Pennsylvania Precast Association

Membership Meeting

September 7th – Carlisle, Pa

Meeting called to order at 9:00 AM

1.) Reviewed anti-trust policy
Sign in was passed around
2.) Reviewed financials
Balance- $57,057.85
Est. reserves- $57,121.89
3.) Executive committee review
President- Pat Holleran
Vice President- Phil Weber
Treasurer/Secretary- Rusty Fox
Immediate Past President- Jay Behney
4.) Committee Membership review- Please start thinking of nominations for the November meeting at which time we will have the election.
    a.) Quality Assurance and Specifications
    b.) Manhole Standards work group
    c.) Membership and Marketing- Open Chair
    d.) Septic Tank Manufacturing Committee
5.) Action items from May 4th meeting
    a.) Payment for low strength concrete- This was cover by Randy L and is noted in the minutes under the Penn DOT topics.
6.) Membership & Marketing issues
    a.) Please direct addresses to Hank for Precast Solutions magazine. These magazines can be sent out to engineers and other specifies to educate them on the advantages of using precast concrete.
    b.) Web site traffic continues to increase.
    c.) NPCA affiliates Forum is at www.forum.precast.org please check it out.
    d.) PPA is now on Facebook become a friend!
7.) QA Issues-
    a.) Issues with inserts for installation of parapet attachments for box culvert. AC Miller did a power point presentation to show issues with BC Standards. Hank will set up a meeting with BOD & producers to discuss possible solutions to these issues. (Presentation is attached)
8.) PA DOT Topics- (Randy Lazouras presentation is attached)
    a.) Manhole standards - the scope has been finalized with Gannett Fleming, a time frame is in place to have basic design done by year's end.
    b.) BARK1 and BARK2 are still on Level 2 certification.
    c.) There will be an update in November regarding the repair of epoxy coating on rebar.

d.) Plastic chair testing is complete. No spec is required at this time. Please continue to monitor any cracking and report it to Penn DOT.

e.) Clearance transmittal for evaluation and disposition of precast concrete products. This is for Penn DOT product that does not meet 28 day strength requirements. Randy reviewed this in detail and a new spec will be coming out. There is still some "gray" areas with this that BOD hopes to have clear answers for by the next meeting.

9.) Directors report

a.) Keep your listings up to date on PPA's website.

b.) What training or tools do you need help with? Let Hank know.

c.) Transportation funding update and continued contact with elected officials

d.) Note change in email addresses info@paprecast.org

e.) Facebook

f.) Nominations for officers 2012-2013

10.) Upcoming meeting dates

a.) November 2nd - Hotel Carlisle

b.) Election of officers

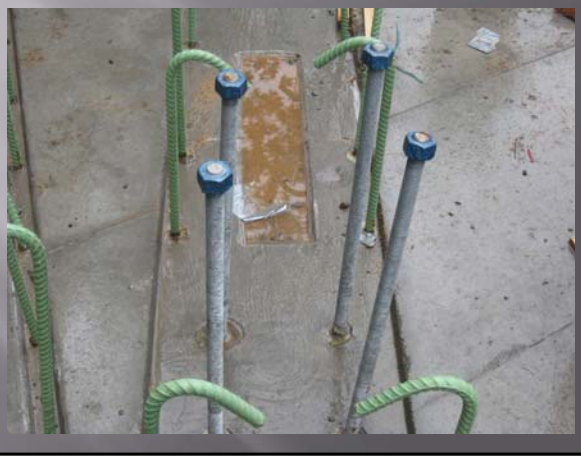
11.) Comments- None

BD-632M — REINFORCED CONCRETE BOX CULVERT STANDARDS (CAST-IN-PLACE AND PRECAST)

Reference BD-609M – Structure Mounted Guide rail

WHY THIS PRESENTATION ON STRUCTURE MOUNTED GUIDE RAIL STANDARDS

- The new PennDOT sturcture mounted guide rail standards were introduced in 2008 and it was up to the manufacturers to make new standard work.
- On June 22, 2011 the following photographs were circulated throughout the state prompting the need for this presentation to:
  - Highlight the conflicts within the standard
  - Present a history of manufacturing technique development
  - Discuss the struggles and the progress as well
  - Explain the difficulties
  - Open discussion on improving the constructability of the standard



