

NEAUPG

NORTHEAST ASPHALT USER / PRODUCER GROUP





Maryland Specification
for Using
Contractor and Agency Test
Results in a
Computer-based
Pay Factor Program

- Maryland's Goals
- QC/QA Specification
- MarylandWare
- Pay Factor Program
- HMA View
- Pavement Tools Consortium



Maryland's Goals

- Track HMA Projects
- Life Cycle Costs
- QC/QA Specification Incorporating Contractor and State Results
- Computer Based

QC/QA Specifications

- Mixture
- Density
- Random Sampling



MIXTURE



NEW SPEC

Lot size: 6000 tons

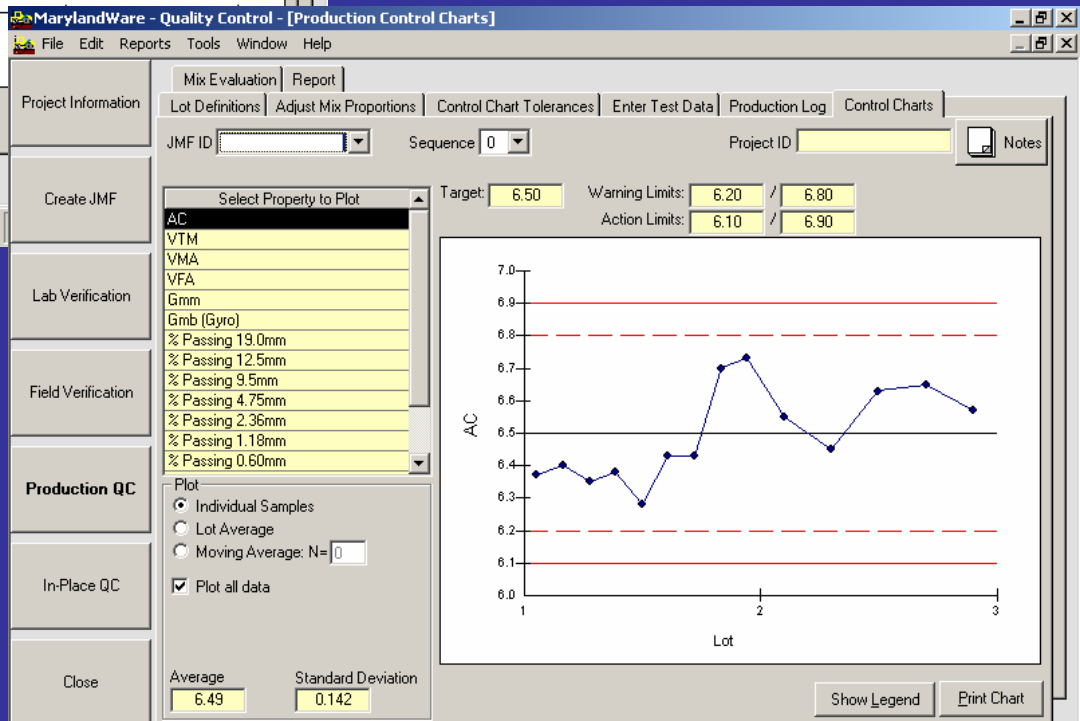
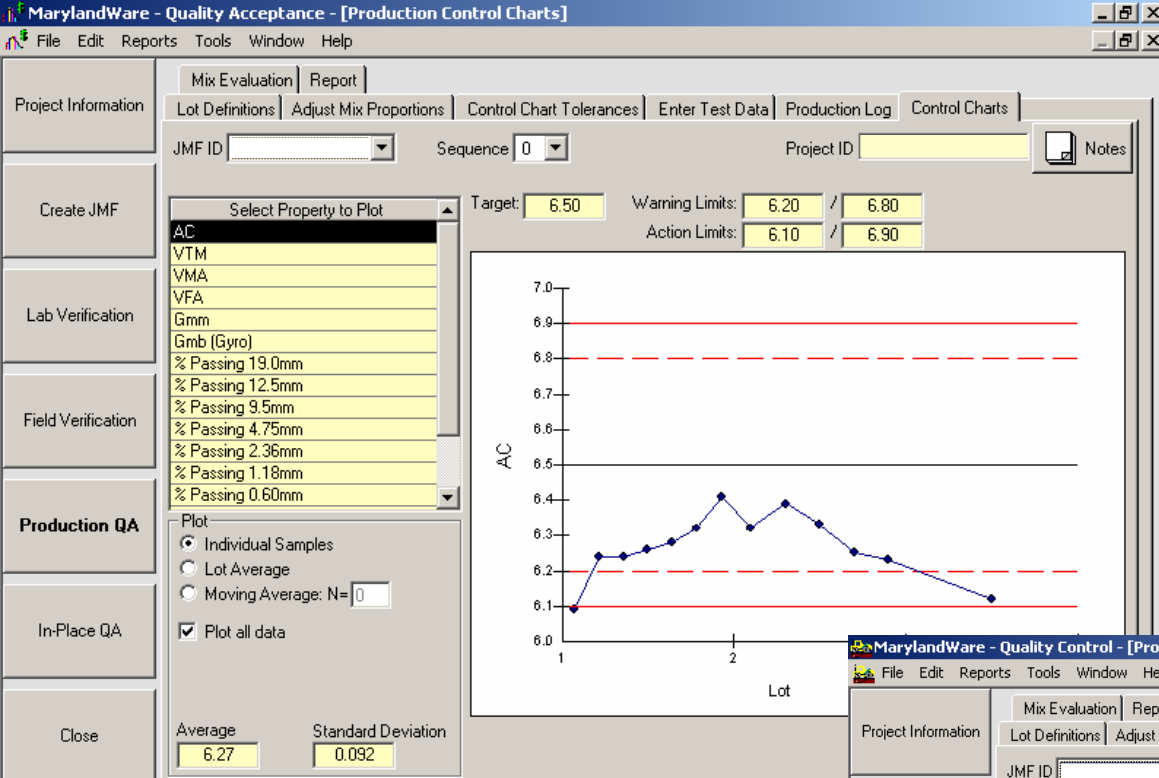
QA Sample Location: Behind the Paver

QC Frequency: As approved in QC plan.
Sampling may be from trucks or BTP.

QA Frequency - minimum of 1/day/mix or
1/1000 tons; whichever yields higher
frequency.

QA test compared to QC by MSMT 733, t &
F tests. If comparable, QC & QA results will
be combined to determine final pay factor. If
not, only State results will be used.

