

# Joint Technical Committee on Pavements (JTCP)

Georgene M. Geary, P.E.

State Materials and Research Engineer

Georgia DOT

2011 SOM

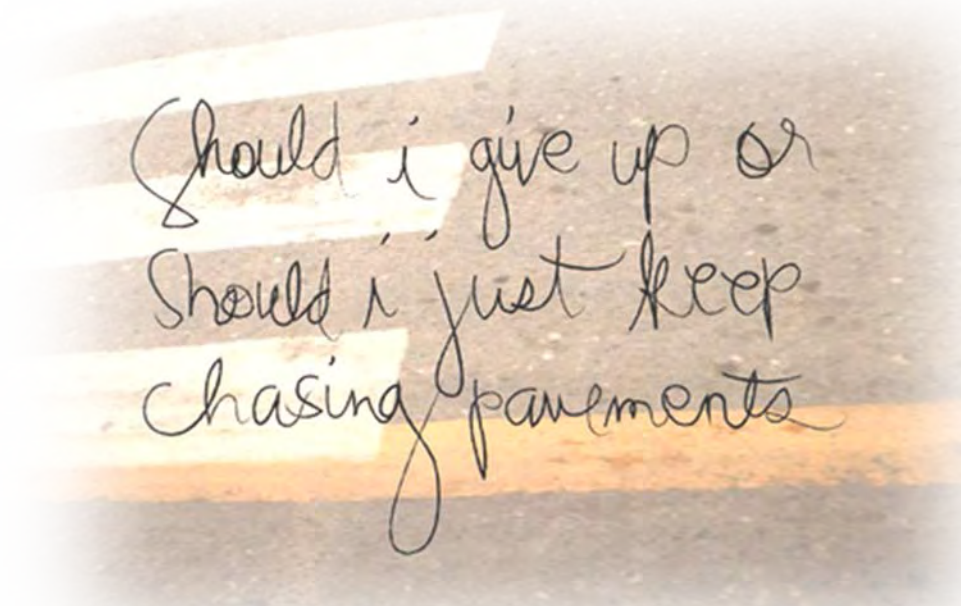
Burlington, Vermont



# OUTLINE

## JTCP

- Who
- What
- Why
- What does it have to do with SOM?



Should i give up or  
Should i just keep  
chasing payments

# JTCP

- ❖ 20 State DOT members +Chair & Vice-Chair
  - ❖ ½ SOD, ½ SOM
  - ❖ All AASHTO Regions
- ❖ Liaisons
  - ❖ AASHTO, NCHRP, FHWA, SHRP2, NAPA, ACPA
- ❖ Meet once/year in person
  - ❖ Webinars
  - ❖ Teleconferences
- ❖ 4 Technical Groups

# Technical Groups



- ❖ Pavement Design and Analysis
- ❖ Pavement Management
- ❖ Sustainability and Surface Characteristics
- ❖ Low Volume Roads

# Publications (Reports and Guides)

AASHTO Guide for Design of Pavement Structures

Pavement Friction Guide

Pavement Management Guide

Pavement Deflection Data Exchange:  
Technical Data Guide

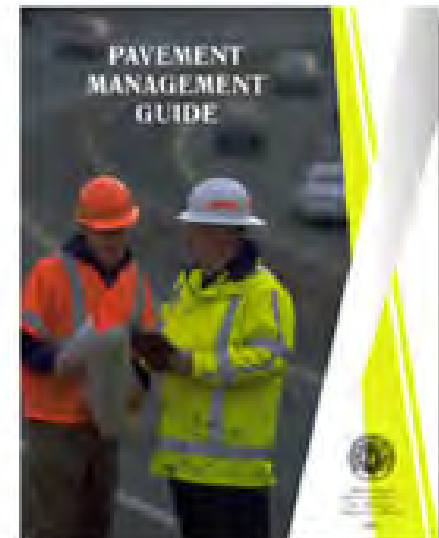
Pavement Management Roadmap

Guide to Local Calibration of the MEPDG

COMING SOON:

Pavement Type Selection Guide

Pavement Management Handbook



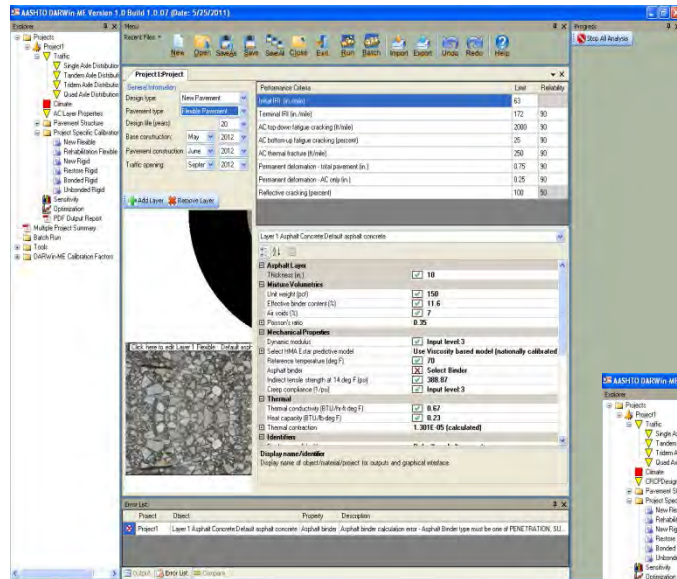
# DARWin-ME:

# Mechanistic-Empirical Pavement Design

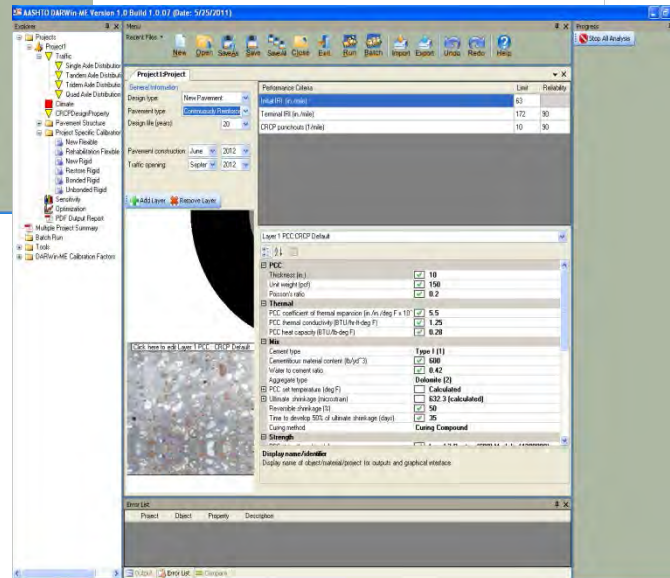
“DARWin-ME™  
is the next  
generation of  
AASHTOWare®  
pavement design  
software



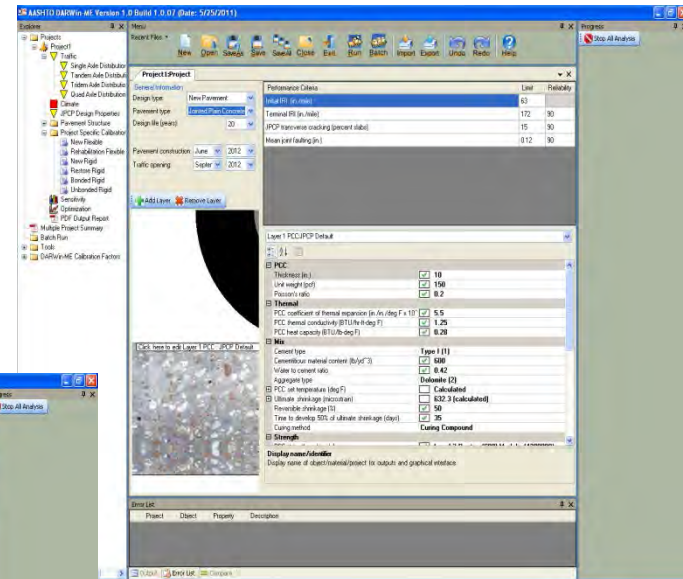
# New Pavement Design



Flexible Pavement (AC)



