Concrete Property Test

Shrinkage 5-2: HIPERPAV

National Concrete Pavement Technology Center

www.cptechcenter.org

Purpose – Why Do This Test?

HIPERPAV is a software tool that predicts the strength of concrete pavement as well as the internal stresses that a concrete pavement may experience in the first 72 hours of its life. When stresses exceed the strength, cracks will occur. HIPERPAV does not prevent cracks, but it provides the user with information about the likely risk of early cracking in the pavement, allowing preventative actions to be taken. Using HIPERPAV is analogous to driving at night with headlights. We are able to see potential dangers sooner than if we were driving by the light of the night sky.

Principle – What is the Theory?

HIPERPAV simulates the strength gain and internal stresses of a concrete pavement through a computer model that considers the following factors:

- Materials.
- Mixture proportions.
- Subbase and subgrade support.
- Subbase friction.
- Subbase temperature.
- Concrete temperature.
- Curing procedures.
- Sawcutting procedures.
- Weather conditions (temperature, humidity, wind, and cloud cover).
- Slab design (thickness, width, length, steel, etc.).
- Time.

Test Procedure – How is the Test Run?

Project-specific inputs are entered into the software.

Test Apparatus

- Personal computer.
- HIPERPAV software.

Test Method – Refer to HIPERPAV help files for user documentation

Output – How Do I Interpret the Results?

The graphical output of HIPERPAV is very easy to understand. When stress approaches or exceeds strength, the probability of early cracking is increased (figure 1).

Construction Issues – What Should I Look For?

Many factors can contribute to early cracking. From a construction perspective, placement temperatures, sawcutting, and curing are the processes that can be most easily adjusted to counteract cracking potential. Working in the cooler part of the day, and/or controlling materials temperatures will help reduce stresses. Early and thorough curing will reduce the stresses within the pavement as well as benefit permeability properties. Sawcutting should be performed as soon as is practical (avoid excess raveling) to relieve stresses within the pavement.

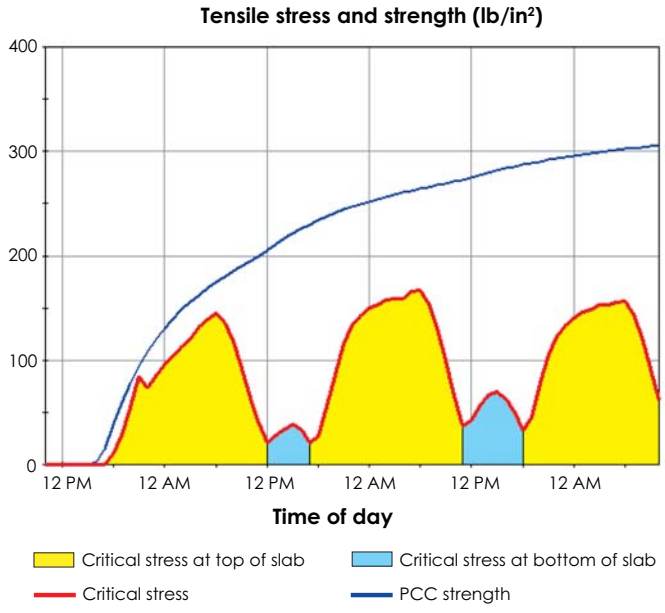

Figure 1. Example HIPERPAV output

FOR MORE INFORMATION

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