No incentive



MarylandWare - Quality Control - [Production Control Charts]

File Edit Reports Tools Window Help

Mix Evaluation Report

Project Information Lot Definitions Adjust Mix Proportions Control Chart Tolerances Enter Test Data Production Log Control Charts

JMF ID [] Sequence [0] Project ID [] Notes

Create JMF

Select Property to Plot

- AC
- VTM**
- VMA
- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm
- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm

Plot

Individual Samples

Lot Average

Moving Average: N=[0]

Plot all data

Average: 4.28 Standard Deviation: 0.908

Target: 3.5 Warning Limits: 2.7 / 4.3 Action Limits: 2.3 / 4.7

Lot	VTM Value
1	4.1
1	5.8
1	6.2
1	3.9
1	5.5
2	3.4
2	3.2
2	3.1
2	3.4
2	4.3
2	5.7
2	4.4

MarylandWare - Quality Control - [Production Control Charts]

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- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm

Plot

Individual Samples

Lot Average

Moving Average: N=[0]

Plot all data

Average: 3.38 Standard Deviation: 0.562

Target: 3.5 Warning Limits: 2.7 / 4.3 Action Limits: 2.3 / 4.7

Lot	VTM Value
1	3.5
1	3.4
1	3.3
1	3.2
2	4.9
2	4.9
2	3.3
2	3.5
2	3.4
2	3.2
2	3.0
3	3.3
3	2.9
3	2.8
3	2.4

Show Legend Print Chart

MarylandWare - Quality Control - [Production Control Charts]

File Edit Reports Tools Window Help

Mix Evaluation Report

Lot Definitions Adjust Mix Proportions Control Chart Tolerances Enter Test Data Production Log Control Charts

JMF ID [] Sequence [0] Project ID [] Notes

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- AC
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- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm**
- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm

Target: 29.0 Warning Limits: 26.5 / 31.5
Action Limits: 25.0 / 33.0

% Passing 4.75mm

Lot

Plot

- Individual Samples
- Lot Average
- Moving Average: N= [0]

Plot all data

Average 31.15 Standard Deviation 1.144

Close

MarylandWare - Quality Control - [Production Control Charts]

File Edit Reports Tools Window Help

Mix Evaluation Report

Lot Definitions Adjust Mix Proportions Control Chart Tolerances Enter Test Data Production Log Control Charts

JMF ID [] Sequence [0] Project ID [] Notes

Create JMF

Select Property to Plot

- AC
- VTM
- VMA
- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm**
- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm

Target: 29.0 Warning Limits: 26.5 / 31.5
Action Limits: 25.0 / 33.0

% Passing 4.75mm

Lot

Plot

- Individual Samples
- Lot Average
- Moving Average: N= [0]

Plot all data

Average 30.52 Standard Deviation 1.474

Show Legend Print Chart

Close

MarylandWare - Quality Control - [Production Control Charts]

File Edit Reports Tools Window Help

Mix Evaluation Report

Project Information: Lot Definitions Adjust Mix Proportions Control Chart Tolerances Enter Test Data Production Log Control Charts

JMF ID [] Sequence [0] Project ID [] Notes

Create JMF: Select Property to Plot

- AC
- VTM
- VMA
- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm
- % Passing 2.36mm**
- % Passing 1.18mm
- % Passing 0.60mm

Lab Verification

Field Verification

Production QA

Plot:

- Individual Samples
- Lot Average
- Moving Average: N=[0]

 Plot all data

In-Place QA

Close

Average: 18.38 Standard Deviation: 0.650

Target: 18.0 Warning Limits: 15.5 / 20.5 Action Limits: 14.0 / 22.0

MarylandWare - Quality Control - [Production Control Charts]

File Edit Reports Tools Window Help

Mix Evaluation Report

Project Information: Lot Definitions Adjust Mix Proportions Control Chart Tolerances Enter Test Data Production Log Control Charts

JMF ID [] Sequence [0] Project ID [] Notes

Create JMF: Select Property to Plot

- AC
- VTM
- VMA
- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm
- % Passing 2.36mm**
- % Passing 1.18mm
- % Passing 0.60mm

Lab Verification

Field Verification

Production QC

Plot:

- Individual Samples
- Lot Average
- Moving Average: N=[0]

 Plot all data

In-Place QC

Close

Average: 19.20 Standard Deviation: 1.111

Target: 18.0 Warning Limits: 15.5 / 20.5 Action Limits: 14.0 / 22.0

Show Legend Print Chart

Mix Evaluation | Report

Lot Definitions | Adjust Mix Proportions | Control Chart Tolerances | Enter Test Data | Production Log | Control Charts

JMF ID: [] Sequence: [0] Project ID: [] Notes

Create JMF

Select Property to Plot

- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm
- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm
- % Passing 0.30mm
- % Passing 0.15mm
- % Passing 0.075mm

Target: 10.5 Warning Limits: 9.0 / 12.0
Action Limits: 8.5 / 12.5

Plot

- Individual Samples
- Lot Average
- Moving Average: N=[0]

Plot all data

Average: 11.53 Standard Deviation: 0.711

Mix Evaluation | Report

Lot Definitions | Adjust Mix Proportions | Control Chart Tolerances | Enter Test Data | Production Log | Control Charts

JMF ID: [] Sequence: [0] Project ID: [] Notes

Create JMF

Select Property to Plot

- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm
- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm
- % Passing 0.30mm
- % Passing 0.15mm
- % Passing 0.075mm

Target: 10.5 Warning Limits: 9.0 / 12.0
Action Limits: 8.5 / 12.5

Plot

- Individual Samples
- Lot Average
- Moving Average: N=[0]

Plot all data

Average: 10.27 Standard Deviation: 0.731

Mix Evaluation | Report

Lot Definitions | Adjust Mix Proportions | Control Chart Tolerances | Enter Test Data | Production Log | Control Charts

JMF ID: [] Sequence: [0] Project ID: [] Notes

Create JMF

Select Property to Plot

- VFA
- Gmm
- Gmb (Gyro)
- % Passing 19.0mm
- % Passing 12.5mm
- % Passing 9.5mm
- % Passing 4.75mm
- % Passing 2.36mm
- % Passing 1.18mm
- % Passing 0.60mm
- % Passing 0.30mm
- % Passing 0.15mm
- % Passing 0.075mm

Target: 10.5 Warning Limits: 9.0 / 12.0
Action Limits: 8.5 / 12.5

Plot

- Individual Samples
- Lot Average
- Moving Average: N=[0]

