Texas Department of Transportation

Construction & Materials Tips

Published Quarterly by the **Construction** and **Bridge Divisions**
First Quarter, 2000

Pointers on Bridge Bearing Pad Installation

Proper installation of bridge bearing pads requires specific bearing seat preparation. The bearing seat may be cast integrally with the cap or built up using either latex- or epoxy-based mortar. Regardless of the composition of the bearing seat build-up, the seat must be given a textured, wood-float finish. Variation from a level plane must not exceed 1/16 inch within the limits of the bearing surface.

If the bearing pad is tapered (sloped), care must be taken to properly orient the pad in the direction of the slope.

More complete information on this subject is located in Sections 420.18 and 435.3(1) of the TxDOT Standard Specifications - 1993 edition. [Randy Cox, P.E. - of the Bridge Division - 416-2189]

Epoxy Safety

When you or your personnel are handling epoxy, it is strongly advised that you first read the product warning label and the Material Safety Data Sheet (MSDS) prior to use. Most manufacturers of epoxies identify their products individual components as irritants, corrosives, sensitizers, and flammable. For these reasons, it is imperative to use chemical resistant gloves, organic vapor respirators and safety goggles when working with epoxy.

A well-ventilated area is also a precautionary measure that is necessary when opening an epoxy container and/or mixing epoxies. If containers do not have handling instructions or safety information on them, contact Claudia Kern with the Materials Branch of the Construction Division at (512) 465-7742.

Curing Concrete

Causes of concrete durability problems include shrinkage cracking; freezing and thawing; sulfate attack; surface wear or abrasion; corrosion of steel; and alkali-silica reactivity (ASR) / delayed ettringite formation (DEF). In most of these causes, the rate of deterioration is directly related to the permeability of the concrete. Therefore, even a properly proportioned mix, designed to resist these problems, will fall short of expectations without proper curing.

The American Concrete Institute (ACI) defines curing as "…the maintaining of a satisfactory moisture content and temperature in the concrete during its early stages so that the desired properties may develop."

We all know that concrete generally contains sufficient mix water at the time of placement for the proper hydration of the cement to take place, if only the concrete wouldn't give up its water to the surrounding environment.

(Continued on Page 2)

To hold moisture loss to a minimum, and to ensure adequate moisture content for proper curing, our Standard Specifications provide concise guidelines for both curing materials and methods. It is very important to verify that both material specifications and specific curing requirements are met to ensure a quality product. Items 360, 420 and 526 cover the requirements for cotton mats, burlap and membrane-forming curing compounds. Any of these items not meeting specification requirements should not be accepted on the job.

A statewide mandatory Special Provision (SP) to Item 360 was also developed to further improve our curing of concrete pavements. This SP requires the use of a evaporation retardant to reduce the rate of moisture loss. Another change incorporated the use of two coats of curing compound. Just remember, curing can make or break the concrete.

For more complete information on this subject, contact Gerald D. Lankes, P.E., with the Materials Branch of the Construction Division at (512) 465-7331.

New Computer Program Helps Predict/Prevent Pavement Cracking

Researchers at the Federal Highway Administration's Turner-Fairbank Highway Research Center, in concert with industry researchers, have developed a software package that will help engineers construct longer-lasting crack-free pavements. The High Performance Paving (HIPERPAV) software determines the amount of stress and strength that will develop in Portland cement concrete during the early stages of construction.

This system thoroughly evaluates the factors that make each project unique, enabling engineers to fine-tune each job and eliminate potential problems before construction starts, FHWA Administrator Kenneth R. Wykle said. It will help take some of the guesswork out of the construction process, saving time and money and yielding a far better product.

Job-specific combinations of mix design, pavement design, construction procedures and environmental factors are entered into the HIPERPAV system and evaluated for their potential to produce cracking. If the potential is found, changes in one or more of the job elements can be tried in subsequent runs of the program until an acceptable combination is found.

Many factors, such as moisture and temperature changes, affect the stress and strength development of pavements. These factors can be particularly damaging during the first 72 hours of construction when concrete is relatively weak compared to the strength it will eventually develop. Critical stresses can develop during this early stage, leading to cracking, and subsequent pavement roughness and poor performance.

Prior to HIPERPAV, pavement predictive models did not account for the complex interactions between the numerous elements involved in each specific project, resulting in generic or inaccurate predictions of performance.

The final report on HIPERPAV, the computer software, and a user's manual are now available. For more information, contact Karen Whitney, 202-366-0660, at the U.S. Department of Transportation Office of Public Affairs, Washington, D.C., www.dot.gov/briefing.htm, and reference FHWA 3-00, dated January 12, 2000.