THE NEW STRUCTURE MOUNTED GUIDE RAIL STANDARDS

- Goal was to develop a system to meet FHWA crash standards

THE NEW STRUCTURE MOUNTED GUIDE RAIL STANDARDS

- Goal was to develop a system to meet FHWA crash standards
- Introduced new standard in 2008

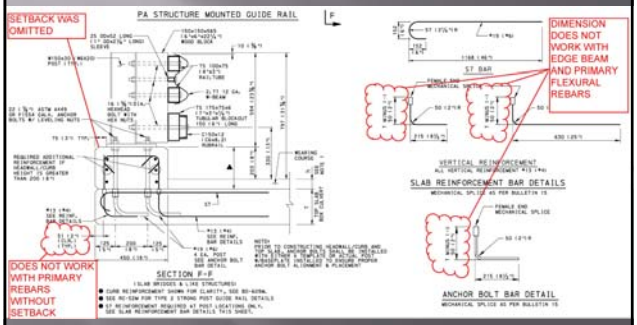
THE NEW STRUCTURE MOUNTED GUIDE RAIL STANDARDS

- Goal was to develop a system to meet FHWA crash standards
- Introduced new standard in 2008
- Added the following features
  - Dowel bar connections in lieu of loop ferrule type inserts
  - Guide rail posts also required dowel bars
  - Added S-7 bars to the end section reinforcement

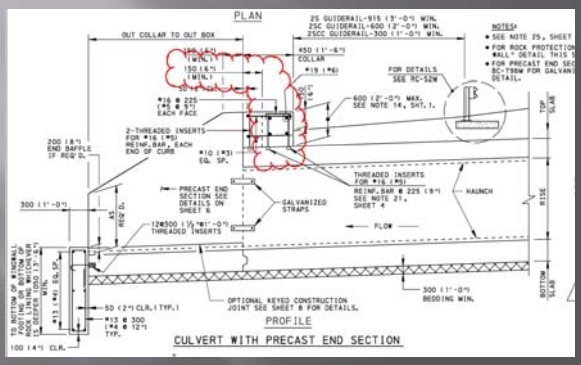
THE NEW STRUCTURE MOUNTED GUIDE RAIL STANDARDS

- Goal was to develop a system to meet FHWA crash standards
- Introduced new standard in 2008
- Added the following features
  - Dowel bar connections in lieu of loop ferrule type inserts
  - Guide rail posts also required dowel bars
  - Added S-7 bars to the end section reinforcement
- The new standard contains conflicts within it self (sheets 5&7)
  - Head wall setback on sheet 5 is omitted on sheet 7
  - Dowel bar dimension on sheet 7 do not work with primary flexural reinforcement

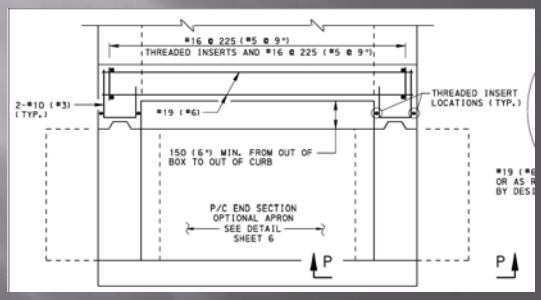
BD-632M – SHEET 7 – STRUCTURE MOUNTED GUIDE RAIL DETAILS



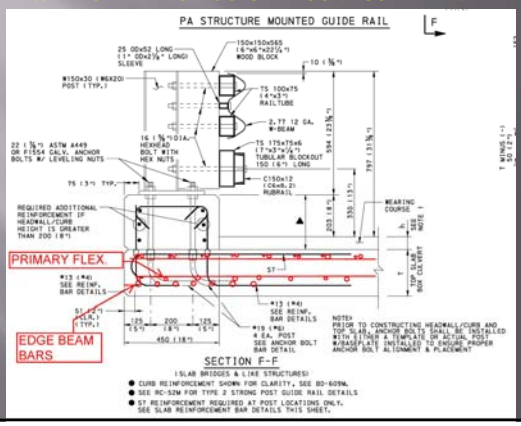
BD-632M – SHEET 5 – HEAD WALL ELEVATION



BD-632M – SHEET 5 --- HEAD WALL PLAN VIEW



BD-632M – SHEET 7 – STRUCTURE MOUNT GUIDE RAIL DETAIL



IT IS UP TO THE FABRICATOR TO MAKE THE STANDARD WORK

- DETERMINE HOW TO MOUNT THE DOWELS ON THE FORM
  - Forms are too expensive to drill large diameter holes to mount dowels
  - Impossible to miss all ribs and stiffeners on the forms
  - Standard does not address skewed curbs that cross over joints in the precast culvert segments
  - Standard does not address skewed end sections with edge beams
- **Mounting the dowels on a recess board is necessary**