Plot all data

Average: 10.27 Standard Deviation: 0.731

Show Legend | Print Chart

DENSITY



NEW SPEC

QC - core or nuclear testing

QC - one test per 500 tons or
5 per day

QA - one core required per 500 tons or 5 per
day

QA core results used to develop pay factors.
QC core results may be used as well.

t & F tests used for Acceptance / Pay

Testing frequency based on paving
production. Use Behind Paver Gravities

Pay adjustments by lot based on average
density and minimum value

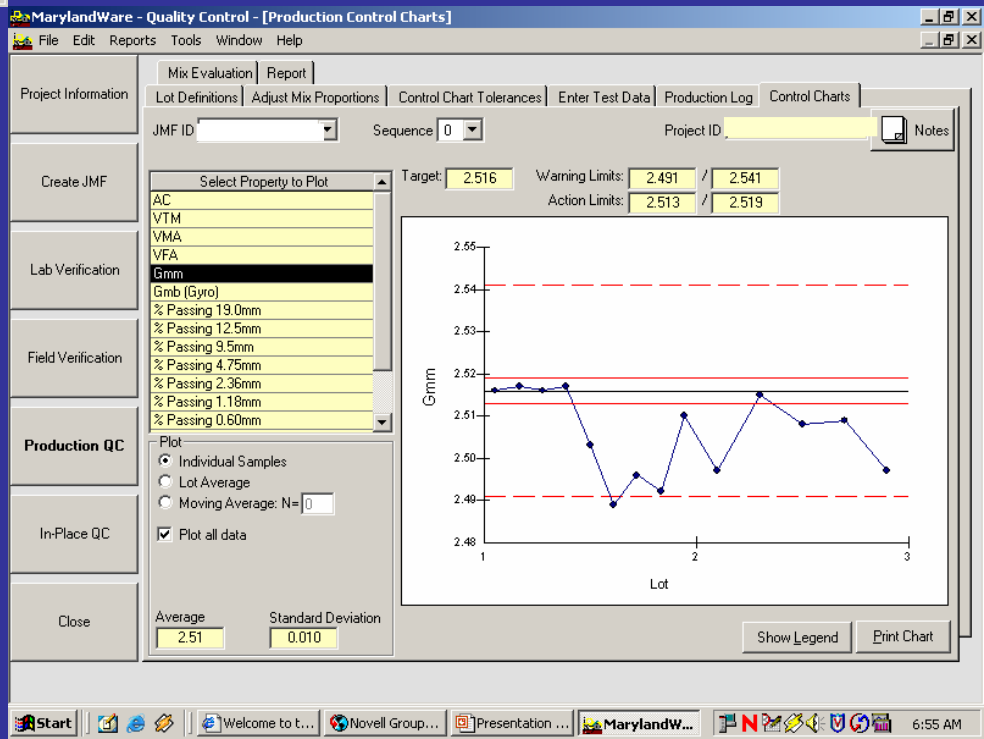
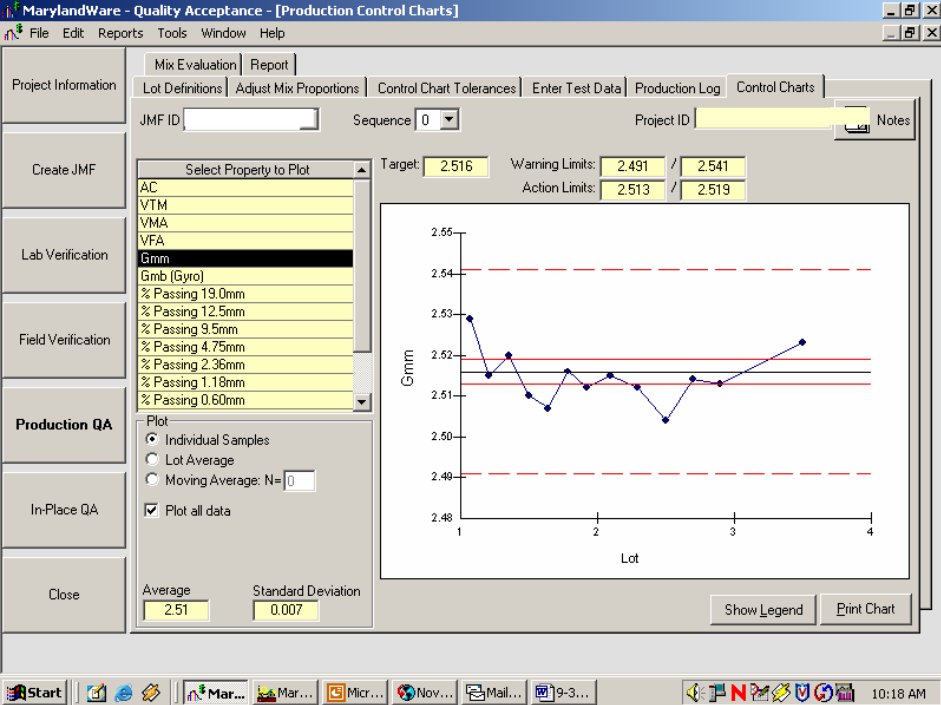
Incentive allowed

