Pipe Advisory Group Meeting Minutes - June 14, 2002

Attendees

Rod Powers, FDOT
Paul Mize, FDOT
Bill Burnette, Natl. Corr. Steel Pipe Assoc.
Doug Todd, Contech
Jim Schluter, Contech
Jim Park, ADS
Joe Zicaro, Rinker
Rick Traylor, Rinker
Michelle French, Hancor
Jeff Enyart, Hardie Pipe
Steve Oesterling, Hardie Pipe
Rob Bottema, Hardie Pipe
Ed McCloskey, Hanson
Chuck Taylor, Hanson
Angel DeJesus, Hanson
Ted Price, Rinker
Sid Hilton, RMC Ewell
Anath Prasad, FDOT
Rico Sadovnik, Contech
Justin James, Contech
Ted Capossela, Contech
Grace Hsuan, Drexel University (observer)
Dean Neaverth, Hancor
Paul Harkins, FDOT

Preliminaries

- Ken Morefield, Assistant Secretary, welcomed the participants and encouraged the continuation of the Pipe Advisory Group as a valuable communications format between the Department and the pipe industry. He stated that meetings should be held regularly, and that the one-year time interval from the last Advisory Group meeting was too long.

- Rick Renna emphasized the purpose and rules of conduct for Pipe Advisory Group
  - To provide industry input and feedback on FDOT pipe policy, specs, manuals
  - Exclusive forum for discussion regarding competitor's pipes – FDOT has no tolerance for manufacturers talking to FDOT about other types of pipe except in the presence of the other manufacturer. This meeting is the exclusive venue for those types of comments.
  - Confrontational, adversarial comments are welcome as long as they are respectful and professional

- At FDOT's request, agenda items for future Advisory Group meetings are to be channeled through industry representatives.

- Rick Renna acknowledged the long term contributions made by Paul Harkins, FDOT, in establishing pipe guidelines and responding to industry concerns. Paul has received a well-deserved promotion to head the Product Evaluation Section of the State Specifications Office.

Updates on FDOT Initiatives

- Flexible Pipe Liveload Study: both Marc Ansley and William Nickas had previous commitments. Rick Renna handed out a summary sheet prepared by Mr. Ansley outlining the scope of the study. A draft final report is expected in early August. Two unanswered questions emerged from subsequent discussions:

  1. From Ed McCloskey, Hanson: Why were the gates to the testing site locked, preventing access?

     Response from Marc Ansley, FDOT: ***Several groups from the FDOT have equipment in testing area. Locking the site was never intended to refuse requested access from the pipe industry***

  2. From Rick Traylor, Rinker: The short term testing will be used to predict long term performance. What duration of long term performance is being targeted – 50 year, 75 year, 100 year?

     Response from Marc Ansley, FDOT: ***We anticipate that the research conclusions will predict an expected service life, not a necessarily a given timeframe.***

- Soil Box Testing of RCP and FRCP: Rick Renna gave an overview of the upcoming efforts to quantify the pipe / soil interaction for RCP and FRCP in differing states of saturation and compaction, targeting both pipe joints and barrel. Periodic pipe industry visits to the testing will be scheduled in cooperation with the UF researchers.

- Pipe Design Service Life Approach: Rick Renna gave an overview of the study of pipe design service life thresholds currently being conducted by the FDOT Drainage Department. Preliminary results indicate that the Department is seeing little cost difference between the different pipe materials. The Department is in the process of re-thinking its design service life approach. Rod Powers discussed an approach whereby elements of life cycle costing and levels of performance confidence are integrated into the selection process.

Pipe Supplier Issues

- Polyethylene Pipe Industry
  - Jim Park, ADS: Mr. Park discussed the AASHTO National Transportation Product Evaluation Program (NTPEP) for pipe QA/QC program (see the attached email, p. 4). Hancor and ADS were supportive of their participation in NTPEP.
  - FDOT Response from Rod Powers: Mr. Powers voiced respect for the NTPEP certification but suggested that FDOT or 3rd party certification would also be needed. He stated that FDOT is not inclined to make participation in NTPEP mandatory in that the current FDOT practice already involves source approval under an approved quality control plan and the manufacturer securing third party testing via an independent testing laboratory.

- Florida Concrete Pipe Institute
  Miscellaneous Issues - See Page 5 – 6: Due to shortness of available time, Angel DeJesus , FCPI, offered to defer this agenda item until the next meeting to allow time for the Rinker issue, below. As a prelude to that discussion, Mr. Ted Price, Rinker, handed out a ***Final Pipe Inspection Form*** attached on p. 7 – 8.