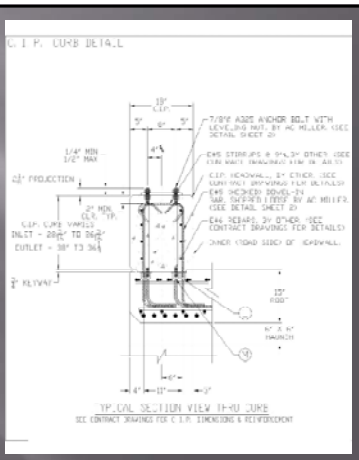
DETERMINE HOW TO RESOLVE THE REBAR CONFLICTS

- Maintain required concrete coverage for primary flexural reinforcement.
  - Inside face 1.5″ without edge beam bars
  - Outside face 2.0″ or typically 2.5″
  - End coverage 1.5″ min to 2.0″ max
- Adjust inside face coverage if edge beam bars are present
- Maintain guide rail position on the curb
- Maintain dowel bar concrete coverage within the curb
- Maintain embedded length of dowels

- **It is necessary to adjust the concrete cover for the dowels on the outside face of the curb**
- **It is necessary to adjust the embedment length of the hooked dowel bars**

HEAD WALL SHOP DRAWING DETAIL

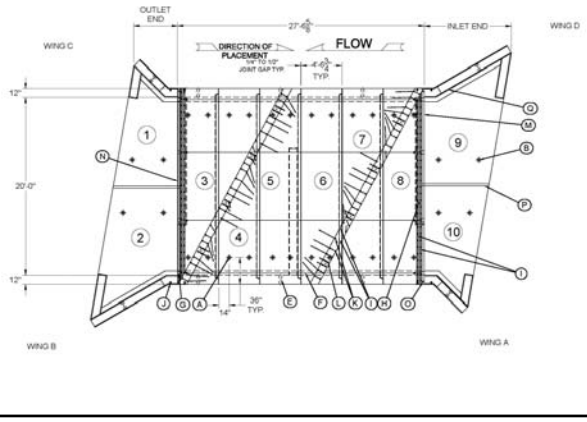
(HUNTINGDON SR0026)

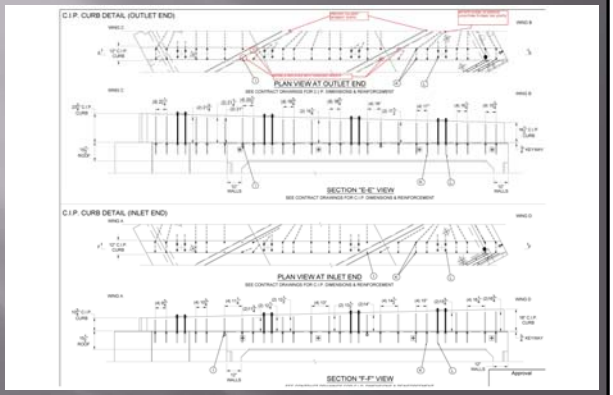


DETERMINE HOW TO HANDLE SKEWED CURBS CROSSING THE JOINTS

- Maintain the proposed post locations whenever possible
- Avoid conflicts with reinforcing bars and post tensioning ducts

- **Adjust the length of the end segment when possible to eliminate having the curb cross a segment joint**
  - **Shipping dimensions and weight of segment are often prohibitive.**
  - **Degree of skew oten requires crossing the joint.**
- **Modify the post locations to minimize the conflict**
  - **Double or triple the rail and span the box**
  - **Vary the post spacing**
- **Substitute a minimum number of inserts for dowels bars.**
- **Use drilled holes and epoxy adhesive for a minimum number of dowel bars.**
- **Rotate the dowel bar tails as needed**





BEFORE THE NEW STANDARD WAS INTRODUCED

- Structure mounted guide rail posts were usually detailed as being bolted through the top slab and curb.
- The concrete curb portion was detailed as being anchored to the top slab of the box culvert with loop ferrule inserts and hook bolts when curbs were greater than 12″ high. When less than 12″ high the inserts and hook bolts were omitted.
  - Some manufacturers used a single recess approximately as wide as the curb to mount the inserts.
  - Other manufacturers used two individual narrow mounting strips for the inserts.

