1. MODIFIED BRIDGE DECK CONCRETE WATER CURE [551] (Revised 3-2-2020)

Description. Protect full depth bridge deck concrete from shrinkage and thermal cracking.

Materials.

Burlap. Furnish burlap in accordance with Subsection 717.01.2.

Water. Furnish water in accordance with Subsection 713.01.

Temperature data logging. Submit for approval a temperature monitoring system having at least 4 channels, capable of measuring internal concrete and ambient temperatures, recording time and temperature at 30-minute intervals or less for a minimum of 14 days, with an accuracy of 1 degree or less.

Construction Requirements.

For each concrete placement, install 4 probes at 3 locations on the deck (12 probes total per placement) in concrete a minimum of 5 feet away from any edge or joint. For placements that are less than 10 cubic yards, place only 4 probes at one location. Place and secure probes at 4 depths within the deck as follows:

* at least 2 feet above deck surface. This probe may be moved to the edge of deck to facilitate attachment;
* to the top of the top mat of rebar;
* midway between the 2 mats of rebar, and;
* to the bottom of the bottom mat of rebar.

Start recording temperatures at least 1 hour prior to concrete placement. Ensure probes read within 3.6 °F (2 °C). Replace probes that do not. Protect probes during concrete placement. Relocate any displaced probes within wet concrete. Monitor and record ambient air temperature while recording probe temperatures. Monitor concrete temperature probes until concrete is within 5 °F (2.8 °C) of ambient, and vertical temperatures through the deck thickness are uniform (within 10 °F [5.5 °C]) and concrete is at least 96 hours old (72 hours old if concrete does not contain silica fume).  
Exception: for cold weather concrete, monitor temperatures until cold weather protection is removed.

Increase ambient humidity by fogging above finished concrete and concrete forms/rebar using one or more 3000 psi (21MPa) or greater pressure washer powered fogging wands. Do not:

* use low pressure spray nozzles;
* use fogging systems attached to the screed;
* use fogging, or other methods, to add finishing water to unfinished concrete;
* allow water to drip, flow, or puddle on the concrete surface during fog misting, when placing the burlap, or at any time before the concrete has achieved final set.
  + 1. Maintain the forward edge of concrete placement nearly parallel to and not more than 6 feet (1.8 m) ahead of the strike-off.

Use catwalk(s) to facilitate uniform application of the fog mist across the entire deck and to facilitate placement of the wet burlap on the fresh concrete surface. Apply a fog mist as necessary to maintain a moist surface on the finished concrete before and after covering with burlap until the water cure process is operational.

Start the water cure as soon as possible without damaging the concrete finish by applying pre-moistened burlap to maintain a water-saturated environment on the concrete surface. Meet the following requirements for the water cure.

Ensure the temperature of all water used in the water cure is within 20 °F (17 °C) of the in place concrete temperature.

Presoak the burlap by immersing it in water for at least 24 hours prior to placement.

Apply the wet burlap to the concrete surface no later than 15 minutes after striking off and finishing the surface of deck-slab concrete.

Place soaker hoses when the concrete has hardened sufficiently to prevent marring of the surfaces.

Keep the entire deck surface saturated for 3 hours (1 hour for cold weather concrete, unless otherwise approved by the Project Manager) after concrete has reached maximum temperature as recorded by the probes. Immediately turn off soaker hoses and apply clear plastic sheeting over the wet burlap to keep concrete moist.

Apply cold weather insulation blankets to minimize the rate of cooling of concrete immediately following the installation of plastic sheeting.

Remove all curing and allow deck to dry when concrete is within 5 °F (2.8 °C) of ambient, and vertical temperatures through deck thickness are uniform (within 10 °F [5.5 °C]) and the concrete is at least 96 hours old (72 hours old if concrete does not contain silica fume).

Method of Measurement and Basis of Payment. Fogging and water cure will not be measured separately for payment. Include all costs associated with this provision in the concrete receiving the cure.