- Florida Concrete Pipe Institute
  - Rick Traylor and Joe Zicaro, Rinker: Mr. Traylor and Mr. Zicaro outlined the points in Mr. Traylor's letter dated April 19, 2002 to Rick Renna, attached, p. 9 – 11.
  - Jeff Enyart, Hardie Pipe: Mr. Enyart, outlined the points in his letter to Rick Renna dated June 12, 2002, attached to the email transiting this document.
  - Open Discussion on this topic was deferred until the next meeting.

Closing Issues

In discussion with the group, Mr. Renna set the next meeting for September 12, 2002 from 9 am until 2 pm, and thanked the group for the professional manner at the meeting.

Jim.Park@ads-pipe.com

05/23/2002 06:50 PM

To: Rick.Renna@dot.state.fl.us
cc:
Subject: Re: Pipe Advisory Group

Rick,

Please include the following agenda items for the June 14, 2002 Pipe Advisory Committee Meeting:

I. FDOT to participate in AASHTO's National Transportation Product Evaluation Program (NTPEP) for pipe QA/QC program.

a. What is NTPEP?

It is a cooperation between AASHTO and industry trade associations with purpose "to provide quality and responsive engineering to the testing and evaluation of products materials, and/or devices that are commonly used by AASHTO member Departments of Transportation".

b. This is currently being done for other industries, such as geotextiles.

c. Program Purpose:

Provide complete testing of pipe product in accordance to AAHSTO Materials Specifications.
Provides list of pipes by diameter and manufacture that were tested, including base materials.
Reports test results to AASHTO member departments, as a central primary source of information that offers credible, reliable data.

d. Advantages of NTPEP:

AASHTO manufacturing specifications do not mandate, inspect or enforce compliance.
Results can be used as product acceptance and quality assurance.
Manufacturer's is validated by the appropriate NTPEP testing, inspection and review of manufactures facilities
Reduces State DOT sampling and product testing.
Manufacturer pays for testing.

II. Require 3rd Party Certification of pipe base materials and product

a. Advantages of 3rd Party Certification:

Non-biased certification of base material and product compliance with AASHTO specifications.
Approved Quality Control/Assurance Program.
Reduces State DOT sampling and product testing.
Reduces State DOT plan audit and certification programs.
Basis for approved products.
No cost on DOT's part.
Fosters higher quality industry wide.

Thank you for including these topics into the agenda. I look forward to seeing you then.

Thanks.

James M. Park, PE
Regional Engineer
Advanced Drainage Systems, Inc.
1218 SW Ivanhoe Blvd
Orlando, FL 32804

Florida Concrete Pipe Institute

Agenda Items: (In order of Priority)

1)- Documentation, reporting and record keeping of video taping & deflection tests in accordance with section 430-4.8.

2)- A review of the roughness coefficients for all FDOT accepted pipe materials. The concrete pipe industry promotes its products as having design values of 0.012 and 0.013 that are historically and widely accepted in the engineering community. The 20 to 30 percent **design factor** included by the concrete pipe industry takes into account the differences between laboratory testing and actual installed conditions. The use of design factors is good engineering practice and, **to be consistent for all pipe materials**, the applicable Manning's "n" laboratory value should be increased a similar amount in order to arrive at design values.

There is a phenomenon known in the industry as "Corrugation Growth", which is observed at the inside surface of some types of HDPE pipes after installation, whose impact on the hydraulic performance of these type of pipes, to our knowledge have not been investigated in Florida.

3)- Joint Gap tolerances for all alternate pipe materials. How much pipe should be left inside the joint after installation for all optional pipe materials, to assure 1)- Joint Performance over the full expected service life of the pipeline (consider potential soil settlement effects on future joint gaps – **in other words, don't use all of the joint extensibility solely during the installation**), 2)- That manufacturers installation recommendations in terms of joint gaps & misalignment are followed.

4)- Practical review of the durability of all pipe materials based on present field experiences & history. The future of Florida infrastructure economic expenditures as related to drainage pipelines, depend in great deal on the decisions made at the present. The FDOT has a very good and comprehensive corrosion and service life estimating process. What may still be missing is a correlation of the past and present design processes with actual field installations. Ex.: Do we have research to substantiate that all type pipes are performing as expected in their different environmental conditions? Looking at the FDOT research center website, it looks like a recent study on the Life Expectancy of Reinforced Concrete Pipe based on laboratory studies and some field correlation was completed. Are there any life expectancy research projects planned for other type pipes?

5)- Reduction of the compaction requirement around concrete pipe from 100% to 95%.

6)- Acceptable repair procedures for all kinds of alternate drainage pipe materials. Inevitably damage to the ends and other sections of the pipe will occur on the projects. Reinforced Concrete Pipe having been the most widely used drainage product for the longest period of time, have a set of well known repair procedures adequately covered by several different applicable & enforceable specification documents. Examples of these enforceable specifications are found on Section 941 & ASTM-C-76. Do we have a clear set of enforceable specifications to cover all the other alternate pipe materials presently allowed by the FDOT?