WHERE WE STARTED WHEN THE NEW STANDARD WAS INTRODUCED

- When the new standards were introduced the recess board remained a standard manufacturing detail for the reasons listed previously.
  - Dowels were first mounted to the recess board on wooden pegs
    - Simple to install
    - Easy to strip form as there was no mechanical connect but a slip fit connection between the form and the dowel

BUT

THERE WERE STRUGGLES

Lost dowels
- Drilled and install a rebar or threaded insert using epoxy adhesive

Miss-located dowels
- Request a letter of acceptance
- Drill and install a rebar or threaded insert using epoxy adhesive

Miss-aligned dowels (angled)
- Request a letter of acceptance
- Drill and install a rebar or threaded insert using epoxy adhesive

There were a few customer complaints
- Most issues were handled by the contractor
- One or two occasions – personnel from the plant visited the site and aligned the bars using a pipe to bend them into position

Dowels in skewed curbs fell on the ship lap joint
- Rotate tails of the dowels as they neared the joints.
- Detail the dowels on the shop drawings relocated to miss the joints
- Detail the dowels on the shop drawing replacing this dowel with a threaded insert
- Detail the dowels on the shop drawings to require the contractor to field drill the anchor bolt and use an epoxy adhesive

THE FIRST IMPROVEMENT STEP

- To reduce the number of problems that occurred mounting of the dowels to the recess board was modified.
  - The dowel bars are available with a mounting flange to allow the installer to crew the dowel to the formwork. We began using wood screws to mount the dowels to the recess board.
    - Not too much more difficult to install
    - A little harder to strip the form as there was no way to access the screws and they had to be pulled away from the recess board
    - Often the recess board could not be reused.

THE PROBLEMS WERE GREATLY REDUCED BUT WERE NOT GONE

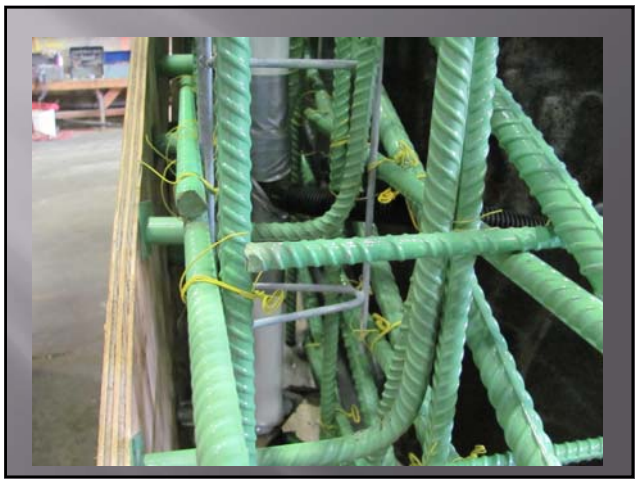
THE NEXT IMPROVEMENT STEP

- Following the circulation of the pictures at the beginning of the presentation, the method of mounting the dowels to the recess board was again modified to further reduce and hopefully eliminate the problems.
  - The dowel bars are now mounted to the recess board using a machine bolt of the same size as the dowel.
    - Takes much longer to mount the dowels
    - A lot harder to strip the form as the dowels are mechanically fastened to the recess board using 5/8″ diameter machine bolts.
    - Very secure when installed
    - Often the recess board could not be reused.

THE PROBLEMS ARE STILL NOT GONE

WHY DO THE PROBLEMS PERSIST AND PERFECTION ELUDE US?

- The many factors that complicate and affect the position and alignment of the dowels. Following this slide are several photographs from a recent project which is a smaller culvert that is lightly reinforced when compared to most. .
  - The end sections with structure mounted guide rail have highly congested reinforcing in the area of the head wall.
  - The reinforcing cage is not in its final position on the form until the form walls are closed and all of the chairs push and align the cage to meet coverage requirements.
  - A slight under bend on the dowel bars creates a lot of leverage from the tail of the dowel to force a miss-alignment
  - Although SCC concrete has virtually eliminated the need for vibration on some projects the mix design must be vibrated increasing the potential for miss-aligned dowels
  - The is no physical means or tools for the QC/QA department to measure the angle of the dowel in relation to the recess board once the form walls are closed. Often even visual inspection is difficult in the congested cages.



