
Stevens					
Sward					
Tkachuk	Y	Y	Y	Y	Y
D. Williams	Y	Y	Y	Y	Y
M. Williams	Y	Y	Y	Y	Y

Associate Members /Section	1	9	10	17	18
Carnell*					
Deitrich*					
Field*					
Fossing*					
Frenn*					
Hayes*					
Kochis*					
Krauser*	Y	N	N	Y	Y
McBride*					
Mikula*					
Pedraza*					
Pethani*					
Sohal*	Y-E	Y	Y	Y	Y
Sterling*	Y	Y	Y	Y	Y
Taylor*					

* nonvoting members

PTI Committee: M-10 Unbonded Tendon Committee	Ballot: M-10-1502	Ballot Start Date:	August 11, 2015
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Name	Comment #	Vote: Y / Y-E / N	Y=Affirmative Y-E=Affirmative with Comment N=Negative (must include reason)	Comment	Proposed Resolution
Cheema N. Khosa Khoury Schlegel Tkachuk D. Williams M. Williams	All	Y		I approve the M-10 Committee responses to the TAB comments	
J. Harrison	9	N		This was discussed and approved at our meeting in Cancun for this specification not the S-O-G Specification. There is no reason for an “overlap” in the field. If the seal against the sheathing works, it works – if the seal does not work, no amount of overlap will help. The primary reason for the overlap was to allow approximately 4-inch of sheathing shrinkage from fabrication to placement; however, some inspectors/engineers are interpreting this to mean in the field. This is the reason for the change from 4-inch to 2-inch. Proposed resolution: leave at 2-inch	
Sorkin	9	N		This was discussed and approved at our meeting in Cancun for this specification not the S-O-G Specification. There is no reason for an “overlap” in the field. If the seal against the sheathing works, it works – if the seal does not work, no amount of overlap will help. The primary reason for the overlap was to allow approximately 4-inch of sheathing shrinkage from fabrication to placement; however, some inspectors/engineers are interpreting this to mean in the field. This is the reason for the change from 4-inch to 2-inch. Proposed resolution: leave at 2-inch	

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Name	Comment #	Vote: Y / Y-E / N	Y=Affirmative Y-E=Affirmative with Comment N=Negative (must include reason)	Comment	Proposed Resolution
J. Harrison	10	N		This was discussed and approved at our meeting in Cancun for this specification not the S-O-G Specification. There is no reason for an “overlap” in the field. If the seal against the sheathing works, it works – if the seal does not work, no amount of overlap will help. The primary reason for the overlap was to allow approximately 4-inch of sheathing shrinkage from fabrication to placement; however, some inspectors/engineers are interpreting this to mean in the field. This is the reason for the change from 4-inch to 2-inch. Proposed resolution: leave at 2-inch	
Sorkin	10	N		This was discussed and approved at our meeting in Cancun for this specification not the S-O-G Specification. There is no reason for an “overlap” in the field. If the seal against the sheathing works, it works – if the seal does not work, no amount of overlap will help. The primary reason for the overlap was to allow approximately 4-inch of sheathing shrinkage from fabrication to placement; however, some inspectors/engineers are interpreting this to mean in the field. This is the reason for the change from 4-inch to 2-inch. Proposed resolution: leave at 2-inch	
Price	17	Y-E		Make last sentence two sentences to read better. “... may be different in each direction. In slabs the horizontal”	
Draginis	18	N		Confusing as written Proposed resolution: Strike out the words “to the strand tail from the exterior face of the concrete”... page 41 lines 7&8	
Mathews	18 (listed on ballot as second #17)	N		p. 41 LINE 7; The 0.5” minimum length of tail is not to achieve cover, but to protect the wedge and anchor connection from disturbance by cutting methods. Section 3.11.1 was written to	

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Name	Comment #	Vote: Y / Y-E / N	Y=Affirmative Y-E=Affirmative with Comment N=Negative (must include reason)	Comment	Proposed Resolution
				apply to both encapsulated and standard systems and should now assume encapsulation. Proposed resolution: Best solution is to revise sentence to read “Minimum cover from the exterior face of the concrete shall comply with section 3.7.5.7.”	
Nethken	18	Y-E		A CLARIFYING SENTENCE WAS PROPOSED HOWEVER NOT SUPPLIED. Proposed resolution: “.... anchor casting. The final tendon length shall not damage or compromise the seal of the encapsulation system.” Encapsulation caps...”	
R. Khosa	n/a	N		1.6.2.2a - Storage prior to shipping It does not make any reasonable sense to allow the fabricated end product be exposed to “any precipitation (snow, rain, etc.)” for a period less than 7 days. How would it be acceptable to expose the end product for say 6.9 days and it would not be acceptable if exposed for 7.1 days. What more bad can happen in another 5 hours beyond 6.9 days that would not have already happened which would suddenly make the end product unacceptable. Refer to the last sentence: “..... shall not be exposed to any elements known to be deleterious or corrosive” . Wouldn’t snow and rain fall in the category of deleterious or corrosive. There seems to be some contradiction. The industry has made a considerable progress in first introducing an encapsulated system, then upgrading it and finally succeeding in having ACI Code require that the said	<u>Unrelated - Consider as new business in next meeting</u>

