POST-TENSIONING INSTITUTE ®

AGENDA

PTI M-10 TG-Performance Specification

Thursday, September 27, 2018
1:00 PM – 5:00 PM
The Antlers, Colorado Springs, CO

Voting Members Present (x of 10)

Doug Schlegel, Lead	Consultant
Asit Baxi	Baxi Engineering
Jerry Jensen	Entec Polymers
Larry Krauser	General Technologies, Inc.
Thomas Mathews	EVEHX-North America
Harley Nethken	Tech-Con
Rob Paderofsky	Structural Technologies
Russ Price	Suncoast Post Tension, Ltd.
Todd Stevens	Gerdau
Amy Dowell	PTI Representative

Visitors Present

ACTION ITEMS FROM LAST / THIS MEETING

Item #	Subject	Action	Responsible	Deadline / Completed
	Review referenced ASTM tests identified		All	Prior to discussion of related subject in web meeting or in-person meeting

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	A.3 – Jerry Jensen added – plastics expertise

Agenda Item	Expected Outcome / Actions Taken
B. <u>Agenda & Minutes</u> B.1 Approval of Agenda B.2 Review Minutes from 5/8/18 and 8/7/18 (Meeting ballot required)	B.2 Review minutes from May 8, 2018 meeting in Minneapolis (Attachment B.2a) Review minutes from August 7, 2018 web meeting (Attachment B.2b)
C. <u>Actions Taken Between Meetings</u> C.1 Web Meetings (August 7, 2018)	
1. <u>Action Item 1: (Fracture / Impact Resistance)</u> 1.1. ASTM G14 1.2 CRSI-RB4.1	
2. <u>Action Item 2: (Abrasion Resistance)</u> 2.1. ASTM D968 2.2. ASTM D4060	
E. <u>New Business</u> E.1	
F. <u>Next Meeting</u> 2019 PTI Convention Hyatt Regency Seattle May 5-8, 2019 Web Meetings: October 2018	
G. <u>Adjourn</u>	

<u>AGENDA</u> / MEETING EXHIBITS

Exhibit #	Subject
Roster / A.4	Sign-In Sheet / PTI Anti-Trust Policy
B.2a	Minutes from 5/8/18
B.2b	Notes from 8/7/18 web meeting

POST-TENSIONING INSTITUTE ®

MINUTES

PTI M-10 Unbonded Tendon Committee TG-B Performance Specs

Tuesday, May 5, 2018, 10:15 AM - 12:00 PM

Minneapolis Hilton, Minneapolis MN – Conrad A

TG Members Present

Doug Schlegel – Leader	Consultant
Asit Baxi	Baxi Engineering
Larry Krauser	General Technologies, Inc.
Thomas Mathews	Precision-Hayes International
Harley Nethken	Tech-Con Systems, Inc.
Russell Price	Suncoast Post-Tension, Ltd.
Todd Stevens	Gerdau Reinforcing
Rob Paderofsky	VSL
Miroslav Vejvoda, NV	PTI Liaison

Visitors

Paul Hohensee	Precision-Hayes International
John Pearson	WJE
Mark Sterling	Martin Specialty Products
Justin Jewkes	Martin Specialty Products
Charles Skarbrevik	CRA & Associates
William Wesley	Elkins Tri-Steel
Rattan Khosa	AMSYSCO, Inc.
Steven Ross	Lubricating Specialties Company
Coy Williams	Consolidated Reinforcement
Joe Harrison	LMS Reinforcing Steel Group
Joel Villanlieva	CTA
Walley Santos	Belgo Bekaent
Ernani Sina Aneto	EVEHX
Brian Chartier	STS Systems
Dale King	Bekaent
Nate Mikulsky	Precision-Hayes International
Mathew Bakich	Precision-Hayes International
Josh Mecom	Sumiden Wire
Josh Phillips	Harris Rebar
Jerry Jensen	Southland Polymers
Jared Rosenquist	Precision-Hayes International

Leader Doug Schlegel convened the meeting at 10:15 am. After introductions of the TG members and the guests present, the following items were discussed:

I. Development of Performance Requirements:

There was a long discussion on developing a performance based specification. Most if not all of PTI specifications are known as detail specifications. The difference between performance based specifications and detailed based specifications are shown below.

Specification Requirements	Performance Specifications	Detail Specifications
Applicable Documents	Usually have fewer references. They refer to test method standards; interface drawings, standards and specifications.	Usually cite a greater number of references since they require the use of materials and part and component specifications and manufacturing process documents.
Requirements	States what is required, but not how to do it.	Includes “how to” and specific design requirements.
Material	Leaves specifics to contractor, but may Require some material characteristics; e.g. corrosion resistance.	May require specific material, usually in accordance with a specification or standard.
Performance	States what the item or system shall do in terms of capability, function, or operation.	Often have performance requirements.
Design	Does not apply “how to” design requirements, but should include requirements for design verification.	Includes “how to” and specific design requirements. Often specifies exact parts and components.
Physical Characteristics	Gives specifics only to the extent necessary for interface, interoperability & environment in which item must perform.	Details weight, size, dimensions, etc. for item and component parts.
Processes	Usually does not specify processes, but if it does, the requirement is stated as the desired outcome from a process.	Often specifies the exact processes and procedures to follow.
Parts	Does not require specific parts.	States which fasteners, electronic piece parts, cables, sheet stock, etc. will be used.
Construction, Fabrication and Assembly	Usually does not specify construction, fabrication and assembly requirements.	Describes the steps involved or references procedures which must be followed; also describes how individual components are assembled.
Reliability	States reliability in quantitative terms. Must also define the conditions under which the requirements must be met.	Often achieves reliability by requiring a known reliable design.
Environmental Operating Requirements	Both performance and detail specifications must provide a means for assuring compliance with the specification requirements.	