SUMMARY

- We have made great strides in reducing problems with structure mounted guide rails, but are still looking for answers on how to eliminate the miss-alignment problems. Some possible directions are:
  - Update the standards to eliminate the conflict and/or possibly reinstitute the head wall setback
  - More secure mounting systems that don't cause damage to the forming equipment
  - A different type of anchoring system in the standard such as a headed anchor that do not have a bent tail.
  - Measuring devices to assist the QC/QA department in identifying a problem before the concrete is cast.

THANK YOU

PPA MEETING – SEPTEMBER 7, 2011

PENNDOT TOPICS

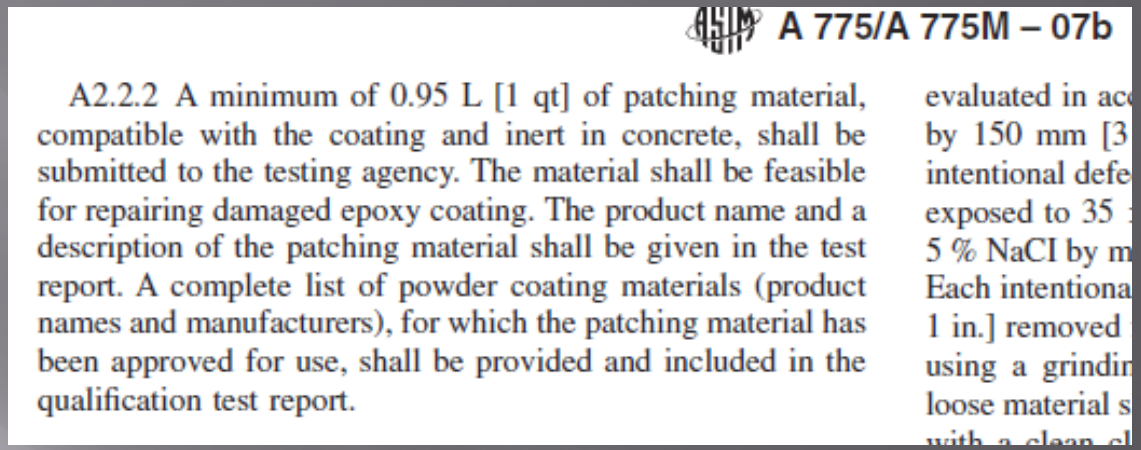
Re-design of RC-39M – Manhole Standards

- The 'Scope of Work' for this work order has been finalized between the consultant (Gannett Fleming…the same consultant who developed the new inlet standards) and PennDOT's Bureau of Design.
- Gannett Fleming is now running design calculations. Much like they did with the RC-45 and RC-46 Standards.
  - Time frame …now until the end of the year.
  - Next meeting between PennDOT and Industry– anticipated January 2012.

Pub 35 Bulletin 15 Reduced Certifications.

- Just a reminder that Barker Steel, Code BARK1 and BARK2, are both on Level 2 (Certification Reduction) per Pub 408 Section 106.03(b)3 (both as a coater and fabricator).
- Barker is currently providing the Department with advance notice of deliveries to projects and precasters. The Department will continue to sample the material in advance of use as part of an effort to evaluate their overall performance.

Epoxy Repair of Reinforcement Bars



A 775/A 775M – 07b

A2.2.2 A minimum of 0.95 L [1 qt] of patching material, compatible with the coating and inert in concrete, shall be submitted to the testing agency. The material shall be feasible for repairing damaged epoxy coating. The product name and a description of the patching material shall be given in the test report. A complete list of powder coating materials (product names and manufacturers), for which the patching material has been approved for use, shall be provided and included in the qualification test report.

evaluated in ac
by 150 mm [3
intentional defe
exposed to 35
5 % NaCl by m
Each intentiona
1 in.] removed
using a grindi
loose material s
with a clean cl

