

707.00 BRIDGE DECKS AND OVERLAYS (*SSHC Sections 710 and 711*)

707.01 DESCRIPTION

- A. The concrete bridge floor is the wearing surface of the bridge superstructure and is commonly referred to as the bridge "deck". This work consists of forming, reinforcing, and placing concrete to the lines, grades, and typical cross sections shown in the plans.

707.02 MATERIAL REQUIREMENTS

- A. See Subsection 706.02
- B. Density Testing
1. Durable, low maintenance bridge decks require impermeable (very dense) concrete. Therefore, checking density during placement is an essential part of deck surfacing and overlay inspection. Test frequencies for determining the density of bridge deck surfacing and overlays are listed in *SSHC Subsection 711.04*. A test should be taken at 5 ft (1.5 m), 10 ft (3 m), 15 ft (4.5 m), and every 50 ft (15 m) thereafter per placement width per bridge. Density tests will not be required for overlaying approach paving areas.
 2. It is always desirable to take more than the minimum nuclear density tests per length of overlay placed. If densities are at or near the lower specification limits, additional testing will need to be performed.
 3. Vibrating Mix at Test Well Location
 - a. On some projects, contractors have been vibrating the concrete mix in the test well with a hand-held vibrator prior to passage of the finishing machine. This practice will not be permitted.
 - b. If the oscillating screed vibrators are functioning properly, complying density of the concrete mix in the test well will be obtained without any difficulty. Obtaining required density at test well locations, without supplemental vibration, assures us that the contractors' equipment and placement procedures are capable of producing the desired results throughout the overlay being placed.
 4. Density Test Wells on Bridge Deck Repair Projects
 - a. Follow guidelines in *SSHC Subsection 710.04, para. 7.b*.

707.03 CONSTRUCTION METHODS

- A. General – The wind velocity-temperature relationships stated in the specifications should be enforced to avoid loss of water from the concrete surface faster than it can be replaced by normal bleeding and to avoid the resultant formation of plastic shrinkage cracks. Anemometers and thermometers must be available on site to measure wind velocity and temperature.

1. Concrete in bridge floors shall be placed uniformly on both sides of the centerline and shall be placed continuously between specified joints. The sequence of placing shall be in accordance with the pouring diagram shown in the plans. If no pouring diagram is shown in the plans, concrete shall be placed as directed by the Project Manager.
2. The deck forms shall be dry when using HD-LS but must be wet when using silica fume concrete before placing the concrete. Concrete shall be adequately vibrated to encase the lower bars of the reinforcing mat where these are near the deck form.
3. Special attention shall be given to finishing the riding surface on the bridge floors. SSHC Subsections 706.03, 710.03, and 711.03 explain concrete bridge floor finish.
4. It has been the policy to permit the contractor to use mechanical finishing machines of an approved type whether or not they are required by the plans or special provisions.
5. Method of Finish - When the hand method described in Section 704 is employed, the concrete surface shall be struck off with a strike board which conforms to the cross section shown in the plans. If this is pulled by hand, care shall be taken not to displace the reinforcing steel by the workmen doing the pulling. A small air winch anchored to a girder outside of the day's pour will pull the strike off at a slow, uniform rate, giving a truer surface with no displacement of the reinforcing steel. The strike board shall be operated with a combined longitudinal and transverse motion, always carrying a small roll of concrete in front of the cutting edge. The strike off shall be pulled a sufficient number of times to properly distribute the concrete. A longitudinal float generally is required and is described in
6. *SSHC Section 704.* The longitudinal float shall be lapped 1/2 its length when moved to a new position and shall be operated across the surface a sufficient number of times to produce a uniform, smooth riding surface. Occasionally during the finishing operation, conditions may require the use of the long-handled transverse float, which require extreme care in its use to preserve the desired cross-section and a smooth riding surface.
7. Regardless of whether hand or machine finishing methods are used, the floor surface shall be tested for trueness with a 10 ft (3 m) straightedge. The bridge contractor is required to furnish a 10 ft (3 m) master straightedge for use in trueing and checking the working straightedges.
8. Phased construction of a bridge deck usually requires a form longitudinally down the bridge deck near the center of the bridge. The location of the form is shown in the plans. Sometimes it is more efficient to move the location of the longitudinal phasing joint. On bridges with concrete girders it is nice if the joint can be lined up to use the notched lip in the girder flange. However, the resulting lane widths must be checked to confirm there is adequate clearance for vehicles.

B. Bridge Deck Curing

1. When the high temperature for the day that the deck will be cast is expected to exceed 80°F the deck should be cast at night. The Contractor should contact the concrete plant and schedule the concrete deliveries to the bridge deck to begin at 5:00 pm. The Contractor must also confirm that the concrete will have a 1-hour set delay when it arrives on the deck.

C. Bridge Deck Joints

1. If a joint compound is not specified the Contractor may use hot tar to seal bridge deck joints.

E. Deck Overlay Preparation

1. Securing an adequate bond at the interface of the existing prepared deck surface and proposed overlay course is essential in obtaining a durable and maintenance free bridge deck system. General surface preparation requires milling, shotblasting, and/or sandblasting depending on the surface condition or amount of existing surface material to be removed. Any reinforcing bar which is exposed must be sandblasted to remove all rust contaminants, and unsound concrete. Also, prior to placing the grout the surface must receive an air blast to remove dust and other foreign particles from the prepared surface.
2. The surface, once cleaned, must remain clean until the grout and concrete is placed. There have been cases where the prepared deck surface has become contaminated during the decking operations by concentrated traffic of vehicles transporting the concrete. This is especially true when the skid-steer type loaders are used to transport mix. The deck surface is contaminated by the abrasive action between the concrete surface and the rubber tires, and also from oil and other foreign material tracked in from off the bridge. Contamination can be recognized by discoloration or oil on the deck surface. Contamination is especially noticeable in the wheel paths used by the vehicles.
3. Core specimens taken and tested for bond strength from areas as mentioned above showed a marked decrease in bond strength between the interfaces.
4. To prevent the cleaned deck surface from being contaminated by traffic, the contractor shall cover any prepared surface with sheets of plywood, multiple layers of plastic, or other suitable material. To ensure a clean surface prior to placement of the overlay system, areas which become contaminated shall be resandblasted followed by an air blast.

F. Class I Floor Repair (*SSHC Sections 710 and 711*)

1. Follow guidance in SSHC Subsections 710.04, para. 1 and 711.04, para. 1.

G. Work on Adjacent Lanes

1. *SSHC Section 423* prescribes traffic provisions when traffic is present.