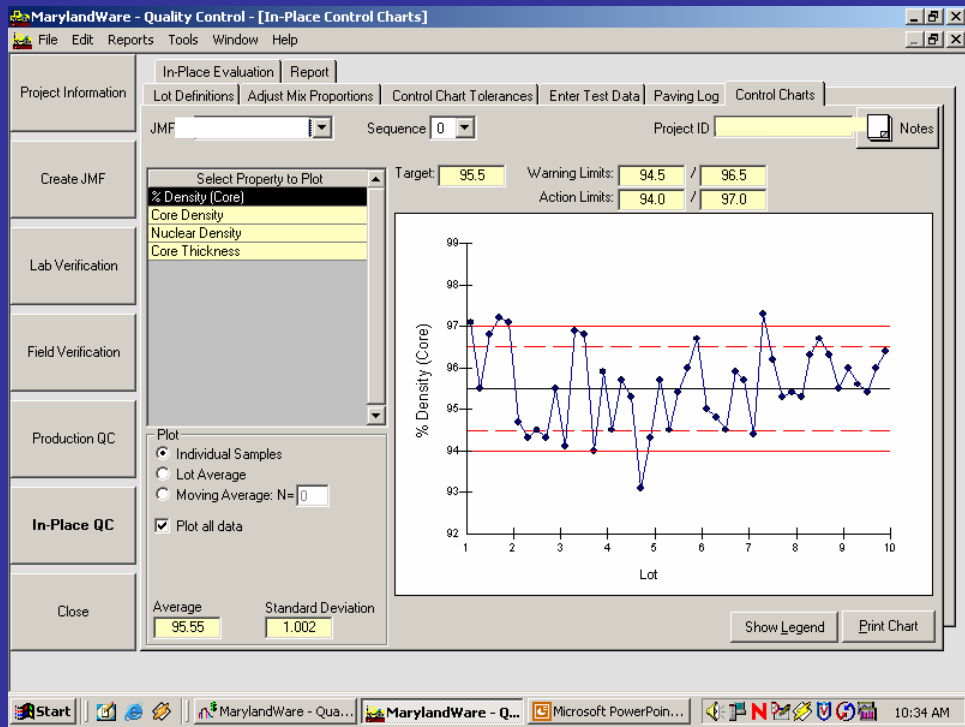
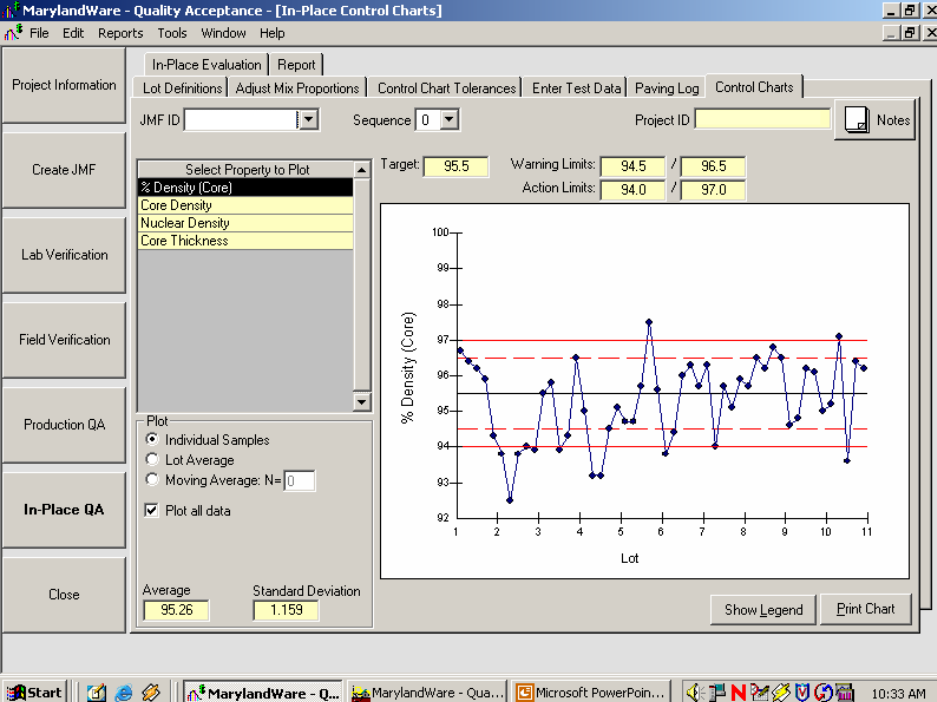
DENSE GRADED MIXES
Percent of Maximum Density

Lot Average	No Sublot Below	Pay Factor %
Within 94.0 – 97.0	94.0	105
Within 94.0 – 97.0	93.0	104
Within 93.0 – 97.0	93.0	103
Within 93.0 – 97.0	92.0	102
Within 92.0 – 97.0	92.0	101
Within 92.0 – 97.0	91.0	100
Within 91.0 – 97.0	90.0	95
Within 90.0 – 97.0	90.0	90
Within 89.0 – 97.0	89.0	85
Less than 89.0	---	75.0 or rejected at Engineer's discretion

GAP - GRADED MIXES
Percent of Maximum Density

Lot Average	No Sublot Below	Pay Factor %
Within 95.0 – 97.0	95.0	105
Within 95.0 – 97.0	94.0	104
Within 94.0 – 97.0	94.0	103
Within 94.0 – 97.0	93.0	100
Within 93.0 – 97.0	92.0	95
Within 92.0 – 97.0	91.0	90
Within 91.0 – 97.0	90.0	85
Less than 91.0	---	75.0 or rejected at Engineer's discretion







Showing Markup

Show

Search

Date: 10/07/2007

Mix Type: Gap Grade

Mix Band: 12.5 mm

Significance Level: 0.01

Property	Data Set	FTest/TTest	US	LSL	N	Min	Mean	Max	Standard Dev.
% Density (Core)	(QC3+QA3)/2	Pass/Pass	0	0	5	95.2	95.6	96	0.35

QA Data

Test	Lot	Sublot	Activity	Test Value
1	9	1	3	94.6
2	9	2	3	94.8
3	9	3	3	96.2
4	9	4	3	96.1
5	9	5	3	95

QC Data

Test	Lot	Sublot	Activity	Test Value
1	9	1	3	96
2	9	2	3	95.6
3	9	3	3	95.4
4	9	4	3	96
5	9	5	3	96.4



* Indicates Outlier Test Value

Density Data Used for Pay Factor Calculations

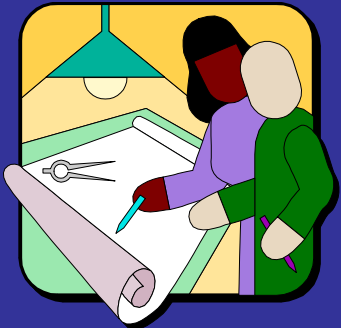
Test	Sub-Lot Mean
1	95.3
2	95.2
3	95.8
4	96
5	95.7

Use (QC3+QA3)/2 Data to Compute Pay Factor

Computed Pay Factor: 105

Tonage: 1504.67

Pavement Design Information



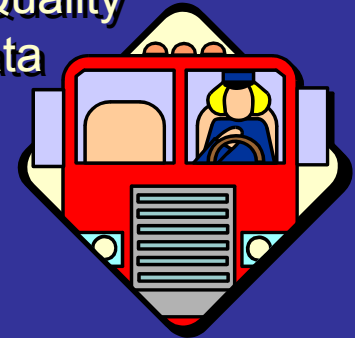
Project Inventory Information



Pavement Performance Data

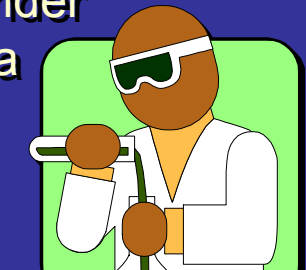


Ride Quality Data

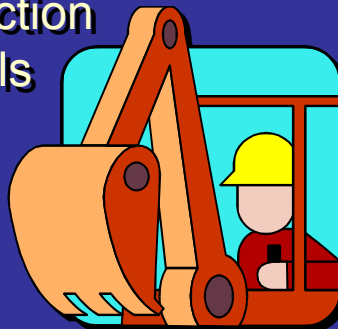


MD Materials Database

Asphalt Binder QA Data



Construction Details



HMA Mix Design and QC/QA Data



Gloria Burke

- LINKS**
- [MDSHA Web Site](#)
 - [FHWA Web Site](#)
 - [NAPA Web Site](#)
 - [NCAT Web Site](#)

WELCOME TO HMAView MARYLAND



Welcome to **HMAView**, a tool for viewing data associated with Maryland's hotmix paving projects. This site contains data only associated with the Maryland State Highway Administration and its affiliated contractors. All data on this site is password protected. Depending on your level of authorization you can view data with regards to any aspect of a particular paving project.

