



NATMEC - 2010

PrepME for WIM Data Processing for MEPDG

Presented by

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U.S. Department
of Transportation
Federal Highway
Administration

Presentation Format

- ❑ Background
- ❑ Darwin ME
- ❑ PrepME
- ❑ Pooled Fund Project



DARWin ME Pre-Alpha Screen Shots



Enterprise Software

RC Login

DARWinME

Login

Password

Provider

Server

Database

OK Cancel



Darwin ME Costs

Annual License Fees

Single user

\$5,000

Site License – 5 - 9 users

\$20,000

Site License – 10 -14 users

\$30,000

Site License – unlimited users

\$40,000

An educational use option will be offered in FY 2012.

DarwinME Explorer Wind... 🔍 ✕

- Projects
 - Project 1
 - Project 101-F
 - Project 102-F
 - Multiple Project Summary
 - Settings
 - Tools
 - DarwinME calibration factors

DarwinME Menu 🔍 ✕

Recent Files ▾

New Open SaveAs Save Save All Close Exit Run Import Export Select Insert Undo Redo

Project1 | Project 101-F | **Project 102-F** ✕

General Information

Analysis type: **New Pavement** ▾

Pavement type: **Jointed Plain Concrete Pavement (JPCP)** ▾

Design life (years): 7 ▾

Base construction: **August** ▾ 2006 ▾

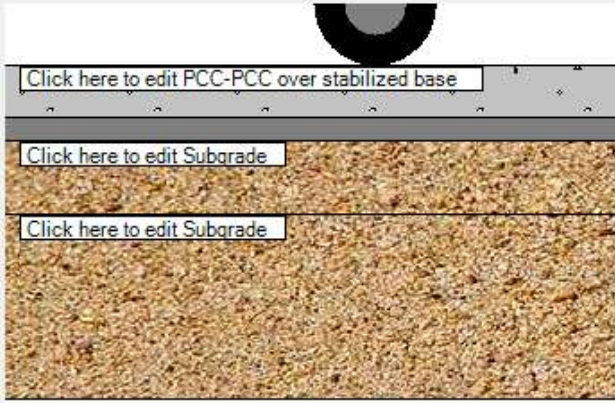
Pavement construction: **September** ▾ 2006 ▾

Traffic opening: **October** ▾ 2006 ▾

Use special traffic loading for flexible analyses.

Use	Analysis	Limit	Reliability
<input checked="" type="checkbox"/>	initialIRI	63	
<input checked="" type="checkbox"/>	terminalIRI	172	90
<input checked="" type="checkbox"/>	crackingPCC	15	90
<input checked="" type="checkbox"/>	faulting	0.12	90

Add Layer Remove Up Down



Click here to edit PCC-PCC over stabilized base

Click here to edit Subgrade

Click here to edit Subgrade

Layer: **Layer PCC-PCC over stabilized base** ▾

🔍 ⬇ ⬆ ⬇

- PCC**
 - Thickness (mm): ⚠ **8.5** *Warning: Value is less than the reco*
 - Unit weight (pcf): ✅ **150**
 - Poisson's ratio: ✅ **0.2**
- Thermal**
 - coefficient ThermalExpansion: ✅ **5.5**
 - thermalConductivity: ✅ **1.25**
 - heatCapacity: ✅ **0.28**
- Mix**
 - cementType: **Type I (1)**
 - cementContent: ✅ **0**

Thickness (mm):
 This is the thickness of the concrete layer (thickness).
 Minimum: 25
 Maximum: 500

Error List 🔍 ✕

Project	Object	Property	Description

DARWin ME Toolbar



Project Creation

Project 102-F

General Information

Analysis type: New Pavement

Pavement type: Jointed Plain Concrete Pavement (JPCP)

Design life (years): 7

Base construction: August 2006

Pavement construction: September 2006

Traffic opening: October 2006

Use special traffic loading for flexible analyses

Use	Analysis	Limit	Reliability
<input checked="" type="checkbox"/>	initial IRI	63	
<input checked="" type="checkbox"/>	terminal IRI	172	90
<input checked="" type="checkbox"/>	cracking PCC	15	90
<input checked="" type="checkbox"/>	faulting	0.12	90

Layer: Layer CSB

Chemically Stabilized
 Layer thickness (in): 4
 Unit weight (pcf): 150
 Poisson's ratio: 0.2

Strength
 Elastic/resilient modulus (psi): 1000000

Thermal
 Thermal conductivity (BTU/hr-ft-F): 1.25
 Heat capacity (BTU/lb-F): 0.28

Identifiers

Layer thickness (in):
 Thickness of the chemically stabilized base
 Minimum: 4
 Maximum: 24

National Defaults

FormLayerSelection

Insert after layer: Subgrade

Layer type: Non-stabilized Base (4)

Layer thickness(in): 12 Check if this is last layer.

Material Selection

Default values Select from database Select from file

Default_A-1-a.xml
 Default_A-1-b.xml
 Default_A-2-4.xml
 Default_A-2-5.xml
 Default_A-2-6.xml
 Default_A-2-7.xml
 Default_A-3.xml
 Example Base.xml

<input type="checkbox"/> Unbound	k0	<input checked="" type="checkbox"/>	0.5
	poisson	<input checked="" type="checkbox"/>	0.35
	thickness	<input checked="" type="checkbox"/>	12
<input type="checkbox"/> Modulus	modulus		40000
<input type="checkbox"/> Sieve	Degree Saturation		0
	Sieve		P200(3.0) P40(0.0) P4(20)D10(0.000) D20(0
	swcc		af(11.1). bf(1.83). cf(0.51). hr(361)
<input type="checkbox"/> Identifiers	Approver		
	Author		
	County		
	Date approved		
	Date created		
	Description of object		
	Direction of travel		
	Display name/identifier		Default_A-1-a
	District		
	From station (miles)		
	Highway		
	Province		
	revisionNumber		0
	State		
	To station (miles)		
	User defined field 2		
	User defined field 3		

Identifiers

OK Cancel

Backcalculated Data Import

Layer: Back calculation data:

FWD
Backcalculation data by layer

Identifiers

	Asphalt	Modulus(psi)	Temperature(°F)	Frequency(hertz)	Unit Weight(pcf)	Poisson's Ratio
	<input checked="" type="checkbox"/>	500000	72	10	150	.2
	<input type="checkbox"/>	40000			120	.28
/	<input type="checkbox"/>	10000			100	.3
*	<input type="checkbox"/>					

Backcalculation data by layer
Backcalculation data by layer

Traffic

Project1:Traffic

AAADTT

AAADTT **4001**

Number of lanes **2**

Trucks design direction(%) **50**

Trucks in design lane (%) **95** *Warning: Value is greater than*

Traffic speed (mph) **60**

Limit of Service **0** *Warning: Value is less than*

Axle Configuration

axleWidth **8.5**

dualTireSpacing **12**

singleTirePressure **120**

dualAxleSpacing **51.6**

tripleAxleSpacing **49.2**

quadAxleSpacing **49.2**

Lateral Wander

meanWheelLocation **18**

trafficWander **10**

laneWidth **12**

Wheelbase

shortAxleSpacing **12**

mediumAxleSpacing **15**

longAxleSpacing **18**

percentShortTruck **33**

percentMediumTruck **33**

percentLongTruck **34**

Identifiers

Misc

axlesPerTruckMain **DarwinDataObjects.AxesPerTr**

TTCGrowth Load Default Growth

Vehicle Class	Percent	Growth	Growth Type
Class 4	3.3	3	Linear
Class 5	34	3	Linear
Class 6	11.7	3	Linear
Class 7	1.6	3	Linear
Class 8	9.9	3	Linear
Class 9	36.2	3	Linear
Class 10	1	3	Linear

MonthlyAdjustment

Month	Class4	Class5	Class6	Class7	Class8	Class9	Class10	Class11	Class12
January	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
February	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
March	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
April	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
May	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
June	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
July	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
August	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sept...	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Nov...	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Dece...	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

AxesPerTruck

Vehicle Class	Single	Tandem	Tridem	Quad
Class 4	1.62	0.39	0	0

HourlyAdjustment

Time of Day	Percent
12:00 am	2.3
1:00 am	2.3
2:00 am	2.3
3:00 am	2.3
4:00 am	2.3
5:00 am	2.3
6:00 am	5
7:00 am	5
8:00 am	5
9:00 am	5
10:00 am	5.9
11:00 am	5.9
12:00 pm	5.9
1:00 pm	5.9
2:00 pm	5.9
3:00 pm	5.9
4:00 pm	4.6
5:00 pm	4.6
6:00 pm	4.6
7:00 pm	4.6
8:00 pm	3.1
9:00 pm	3.1
10:00 pm	3.1
11:00 pm	3.1
Total	100.0

AAADTT

AAADTT (Average Annual Daily Truck Traffic)

Minimum:10

Maximum:5000

Error Checking

AASHTO DarwinME 2.0 Alpha

DarwinME Menu

Recent Files ▾

New Open SaveAs Save Save All Close Exit Run Import Export Select Insert Undo Redo

DarwinME Explorer Wind... ▾ X

Projects

- Project 1
 - Traffic
 - Climate
 - Pavement Material Lay
 - Backcalculation
 - Outputs
 - Analysis Calibration Fac
 - Sensitivity
 - Output Report
- Project 101-F
 - Traffic
 - Climate
 - JPCP Design Propertie
 - Pavement Material Lay
 - Backcalculation
 - Outputs
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- Multiple Project Summary
- Settings
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- DarwinME calibration factors

Project1 Project 101-F Project1:Climate ▾ X

Summary Hourly climate data

Thursday, May 01, 1997 to Tuesday, February 28, 2006 /entry

Date/Hour	Tempei	Winds	Sunshir	Precipit	Humidit	Water Table(ft)
11/28/1997 8:00:00 PM	54	6	0	0	104	10
11/28/1997 9:00:00 PM	55	7	0	0	96	10
11/28/1997 10:00:00 PM	55	8	0	0	100	10
11/28/1997 11:00:00 PM	55	5	0	0	96	10
11/29/1997 12:00:00 AM	55.9	4	0	0	97	10
11/29/1997 1:00:00 AM	55	5	0	0	96	10
11/29/1997 2:00:00 AM	54	4	0	0	100	10
11/29/1997 3:00:00 AM	53.1	4	100	0	100	10
11/29/1997 4:00:00 AM	52	5	100	0	97	10
11/29/1997 5:00:00 AM	51.1	5	100	0	100	10
11/29/1997 6:00:00 AM	51.1	5	100	0	96	10
11/29/1997 7:00:00 AM	51.1	5	100	0	96	10
11/29/1997 8:00:00 AM	53.1	7	100	0	93	10
11/29/1997 9:00:00 AM	55.9	6	100	0	90	10
11/29/1997 10:00:00 AM	55	6	100	0	93	10
11/29/1997 11:00:00 AM	57	6	50	0	90	10
11/29/1997 12:00:00 PM	59	8	75	0.26	87	10
11/29/1997 1:00:00 PM	60.1	10	25	0	84	10
11/29/1997 2:00:00 PM	59	8	100	0	87	10