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Name	Comment #	Vote: Y / Y-E / N	Y=Affirmative Y-E=Affirmative with Comment N=Negative (must include reason)	Comment	Proposed Resolution
				<p>system must be used in all commercial structures. To allow exposure of the end product for 7 days to rain and snow is counter to ensuring that the quality of an encapsulation system is maintained from the time of fabrication to installation</p> <p>SOLUTION – Recommendations The referenced section should read as follows:</p> <p>Stored PT materials shall not be exposed to any precipitation (snow, rain, etc.) as well as any elements known to be deleterious or corrosive.</p>	
R. Khosa	n/a	N	<p>1.6.2.3c – Shipping My vote is negative for the following reasons which are more or less similar in thought process as above.</p> <p>A distance of 500 miles is arbitrary at best. It would mean that if the distance is let say 450 miles, the PT material does not have to be protected. Somehow PT material traveling another say 60 miles would need protection. Enough corrosive damage can occur even if the distance is 100 miles.</p> <p>Regarding this matter, one should take into account not only the distance but also the time factor. There are times when the truck does not leave the PT plant immediately after the loading is completed. Many a times, the loaded truck is not unloaded at the jobsite immediately on arrival. For (PT) loaded trucks to wait hours and or overnight is not unusual.</p> <p>Having a word “or” in the first section of the sentence gives an option. How is any PT supplier or otherwise going to be able to</p>	<p>Unrelated - Consider as new business in next meeting</p>	

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Name	Comment #	Vote: Y / Y-E / N	Y=Affirmative Y-E=Affirmative with Comment N=Negative (must include reason)	Comment	Proposed Resolution
				<p>be accurate in predicting the weather for 500 miles of a shipment and during the waiting time.</p> <p>Comment: Same reasoning applies as in the last paragraph (before SOLUTION) of the first item except replace 7 days by 500 miles in the fifth line.</p> <p>SOLUTION – Recommendations The referenced section should read as follows:</p> <p>During shipping (transportation), the PT material shall be protected by shrink wrapping the tendon bundles and tarp or an alternate method approved by LPD. Material shall be protected from deicing salts and other corrosive elements during transportation.</p>	
Nonvoting Member Viewpoints					
Alarcon Sterling	All	Y	I approve the M-10 Committee responses to the TAB comments		
Sohal	1	Y-E	2.2.3 – this should be changed from min. weight to min. volume. This is dependent on the density of the grease.		
Krauser	9	Negative Viewpoint	<p>This was discussed and approved at our meeting in Cancun for this specification not the S-O-G Specification. There is no reason for an “overlap” in the field. If the seal against the sheathing works, it works – if the seal does not work, no amount of overlap will help. The primary reason for the overlap was to allow approximately 4-inch of sheathing shrinkage from fabrication to placement; however, some inspectors/engineers are interpreting this to mean in the field. This is the reason for the change from 4-inch to 2-inch.</p> <p>Proposed resolution: leave at 2-inch</p>		

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Name	Comment #	Vote: Y / Y-E / N	Y=Affirmative Y-E=Affirmative with Comment N=Negative (must include reason)	Comment	Proposed Resolution
Krauser	10	Negative Viewpoint	This was discussed and approved at our meeting in Cancun for this specification not the S-O-G Specification. There is no reason for an “overlap” in the field. If the seal against the sheathing works, it works – if the seal does not work, no amount of overlap will help. The primary reason for the overlap was to allow approximately 4-inch of sheathing shrinkage from fabrication to placement; however, some inspectors/engineers are interpreting this to mean in the field. This is the reason for the change from 4-inch to 2-inch. Proposed resolution: leave at 2-inch		

Exhibit D.1

1.6.2.2a - Storage prior to shipping

It does not make any reasonable sense to allow the fabricated end product be exposed to “any precipitation (snow, rain, etc.)” for a period less than 7 days. How would it be acceptable to expose the end product for say 6.9 days and it would not be acceptable if exposed for 7.1 days. What more bad can happen in another 5 hours beyond 6.9 days that would not have already happened which would suddenly make the end product unacceptable?

Refer to the last sentence: “..... Shall not be exposed to any elements known to be deleterious or corrosive”. Wouldn’t snow and rain fall in the category of deleterious or corrosive? There seems to be some contradiction.

The industry has made a considerable progress in first introducing an encapsulated system, then upgrading it and finally succeeding in having ACI Code require that the said system must be used in all commercial structures. To allow exposure of the end product for 7 days to rain and snow is counter to ensuring that the quality of an encapsulation system is maintained from the time of fabrication to installation.

SOLUTION – Recommendations

The referenced section should read as follows:

Stored PT materials shall not be exposed to any precipitation (snow, rain, etc.) as well as any elements known to be deleterious or corrosive.

Exhibit D.2

1.6.2.3c – Shipping

My vote is negative for the following reasons which are more or less similar in thought process as above. A distance of 500 miles is arbitrary at best. It would mean that if the distance is let say 450 miles, the PT material does not have to be protected. Somehow PT material traveling another say 60 miles would need protection. Enough corrosive damage can occur even if the distance is 100 miles.

Regarding this matter, one should take into account not only the distance but also the time factor. There are times when the truck does not leave the PT plant immediately after the loading is completed. Many a times, the loaded truck is not unloaded at the jobsite immediately on arrival. For (PT) loaded trucks to wait hours and or overnight is not unusual.

Having a word “or” in the first section of the sentence gives an option. How is any PT supplier or otherwise going to be able to be accurate in predicting the weather for 500 miles of a shipment and during the waiting time?

Comment: Same reasoning applies as in the last paragraph (before SOLUTION) of the first item except replace 7 days by 500 miles in the fifth line.

SOLUTION – Recommendations

The referenced section should read as follows:

During shipping (transportation), the PT material shall be protected by shrink wrapping the tendon bundles and tarp or an alternate method approved by LPD. Material shall be protected from deicing salts and other corrosive elements during transportation.