If this is your first time on the site please follow this link to [set up a new user account](#). If you are already a registered user then sign in at left to login and gain access to the rest of the site.

RECENT PROJECTS

Status	Project #	Last Update
Active	AL698B51	9/24/2002 12:18:00 PM
Complete	PG2665177	1/11/2001
Complete	CE7805177	12/6/2000
Complete	WA9205177	11/14/2000
Complete	HO7965176	10/26/2000

[More...](#)

HMA view
Online Tools for Hot Mix Asphalt Pavements

**Homepage -
choose the project
you wish to view.**

PROJECT #AL698B51 Jump to: [dropdown]

OVERVIEW | PAVEMENT DESIGN | MIX DESIGN | CONSTRUCTION | PERFORMANCE

- Existing Road Structure
- Design Parameters

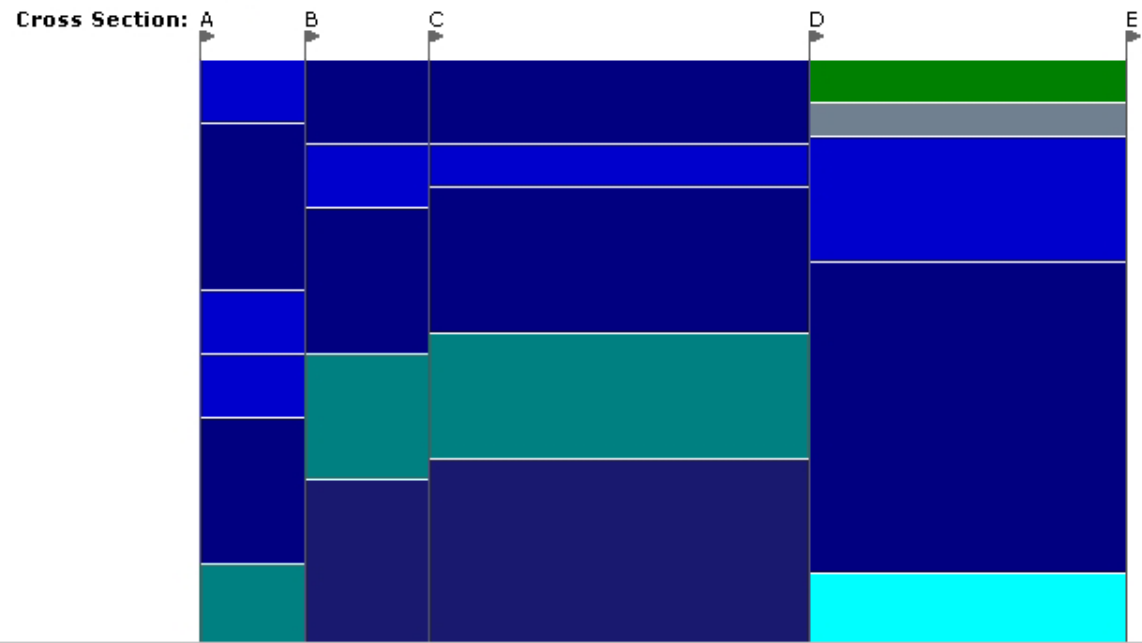
PROJECT SECTION

Section Name: 1 [IS 68 from E of MV Smith Rd to E of Orleans Rd]

From pavement design files

EXISTING PAVEMENT STRUCTURE

Lane: E | W



- Legend**
- BC BASE
 - BC SURF
 - CARBIDE MILLING
 - CEM. STAB. BASE
 - CRUSHED STONE
 - DGSA
 - PMS
 - SC POLISH VAL. 8.5
 - SPAVE - 12.5 mm
 - SPAVE - 19 mm
 - UNKNOWN

PROJECT #AL698B51 Jump to: [dropdown]

OVERVIEW | PAVEMENT DESIGN | MIX DESIGN | CONSTRUCTION | PERFORMANCE

- Operations
 - Operation Info
 - Operations Log
- Production
 - Lot Info
 - Sample Info
- Control Charts
- Data Tables
 - By Lot Type
 - By Category
- Media
 - Media Info
 - Thumbnails
 - Slide Show
- Location Maps

PROJECT IMAGES

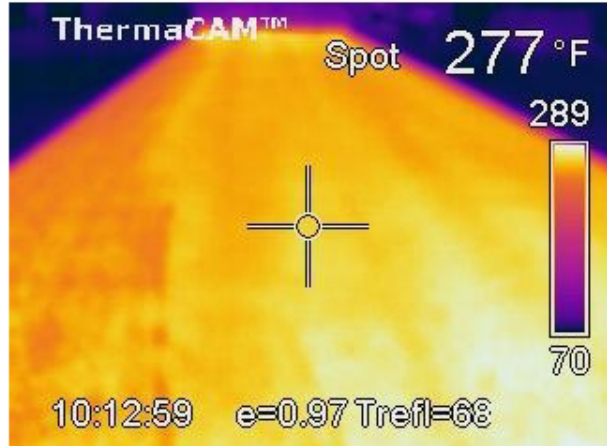
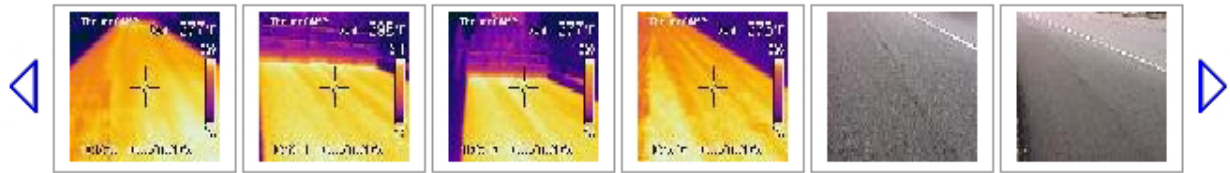


Image from thermal camera

Title: IR Paver - Before Rolling
Description: From the paver before any rolling
Location:

- Operations
 - Operation Info
 - Operations Log
- Production
 - Lot Info
 - Sample Info
- Control Charts
- Data Tables
 - By Lot Type
 - By Category
- Media
 - Media Info
 - Thumbnails
 - Slide Show
- Location Maps

PRODUCTION SAMPLE LOCATIONS

Instructions:
 This is a map of all of the location stamped samples for the project. Mouse over a pushpin to get information for that sample. Use the 'N', 'S', 'E', 'W' buttons to move the map view North, South, East, or West respectively. The '+' and '-' button zoom the map in and out respectively.