ClimateStation

Longitude (decimal degrees) -88.17

Latitude (decimal degrees) 40.02

Elevation(ft) 752

Depth of water table(ft) **Annual(10)**

Climate station: **CHAMPAIGN/URBANA,IL (94870)**

Identifiers

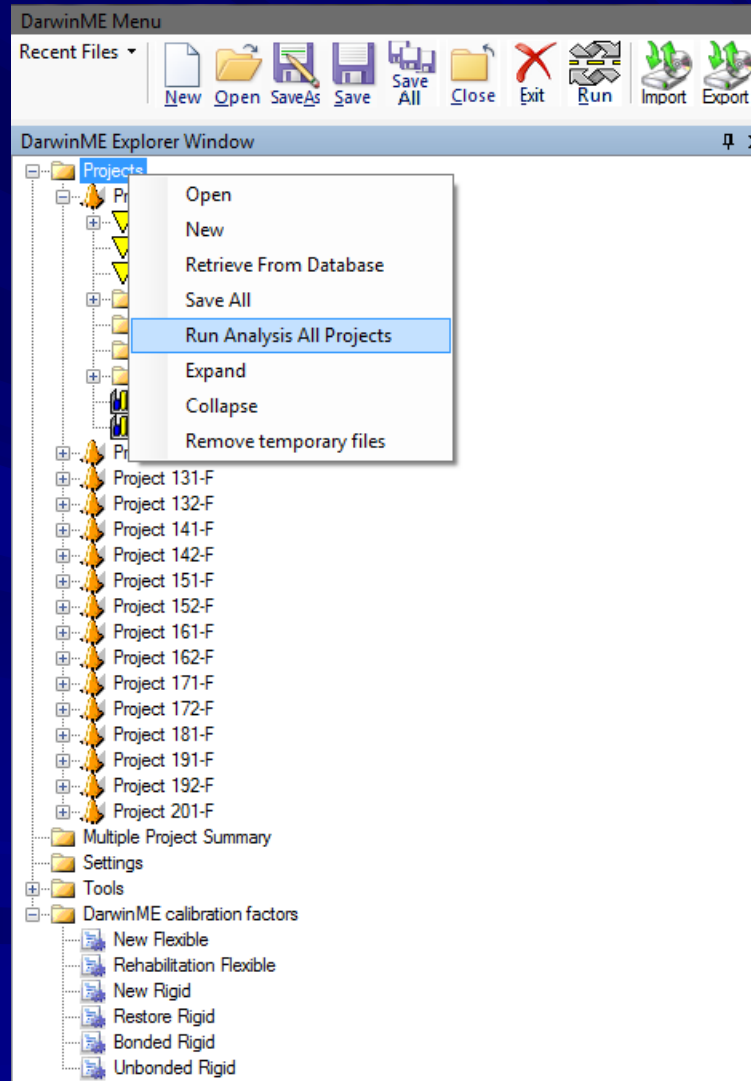
Climate station:
Climate station selected from hourly climatic database (optional)

Error List

Project	Object	Property	Description
Project1	TreeNodeTraffic...		WARNING_HOURLY_TOTAL
Project1	ClimateTreeNode		11/28/1997 8:00:00 PM percent humidity of 104 is outside of allowable range (0-100)
Project1	ClimateTreeNode		8/8/1998 12:00:00 AM percent humidity of 103 is outside of allowable range (0-100)
Project1	ClimateTreeNode		3/29/1999 1:00:00 AM percent humidity of 104 is outside of allowable range (0-100)
Project1	ClimateTreeNode		1/24/2000 4:00:00 AM percent humidity of 159.7 is outside of allowable range (0-100)
Project1	ClimateTreeNode		1/24/2000 5:00:00 AM percent humidity of 238 is outside of allowable range (0-100)
Project1	ClimateTreeNode		11/4/2003 6:00:00 PM air temperature change from hour to hour (35) is greater than warning level (30)

