Bridge Deck Concrete Placement Checklist – see Spec. 2401

Revised 6/2014

Pre-Pour-Planning the Placement: It is required that a pre-pour meeting with the Contractor be scheduled to specifically discuss:

- ☐ Time of starting of pour -- Anticipated weather conditions?
- ☐ Anticipated rate of delivery of concrete?
- ☐ How much material will be needed? At what rate? Haul time from plant?
- ☐ Discuss pouring sequence concerns. Admixtures, dosage rates?
- ☐ Use of concrete retarders. Concrete must remain plastic ½ span back until ½ of the next span is placed.
- ☐ Deck placement sequence reviewed if so indicated in the plan and bulkhead placement if required.
- ☐ Pour to start on what side? Proceed to what side? Location of pumps (lights)? Pump break down? Back up procedure?
- ☐ Manpower – review the size of the crew and their specific duties assigned to them.
- ☐ How many assigned to consolidation, finishing, and curing? Application of surface texture?
- ☐ Curing requirements … there is a 30 minute time limit to get the concrete covered with pre-wetted burlap and plastic sheeting. Full depth deck slab-curing compound permissible with a wet cure.
- ☐ Curing and protection … windy, hot conditions create excessive evaporation? Are cold weather blankets and/or a heating system needed? See Bridge Construction Manual Figure A 5-393.360. and Specification 2401.3.G.
- ☐ Header available? Possible header locations? Emergency covering materials available just in case? (No rain to be forecasted during placement; if rain occurs, pour stops)
- ☐ Method of placement of the deck concrete? Pumping equipment with backup planned?
- ☐ Skew placement concerns.
- ☐ Type of finishing machine to be used? [if structural deck (7")-air screed is O.K. or the use of a Bidwell/Gomaco type finishing machine is also permissible. Full depth decks (9") require a Bidwell/Gomaco type finishing machine]
- ☐ Number of foot bridges needed (typically 2 minimum required)

- **Prior to Placement:**
  - ☐ Check that the falsework and forms are at the proper grade with no gaps (concrete leakage).
  - ☐ Have the forms been oiled and hanger bolts greased?
  - ☐ Rebars placed at correct location, height and the correct total quantity incorporated into deck.
  - ☐ Rebar mat has been tied to beam stirrups, epoxy has been touched up?

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- ☐ Conduct a dry run using a filler strip attached to finishing machine to check proper rebar height. Adjust rebars as necessary. Also, make depth checks during this run for total slab thickness.
- ☐ Check deck drain clearances and rail deflection & stability.
- ☐ Assure that sufficient rebar supports have been used and tied as required (bottom mat every other intersection and top mat 100%).
  If air screed is O.K. to use (structural deck only), additional bolsters and high chair supports may be required under the skids.
- ☐ Are the overhang brackets properly seated against the beam? Struts need to be installed on steel beams between diaphragms if there is a wide overhang compared to the beam depth.
- ☐ Have expansion joints been set to correct grade and width for temperature? The finishing machine needs to be checked against the expansion joint for proper height.
- ☐ Adequate equipment at the site; size of crew with a review of each person's responsibility.
- ☐ Check frequency of pulses of vibrators, only use non-metallic head vibrators.
- ☐ Have the forms been cleaned out?
- ☐ Any joints need to be marked out – need to be tooled in during the pour and saw cut later.
- ☐ Proper curing materials at the site with enough people to install as soon as possible.
- ☐ Burlap must be pre-soaked.
  Note: Excessive deck cracking is occurring. Proper placement & curing is of great importance.

• During the Placement:

- ☐ Within the Department's organization, discuss:
  - ☐ Will concrete supplier test concrete?
  - ☐ Will concrete supplier test re-mixed concrete?
  - ☐ The concrete mix specified, quantity of tests needed and who is assigned the testing?
  - ☐ What are the procedures to follow for any failures?
  - ☐ Is retempering allowed?
  - ☐ How many 10 foot straight edges?
  - ☐ Who will be the inspector on the deck?
  - ☐ Are control cylinders required?
- ☐ Air testers calibrated & correlated, spare testers available?
- ☐ Is the correct concrete mix being furnished?
- ☐ The deck forms need to be kept wet ahead of concrete placement.
- ☐ Review that the concrete is placed uniformly and uniform consolidation with vibrators (pattern).
- ☐ Place concrete on adjacent bay before the overhang to reduce deflection of reinforcement, reducing cover.