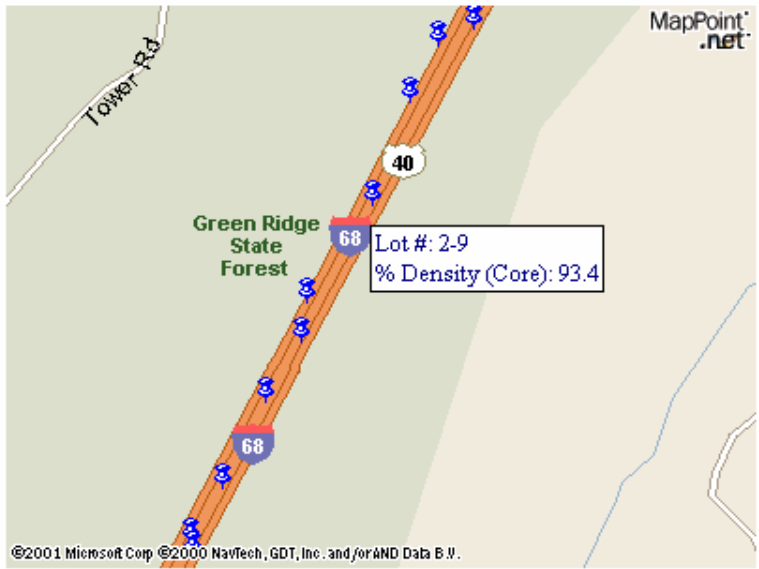
Shows all locations sampled

- Operations
 - Operation Info
 - Operations Log
- Production
 - Lot Info
 - Sample Info
- Control Charts
- Data Tables
 - By Lot Type
 - By Category
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Close-up view of sample location (Click on pushpin for details)

Graphing Options:

Select Fields to Display: (display fields are shown)

Available Fields: VFA, VMA, AV, Gmm, Gmb, Dust/Asphalt, 19 % Passing, 12.5 % Passing, 9.5 % Passing, 4.75 % Passing, 2.36 % Passing, 1.18 % Passing

Display Fields: Asphalt Content

(hold ctrl to select multiple)

Select Data Range to Display: (check to include)

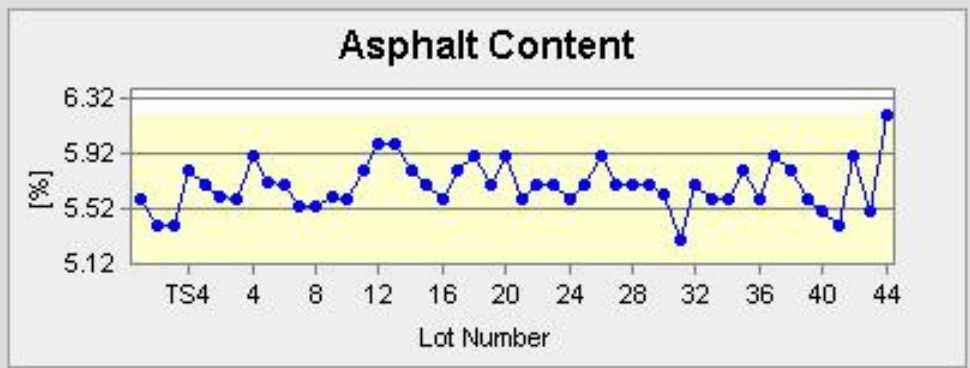
Available Construction Phases: Phase #1

Plot Style: (check for yes)

- Show Design Line?
- Show Average Line?
- Show Specification Bands?
- Show Tolerance Values?
- Combine Plots?

Refresh Plots

Selected Plot(s):



Graphing Options:

Select Fields to Display: (display fields are shown)

Available Fields:	Display Fields:
<ul style="list-style-type: none"> VFA VMA Gmm Gmb Dust/Asphalt 19 % Passing 12.5 % Passing 9.5 % Passing 4.75 % Passing 2.36 % Passing 1.18 % Passing 0.6 % Passing 	<ul style="list-style-type: none"> Asphalt Content AV 0.075 % Passing

(hold ctrl to select multiple)

Select Data Range to Display: (check to include)

Available Construction Phases:

Phase #1

Plot Style: (check for yes)

Show Design Line?

Show Average Line?