DarwinME Output Window Compare Error List

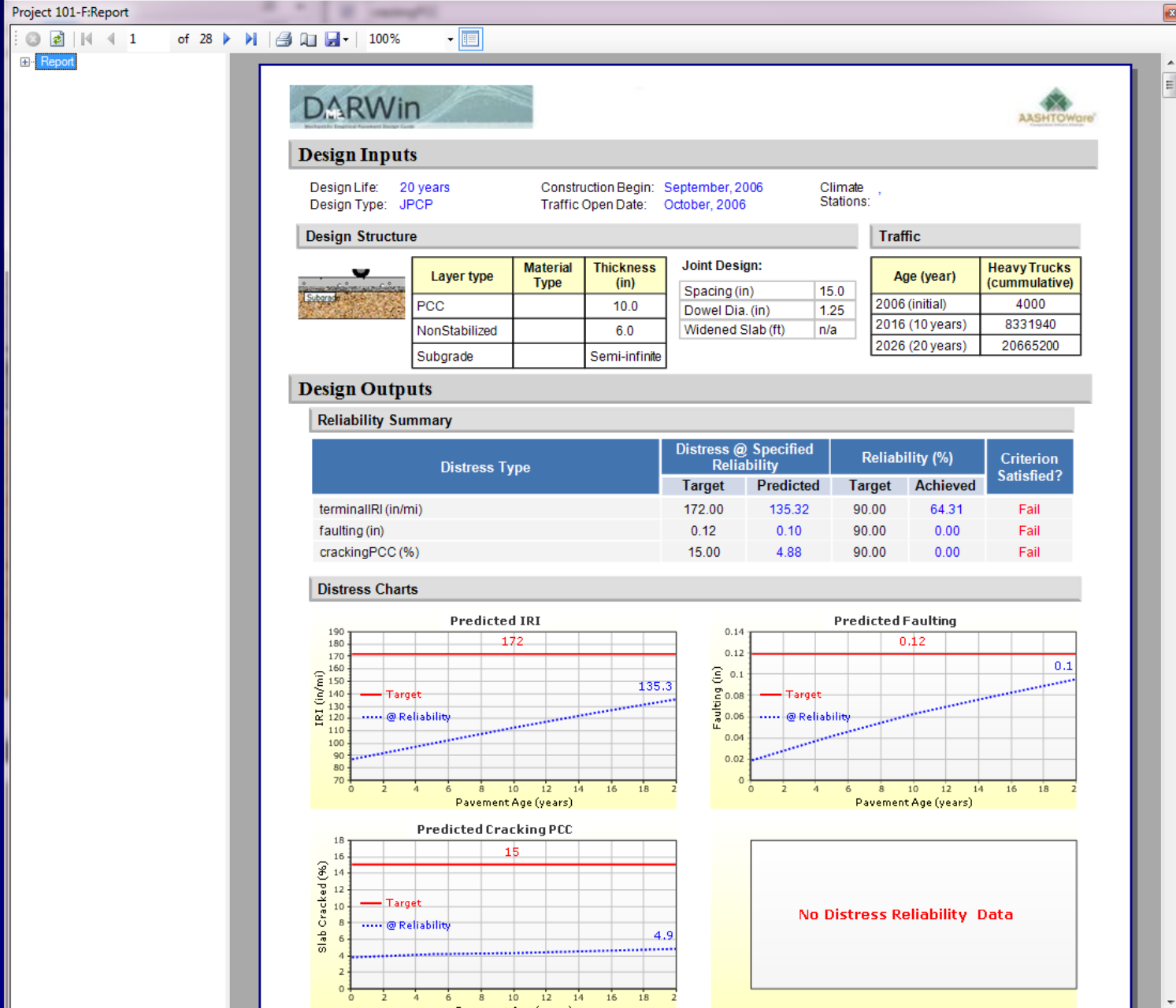
Batch Mode



U.S. Department
of Transportation

Federal Highway
Administration

Integrated Reports



DARWin ME Development Status

Milestones	Percent Complete, Date of Completion
Kick-Off	100%
User Requirements Spec & Review/Approval	100%
Preliminary Design Review	100%
System Requirement Spec & Review/Approval	100%
Requirements Traceability Matrix	100%
Critical Design Review	100%
Implementation & Integration Process Audit	40%, 7/31/10
Test Readiness Review	80%, 6/15/10
Testing Process Audit	0%, 9/30/10
Software Alpha Test	0%, 8/15/10
Software Beta Test	0%, 10/15/10
Acceptance Test	0%, 11/30/10
Release	0%, 12/31/10

PrepME Capabilities

- ❑ Import Raw Data to the Database Tables
- ❑ Traffic Data Check
- ❑ Interpolate Traffic Data
 - **PrepME prepares the 11 files that can be directly imported into the MEPDG software**



Data Importing Menu

The screenshot shows the 'PrepME Version 0.9 - [PrepME]' window. The 'File' menu is open, displaying options: 'Import Raw Data', 'Traffic Data Check', 'Interpolate Climate and Traffic Data', 'Retrieve Material Parameters', and 'Exit'. A sub-menu for 'Update New Data' is also visible, containing 'Complete Import', 'Complete Climate + Traffic', 'Complete Climate', and 'Traffic'. The main window features the text 'PrepME' in large red letters, followed by 'For the Mechanistic Empirical Pavement Design Guide M-EPDG' in yellow. A flow diagram illustrates the process: a weather icon (sun, cloud, rain) points to a cylinder (data storage), which points to a road cross-section (pavement structure). A globe icon also points to the road cross-section. Below the road cross-section, a graph with a curve and a waveform icon point to a detailed pavement cross-section image. At the bottom center is the 'UNIVERSITY of ARKANSAS' logo. The bottom right corner of the window has 'NUM' and 'SCRL' buttons.



Data Importing Processing Window

PrepME-Generate MEPDG Supporting Database

Arkansas

Import Climate Data C:\Documents and Settings\WayLink\Desktop\PrepM

Import Traffic Data C:\Documents and Settings\WayLink\Desktop\PrepM

SaveDB to C:\Documents and Settings\WayLink\Desktop\PrepM

Processing completed 57%

This is the first importing
Importing C:\Documents and Settings\WayLink\Desktop\PrepME\Demo
Data\Importing Data\Traffic\ARAPR02.CLA

OK Cancel



Google Map Utility

PrepME Version 0.9 - [PrepME]

File Help

Map Satellite Hybrid

General Information

ProjectName	RouteNumber	BgnStation	EndStation	BgnLat	BgnLong	EndLat	EndLong
A							
B							
A							
B							
A							
B							

Legend

- Climate Station
- Water Table S...
- Traffic Station

For Arkansas Highway Transportation Department Use only (TRC0702)

Ready

NUM



Traffic Data Check

PrepME Version 0.9 - [PrepME]

File Help

- Import Raw Data
- Traffic Data Check
 - Weight
 - Classification
- Interpolate Climate and Traffic Data
- Retrieve Material Parameters
- Exit

PrepME

For the Mechanistic Empirical Pavement Design Guide
M-EPDG

UNIVERSITY of ARKANSAS

NUM SCRL



Weight Data Check Window

PrepME-Traffic Weight Data Check

MEPDG Supporting Database File for Quality Control
 F:\TRC-0702, AASHTO-Web Meeting on May 27th 2009\Database\AR-05-19-09.mdb Browse RUN QUALITY CONTROL

Weight Data Check

Station ID: 480037

Legend:

- Jan (Red solid line)
- Feb (Red dashed line)
- Mar (Red dash-dot line)
- Apr (Green solid line)
- May (Green dashed line)
- Jun (Green dash-dot line)
- Jul (Blue solid line)
- Aug (Blue dashed line)
- Sep (Blue dash-dot line)
- Oct (Black solid line)
- Nov (Black dashed line)
- Dec (Black dash-dot line)

Load Spectra

Axle Type

- Single
- Tandem
- Tridem
- Quad

Class

- Class 4
- Class 5
- Class 6
- Class 7
- Class 8
- Class 9
- Class 10
- Class 11
- Class 12
- Class 13
- All (4 to 13)

Gross Vehicle Weight
 Average Front Axle Weight
 Average Drive Tandem Axle Weight
 Load Spectra

Station	Accepted	Partial Accepted	Not Accepted	Year (Month) of Available Data
100019	300052	171651	100019	2002(Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
10009	350019	420010	10009	2003(Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
160058	350314	460006	160058	2004(Feb, Mar, Apr, May, Aug, Oct, Nov, Dec)
160074	40432	480037	160074	2005(Jan, Feb, Mar, Apr, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
161993	430038	71813	161993	
170049	600567	740035	170049	
170064	630008		170064	
171651			180002	
180002			181501	
181501			20006	
20006			20205	
20205			210033	
210033			220024	

None
 Bad Data
 Missing Data

QC Details

Station ID: 480037
 Gross Weight Criteria: Pass, 2 Peak
 Front Axle Criteria: Pass
 Drive Tandem Criteria: Pass
 Conclusion: Partial Accepted
 QC Method: Automatic

