HIPERPAV III – Press Release

HIPERPAV III is hitting the streets this summer!

HIPERPAV (HIgh PERformance concrete PAVing) is a simulation tool of early-age concrete pavement behavior. Funded by the Federal Highway Administration (FHWA) and developed by The Transtec Group, Inc., with HIPERPAV you can simulate how pavement design features, materials, climate, and construction procedures impact strength and stress development, and ultimately cracking risk. You can also evaluate early-opening to traffic, optimal mix characteristics, sawcutting windows, and curing methods for your specific conditions.

To date, two major versions have been released to the public (HIPERPAV and HIPERPAV II) with widespread acceptability and recognition. Recently, FHWA funded the development of HIPERPAV III. With an improved software interface and several modeling enhancements you can count on ease of use and improved accuracy of prediction for reduced premature cracking risk easier than ever. Below are some of the enhancements incorporated in HIPERPAV III:

Improved Software Interface:

1. **Simple vs. Advanced Strategy View.** An improved interface allows you to navigate through the software with more ease. You can toggle between Simple View (less inputs) and Advanced View (more inputs). In the Simple View you enter a minimum number of inputs required for an analysis and all other inputs are estimated by the software. As a result, you navigate through fewer screens to complete an analysis. In the Advanced View you have access to additional inputs (e.g. axial restraint, PCC stiffness, PCC drying shrinkage, maturity, and heat of hydration inputs) for a more refined analysis.

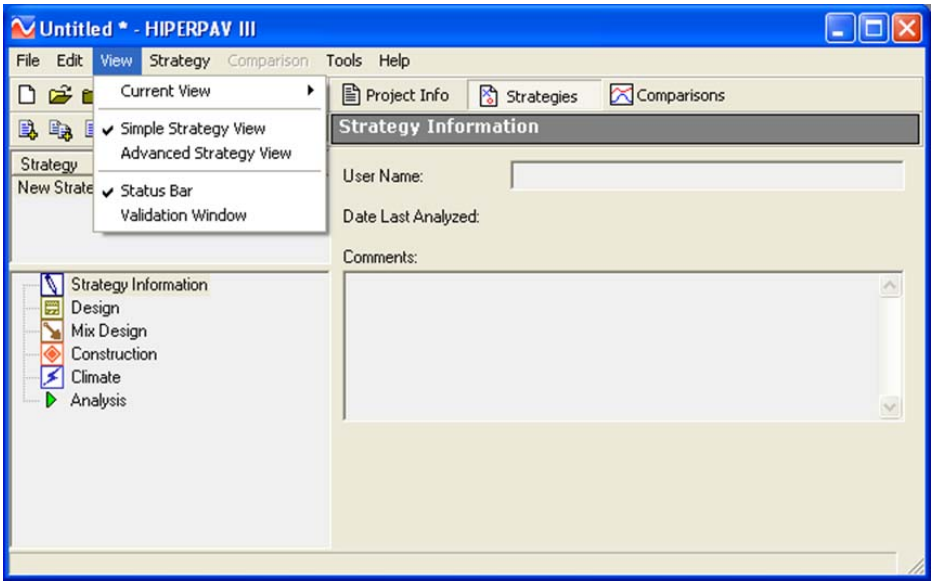

Figure 1 Simple Strategy View

2. **Multiple Strategy Batch Mode:** Sometimes, after creating several strategies, you find that one input parameter needs to be modified in each one of your strategies. After modifying the strategies, they have to be reanalyzed. In HIPERPAV III, if you have multiple strategies, you can run them all at once by selecting "batch mode" from the Strategy Menu and checking the strategies you want to run.