7)- Hydrostatic Pressure Rating of pipe joints for applications exceeding the 2 psi requirement for "Soil Tight" category.

8)- A definition of the maximum pipeline length that can be visually inspected versus videotape inspection.

430 PIPE CULVERTS AND STORM SEWERS.
(REV 2-15-01) (FA 4-11-01) (1-02)

SECTION 430 (Pages 434-446). The text is deleted and the following substituted:

SECTION 430

PIPE CULVERTS AND STORM SEWERS

430-4.8 Final Pipe Inspection: Upon completion of all paving operations,**(1)** dewater installed pipe and provide the Engineer with a video**(2)** taping schedule. Provide the Engineer with a video tape of pipe 48 inches [1,200 mm] or less in diameter, for examination. The Engineer may waive this requirement for**(3)** side drains and cross drains which are **(5)**short enough to inspect from each end of the pipe. The Engineer will inspect pipe for**(6)** line and grade,**(7)** joint gaps,**(8)** joint misalignment, leaks, **(9)**damage, and for debris. For **(4)**metal and plastic pipe the Engineer will also inspect for**(10)** deflection. The Engineer may require further testing of the pipe as a result of the inspection. If so directed by the Engineer, test pipe **(11)**36 inches [900 mm] and less in diameter using a mandrel. The mandrel shall be pulled by hand and be approved by the Engineer prior to use. For pipe larger than**(17)** 36 inches [900 mm] in diameter, deflection shall be determined by a method approved by the Engineer. If use of a mandrel is selected as the means of further testing, the mandrels diameter, length, and other requirements shall conform to 430-4.8.2. Replace pipe failing to meet the specific deflection requirements for the type of pipe installed, at no cost to the Department. Should the deflection test prove that the pipe met specifications, the Department will bear the cost of the deflection testing.

430-4.8.1 Video Taping: Provide a high quality VHS format videotape with **(14)**460 lines of resolution. Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe and rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition.

The videotape image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe. The (15)tape speed shall be standard play. The video tape will include an identification before each section of pipe filmed. The identification will include the **(16)**project number, the structure number corresponding to the structure number on the set of plans for the project, size of pipe, the date and time, and indicate which pipe is being filmed if multiple pipes are connected to the structure. Notes should be taken during the video taping. Provide the Engineer with copies of these notes along with the video.

Move the camera through the pipe at a speed not greater than**(15)** 30 feet per minute [10 meters per minute]. Mark the video tape with the distance down the pipe. The distance shall have an accuracy of one foot per 100 feet [300 mm in 328 meters]. Stop the camera and pan when necessary to document defects. Film the entire circumference at each joint.

.**430-4.8.2 Mandrel**s: Use mandrels which are**(12)** rigid, nonadjustable, odd-numbered legged

(minimum 9 legs) having a length not less than its nominal diameter. The **(13)**diameter at any point shall not be
less than the allowed percent deflection of the certified actual mean diameter of the pipe being tested. The mandrel shall be fabricated of metal, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner with the nominal pipe size and mandrel outside diameter.

I would like to add the following to item number 1 "Documentation and Record Keeping of Deflection Test"
The only form available for listing this information is on the "Daily Report of Construction" and there is no dedicated space for this specific information. I would suggest that a new form be created which could be called ***Final Pipe Inspection Form, which*** correlates with the specification section 430-4.8.
The following items at a minimum should be included on this form.

1) Date of dewatering
2) Video Scheduling dates
3) Pipe Application, Side Drain, Cross drain Storm Sewer etc.
4) Pipe types, HDPE, Aluminized Steel Spiral Rib etc.
5) Length of pipe runs
6) Line and Grade comments
7) Joint Gap
8) Joint Misalignment
9) Damage
10) Deflection, Vertical, Horizontal, Amount
11) Pipe Size
12) Mandrel Type, number of legs, manufacturer, outside diameter
13) Mandrel Diameter, Length
14) VHS Tape resolution
15) Tape speed
16) Project Number
17) For pipes larger, than 36" which engineer approved method was used to determine deflection
18) Date and Time of testing
19) Pipe location

Having the pipe deflection tested is great for the FDOT, but if it’s not being properly recorded and acted on, it does no one any good.
Thanks, Ted Price

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April 19, 2002

Mr. Rick Renna, P.E.
Florida Department of Transportation
State Drainage Engineer
605 Suwannee Street
Mail Station 32
Tallahassee, Florida 32399-04595

Dear Mr. Renna:

As you know, Rinker Materials Hydro Conduit always maintained the position that fiber cement pipe (FCP), as allowed by the Department in Section 941, is not equal to reinforced concrete pipe. Ongoing developments in Australia with AS 4139 validate our concerns. The purpose of this letter is to list and summarize our concerns, and if possible, meet with you and the FCP manufacturer to discuss them.