Relaxation Type

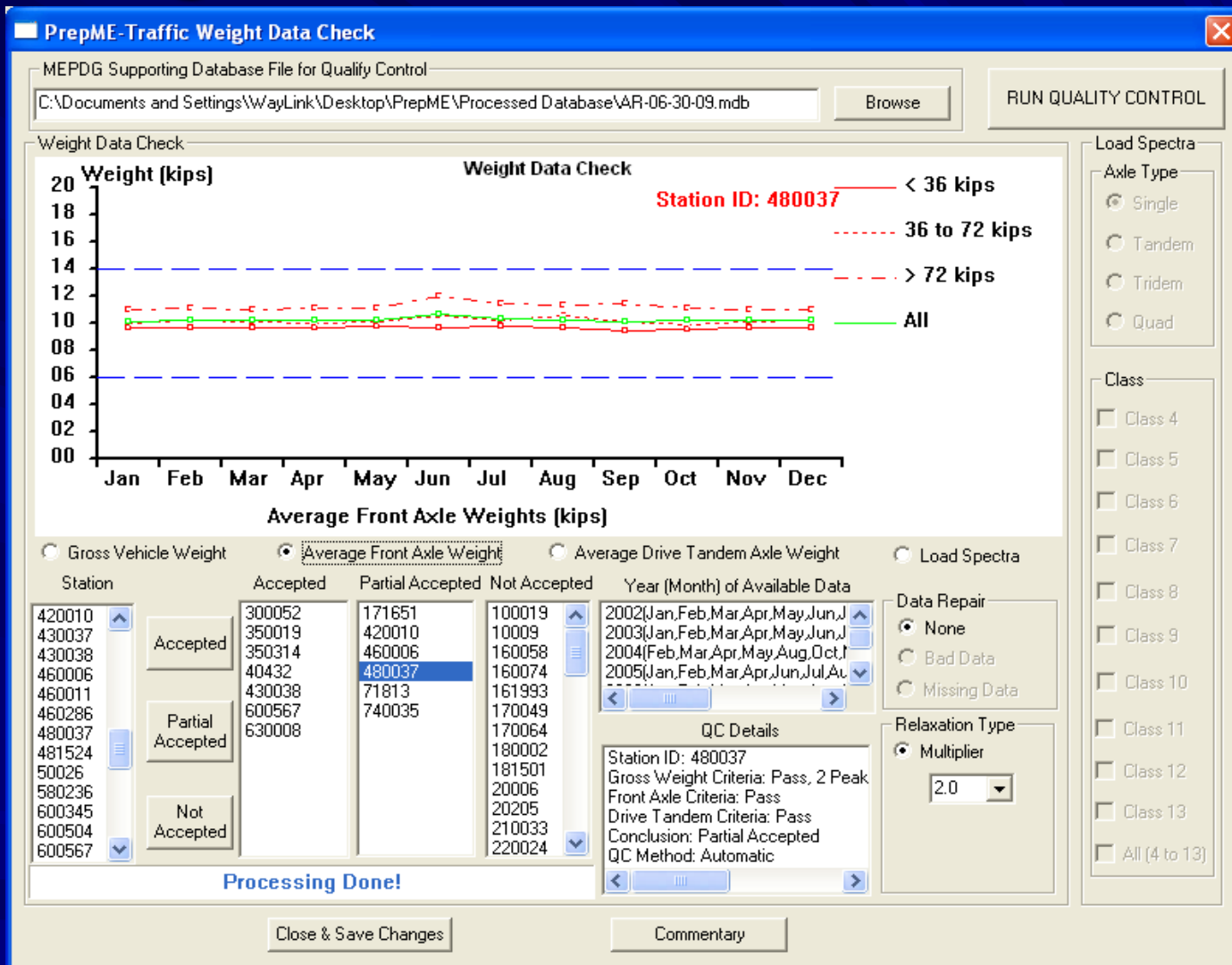
Multiplier

Processing Done!

Close & Save Changes Commentary



Weight Data Check Window



Weight Data Check Window

PrepME-Traffic Weight Data Check

MEPDG Supporting Database File for Quality Control
 C:\Documents and Settings\WayLink\Desktop\PrepME\Processed Database\AR-06-30-09.mdb Browse RUN QUALITY CONTROL

Weight Data Check

Weight Data Check
 Station ID: 480037

Weight (kips)

Average Drive Tandem Axle Weights (kips)

Gross Vehicle Weight
 Average Front Axle Weight
 Average Drive Tandem Axle Weight
 Load Spectra

Station	Accepted	Partial Accepted	Not Accepted	Year (Month) of Available Data
420010	300052	171651	100019	2002(Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
430037	350019	420010	10009	2003(Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
430038	350314	460006	160058	2004(Feb, Mar, Apr, May, Aug, Oct, Nov, Dec)
460006	40432	480037	160074	2005(Jan, Feb, Mar, Apr, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
460011	430038	71813	161993	
460286	600567	740035	170049	
480037	630008		170064	
481524			180002	
50026			181501	
580236			20006	
600345			20205	
600504			210033	
600567			220024	

Class 4
 Class 5
 Class 6
 Class 7
 Class 8
 Class 9
 Class 10
 Class 11
 Class 12
 Class 13
 All (4 to 13)

Class 4
 Class 5
 Class 6
 Class 7
 Class 8
 Class 9
 Class 10
 Class 11
 Class 12
 Class 13
 All (4 to 13)