Continuously Reinforced Concrete Pavement (CRCP)



Jointed Plain Concrete Pavement (JPCP)

# Overlay Design

## Types of Overlays:

1. AC over AC
2. AC over JPCP
3. AC over CRCP
4. AC over JPCP (fractured)
5. AC over CRCP (fractured)
6. Bonded PCC/JPCP
7. Bonded PCC/CRCP
8. JPCP over CRCP (unbonded)
9. JPCP over JPCP (unbonded)
10. CRCP over CRCP (unbonded)
11. CRCP over JPCP (unbonded)
12. JPCP over AC
13. CRCP over AC

The screenshot displays the AASHTO DARWin-ME software interface. The main window is titled 'Project:Project' and shows various design parameters and performance criteria.

**General Information:**

- Design type: Overlay
- Pavement type: AC over CRCP
- Design life (years): 20
- Existing construction: May 2012
- Pavement construction: June 2012
- Traffic opening: Septer 2012

**Performance Criteria:**

Performance Criteria	Limit	Reliability
Initial IRI (in./mile)	63	
Terminal IRI (in./mile)	172	90
AC top-down fatigue cracking (ft/mile)	2000	90
AC bottom-up fatigue cracking (percent)	25	90
AC thermal fracture (ft/mile)	250	90
Permanent deformation - total pavement (in.)	0.75	90
Permanent deformation - AC only (in.)	0.25	90
Reflective cracking (percent)	100	50
CRCP punchouts (1/mile)	10	90

**Layer 1 Asphalt Concrete: Default asphalt concrete**

- Asphalt Layer:** Thickness (in.)  4
- Mixture Volumetrics:**
  - Unit weight (pcf)  150
  - Effective binder content (%)  11.6
  - Air voids (%)  7
  - Poisson's ratio  0.35
- Mechanical Properties:**
  - Dynamic modulus  Input level:3
  - Select HMA Estar predictive model  Use Viscosity based model (nationally calibrated)
  - Reference temperature (deg F)  70
  - Asphalt binder  Select Binder
  - Indirect tensile strength at 14 deg F (psi)  388.87
  - Creep compliance (1/psi)  Input level:3
- Thermal:**
  - Thermal conductivity (BTU/hr-ft-deg F)  0.67
  - Heat capacity (BTU/lb-deg F)  0.23
  - Thermal contraction  1.301E-05 (calculated)
- Identities:**
  - Display name/identifier: Default asphalt concrete
  - Description of object:

**Display name/identifier:** Display name of object/material/project for outputs and graphical interface.

**Error List:**

Project	Object	Property	Description
Project1	Layer 1 Asphalt Concrete: Default asphalt concrete	Asphalt binder	Asphalt binder calculation error - Asphalt Binder type must be one of PENETRATION, SUPERPAVE, and ...



# Pavement Restoration

## Types of Restorations:

1. JPCP Restoration

The screenshot displays the AASHTO DARWin-ME software interface, version 1.0.07, dated 5/25/2011. The interface is divided into several panes:

- Explorer:** Shows a project tree with folders for Traffic, Foundation/Support, JPCP Rehabilitation, Climate, Pavement Structure, Backcalculation, Project Specific Calibration Factors, Sensitivity, PDF Output Report, Multiple Project Summary, Batch Run, Tools, and DARWin-ME Calibration Factors.
- Menu:** Includes options like New, Open, Save, Save As, Close, Exit, Run, Batch, Import, Export, Undo, Redo, and Help.
- Project Information:**
  - Design type: Restoration
  - Pavement type: JPCP Restoration
  - Design life (years): 20
  - Existing construction: May 2012
  - Pavement construction: June 2012
  - Traffic opening: Septer 2012
- Performance Criteria:**