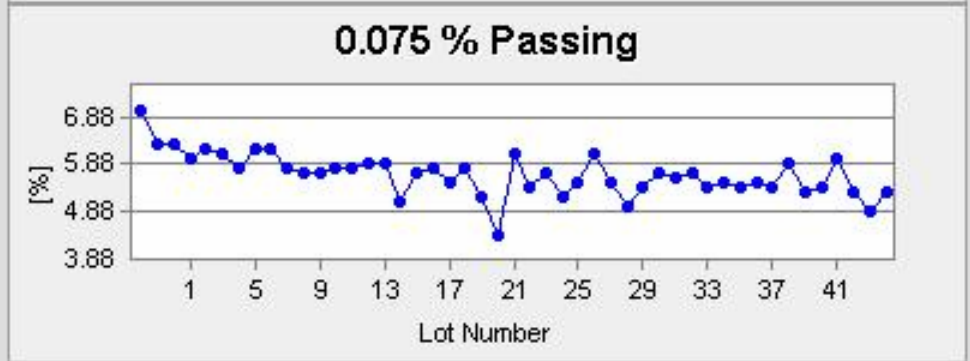
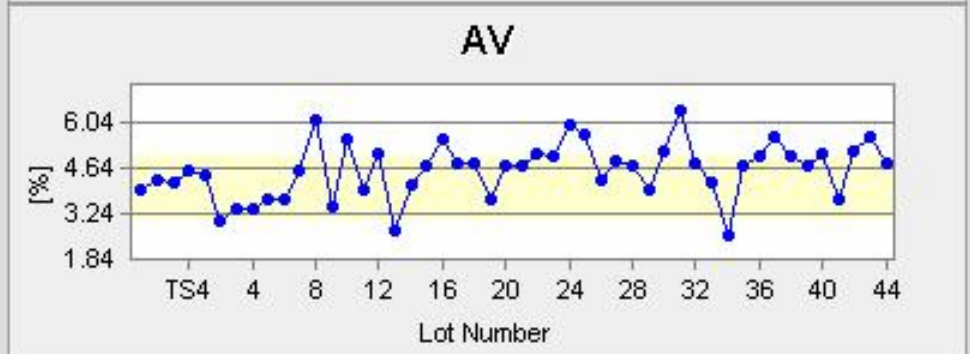
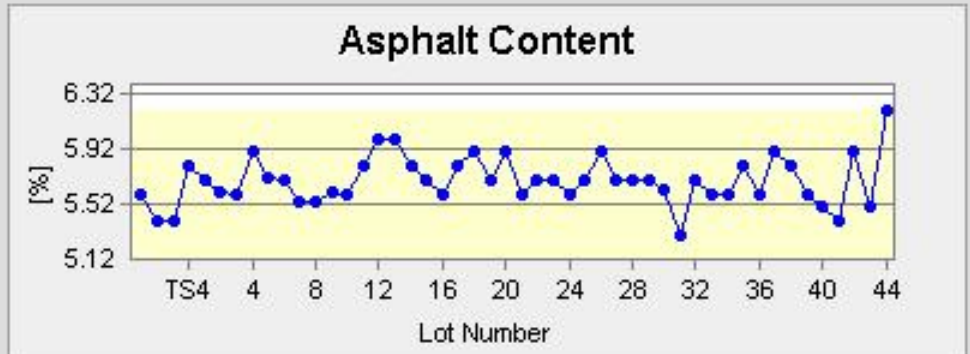
Show Specification Bands?

Show Tolerance Values?

Combine Plots?

Refresh Plots

Selected Plot(s):



Project # 6151

Superpave 12.5 mm
 SR21 Vic. To Ritzville, 1 WA
 Completed on 10/27/2001

PROJECT INFO

MIX DESIGN

CONSTRUCTION

PERFORMANCE

ANALYSIS

• [Field Control Charts](#) • [Diagnostics](#)

Graphing Options:

Select Fields to Display: (display fields are shown)

Available Fields:

VFA
 VMA
 Gmm
 Gmb
 Dust/Asphalt
 19 % Passing
 12.5 % Passing
 9.5 % Passing
 4.75 % Passing
 2.36 % Passing
 1.18 % Passing
 0.6 % Passing

Display Fields:

Asphalt Content
 AV

(hold ctrl to select multiple)

Select Data Range to Display: (sample)

Sample Size: [Lots]Starts At:

Type of Diagnostic: (select one)

Design \pm Tolerance Value Range

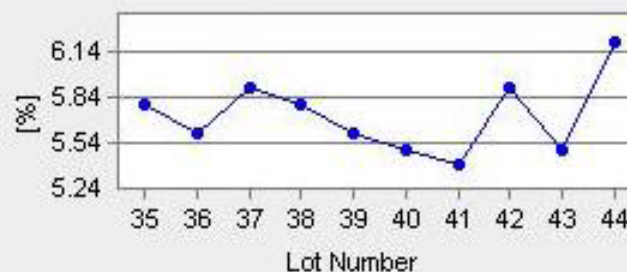
Plot Style: (check for yes)

Show Design Line?

Show Average Line?

Selected Plot(s):

Asphalt Content



Diagnostic Limits

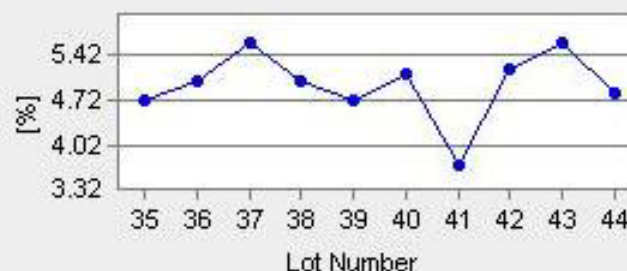
Specify JMF and tolerances

 \pm

Std. Dev falls between

 to **Average:** 5.72**Std Dev.:** 0.232**SATISFACTORY**

AV



Diagnostic Limits

Specify JMF and tolerances

 \pm

Std. Dev falls between

 to **Average:** 4.94**HIGH****Std Dev.:** 0.514**SATISFACTORY**

**DATA ANALYSIS: Future
 addition to OMT's database**

Project # 6151

Superpave 12.5 mm
 SR21 Vic. To Ritzville, 1 WA
 Completed on 10/27/2001

PROJECT INFO

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 19 % Passing
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 2.36 % Passing
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 0.6 % Passing

Display Fields:

Asphalt Content
 AV

(hold ctrl to select multiple)

Select Data Range to Display: (sample)

Sample Size: [Lots]Starts At:

Type of Diagnostic: (select one)

Design \pm Tolerance Value Range

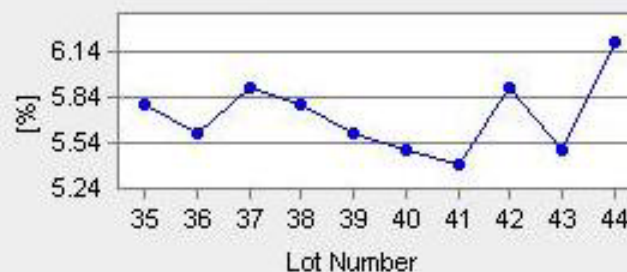
Plot Style: (check for yes)

Show Design Line?

Show Average Line?

