

Jan 10th 2013 Post Construction Meeting Minutes

Attendees: Mike Paipal – Five Star, Norman Nowosinsky – Five Star, Josh Krage, Jim Finke – Cretex, Charlie Johnson – Redstone, Nate Larson – Redstone, Steve Grover – Materials, Jake Rezac – Materials, Frank Jordan – Bridge, Paul Rowekamp – Bridge, Kent Kohler – District, Andy Johnson – District, Ed Lutgen – Bridge

Design Plans

Frank lead designer, open to suggestions of weights, tolerances, sizes, sequencing

- Maybe thinner panels 8" for longer bridges and less crane pick points. Used 75 ton crane from both sides of river behind abutment and maxed out lifting capacity.
- Use round ducts (better access to bottom for splicing)
- Use 0.6" strands
- Drip edge, use sharp angle V groove otherwise spalls inside corner (vertical) off
- Sequencing from the outside in would have been difficult
- Latest letting November for next summer construction
- Every other week meetings to go over construction vital to project deadline
- Include note on plans for Contractor to build a header form on top of beam for help and easement of placing first panel.
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Panel Fabrication

- Retarder "Duratard 25" worked well on panel outside edges, consider using on shear pockets (cretex used duct tape over Styrofoam), exposed aggregate surface repeatable and controllable. Consider using on the areas over beam so you do not have to sandblast on the underneath. Retarder was not specified in the contract.
- Longitudinal closure pour joint rebar required bending to place, consider offset or stagger in panel rebar spacing, layout in the shop drawings
- Panels cured 1 day in the form
- Specs say keep wet after uncovered, Cretex used cold water to spray panel and that "shocked" the panel causing cracking. Use a mist instead of spraying. Maybe say keep moist after removal from form and mist if required
- Panel Tolerances – PT tubes block welded to form so no movement, there was some edge of deck meander to make up for duct misalignment. Like the 2" from back of rail to edge of deck for field adjustment. Keep same tolerances on panels.
- Trucking went well. Wider panels first.

- Smaller cores on mock up panel..2"
- Depending on risk probably would not pour extra panel for construction risk. Would like prepared design and plans for cast in place details ready to go for the field if accelerated deadline? Do not include in contract but have option ready to go.

Construction

- Stool forming – Ceramar product used successfully, started with ¼" extra than stool, eventually made ½" taller than tallest stool so some spot had 1" higher, good compressed and seal, no grout leakage, some coefficient of expansion differences between beam and ceramar, The leveling bolts calculations from the stool and plates had to be consistently adjusted in the field for unknown reason.
- Transverse joints – 1 1/8" backer rod good for all ¼" gaps, did not use ethofoam rope, used same size for all joints because did not place from ends to the center.
- Duct splice – Redstone asked for larger opening, longer and wider, (+2" on each side for total of 4" increase) used torch and flashing (to reflect heat and protect panel) to shrink splices around duct
- Do not air pressure test to 50 psi, too many joints and leaks, leaked from top and bottom
- Grout to 10-15 psi for placement
- Ideally the splice material needs to span more ribs in the duct
- The first ducts were filled with no air test, then about ½ failed the air test, Some grout was leaking out the top and bottom of deck when tested to high pressure. This probably did more harm than good for splices.
- Redstone recommended different splice material that does not need heat. MnDOT responded that other states are successfully using the current splice.
- Post Tensioning – went well, some sub issues getting mobilized and delays to project. Cannot do air test prior to closure pour as the concrete containment has to be cast.
- Epoxy – concern with dust and blowing aggregate adjacent to traffic. Fractured flint better for dust than dresser trap rock. Aggregate meeting gradations. Require pre-application test. Did not get overlay on in 2012 due to temperature and condensation concerns. Would have like to apply but supplier recommended against.
- Planing – Cannot get to gutterline even with walk behind planers, 3" from gutter closest, some low areas not planed from tolerances, will require a 3rd layer of epoxy.
- Cracking – There were some minor cracks near the shear blockout areas on a couple of panels. Most of the closure pour areas have cracking that is sealed for the winter from shrinkage.

Grout

- Five star, Highway patch with aggregate extender and superplasticisers used, mobile mixer, product not designed for this type of application. Utah just used because available.

- Recommend Fluid 100 product for all joints. Longer working time but slightly lower compressive strength gain. Would use 50% aggregate extenders for cost savings, lengths over 4" do aggregate extension (for shrinkage and cost), plasticisers, durability good air 4-5%. No outgassing after 7 days so could apply epoxy sooner, will not bleed or break down with double the working time. Redstone interested in this grout.
- Recommend Concrete ES for end closure pour extended 80% with aggregate, 28 day cure wait maybe reduced, could use "chem grout" mixers portable 3" line smaller mixer operation with bags and wheelbarrows.
- Require head boxes to get hydraulic head on transverse, longitudinal and shear blockout pours.
- Grout operation could have gone better if stopped, cleaned and regrouped and started again. Would have wasted some material but done better job.
- Should require contractor to have warm weather grout contingency plans. Ask for procedure in contract. Use shade or ice to prevent heat and shrinkage.

Comments on accelerated projects

- Prime contractor taking more risk for lining up subs. Activities have shorter windows and less allowance for delays
- Can we lower the cure times?
- The approach panel and end diaphragm timing constructability delay issue. Could we use sacrificial MSE walls as end diaphragm form to accelerate approach panel compaction?
- Like Tex cote special surface finish, higher pressure nozzle and finish tackier longer but easier to use and looks better
- Could you use jacking instead of PT?
- Redstone comment on his bid cost probably not reducing. Panel fabricator could probably reduce based on efficiencies and risk