- ASTM A775 requires that each epoxy powder mfgr identify AND test the repair materials to be used with their powder system.
- Bulletin 15 does not currently list approved epoxy coating repair materials/manufacturers
- Effort reinitiated (began 2009) to resolve this and list manufacturers.
  - Manufacturers are being contacted individually.
  - Aerosols (ie AERVOE) will be permitted to test and qualify their materials
    - Bulletin 15 applications are REQUIRED to be submitted
    - Powder mfgrs who do not have repair materials qualified will be removed
- Maintain status quo until notified otherwise

Epoxy Repair of Reinforcement Bars

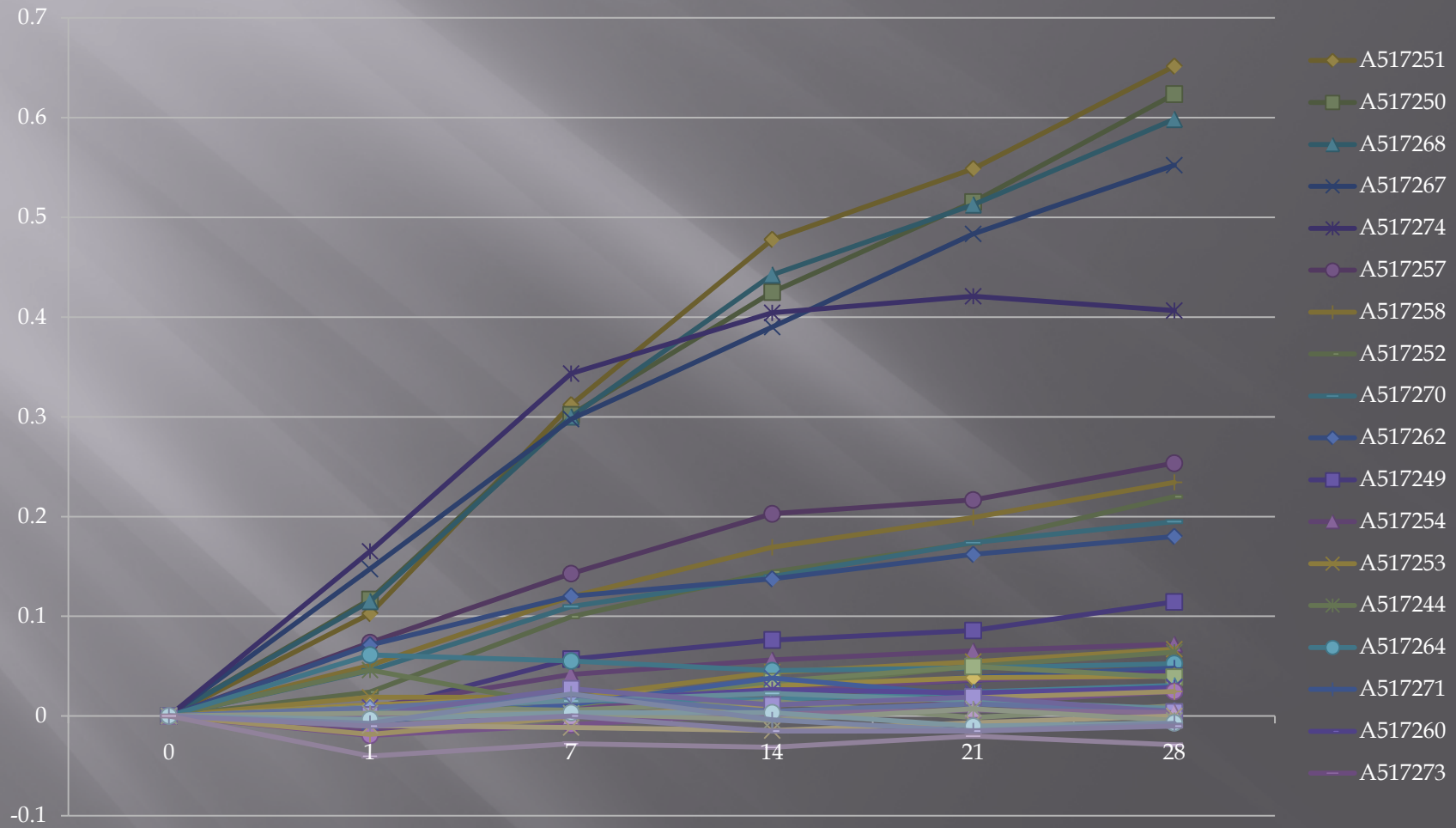
- Manufactures must have their repair procedures and compatibility information submitted to PENNDOT by the end of this year.
- We will have an update on this at the next meeting in November.