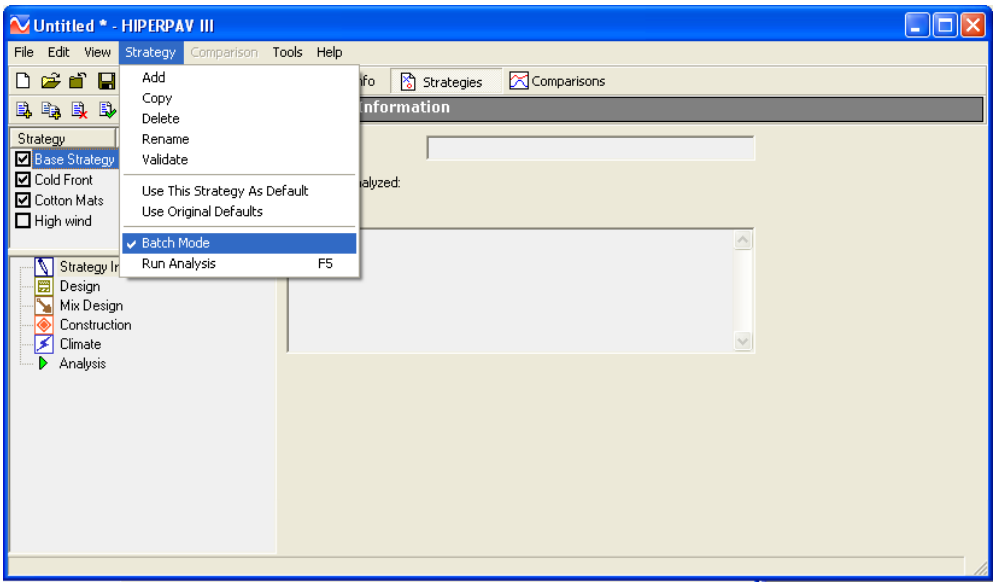

Figure 2 Batch Mode Analysis

3. **Quick Compare.** The Quick Compare screen offers you a chance to quickly make comparisons of up to 4 strategies simultaneously. After selecting the strategies to compare, you can look at differences in input data, strength, stress, and cracking risk plots.

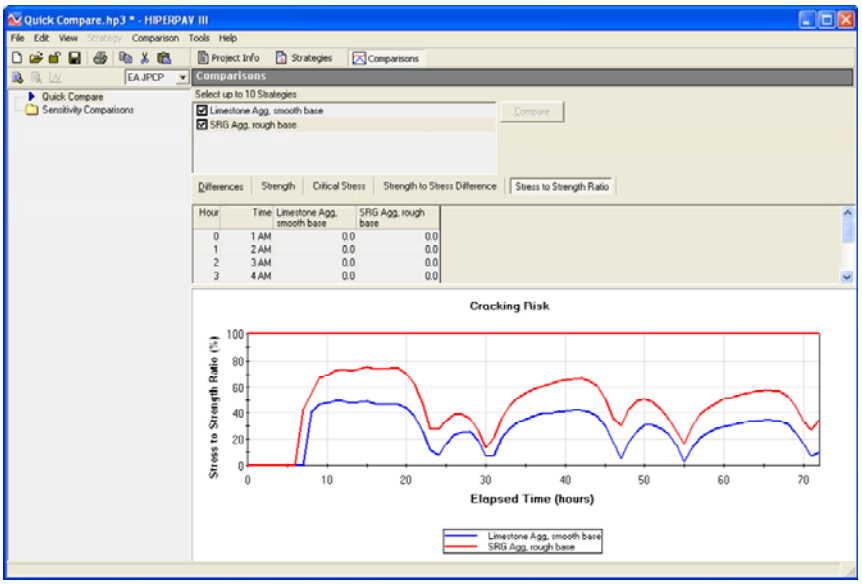

Figure 3 Quick Strategy Comparison

4. **Sensitivity Comparisons.** In this mode you can do multiple sensitivity analysis varying one input at a time for a given strategy (base case strategy). To do so, a wizard screen will allow you to select the early-age strategy to analyze and the input for which you want to perform the sensitivity analysis. You have the option of modifying additional inputs for every strategy (i.e. base and mix temperature for time of construction sensitivity or 28-day strength for materials sensitivities).

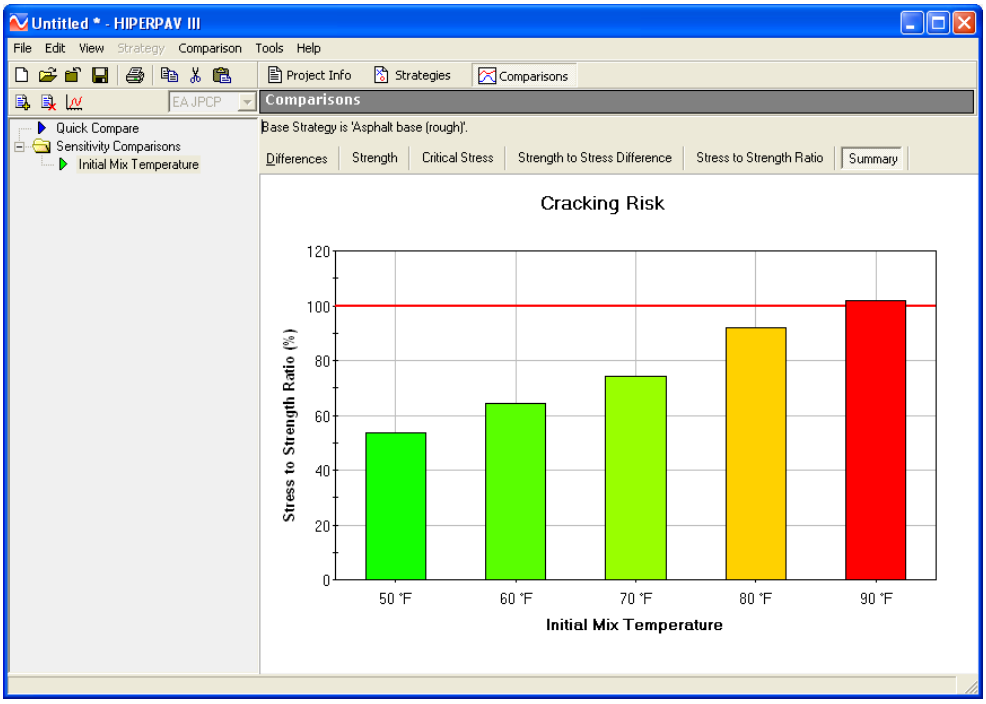

Figure 4 Mixture Temperature Sensitivity

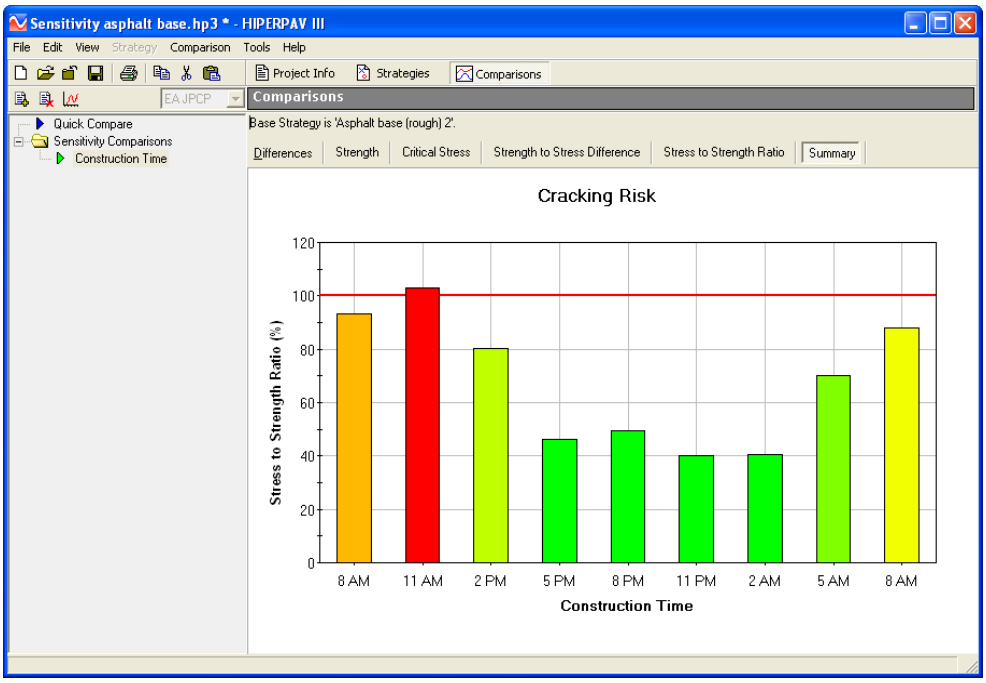

Figure 5 Construction Time Sensitivity

Modeling Enhancements:

1. **Enhanced Moisture Characterization.** This is the primary enhancement made in this version. With the new moisture modeling improvements now you can more realistically compare the effect of various curing strategies and environmental conditions. In previous versions of HIPERPAV, research focused primarily on developing mathematical models to simulate temperature effects with a rather simplistic approach to moisture modeling. However, moisture changes in PCC have a great influence on PCCP early-age behavior. Changes in moisture content are the result of drying due to hydration, evaporation, or moisture transport into the base. As the concrete dries, it shrinks. This shrinkage coupled with temperature gradients cause axial, curling, and warping movements creating tensile stresses in the concrete and ultimately the potential for early-age cracking. The potential for PCCP early-age cracking due to moisture changes is now calculated in HIPERPAV III by a one-dimensional finite-difference model that relates materials, environmental effects, and curing procedures.

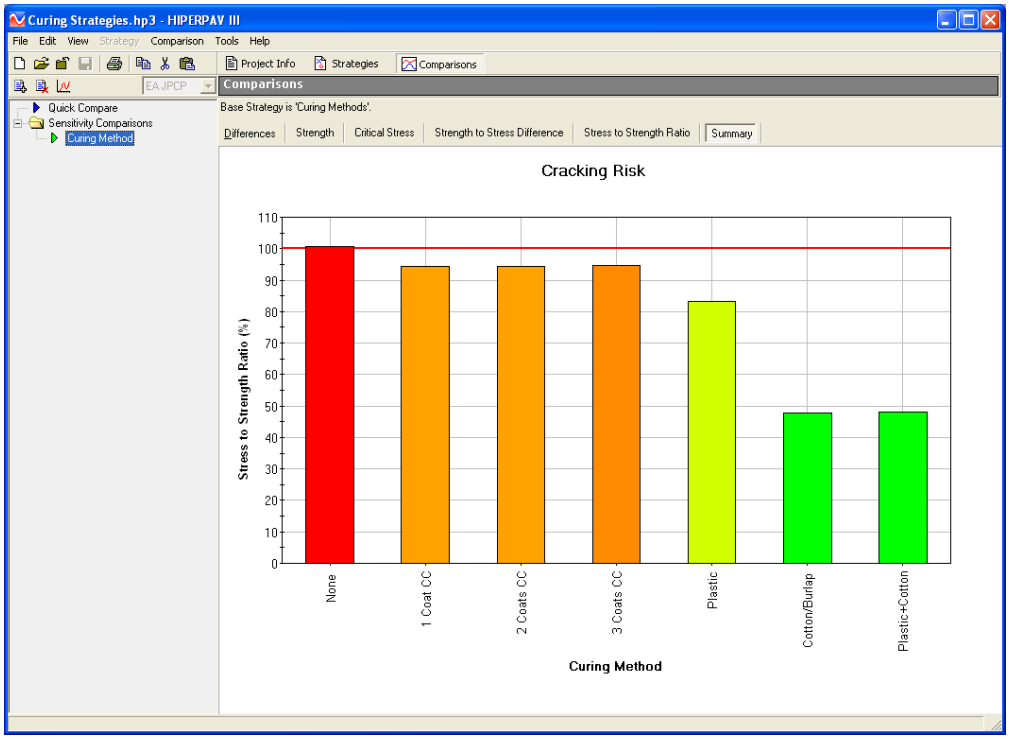

Figure 6 Effect of Curing Methods on Cracking Risk

2. **Heat Evolution Characterization.** Heat of hydration influences thermal gradients and affects early-age concrete stress and strength development. Previous versions of HIPERPAV modeled heat of hydration based on linear regression models related to cementitious materials chemistry. HIPERPAV III now has the ability to characterize heat hydration of concrete mixtures from semi-adiabatic calorimetry testing. This new addition also improves the software accuracy in predicting thermal stress and strength development.