None
 Bad Data
 Missing Data

Multiplier
 2.0

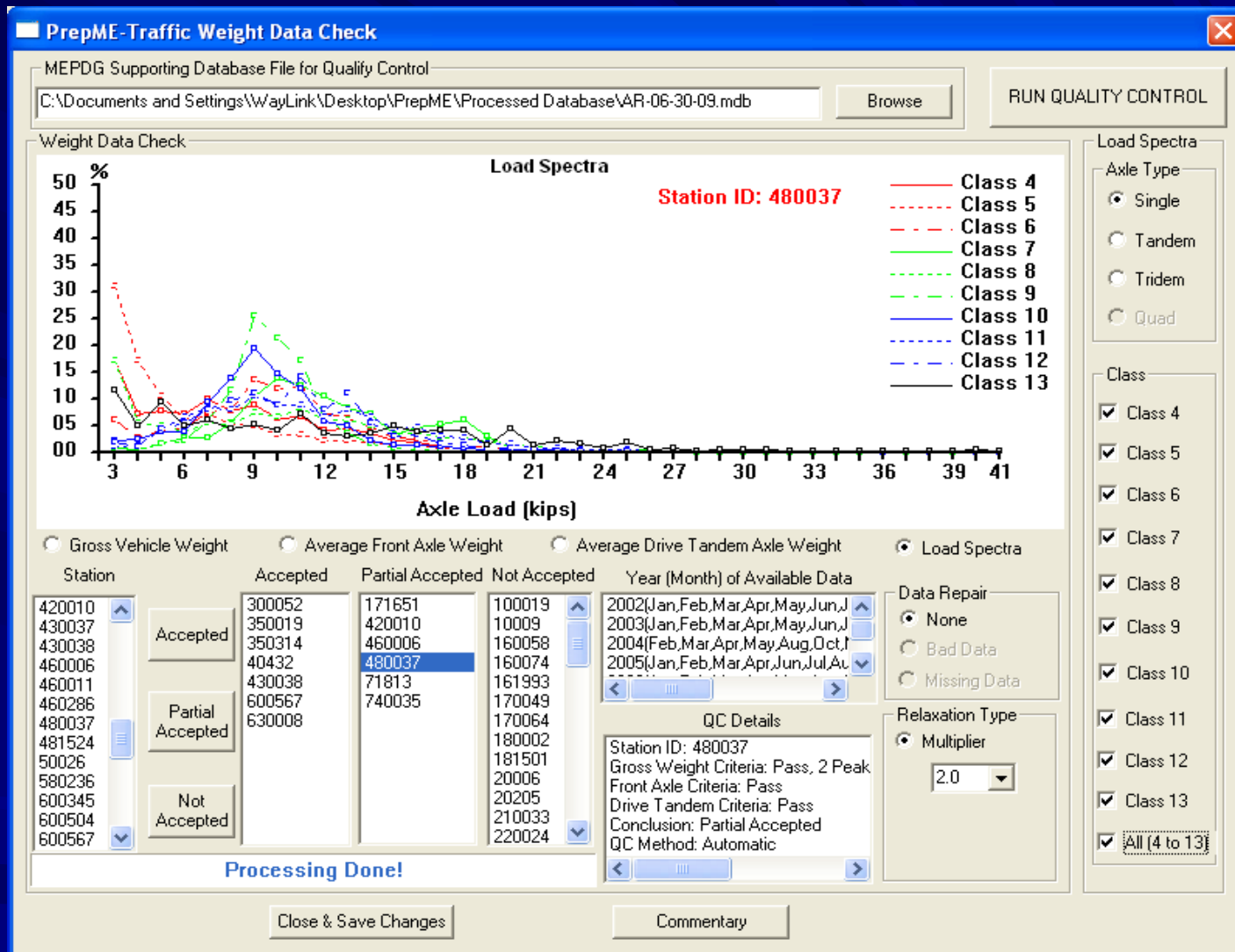
QC Details
 Station ID: 480037
 Gross Weight Criteria: Pass, 2 Peak
 Front Axle Criteria: Pass
 Drive Tandem Criteria: Pass
 Conclusion: Partial Accepted
 QC Method: Automatic

Processing Done!

Close & Save Changes Commentary



Weight Data Check Window



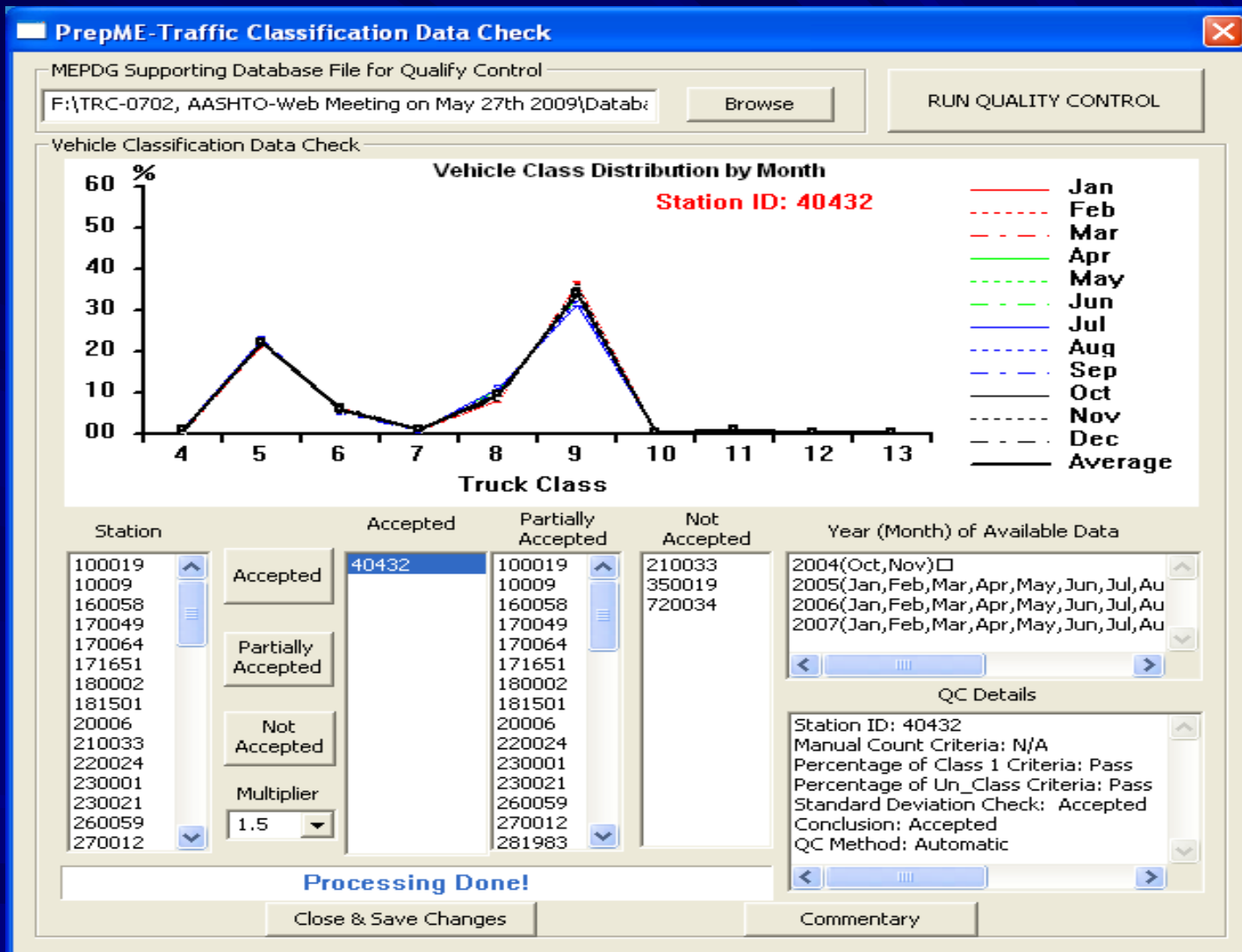
Weight Data Check

■ Multipliers

- If No Multiplier: Few Stations Passed the Weight Data Check
- Need to Relax Requirements—Multipliers
- If multiplier=1.0, LTPP Weight Range, e.g.. $10,000 \pm 2,000$ lb;
- If Multiplier=2.0, For Example, the Range for Front Axle $10,000 \pm (2,000 \times 2.0)$ lb.



Vehicle Classification Data Check



Vehicle Classification Data Check

■ Multiplier

- Use Standard Deviation to Identify the Consistence of the Data
- If Multiplier=1.0, then 2 Standard Deviation.
- If Multiplier=1.5, then 3 Standard Deviation



Traffic Files Generation

PrepME-Interpolation

MEPDG Supporting Database File
F:\TRC-0702, AASHTO-Web Meeting on May

Export to MEPDG Input Files
C:\Documents and Settings\qli\Desktop

General Information
Project ID: I-540 Section ID: 01
Start at: End at:
Latitude: 36.00 36.50 (range from 33 to 37)
Longitude: -94.15 -93.15 (range from -89 to -95)
Station: 1 10

Climate
 Interpolate Based on Radius
Radius (mi)
 Interpolate Based on Adjacent Six Stations
Water Table Depth
From Database
 Annual Seasonal
From User Input
 Annual (ft)
 Seasonal
Spring (ft) Summer (ft) Fall (ft) Winter (ft)

Traffic Parameters
Initial Two-Way AADTT: 6000
Number of Lanes in Design Direction: 2
Percent Trucks in Design Direction (%): 50
Percent Trucks in Design Lane (%): 95
Operational Speed (mph): 60
Traffic Growth: Linear, 3.50%
TTC (Truck Traffic Classification):
TTC6:Intermediate Light and Single_Trailer Truck Route (Typ)

Classification Stations Weight Stations Stations of Selected TTC
100019 300052 290002
10009 350019 350019
160058 350314 350314
170049 40432 40432
170064 430038 460286

Source for Interpolation
Classification Weight
290002 350019
350314 350314
40432 40432
460286
480037

Processing completed 43%

This process shows 11 files to be generated which can be imported to the MEPDG software



Software Generates the 11 Traffic Files

The screenshot shows a Windows Explorer window titled "Interpolation Result" with the address bar pointing to "C:\Documents and Settings\qli.GACL\Desktop\weigu\CD Files, AHTD May Conference, 05-16-2007\D". The window displays a list of files and folders. Red annotations highlight specific items:

- A red box around the "I540" file (ICC Profile) is labeled "Climate".
- A red box around the "single", "tridem", "AxlesPerTruck", "MonthlyAdjustmentFactor", and "TrafficGrowth" files is labeled "Traffic Files: 11 in total".
- A red box around the "DSR" and "Material_Report" files is labeled "Materials".
- A red box around the "E_Modulus" file is labeled "Can be imported to MEPDG software".
- A red box around the "Material_Report" file is labeled "Summary Report".

File Name	Date/Time	File Type	Annotation
I540	4/25/2008 9:01 AM	ICC Profile	Climate
single	4/25/2008 9:01 AM	ALF File	Traffic Files: 11 in total
tridem	4/25/2008 9:01 AM	ALF File	
AxlesPerTruck	4/25/2008 9:01 AM	Text Document	
MonthlyAdjustmentFactor	4/25/2008 9:01 AM	Text Document	
TrafficGrowth	4/25/2008 9:01 AM	Text Document	
quad	4/25/2008 9:01 AM	ALF File	Can be imported to MEPDG software
tandem	4/25/2008 9:01 AM	ALF File	
_HourlyTrafficPerc	4/25/2008 9:01 AM	Text Document	Materials
GeneralTraffic	4/25/2008 9:01 AM	Text Document	
Traffic	4/25/2008 9:01 AM	Text Document	Summary Report
VehicleClassDistribution	4/25/2008 9:01 AM	Text Document	
DSR	4/25/2008 9:14 AM	BIF File	Materials
E_Modulus	4/25/2008 9:14 AM	DWN File	
Material_Report	4/25/2008 9:23 AM	Microsoft Office Access Application	Summary Report



Import Generated Traffic Files to MEPDG

Traffic

Design Life (years): 20

Opening Date: June, 2007

Initial two-way AADTT: 2000

Number of lanes in design direction: 2

Percent of trucks in design direction (%): 50.0

Percent of trucks in design lane (%): 95.0

Operational speed (mph): 60

Traffic Volume Adjustment: Edit

Axle load distribution factor: Edit

General Traffic Inputs: Edit

Traffic Growth: Compound, 4%

OK Cancel

Import/Export Traffic

Directory where import/export traffic files located: C:\Documents and Settings\qli.GACL\Desktop\weiguo\CD Files, AHTD May Conference, 05-16-2007\Dr Wang, M

Available traffic files:

- C:\Documents and Settings\qli.GACL\Desktop\weiguo\CD Files, AHTD May Conference, 05-16-2007\Dr Wang, Mar 17 20i
- C:\Documents and Settings\qli.GACL\Desktop\weiguo\CD Files, AHTD May Conference, 05-16-2007\Dr Wang, Mar 17 20i
- C:\Documents and Settings\qli.GACL\Desktop\weiguo\CD Files, AHTD May Conference, 05-16-2007\Dr Wang, Mar 17 20i
- C:\Documents and Settings\qli.GACL\Desktop\weiguo\CD Files, AHTD May Conference, 05-16-2007\Dr Wang, Mar 17 20i
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11 Traffic Files in Total

Import Export Cancel



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- MEPDG_Climate_WTD_InUse
- MEPDG_Const_AC_Core_Thickness
- MEPDG_Const_AC_Extracted_Ashphalt_Content
- MEPDG_Const_AC_Specific_Gravity_Bulk
- MEPDG_Const_AC_Specific_Gravity_Max
- MEPDG_Const_AC_Volumetric
- MEPDG_Const_Binder_DSR
- MEPDG_Const_Binder_Penetration
- MEPDG_Const_Binder_Specific_Gravity
- MEPDG_Const_Binder_Viscosity_77
- MEPDG_Const_Binder_Viscosity_Kinematic_Absolute
- MEPDG_Const_Core_Log
- MEPDG_Const_ExtractedAggregate_Gradation
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- MEPDG_Maint_Improvements
- MEPDG_Maint_PCC_Crack_Seal
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Data Dictionary

Table 6 The structure of MEPDG_Climate_Hourly Table

Field Name	Data Type	Unit	Short Definition	Code Type	Field Key
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Percent_Sunshine	NUMBER(3,1)	%	Hourly percent of sunshine		
Relative_Humidity	NUMBER(3,2)	%	Hourly relative humidity		



Other Features of the Software



U.S. Department
of Transportation
**Federal Highway
Administration**

Pavement Performance Module

■ AC

- Distress
- Rutting
- IRI

■ CRCP

- Distress
- IRI

■ JPCP

- Distress
- Faulting
- IRI

■ Others

- FWD (2)
- GPR (3)
- Friction



Pavement Performance Module

- Distress (MEPDG Required)
 - Based on LTPP Survey Manual
- FWD
 - FWD Equipment Information
 - Point to Point Dropping Data
- GPR
 - GPR Equipment Information
 - GPR Point Data
 - GPR Section Data
- Friction



Construction and Related Testing Module

- As Built Construction Data
- Field Materials Sampling
- AC Construction Related Testing
- PCC Construction Related Testing
- Stabilized Materials Construction Related Testing
- Unbound Materials and Subgrade Construction Related Testing



Construction and Related Testing Module

■ As Built Construction Data (11)

- Compaction Data (AC)
- Construction Data (AC)
- Overlay (AC)
- Aggregate (PCC)
- Construction Data (PCC)
- Joints (PCC)
- Mix (PCC)
- Steel (PCC)
- Overlay (PCC)
- Subgrade Preparation
- Unbound Aggregate



Construction and Related Testing Module

- **Field Materials Sampling (4)**
 - Hole Log
 - Sample Log
 - Nuclear Gauge
 - Dynamic Cone Penetrometer (DCP)



Construction and Related Testing Module

■ AC Construction Related Testing (12)

- Core Exam (Thickness)
- Bulk Specific Gravity
- Max Specific Gravity
- Extracted Asphalt Content
- Volumetric Properties
- Binder Penetration
- Binder Specific Gravity
- Binder Kinematic Viscosity
- Binder DSR
- Bulk Specific Gravity & % Moisture of Extracted Coarse Aggregate
- Bulk Specific Gravity & % Moisture of Extracted Fine Aggregate
- Gradation of Extracted Aggregates



Construction and Related Testing Module

■ PCC Construction Related Testing (6)

- Core Exam (Thickness)
- Density
- Compressive Strength
- Elastic Modulus
- Rupture Strength
- Coefficient of Thermal Expansion (CTE)



Construction and Related Testing Module

■ Stabilized Materials Construction Related Testing (2)

- General: Classification of Treated Materials
- Unconfined Compressive Strength



Construction and Related Testing Module

■ Unbound Materials and Subgrade Construction Related Testing (7)

- Sieve Analysis
- Classification
- Atterberg Limits
- Proctor Test
- In Situ Moisture
- Specific Gravity
- Resilient Modulus



Maintenance Module

■ PCC Pavement

- Crack Seal
- Full Depth Repair
- Partial-Depth Patching
- Joint Reseal

■ AC Pavement

- Crack Seal
- Patching
- Seal Coat

■ Others

- Grinding, Milling, Grooving
- Costs
- Improvements



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Future Work in the Pooled-Fund Study

<http://www.pooledfund.org/>

Solicitation Number: 1260

Traffic and Data Preparation for Darwin ME Analysis and Design



U.S. Department
of Transportation
**Federal Highway
Administration**

Future Work

- Re-write the software for universal usage for any state and any WIM equipment
- Refine code development and debugging
- Refine database engine and visual/geo interface
- Allow manual processing of traffic data by user
- Enhance the importing speed using multi-thread programming techniques.



Future Work (cont.)

- Integrate with efforts in PMS, materials, and construction, et al
 - Add Resilient Modulus if the data are available
- Adapt database tables for SQL Express
- Add database security feature
- Compatible with new Darwin ME software



Pooled Fund Study

- Lead State: Louisiana Dept. Of Transportation and Development (LaDOTD)
- Starting Date: Late 2010
- Commitment: \$50,000/State for three years
- Sponsor Contact: Harold Paul,
harold.paul@la.gov
- Lead Agency Contact: Doc Zhang
doc.zhang@la.gov
- FHWA Contact: Mike Moravec,
mike.moravec@dot.gov



Q&A

Thank You!



U.S. Department
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**Federal Highway
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