Plastic Chair Testing

- BOCM has concluded the testing and evaluation of the plastic chair samples.
- Less than 1% of the samples exhibited absorption higher than 0.5 % (only 4 chair models)
  - Florida DOT has a specification (concrete industry driven) to qualify plastic chairs – limiting absorption during qualification or subsequent testing to not more than 0.5%.

Plastic Chair Testing

Plastic Chair Testing



Plastic Chair Testing

- We did note significant variability in some materials where for a single chair manufacturer and model, the chair was ‘green’, ‘gray’ and ‘off white’… Test results yielded varying results for absorption and expansion indicating the manufactuer did not consistently use the same material!
- Based upon the overall analysis and test results however, BOCM has decided not to initiate a specification at this time.
- Precasters are encouraged to continue to monitor any cracking that would appear to be related to plastic chairs (due to location, member size etc.) and report the information to PennDOT.

Pub 408 Sec 110.12 Evaluation and Disposition of Precast Concrete Products

- A Clearance Transmittal (C-11-013) was circulated for comments regarding the Evaluation and Disposition of Precast Concrete Products.
- This was done as PENNDOT does not have a formal procedure in place for evaluating precast concrete products that fail to meet 28-day design strengths.
- The procedure will provide guidance for performing verification of the 28-day minimum

Pub 408 Sec 110.12 cont.

- Strength requirement using compressive strength testing of cores according to AASHTO T24
- Provided the average of the cores pass, the lot in question will be accepted.
- If the cores do not meet 28-day design strengths, then the lot will be considered deficient and rejected.
- Step 1 External comments were received (minimal). Spec. revision is anticipated to be incorporated within the next 12 months.

Pub 408 Sec 110.12 cont.

- **110.12 EVALUATION AND DISPOSITION OF PRECAST CONCRETE PRODUCTS**
- **(a) General.** Low strength precast concrete products will be evaluated using the compressive strength of concrete core test specimens. This policy applies only to (non prestressed) precast concrete products where the minimum structural design strength is equal to the 28-day minimum concrete compressive strength Where precast concrete products are designed with a minimum structural concrete strength less than the 28-day minimum compressive strength, evaluation and disposition will be in accordance with Section 110.10.

Pub 408 Sec 110.12 cont.

- **(b) Definitions.**
- **F′(28-day).** 28-day minimum concrete compressive strength (pounds per square inch), as specified in the RC Standards or on the approved shop drawings.
- **F′(cyl).** 28-day concrete compressive strength (pounds per square inch) of acceptance cylinders representing the lot of precast concrete products.
- **F′(core-average).** Concrete compressive strength (pounds per square inch) of acceptance cores extracted from the precast concrete products. Determined as the average of all cores from the lot

Pub 408 Sec 110.12 cont.

- **(c) Evaluation and Disposition of Low Strength Precast Concrete Products Using Cores.** If F'(cyl), representing a specific lot of precast concrete products, fails to meet the F'(28-day) for the specific product, the lot of precast concrete products will be considered deficient.
- Request permission from the Structural Materials Engineer, in writing, to extract cores from the deficient lot. When coring is approved, obtain cores under the direction and supervision of the Representative or his or her designate, within 1 week of n Use a pachometer if necessary to avoid damage to the reinforcing steel. Patch holes left after coring using the approved concrete mix design or an approved concrete repair material a manufacturer listed in Bulletin 15 that will achieve the minimum concrete design strength. For products with architectural finishes, obtain advance approval for the repair methods and materials from the Department.

Pub 408 Sec 110.12 cont.

- The total number of cores required for evaluation of the lot shall be determined from the cube root of the number of precast concrete products produced for that lot. The cube root shall be rounded to the nearest whole number, with a minimum of three cores required, regardless of the lot size, unless the lot size is less than three pieces.
- Deliver cores immediately to the Materials and Testing Division within 3 working days. Cores will be prepared for testing according to AASHTO T24 and compressive strength testing will be conducted according to PTM No. 604.
- If F'(core-average) > F'(28-day), the lot is accepted. If F'(core-average) < F'(28-day), the lot is considered deficient and rejected.

Any Questions?