

9600202 POST-TENSIONING COMPONENTS
INTERNAL/INDUSTRY REVIEW COMMENTS

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Comments: (7-18-16)

1. 960-2.2.1.2 Smooth Plastic Duct: This was not listed in the current revision: For Internal system injected with flexible filler – Suggest to make the following changes: External PT systems with duct injected with flexible filler shall use smooth plastic duct. Internal PT systems with duct injected with flexible filler can use corrugated plastic duct. Our concerns are really on minimum bending radius needed for internal PT system together with bonding issues.

Response:

2. General comments on implementing fib Bulletin 75 for Internal Bonded Post-tensioning: While fib Bulletin 75 is report has merit presenting extensive information about material components, fabrication process, on-site installation and testing and approval processes for the ducts, their associated accessories and PT systems. ETAG themselves have not put the time table for PT suppliers to conduct the new tests or set up a deadline before their approved system being taken off from the approval list. Our question is: What is the grace period for conducting additional tests? Some test definitely make sense, such as the one already in the current version of July 2016 which combines wear test and minimum bending tests on the same sample and keep the clamping force for a duration of 14 days. Other tests such as elevated temperature: Is it necessary? What is Florida DOT's experience with this? How was duct performing from the demolishing of the existing bridge. The challenge here is to find a lab or build oven big enough to put the testing frame and testing equipment in the oven. As far as we know, none of our European PT suppliers have conducted the duct tests under elevated temperatures yet.

Response:

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Comments: (7-18-16)

We would like to highlight the main changes that, as a PT contractor, we will face on our PT system moving from Fib Bulletin 7 to Fib Bulletin 75. In details (table 3.2.1-1): Test per Appendix B.1 (“Leak tightness of anchorage-duct assembly”): such test aims to demonstrate the tightness of the connection anchorage duct as the former Fib Bulletin 7 “Leak tightness test” (paragraph 4.2.2) was trying to assess. Of course now it is required a pressure five times higher (0.5 bar instead of 0.1) and sincerely technically we do not understand such increase of pressure. Test per Appendix B.4 (“Full scale duct system assembly”): it is nearly the same as “Stage 1 test: Full Scale System Assembly” (Fib Bulletin 7, paragraph 4.2.1) but it is requested to thread steel strands inside ducts and to expose tendons to outside environment for 14 days. Such supplementary requirements, by facts, completely forces to make new tests again. Test per Appendix B.5 (“Leak tightness of assembled duct system”): such test substitutes “Stage 2 test: Leak tightness test” (Fib bulletin 7, paragraph 4.2.2) but asking for steel strands to be threaded, a five times higher pressure (0.5 bar instead of 0.1) and a 1 hour conditioning (not requested before). Previous tests as per Fib Bulletin 7 become of course no longer valid. We have not been

able, even talking to Fib group members who wrote Bulletin 75, to understand reasons for this change.

Regarding paragraph 960 – 3.2.3 “External PT Systems Pressure Tests”: We see that now it is required to have full external tendon, from anchorage to anchorage, conditioned to 150 psi, an extremely high value. Previous FDOT Spec was calling for a 1.5 psi pressure for the connection anchorage to duct/pipe assembly, which is definitely the weakest point. We believe that 150 psi it is a very difficult target to achieve, even in case that all mock up tests are carried out within massive concrete blocks.

Response:

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Comments: (7-18-16)

1. 960-3.2.1 Table 3.2.1-1 Appendix B.5 (Leak tightness of assembled duct system) The understanding of this test was to check the airtightness of the system. Previously, 1.5psi held for 1min with a loss of 0.15psi was used in fib 7. That was sufficient to know if there is any loose connection or missed heatshrink before pouring concrete. It appears that, so far, the 1.5 psi has worked for fulfilling that objective. Now, fib 75 requires a pressure of 7.25 psi held for 5 minutes. Is there a real benefit for this increase? Some connections of the currently available industry systems may not pass this requirement unless significant changes and re-design are made across the board with added costs.

Response:

2. 960-3.2.1 Table 3.2.1-1 Appendix B.4 (Full Scale duct system assembly) The FIB 75 procedure B.4.3.4 includes the installation of rebar cage. Since no concrete pour is involved in this test, what is the purpose of the rebars? Would it make sense to keep the fib 7 test in this case?

Response:

3. 960-3.2.1 Table 3.2.1-1 Appendix A.2 (Stiffness of duct) This test is intended to determine the effective stiffness of the corrugated duct to be used in the calculation of maximum duct support spacing according to the equation in Fib 75 Section 6.2. Since the smooth duct has no corrugations, it is relatively straight forward to compute the stiffness....and therefore the maximum support spacing. Perhaps, it would be preferable that the maximum duct support spacing for each size be computed and provided in a table in the new specs for constancy.

Response:

4. 960-3.2.1 Table 3.2.1-1 Appendix A.1 (Dimensional requirement) For flexible filler, duct is smooth HDPE with max. DR of 17 according to ASTM D3035 and F714 per section 960-2.2.1.2(3). These ASTM specs govern the manufacturing of HDPE pipes in the United States. Therefore OD, ID and thickness tolerances should be according to the ASTM specs and not FIB bulletin 75. The OD and ID tolerance of ASTM specs are stricter than Fib 75. We believe no dimensional requirement test is needed as long as the smooth HDPE is manufactured according to ASTM specs.

Response:

5. 960-3.2.1 Table 3.2.1-1 On a general comment, do the performance test requirements of fib 75 make sense for the smooth HDPE Pipe?...As the DR 17 HDPE pipes are thicker and stronger than the current corrugated duct, some of the performance load and acceptance criteria may seem trivial. For example, for the 125 psi rated DR 17 HDPE pipe, the 11 psi negative pressure or 4 psi positive pressure to test for concrete pressure on duct sounds insignificant.

Response:

6. 960-2.1(5) Fatigue test per ETAG-013 Section 6.1.2-I specifies the use of a machine apparatus and not concrete block for anchorages other than bond anchorage. The last reference of 6500 psi concrete strength seems to apply for the bond anchorage test.

Response:
