
WCPA
WISCONSIN
CONCRETE
PAVEMENT
ASSOCIATION
Moving forward with concrete results

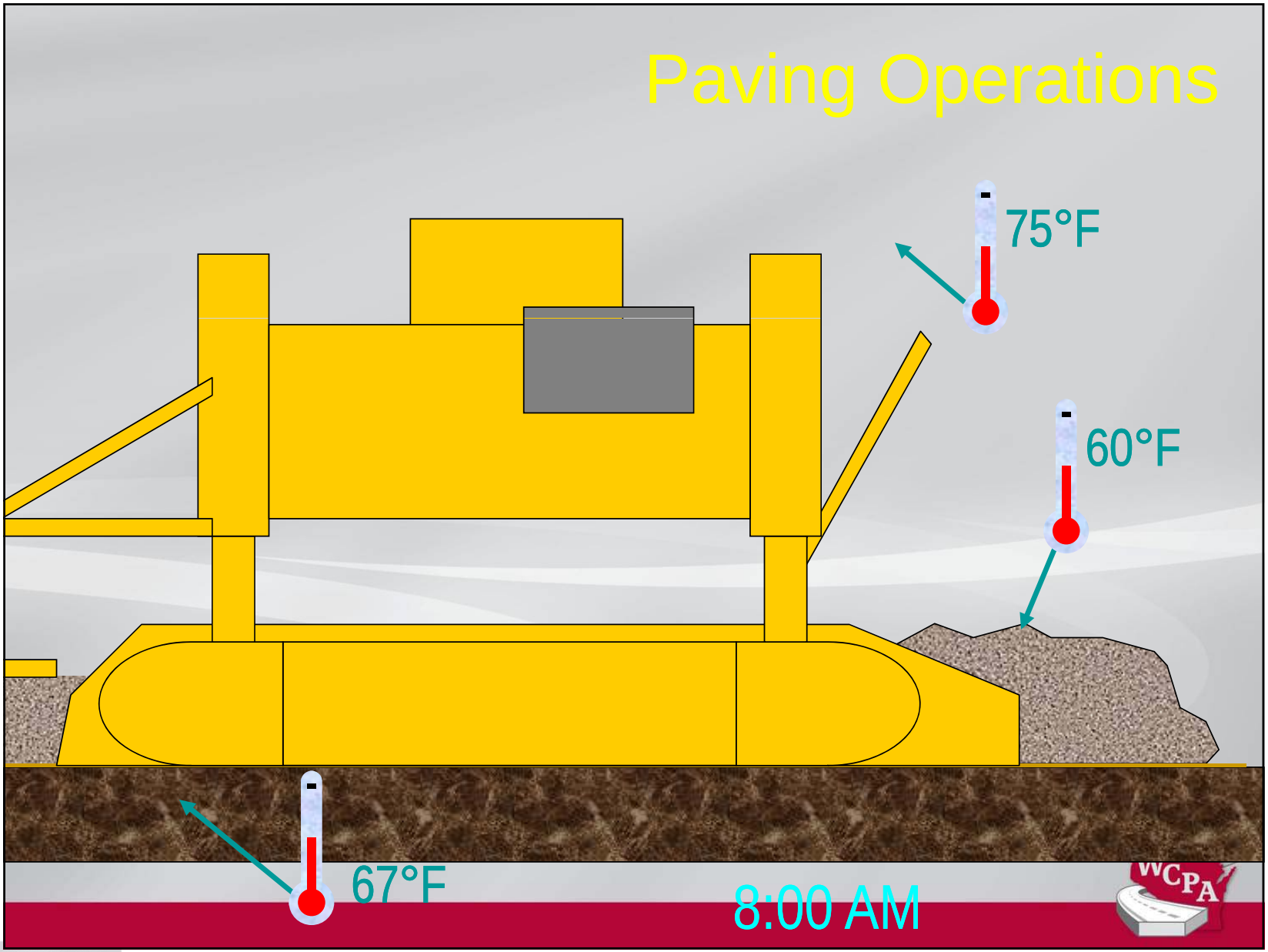

HIPERPAV
WISCONSIN
Event and Date
WCPA

Background

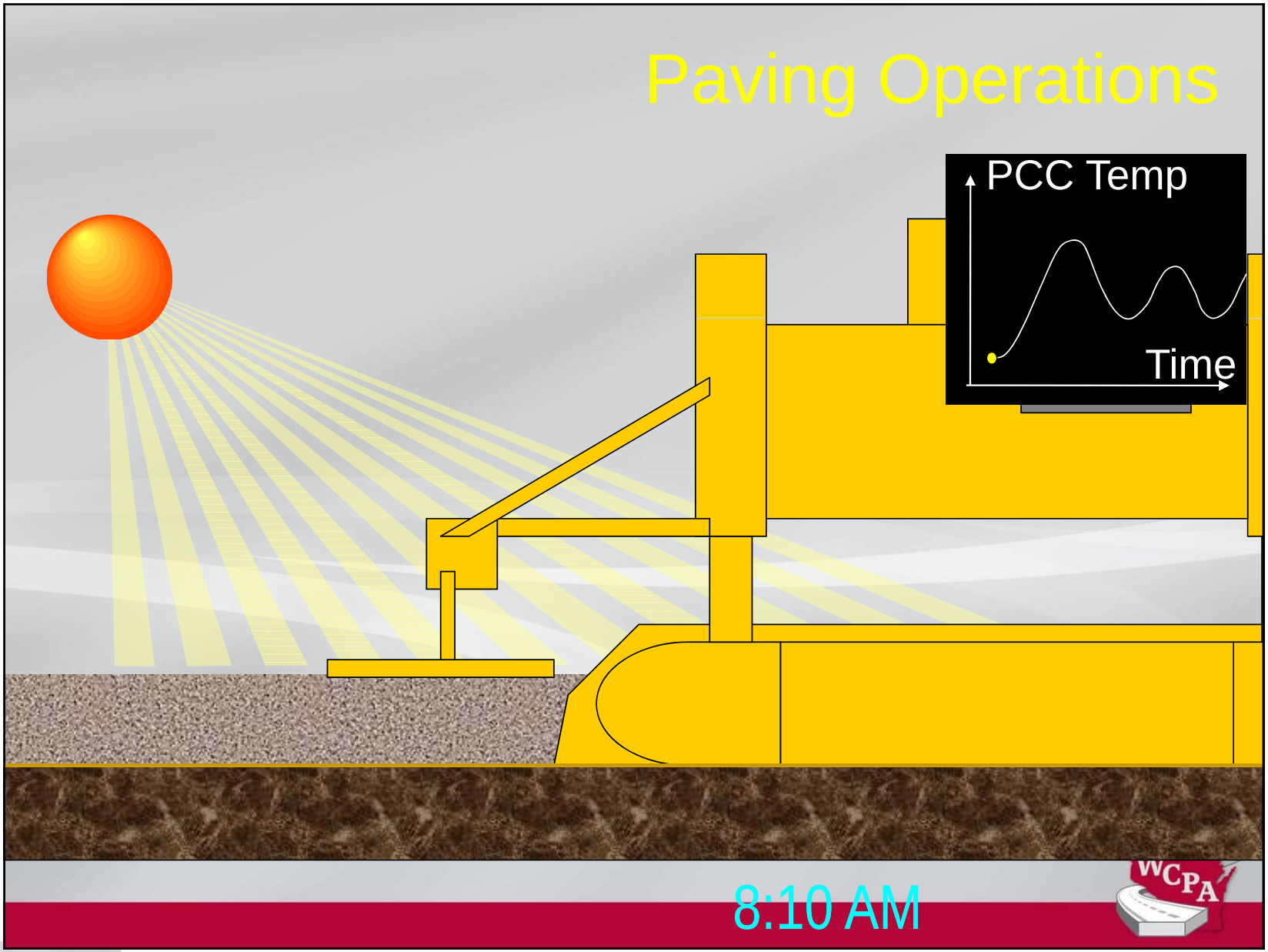
- HIPERPAV helps engineers and contractors:

Understand 72-hour behavior

Predict 72-hour behavior of concrete pavements



WISCONSIN CONCRETE PAVEMENT ASSOCIATION
Moving forward with concrete results



WISCONSIN CONCRETE PAVEMENT ASSOCIATION
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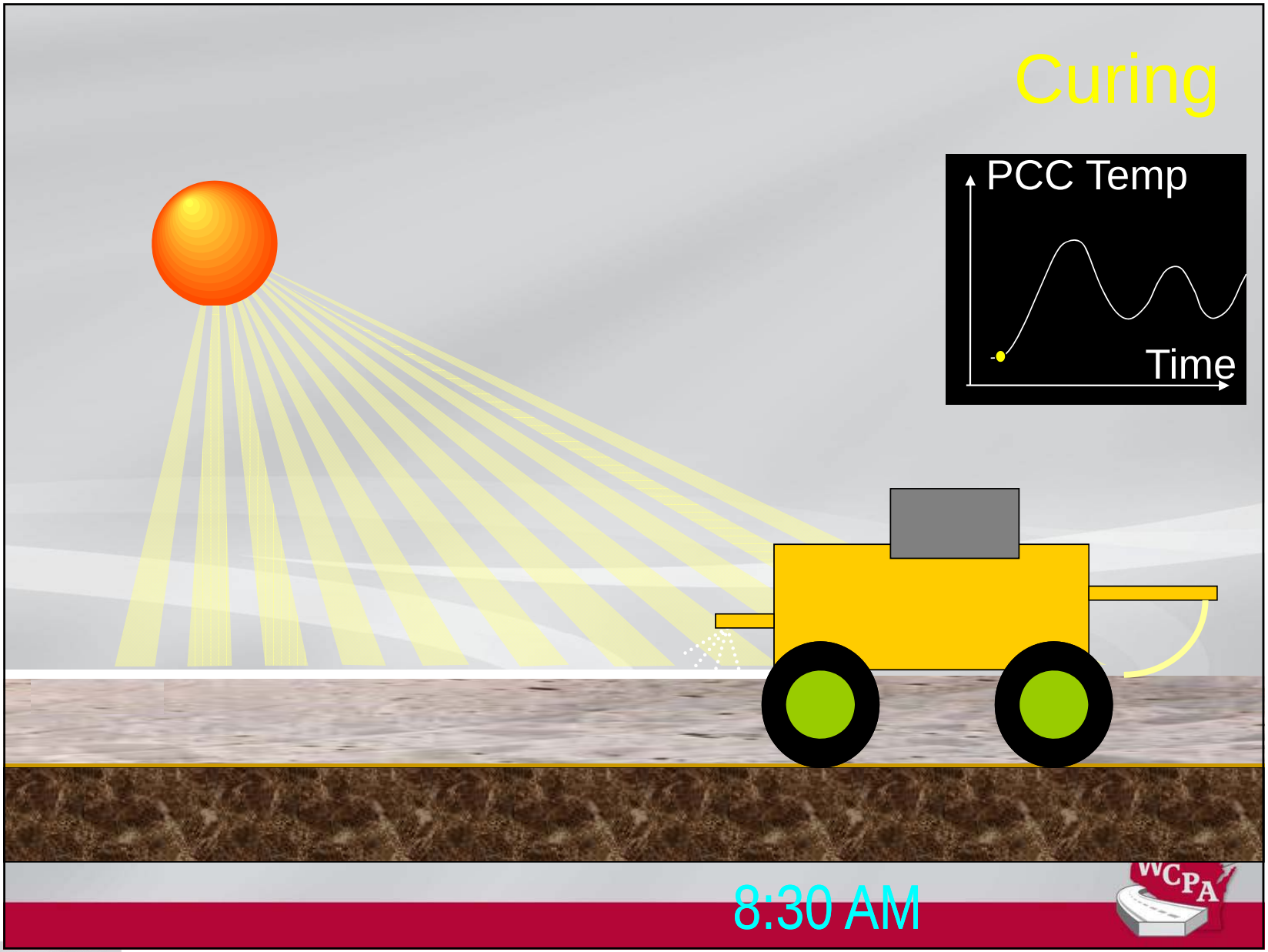
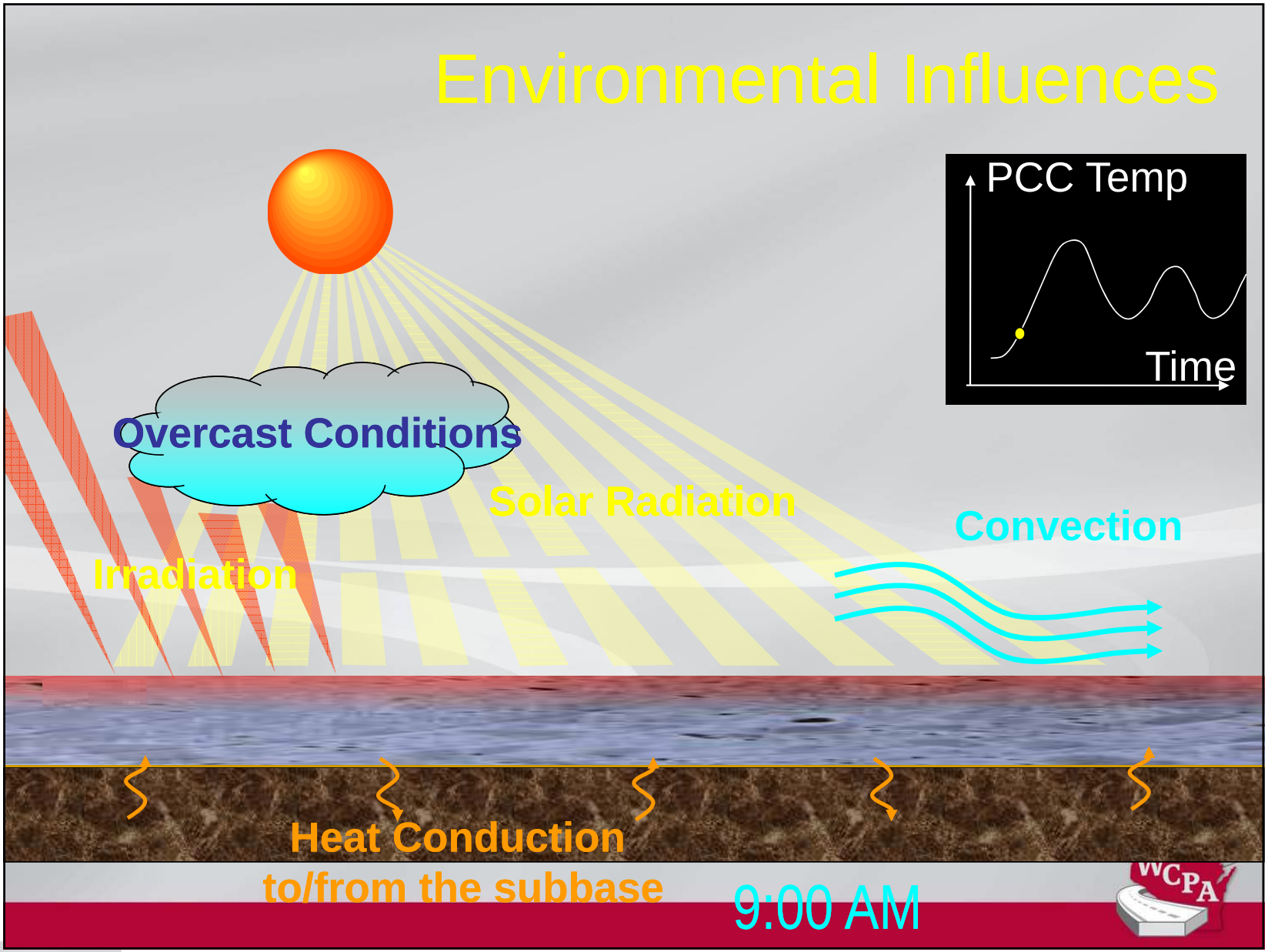
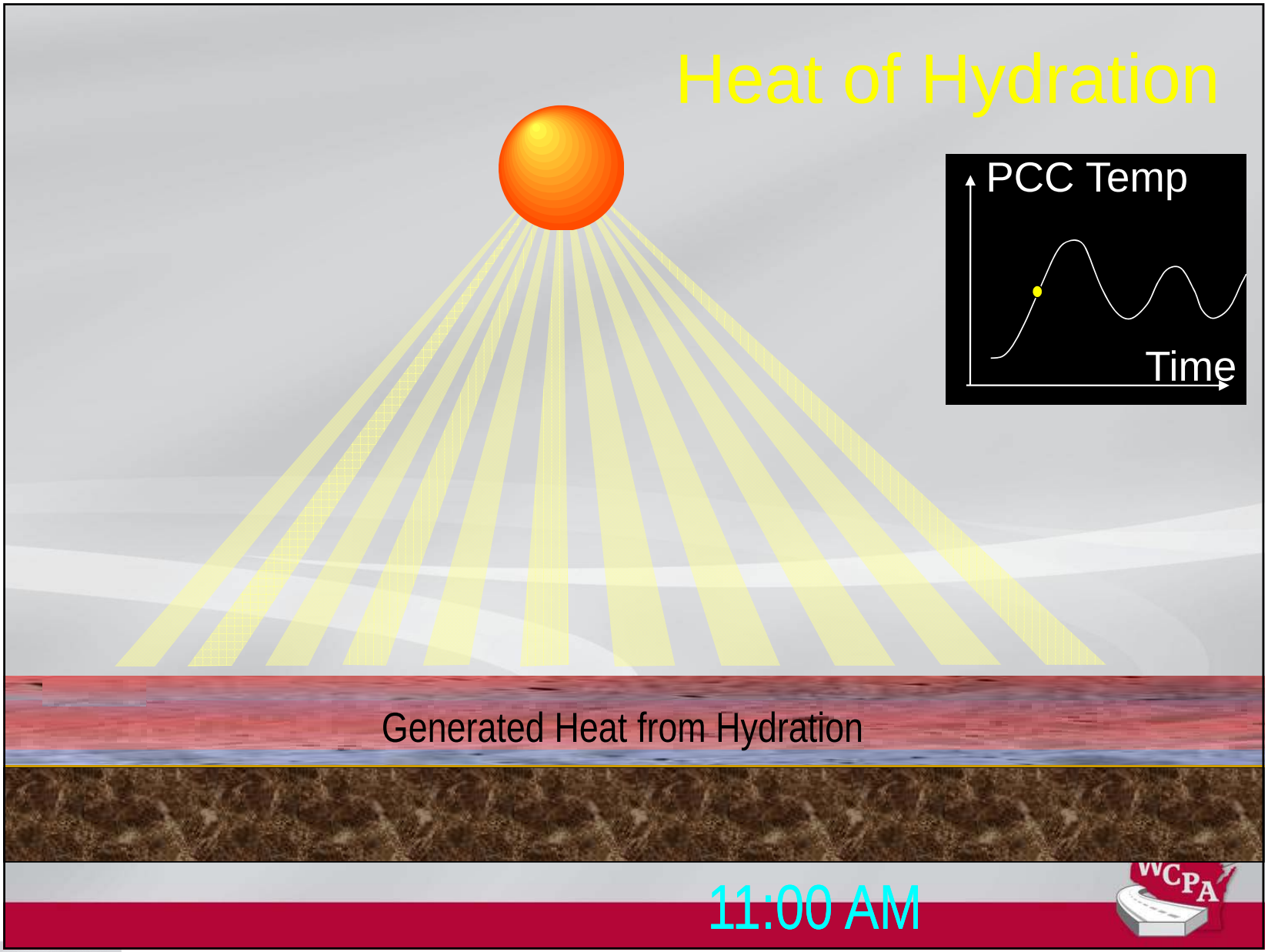
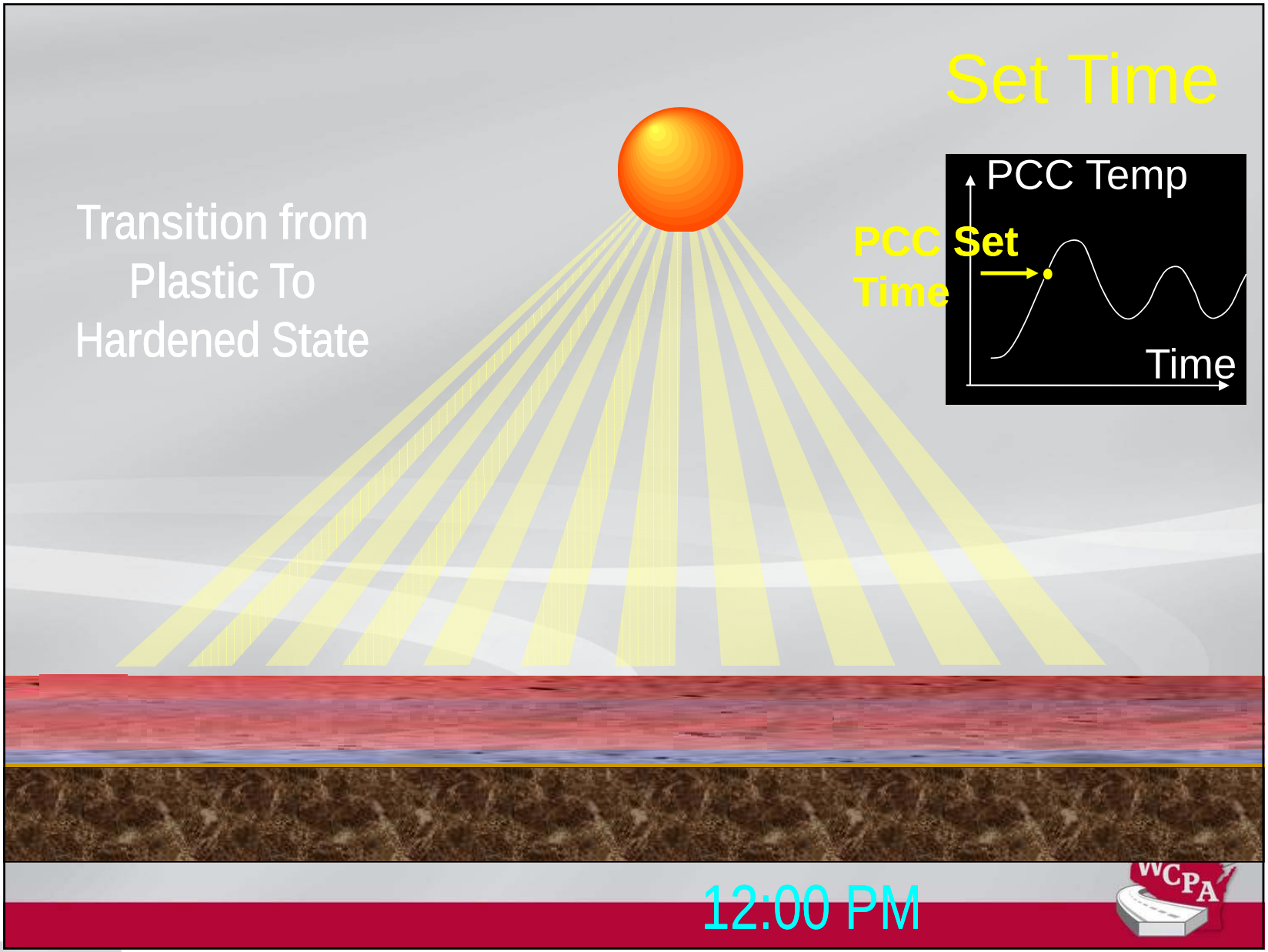
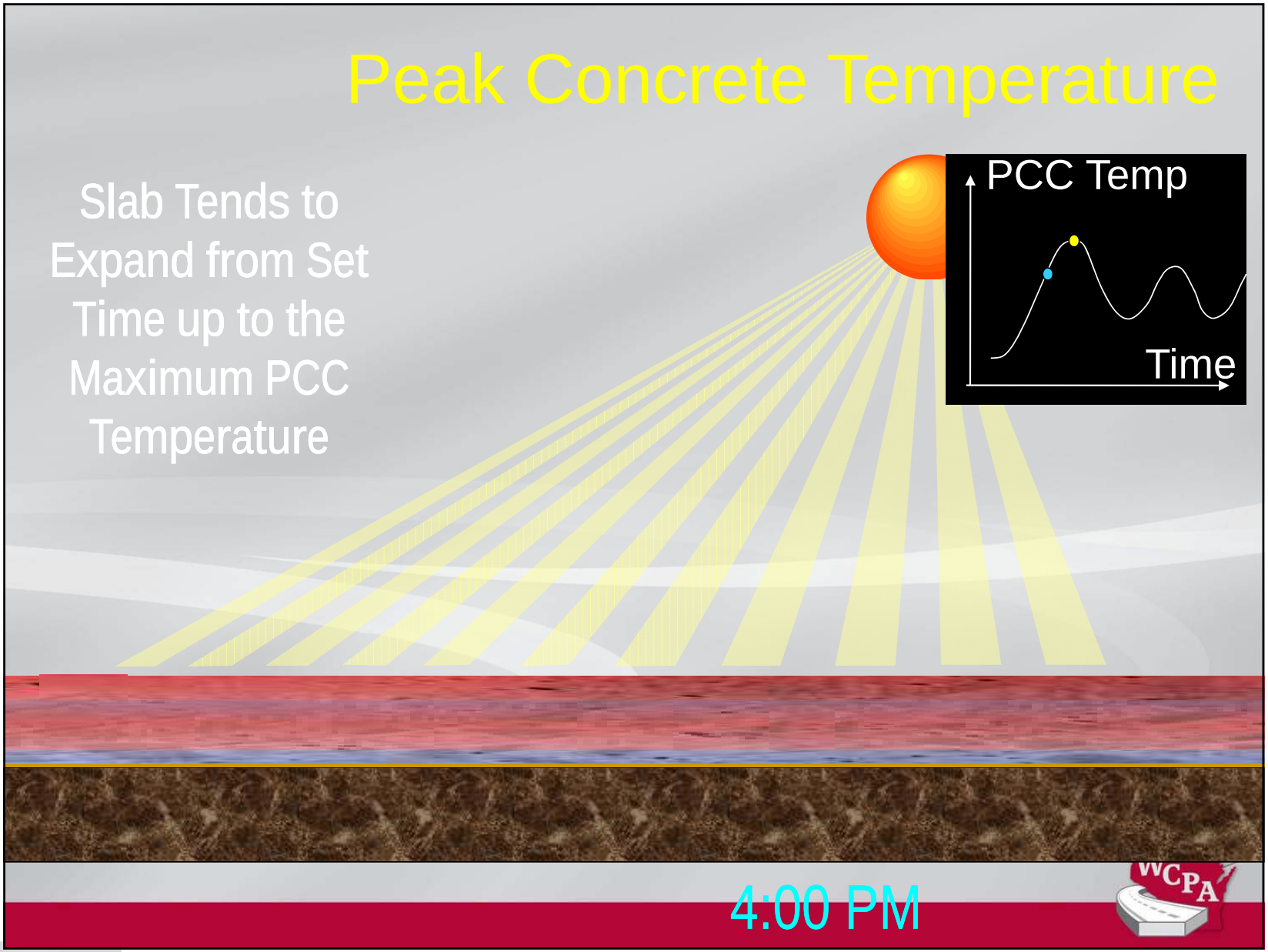
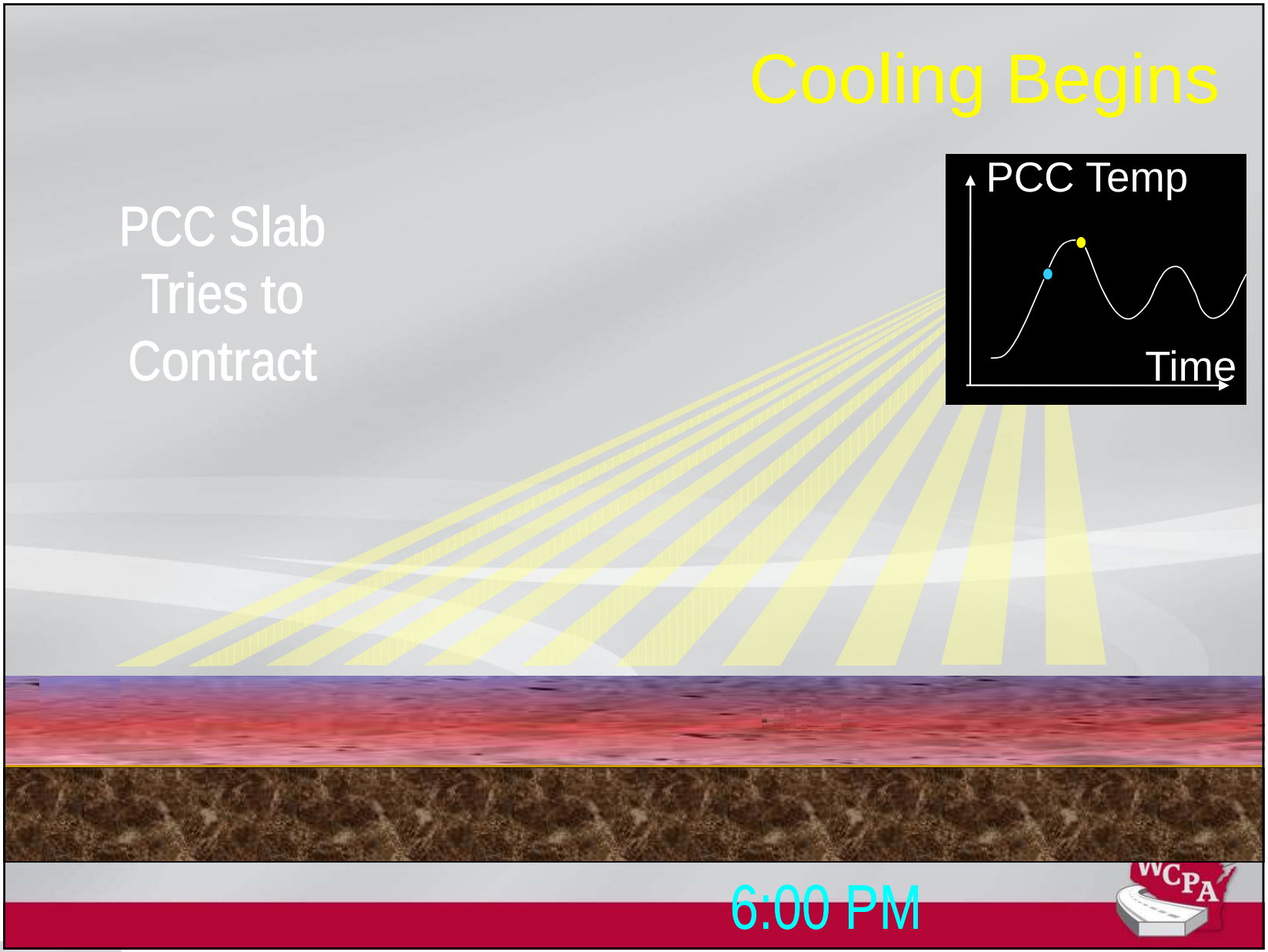

Curing
PCC Temp
Time
8:30 AM

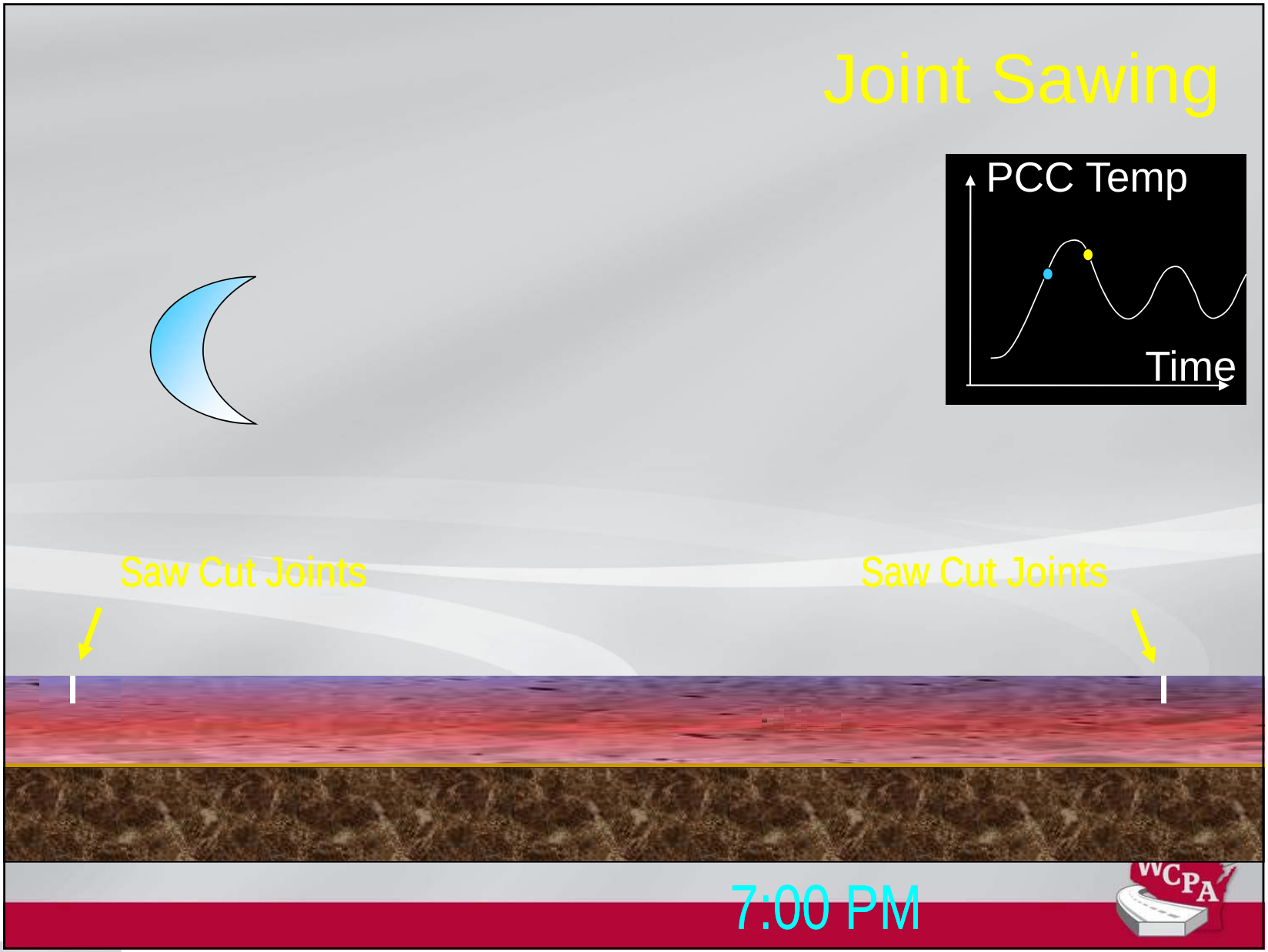

Environmental Influences
PCC Temp
Time
Overcast Conditions
Solar Radiation
Convection
Irradiation
Heat Conduction
to/from the subbase
9:00 AM

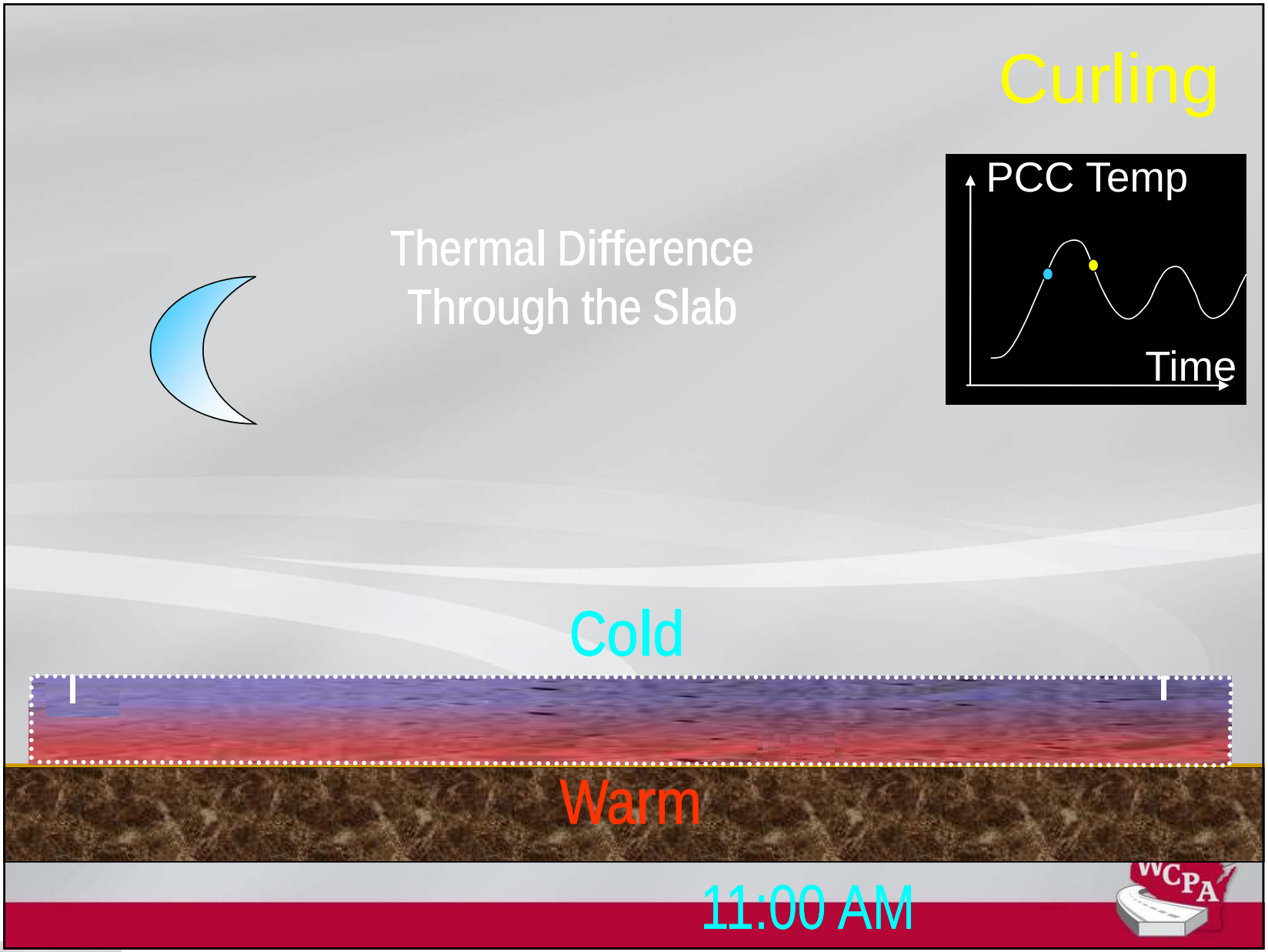

Heat of Hydration
PCC Temp
Time
Generated Heat from Hydration
11:00 AM


Set Time
Transition from Plastic To Hardened State
PCC Temp
PCC Set Time
Time
12:00 PM

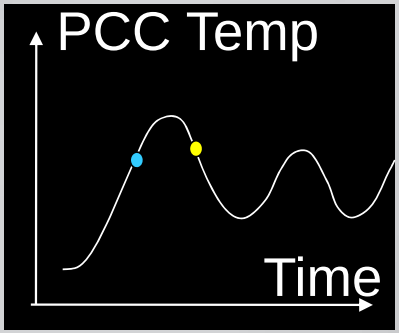

Peak Concrete Temperature
Slab Tends to Expand from Set Time up to the Maximum PCC Temperature
PCC Temp
Time
4:00 PM


Cooling Begins
PCC Temp
Time
PCC Slab
Tries to
Contract
6:00 PM


Joint Sawing
PCC Temp
Time
Saw Cut Joints
Saw Cut Joints
7:00 PM


Curling
PCC Temp
Time
Thermal Difference
Through the Slab
Cold
Warm
11:00 AM

Curling

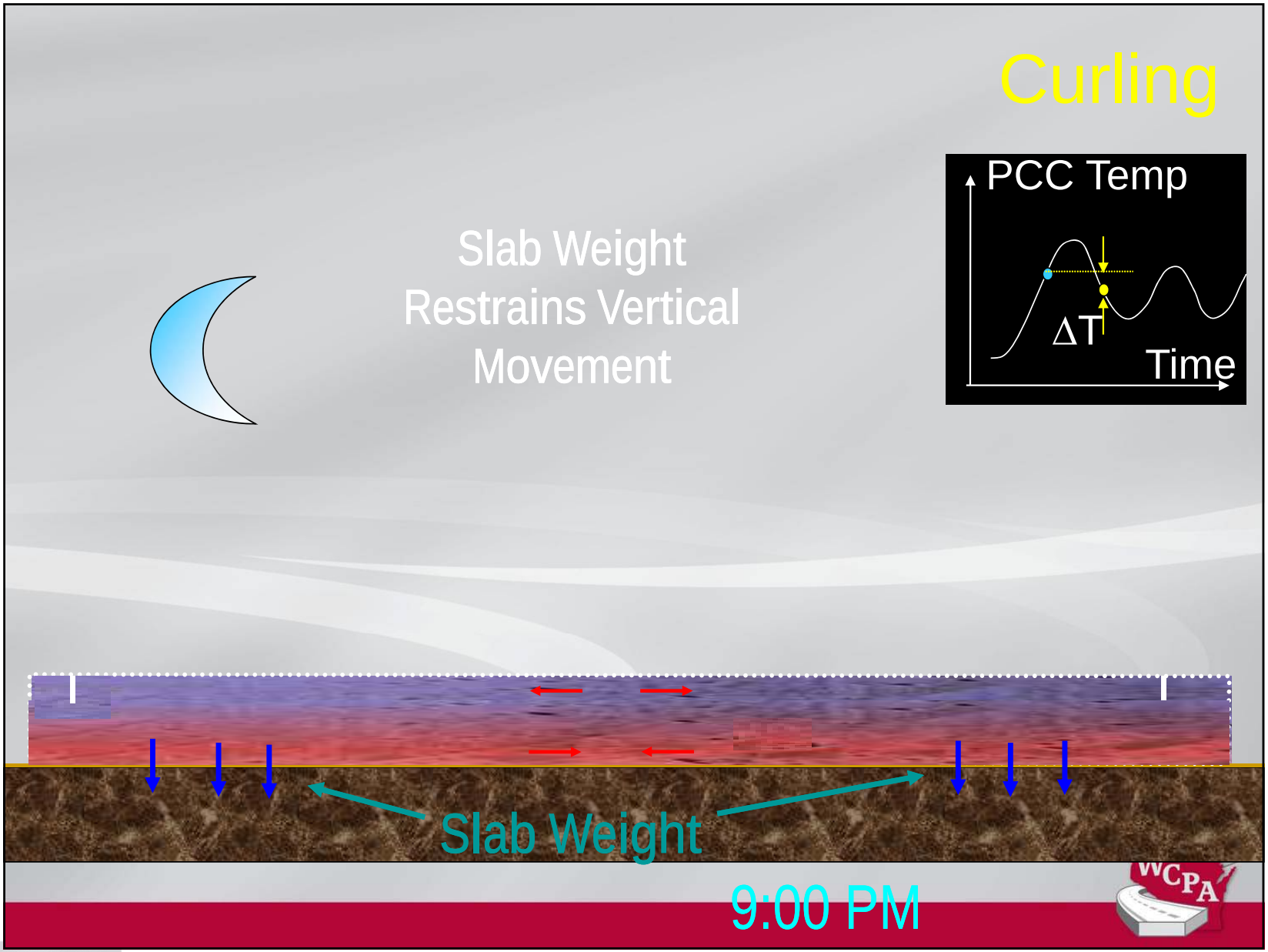


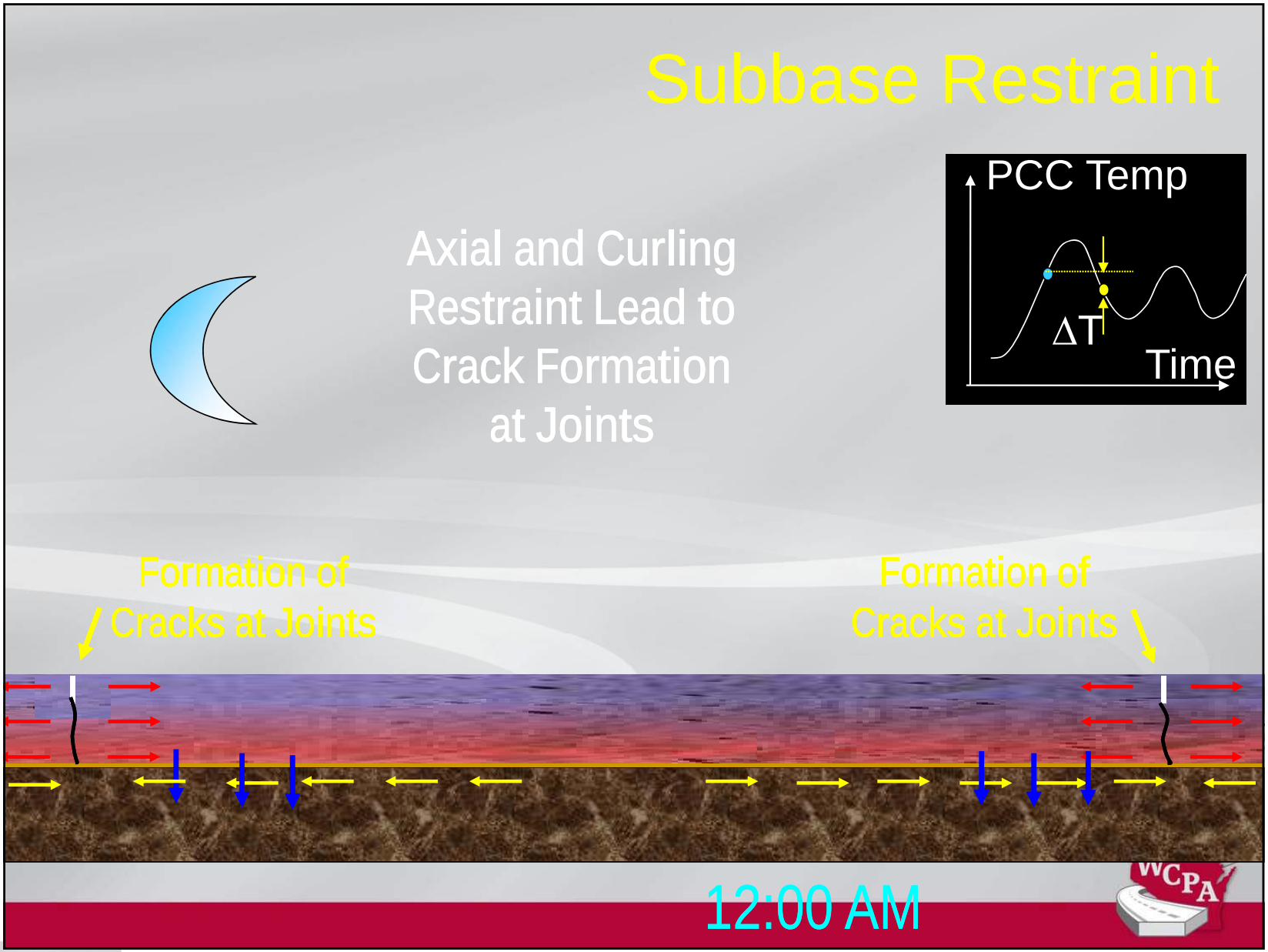
Bottom Expands
Top Contracts: Slab
Tends to Curl

Cold

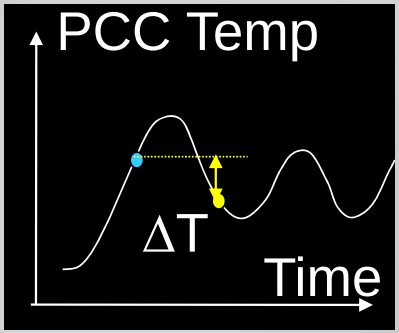
Warm

9:00 PM


Curling
PCC Temp
ΔT
Time
Slab Weight
Restrains Vertical
Movement
Slab Weight
9:00 PM

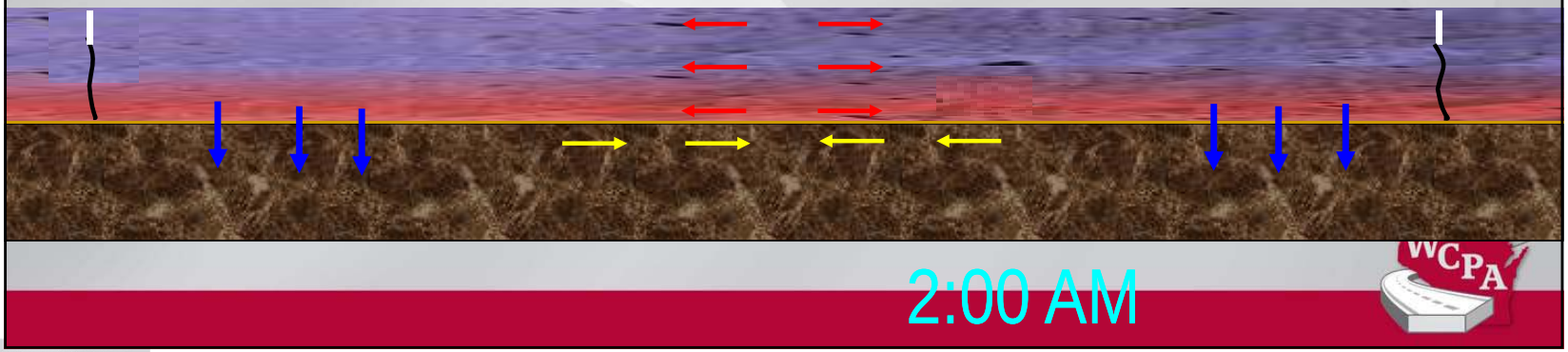

Subbase Restraint
PCC Temp
ΔT
Time
Axial and Curling
Restraint Lead to
Crack Formation
at Joints
Formation of
Cracks at Joints
Formation of
Cracks at Joints
12:00 AM

Excessive Restraint



As Temperature Decreases,

PCC Contraction Continues…



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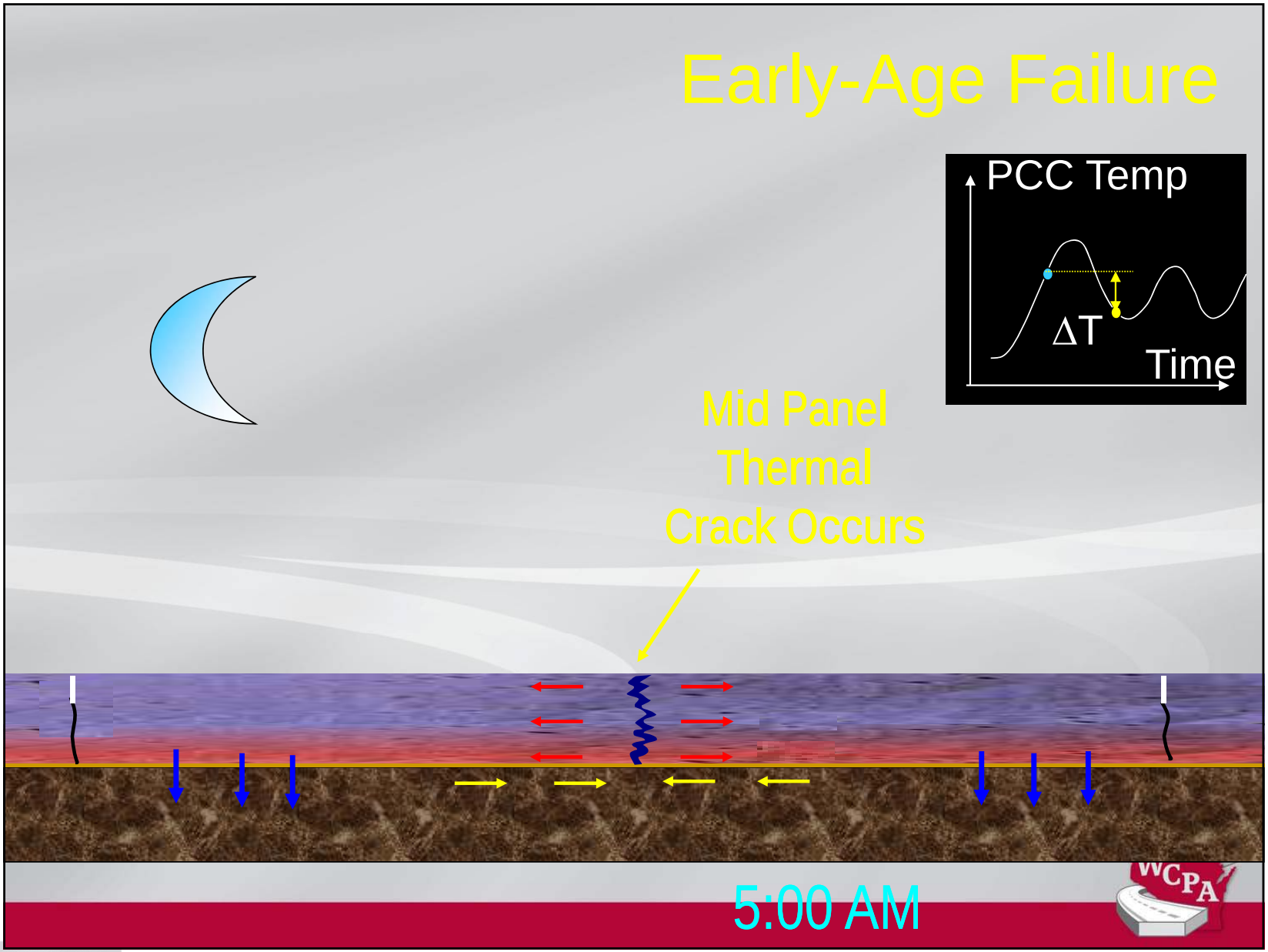

Early-Age Failure
PCC Temp
ΔT
Time
Mid Panel
Thermal
Crack Occurs
5:00 AM
WCPA

Guidelines

- Complexity Galore
  - Paper guidelines – very limited use
  - What about computerized modeling?

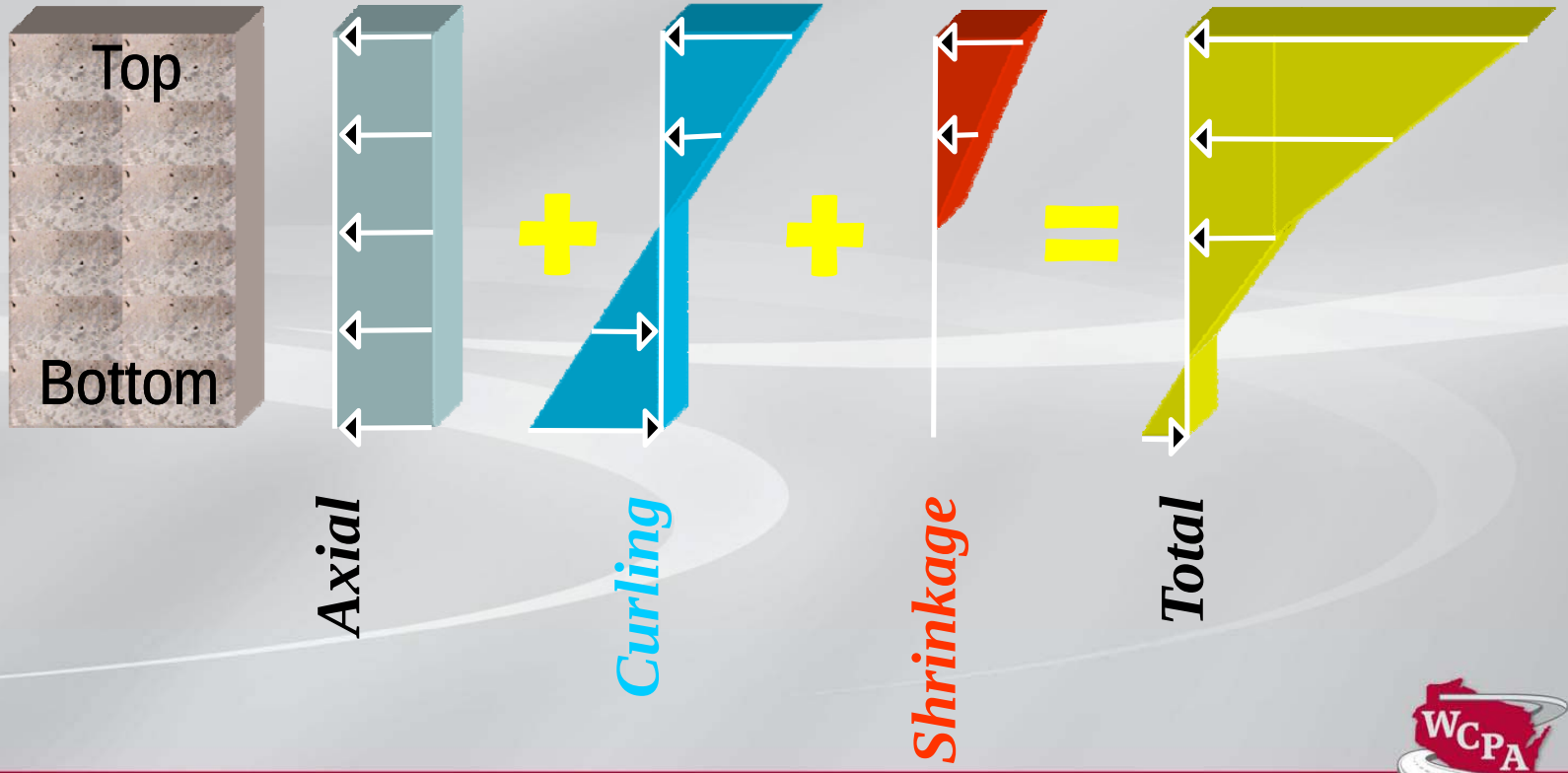
  - Thus, was born

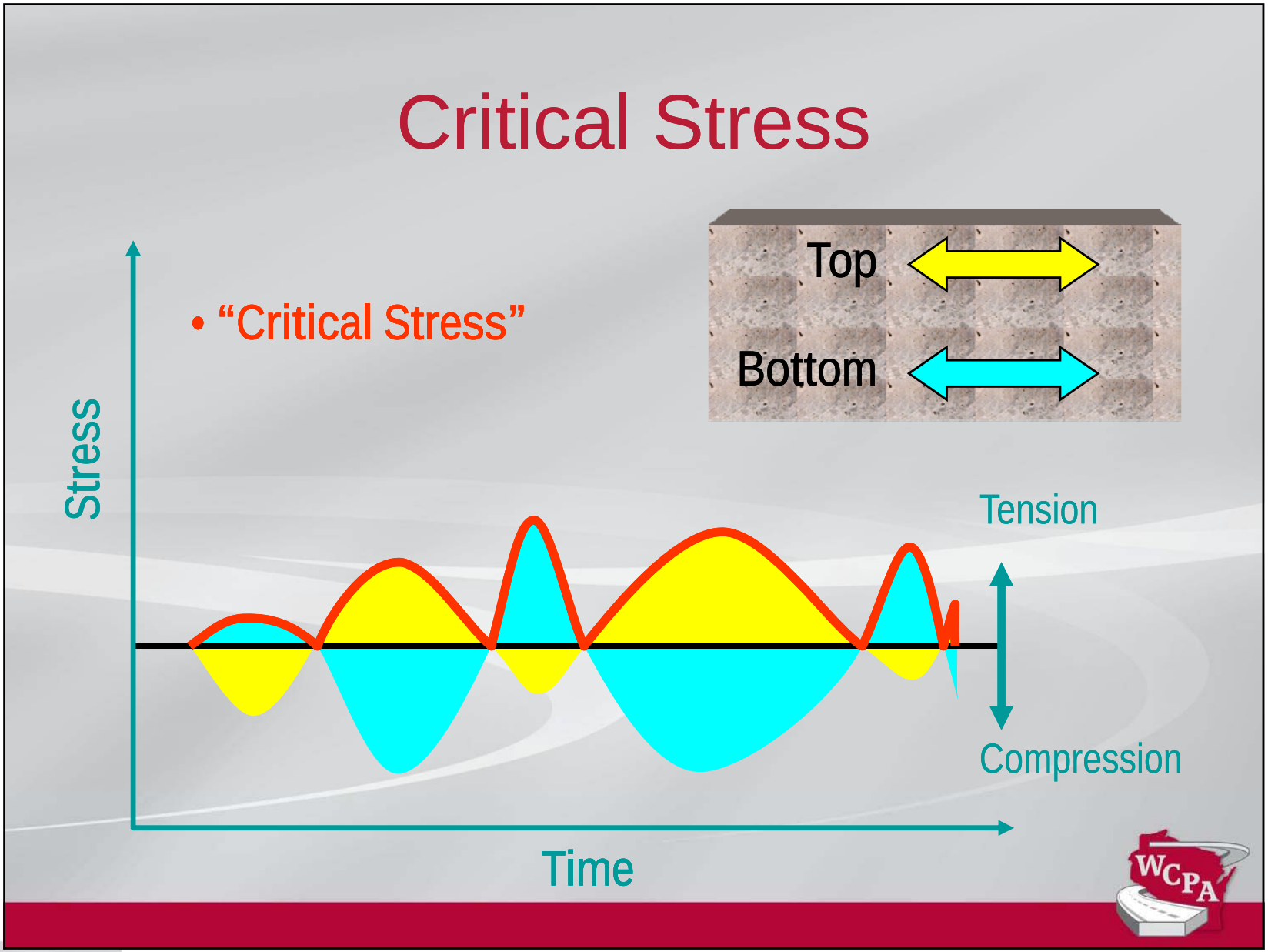
HIPERPAV

Systems approach

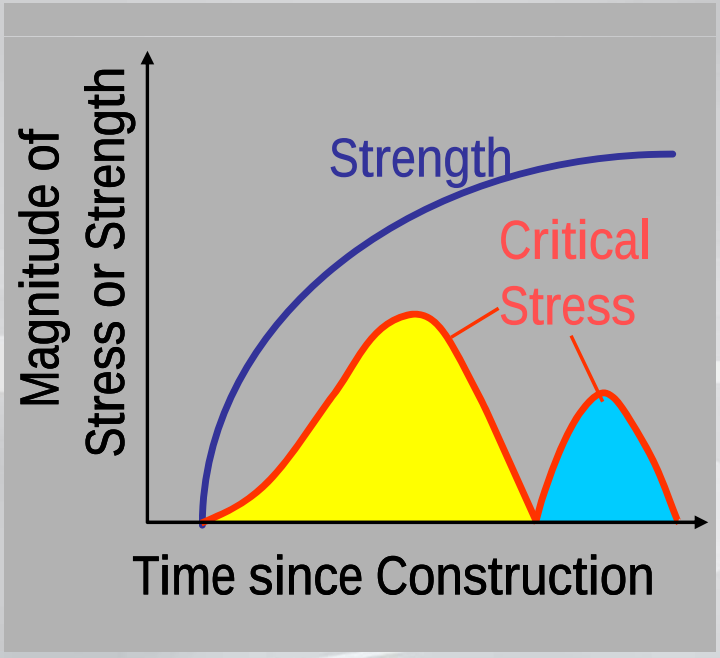
- In the past, many individual models have been developed to address pavement behavior
- HIPERPAV uses the Systems approach to unify all the models into one useful tool
- The Systems approach integrates:
  - Design parameters
  - Material properties
  - Environmental conditions
  - Construction activities

Superposition of Stresses

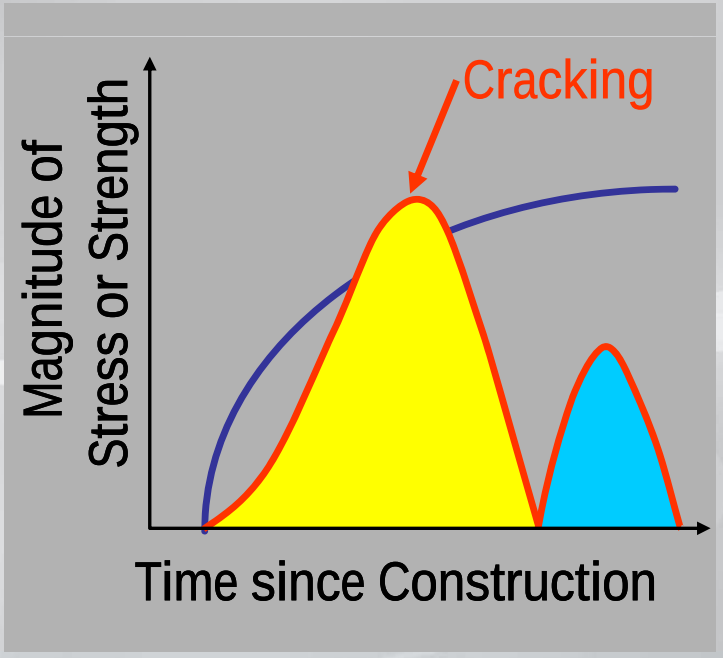



Critical Stress
• "Critical Stress"
Top
Bottom
Stress
Tension
Compression
Time

JCP Stress and Strength Development

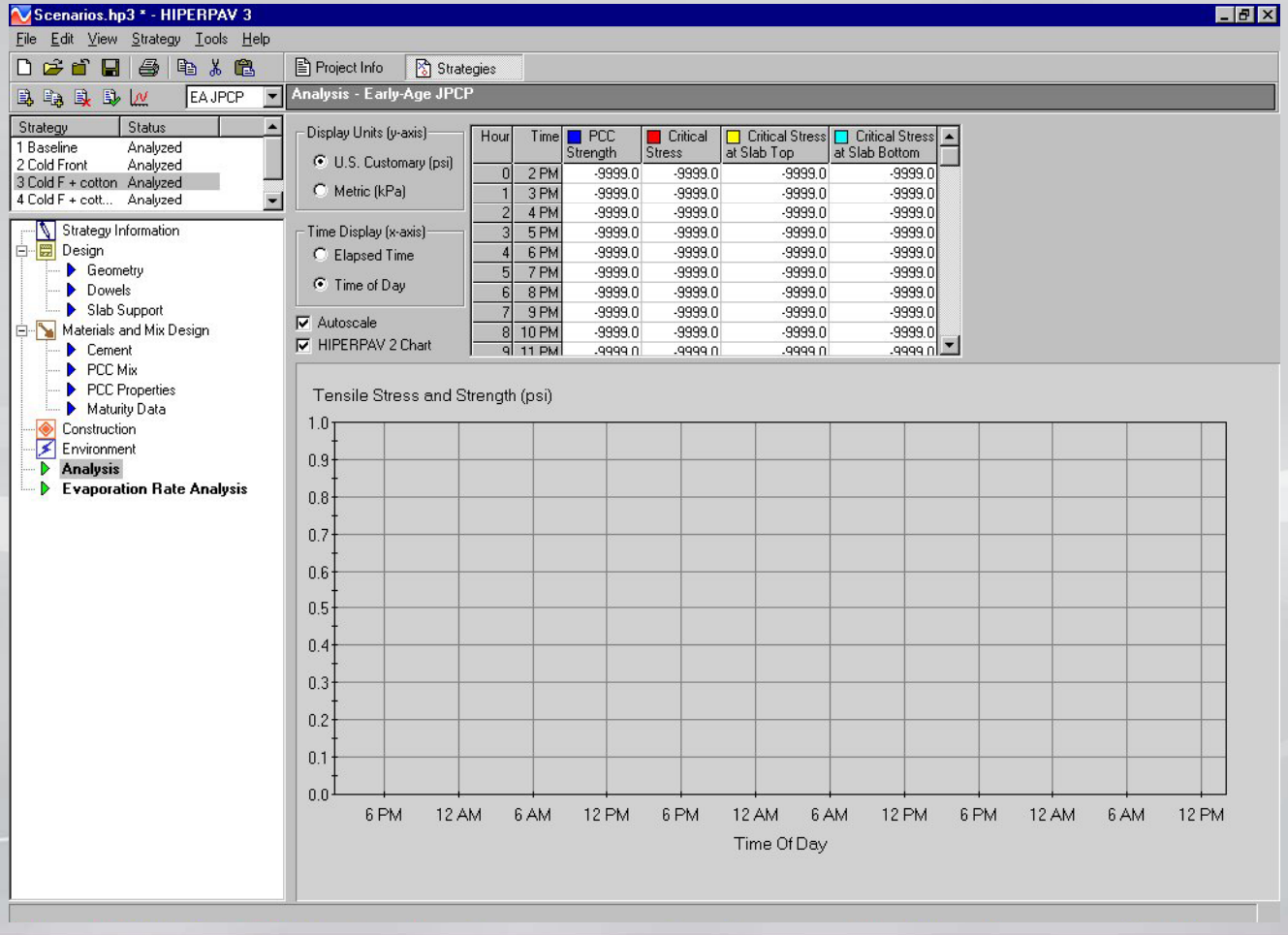


Scenario #1
Cracking should not occur

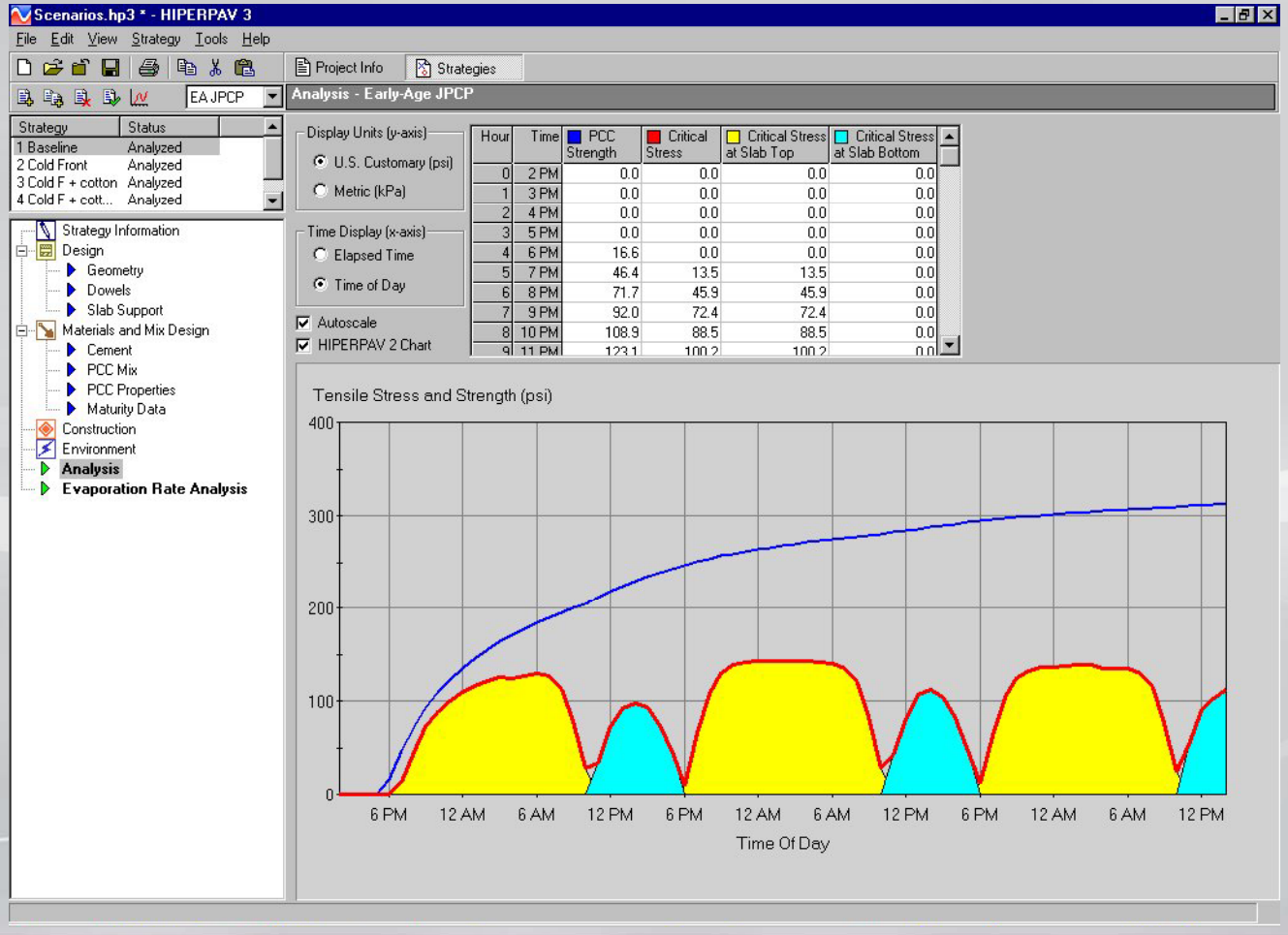


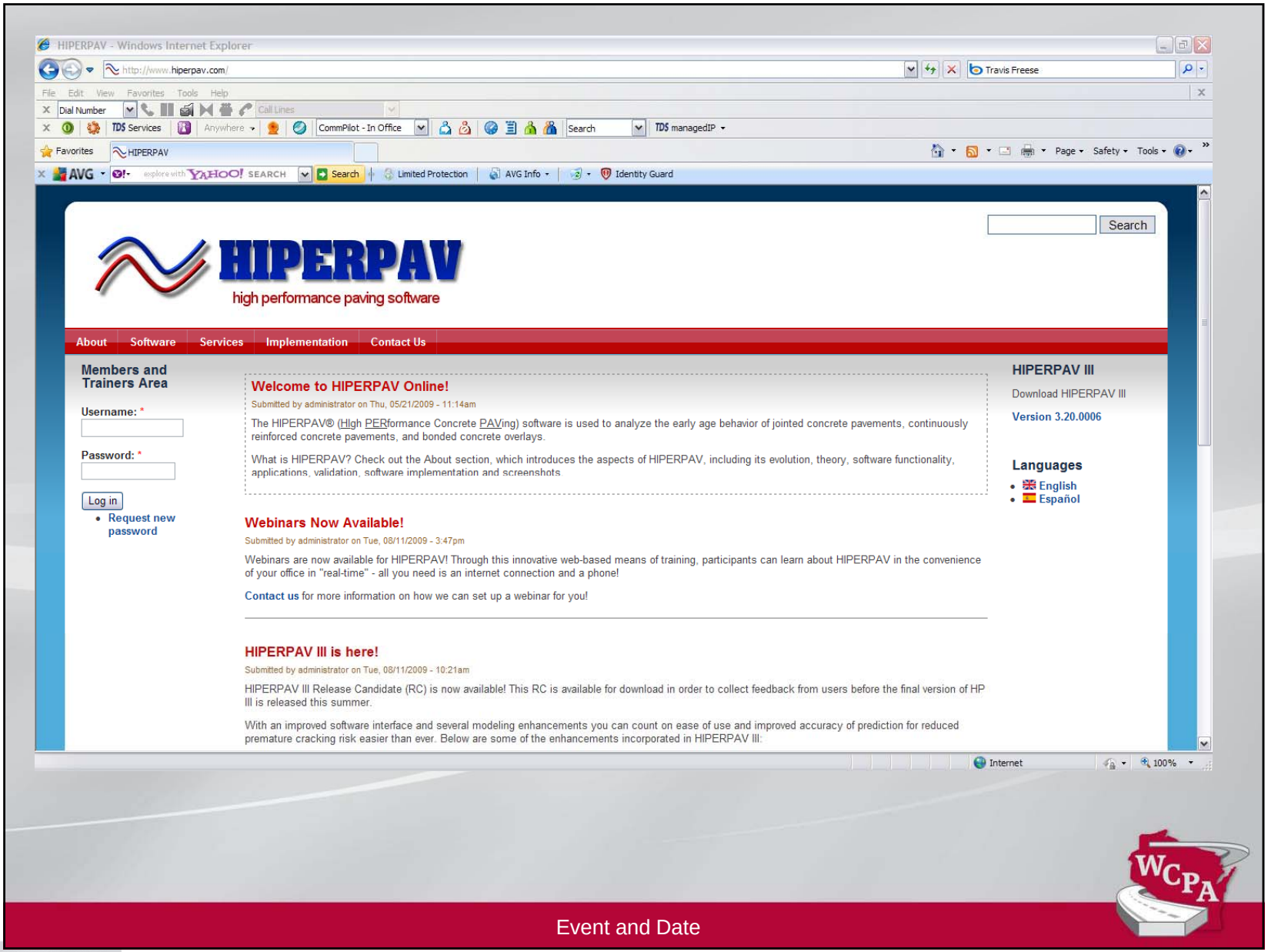
Scenario #2
Cracking may occur

Baseline Case



Baseline Case

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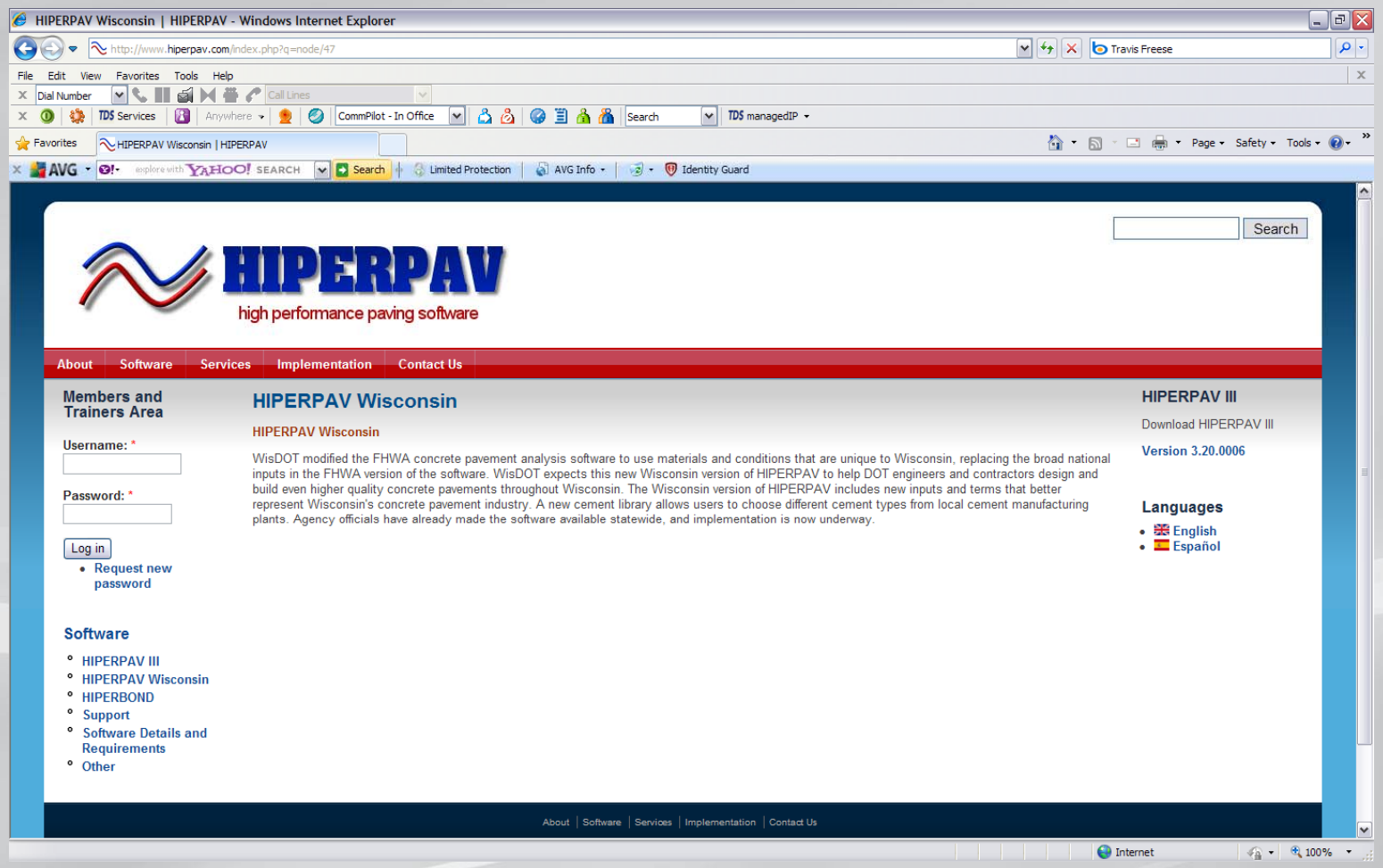
Log in
Request new password
Welcome to HIPERPAV Online!
Submitted by administrator on Thu, 05/21/2009 - 11:14am
The HIPERPAV® (HIgh PERformance Concrete PAVing) software is used to analyze the early age behavior of jointed concrete pavements, continuously reinforced concrete pavements, and bonded concrete overlays.
What is HIPERPAV? Check out the About section, which introduces the aspects of HIPERPAV, including its evolution, theory, software functionality, applications, validation, software implementation and screenshots.
Webinars Now Available!
Submitted by administrator on Tue, 08/11/2009 - 3:47pm
Webinars are now available for HIPERPAV! Through this innovative web-based means of training, participants can learn about HIPERPAV in the convenience of your office in "real-time" - all you need is an internet connection and a phone!
Contact us for more information on how we can set up a webinar for you!
HIPERPAV III is here!
Submitted by administrator on Tue, 08/11/2009 - 10:21am
HIPERPAV III Release Candidate (RC) is now available! This RC is available for download in order to collect feedback from users before the final version of HP III is released this summer.
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:
HIPERPAV III
Download HIPERPAV III
Version 3.20.0006
Languages
English
Español
Internet
100%
WCPA
Event and Date



Event and Date