The DOD guide for performance specifications provided the previous comparisons to assist in the initial guidance on how to write performance based specifications. General consensus was to start working on some parts of the existing specification and to move towards performance based specifications one subject at a time. M-10 should provide guidance on what parts to address first. The general consensus of the group was to begin with the encapsulated anchorages. There was a general belief that the best way to get this process moving was to schedule an “in-person” meeting (probably in TX) sometime toward the end of June.

II. New Business – there was no other new business.

III. Adjournment – the meeting was adjourned at 12:00 p.m.

2.4.1.1

Key Performance Requirements:

Durability of anchorage assembly exposed to corrosive elements

- **Corrosion protection of final anchorage assembly (need to define "final anchorage assembly")**

Performance Criteria	Tests	Proposed Modifications	Order of Web Meetings
Anchorage assemblies ~~using coated corrosive materials~~ shall protect any materials that are subject to corrosion and shall be water-tight at the point of force transfer. o No moisture shall penetrate into the final anchorage assembly o The use of coated components, such as epoxy coated or galvanized strand and wedges, does not provide corrosion protection at the point of force transfer (wedge/strand connection) and shall be contained in a water-tight enclosure	Current PTI M10.2-17 watertightness test. - investigate amendments to current test method to update requirements	2.6.2 – Hydrostatic test Hydrostatic testing shall ensure watertight encapsulation of the prestressing steel at the point of force transfer. All anchorage and coupler components used in the water-tightness testing shall be taken from production inventory, shall be complete assemblies including all components, and shall be assembled following documented instructions for assembly in the field. Arrange anchorage assemblies to ensure a uniform hydrostatic pressure for a period of 24 hours in the final assembled state. Use the following minimum uniform hydrostatic pressure in the test: 1. For building and other applications governed by ACI 318: 1.25 psi (0.0086 MPa) 2. For environmental structures and other applications governed by ACI 350: 10 psi (0.0688 MPa) Three tests are required for each assembly. Tests shall be performed or observed, and certified by an independent testing laboratory accredited under ASTM C1077.	1

		Retesting is required every 5 years or whenever a component of an assembly changes or the testing criteria changes, whichever is earlier. Encapsulated systems using components from different manufacturers are acceptable provided they are tested in accordance with Section 2.6.2 Acceptance criteria: Anchorages shall remain watertight for the duration of the test at the specified minimum uniform pressure. No visible water infiltration into the anchorage system. All three tests for each anchorage assembly shall be acceptable for the system to pass.	
Fracture/impact resistance	ASTM G14 “Standard Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test)" CRSI-RB4.1 (look at modifications to apply to anchorage assemblies specifically)		2
Abrasion resistance	ASTM D968 "Standard Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive" ASTM D4060 Adapt/modify test method to simulate dragging components across concrete		3

Weathering/UV resistance	ASTM D2565 (for plastic coated) ASTM D6695 (for painted / coated) ASTM G155 (testing method for nonmetallic materials)		4
Chloride permeability	FHWA-RD-74-018 ASTM A775 Annex A1 (for epoxy coated materials)		5
Corrosion resistance	ASTM B117		6
Chemical resistance	ASTM G20		7
Electrical conductivity – only required when specified for special circumstances	FIB 75 (B2, B3)		8
Anchorage assemblies using components made of alternate corrosion-resistant materials shall not allow corrosion within the final anchorage assembly.	All other tests + material dependent tests for alternate materials		9

Key:

Tested on final assembly

Tested on individual components and final assembly

Overall goal – Corrosion protection at point of force transfer

ACI 423.7

6.5—~~Encapsulated systems~~

6.5.1 ~~*Encapsulation*~~*Corrosion Protection Systems*—For all unbonded tendons used in applications governed by either ACI 318 or ACI 350, protect all components of the PT system ~~anchorage assemblies by encapsulation, including the anchorage, wedges, and prestressing steel~~, against corrosion.

M10.2-17 Proposed Modifications:

1.1.1 — Work specified

This Specification provides minimum specific

performance criteria for materials and requirements

for the fabrication and installation of unbonded single

strand tendons.

Tendons used in all applications governed by ACI 318

shall ~~be encapsulated~~ have all components of the post-tensioning system protected against corrosion to maintain prestressing force.

Add definition of corrosion

Add section addressing corrosion (to replace 2.4.1)

2.4.1 — Anchorages

Protect anchorages against corrosion ~~by encapsulation~~.