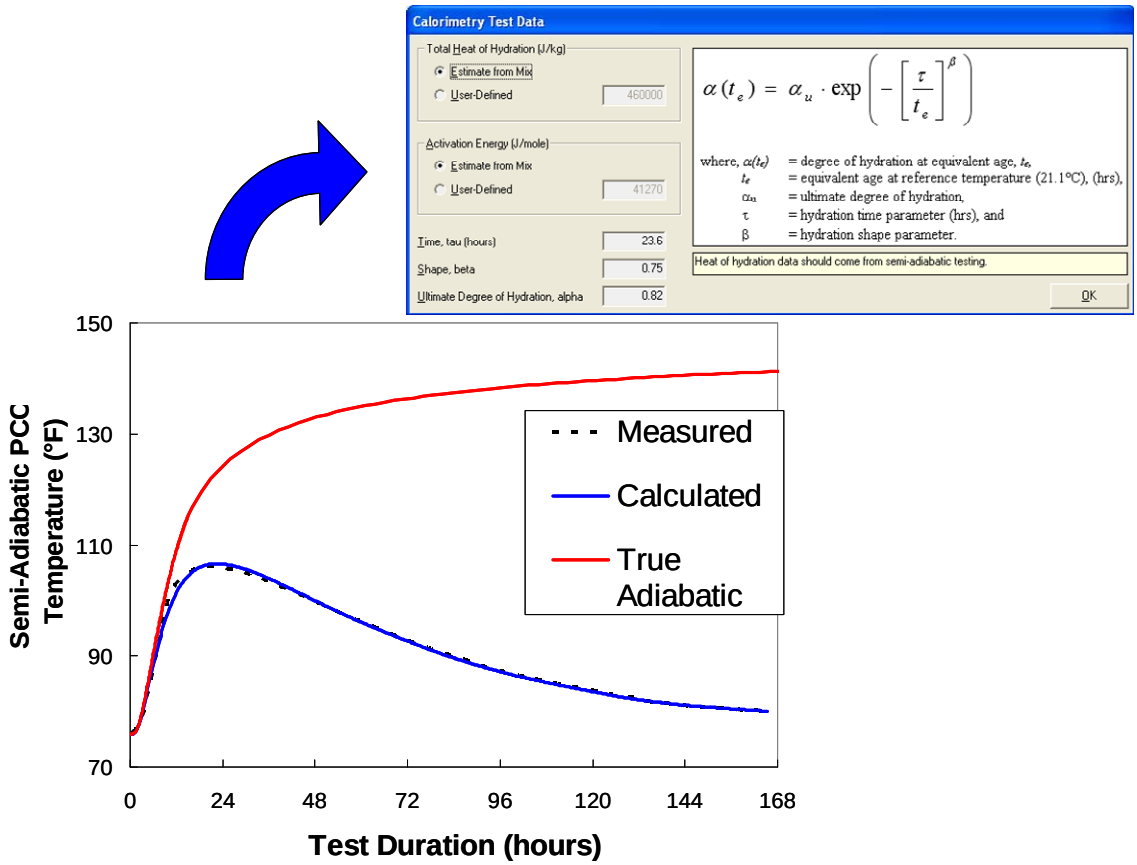

Figure 7 Heat Evolution Characterization from Semi-Adiabatic Calorimetry

The HIPERPAV team is committed to reducing cracking risks thus minimizing hefty expenditures on slab replace and removal operations. The next steps will focus on exploring a production version of HIPERPAV with automated weather data entry and automated cracking risk analysis and reporting.

Stay tuned!

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