

CONSTRUCTION

TIPS

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Curing compound, properly applied, can be effective in acting as a temporary (interim) curing method for a bridge deck until the concrete can support the weight of the personnel placing the mat and the weight of the wet mat itself.

For concrete pavements, sidewalks and curbs, properly applied curing compound is the only protection to prevent the loss of moisture from the fresh concrete.

In either case, timing, application rate and material quality are important.

Timing the Application of Curing Compounds

In the 2004 TxDOT Standard Specifications, Item 420, Concrete Structures, emphasizes the need to apply curing compound as quickly as possible. This item states:

“. . . apply interim cure . . . as soon as possible after application of the evaporation retardant and after the water sheen has disappeared, but no more than 45 min. after application of the evaporation retardant.”

Item 360, Concrete Pavements, describes similar time constraints:

“Apply the first coat within 10 min. after completing texturing operations. Apply the second coat within 30 min. after completing texturing operations.”

Do not allow the concrete surface to dry out! Keep in mind the use of supplementary cementitious materials (SCMs) and the low water-to-cement ratios in most of the concrete (used by TxDOT) usually produces very little bleed water. Allow the puddles of bleed water to dry or be absorbed with a towel before applying the curing compound. Then apply the curing compound as soon as possible.

Application Rates for Curing Compounds

The standard application rate is 180 sq. ft./gal./coat. It is not easy to determine if the application rate is being achieved unless there is extremely accurate accounting of the quantity of compound used and the surface area to which it is being applied. However, there is one commonly used guideline: *If any grey concrete can be seen through the fresh curing membrane, there is not enough curing compound!* The membrane works only if there is a solid barrier between the concrete and the environment; voids allow water to evaporate. Two evenly placed coats are more effective than one heavy coat.



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Curing Equipment Maintenance

Can the curing compound be thinned to keep the nozzles from clogging? No. **NEVER** use this method to prevent nozzle clogging.

If you suspect the curing compound does not meet specifications, obtain a sample from the sprayer (a clean 4 × 8 cylinder mold, sealed, is a good sample container) and test for:

- gallon weight
- % solids and
- viscosity.

Anecdotal observations indicate the chances of thinned curing compound are greater when the curing compound is sprayed by hand with a small compressor or when the curing compound is transferred from the manufacturer's tank to a secondary spray tank.

Curing Compound Protection

Some conditions are extremely adverse to concrete curing. Under these extreme conditions, even the best and most timely curing compound application will not prevent plastic shrinkage cracks. Factors that can contribute to this undesirable condition are:

- high wind
- low relative humidity
- slow tensile strength gain of the concrete (caused by low concrete and ambient temperatures, SCMs, admixture interactions and poor mixture design selection)
- high concrete temperature and
- high ambient temperature.

In addition to plastic (early age) shrinkage cracks, some concrete mixes are prone to drying (later age) shrinkage cracks. A good curing regimen can prevent plastic shrinkage cracks in most conditions and can minimize drying shrinkage cracks. Although curing is one of the last steps in concrete work TxDOT performs, obtaining proper curing is one of the most important tasks a TxDOT concrete inspector performs to ensure long-term concrete performance.

Contact Information

If you have any questions regarding the content of this article, including how to find programs and information about concrete and concrete curing, please contact the Concrete Laboratory of the Construction Division – Materials and Pavements Section (CST-M&P):

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