Please find the enclosed copy of The Proposed Revision of AS 4139-1993 "Fibre-Reinforced Concrete Pipes & Fittings", prepared by James Hardie Research & Product Development, dated November 1, 2001. This submittal, while we believe it is ultimately aimed at reducing wall thicknesses by using semi-rigid or flexible design methods, states that if designed as a rigid pipe, FCP exhibits creep under sustained saturated loading conditions and should be designed through the application of regression analysis. Specifically, these recommendations include using the regression factor (R), the dry / wet factor (C), and a factor of safety of 1.5 times the design service load. This design method has been used in Australia since 1993. While we still have key misgivings concerning long-term durability and strength of the product, we will continue to support this design when viewing FCP as a rigid equal to concrete pipe.

The proposed semi-rigid approach is based on flexible pipe standards and seems to need much improvement. In any case, we will withhold comment on this design approach. FCP was incorporated into Section 941 as a rigid concrete pipe. It is allowed as an equal, class for class. The only restriction is that is not allowed under traveled lanes of interstates. We ask for your consideration of the following concerns.

- FCP manufactured in the United States has already experienced failures but pipe manufactured in Australia reportedly has a good track record. We believe that a major contributing factor to this is wall thickness. Pipe made to AS 4139 design requirements has test loads 50 percent higher than pipe made to FDOT requirements. The Australian pipe, with a higher factor of safety built in, has significantly thicker walls than pipe made in Florida.

RT02-0402.doc

The AASHTO Technical Section on Rigid Pipe voted negative on the ballot for the provisional standard that mirrored the FDOT specification. Major concerns included considering FCP as equal to reinforced concrete pipe, strength loss, confusing terminology, and long-term strength in sustained saturated loading.

- We believe the failures for FCP in America are mainly due to the less conservative specification being used, which results in much thinner walls. We are aware of cases of end delamination, joint breakage, and broken backs. In some cases, we have discovered circumferential breaks before the product was buried.

It is our understanding that the FCP manufacturer initially furnished Australian made pipe for trial installations, but that all pipe being supplied now is manufactured in Florida. In the Department's evaluation of this product, were durability studies conducted on locally supplied pipe?

AS 4139 requires the dry / wet factor (C) to be determined and the determination shall be repeated when the manufacturer changes the design, manufacturing method, or the materials, notwithstanding a minimum frequency of two years. The Department's approval of FCP was based on Australian made pipe with a (C) factor of 1.183. Has (C) been substantiated in Florida on Florida pipe?

The cellulose fiber used is hygroscopic in nature and it has a very high absorption percentage. Since it is an organic fiber, why doesn't it biodegrade? Has data been provided that demonstrates the cellulose fiber in saturated FCP does not biodegrade?

In addition to biodegradation, we would expect absorption to affect wet / dry cycling and freeze / thaw resistance. Have these properties been addressed for FCP?

James Hardie Building Products include a fiber cement roof shingle, and there is a Class Action Settlement against the company for the product. This product's main difference to FCP is the cement content; otherwise, it is practically the same composition as FCP. The Settlement defines damage that includes delaminating, crumbling or separating into layers, cracking, and disintegrating. This settlement reinforces our concern with durability. More information can be found at http://www.hardieroofingclaims.com/.

Most of these questions will need to be answered by the manufacturer. Rather than presenting them at a meeting and expecting an immediate response, we thought it would be helpful to provide these questions to Hardie Pipe in advance. We would like to include these questions and the manufacturer's input at the next Pipe Culvert Advisory Group meeting.

We look forward to the Department's upcoming research, and we are committed to help and provide input. In light of the developments with AS 4139 and while your research is just beginning, we ask that you consider changing the requirements for FCP manufactured to Section 941. The change we recommend would be to 941-1.7. This section currently states, "The minimum dry crush load shall not be less than a factor of 2 times the long-term service load". We recommend changing it to read, "The minimum dry crush load shall not be less than a factor of **3 times the long-term service load**." This change will only require FCP in America to have comparable wall

thickness to FCP in Australia, and it is consistent with the manufacturer's efforts to modify AS 4139 to include rigid and semi-rigid design methods.

Sincerely,

Rick Traylor

Rick Traylor
Manager Technical Services

Cc: Jeff Enyart, Hardie Pipe
Joe Zicaro, P.E., Rinker Materials Hydro Conduit