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- ☐ Where feasible and practical, concrete placement should proceed from lowest elevation to highest, to reduce finishing problems due to rainwater or moisture from fogging or cure blankets.
- ☐ Insert vibrators vertical for 3 to 5 seconds. Do not drag vibrators. Don't use vibrators to move concrete. Avoid walking in mix after vibrating.
- ☐ Screed operation-skewed to fit centerline of bearing? A small head of concrete in front of the roller.
- ☐ Is hand floating sealing all voids?
- ☐ Check for drainage at gutterline, especially on flat grades.
- ☐ Periodically check crown and grade.
- ☐ Is a 10 foot straight edge being used in the gutter lines and for checking the main deck.
- ☐ Is there a form watcher looking at the performance of the falsework?
- ☐ Check the concrete surface at the expansion joint with a 10 foot straight edge.
- ☐ Concrete depth checks need to be made and documented by the Inspector. ***Very important!***
- ☐ Make reinforcing steel depth checks.
- ☐ Carpet drag and tining operations for the texture need to be reviewed.
- ☐ Leakage onto beams or girders must be removed when still plastic to avoid damage to primer/paint system (some contractors will use power washers during deck pour).

- **<u>After the Placement</u>:**
  - ☐ Keep the slab moist; apply the curing per specifications.
  - ☐ Is there a continuous, dedicated water supply? How will it be kept wet overnight and weekend?
  - ☐ If there is cold weather predicted, is the Contractor prepared? Blankets or heating system?
  - ☐ Low temp. protection - means for checking concrete temperature during curing period.
  - ☐ Release the expansion joint; break lose any welded plates across the joint as soon as the joint is covered.
  - ☐ On prestressed beam bridges, tool in a contraction joint cut directly over the pier during deck placement operations and saw cut as soon as possible without raveling.
  - ☐ No heavy loads are allowed on the deck during the cure period or immediately after.
  - ☐ The cure requires **65%** of strength gained; minimum curing time under **ideal conditions** according to **Table 2401-2** is:

    Day 1 15% strength gained for a total of 15%
    Day 2 15% strength gained for a total of 30%
    Day 3 13% strength gained for a total of 43%
    Day 4 10% strength gained for a total of 53%
    Day 5 8% strength gained for a total of **61**%

Day 6 7% strength gained for a total of 68%

Note: A 7 day wet cure is required on decks!

This starts when the last curing protection is inplace.

If control cylinders are used, there is a minimum of 96 hours.

Note: Must be surface moist through the 7 day curing period. Wet cure with pre-wetted burlap and white poly inplace within 30 minutes or a $500.00 monetary deduct for 5 minutes over the time limit. Full-depth deck curing compound use is O.K. with pre-wetted burlap/poly ASAP.

☐ Complete the "Bridge Deck Placement Data Form" BR4789 and submit to the Bridge Office.

- ## Before release of the Falsework:

☐ Must have the proper cure time plus one day dry out.

☐ Release of the falsework starts at the center of each span full width and proceeds simultaneously to the ends of the span.

- ## Before Barrier Placement:

☐ The deck cure needs to be completed.

☐ The slab falsework needs to be released or removed.

- ## Before Heavy Loads are Applied:

☐ Not allowed until curing is completed.

☐ Ready mix trucks-agitating speed only -- not mixing speed.

☐ Slab spans and box girder decks, equipment 15 tons and over not permitted on the deck until the cure is complete plus one week.

☐ See Spec. 1513 - Restriction on movement and storage of heavy loads and equipment.

- ## References - Need to review! *Checklist doesn't override the specifications!*

☐ 2014 Minnesota Specifications book mainly Spec. 2401 and 2461.

☐ MnDOT Bridge Construction Manual especially 5-393.358.

☐ MnDOT Concrete Manual.

☐ Special Provisions.