Performance Criteria	Limit	Reliability
Initial IRI (in./mile)	63	
Terminal IRI (in./mile)	172	90
JPCP transverse cracking (percent slabs)	15	90
Mean joint faulting (in.)	0.12	90
- Layer 1 PCC: JPCP Default:**
  - PCC:** Thickness (in.) 10, Unit weight (pcf) 150, Poisson's ratio 0.2
  - Thermal:** PCC coefficient of thermal expansion (in./in./deg F x 10<sup>-6</sup>) 5.5, PCC thermal conductivity (BTU/hr-ft-deg F) 1.25, PCC heat capacity (BTU/lb-deg F) 0.28
  - Mix:** Cement type Type I (1), Cementitious material content (lb/yd<sup>3</sup>) 600, Water to cement ratio 0.42, Aggregate type Dolomite (2), PCC set temperature (deg F) Calculated, Ultimate shrinkage (microstrain) 632.3 (calculated), Reversible shrinkage (%) 50, Time to develop 50% of ultimate shrinkage (days) 35, Curing method Curing Compound
  - Strength:** PCC strength and modulus Level: 3 Rupture(690) Modulus(4200000)
  - Identities:** Display name/identifier: Display name of object/material/project for outputs and graphical interface.
- Error List:** A table with columns for Project, Object, Property, and Description.

# Analysis Summary Page

## Included in Analysis Summary:

### Inputs

- Traffic
- Climate
- Layer Design Properties

### Outputs

- Distress Prediction Summary
- Distress Charts

Lesson 3.2B Comparison Analysis 2 of 2.pdf - Adobe Reader

File Edit View Window Help

1 / 23 130%

Comment Share

**DARwin** **Lesson 3.2B Comparison** **AASHTOWare**

File Name: C:\DON SINGER\Darwin-ME\Lesson 3.2B Comparison.dgpx

### Design Inputs

Design Life: 5 years      Base construction: August, 2007      Climate Data: 36.01, -84.14  
 Design Type: Flexible Pavement      Pavement construction: September, 2007      Sources (Lat/Lon)  
 Traffic opening: October, 2007

### Design Structure

Layer type	Material Type	Thickness (in.)
Flexible	AC Surface	1.0
Flexible	AC Binder	3.5
Flexible	Default asphalt concrete	6.0
NonStabilized	Crushed Stone Base	10.0
Subgrade	A-6	Semi-infinite

### Traffic

Age (year)	Heavy Trucks (cumulative)
2007 (initial)	6,403
2009 (2 years)	2,866,070
2012 (5 years)	5,998,750

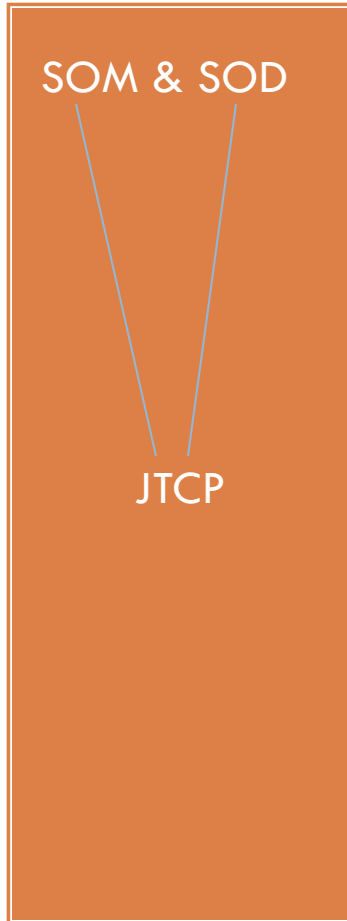
### Design Outputs

#### Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in./mile)	172.00	118.58	90.00	99.97	Pass
Permanent deformation - total pavement (in.)	0.75	0.62	90.00	99.47	Pass
AC bottom-up fatigue cracking (percent)	25.00	1.47	90.00	100.00	Pass
AC thermal fracture (ft/mile)	250.00	27.17	90.00	100.00	Pass
AC top-down fatigue cracking (ft/mile)	2000.00	397.88	90.00	100.00	Pass
Permanent deformation - AC only (in.)	0.25	0.35	90.00	49.25	Fail

#### Distress Charts

# JTCP Needs YOU!!



- We need support from the Subcommittee on Materials for research statements:
  - ▣ Pavement Management
  - ▣ Concrete recalibration for CTE correction
  - ▣ ....future research need statements