Selected Plot(s):

Asphalt Content



Diagnostic Limits

Specify JMF and tolerances

 \pm

Std. Dev falls between

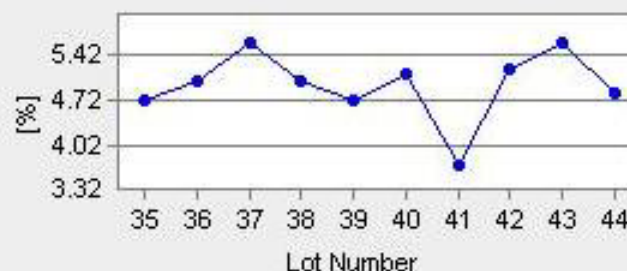
 to

Average: 5.72

Std Dev.: 0.232

SATISFACTORY

AV



Diagnostic Limits

Specify JMF and tolerances

 \pm

Std. Dev falls between

 to

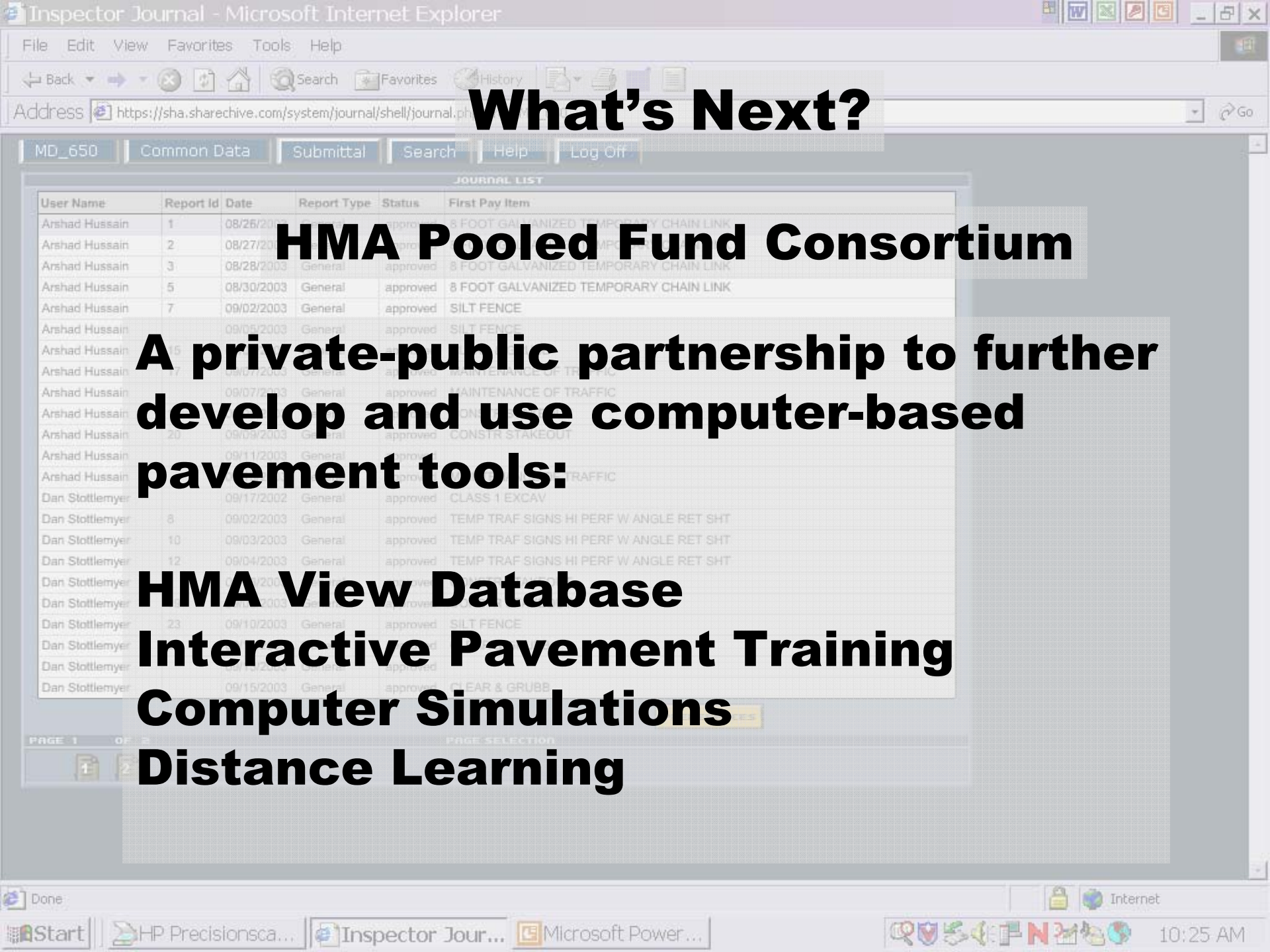
Average: 4.94

HIGH

Std Dev.: 0.514

SATISFACTORY

**DATA ANALYSIS: Future
 addition to OMT's database**



What's Next?

HMA Pooled Fund Consortium

A private-public partnership to further develop and use computer-based pavement tools:

HMA View Database

Interactive Pavement Training

Computer Simulations

Distance Learning

MD_650

Common Data

Submittal

Search

Help

Log Off

JOURNAL LIST

User Name	Report Id	Date	Report Type	Status	First Pay Item
Arshad Hussain	1	08/26/2003	General	approved	8 FOOT GALVANIZED TEMPORARY CHAIN LINK
Arshad Hussain	2	08/27/2003	General	approved	8 FOOT GALVANIZED TEMPORARY CHAIN LINK
Arshad Hussain	3	08/28/2003	General	approved	8 FOOT GALVANIZED TEMPORARY CHAIN LINK
Arshad Hussain	5	08/30/2003	General	approved	8 FOOT GALVANIZED TEMPORARY CHAIN LINK
Arshad Hussain	7	09/02/2003	General	approved	SILT FENCE
Arshad Hussain	9	09/05/2003	General	approved	SILT FENCE
Arshad Hussain	15	09/07/2003	General	approved	MAINTENANCE OF TRAFFIC
Arshad Hussain	17	09/07/2003	General	approved	MAINTENANCE OF TRAFFIC
Arshad Hussain	19	09/07/2003	General	approved	MAINTENANCE OF TRAFFIC
Arshad Hussain	20	09/09/2003	General	approved	CONSTR STAKEOUT
Arshad Hussain	21	09/11/2003	General	approved	CONSTR STAKEOUT
Arshad Hussain	22	09/11/2003	General	approved	MAINTENANCE OF TRAFFIC
Dan Stottliemyer	4	09/17/2002	General	approved	CLASS 1 EXCAV
Dan Stottliemyer	8	09/02/2003	General	approved	TEMP TRAF SIGNS HI PERF W ANGLE RET SHT
Dan Stottliemyer	10	09/03/2003	General	approved	TEMP TRAF SIGNS HI PERF W ANGLE RET SHT
Dan Stottliemyer	12	09/04/2003	General	approved	TEMP TRAF SIGNS HI PERF W ANGLE RET SHT
Dan Stottliemyer	13	09/04/2003	General	approved	TEMP TRAF SIGNS HI PERF W ANGLE RET SHT
Dan Stottliemyer	14	09/04/2003	General	approved	TEMP TRAF SIGNS HI PERF W ANGLE RET SHT
Dan Stottliemyer	23	09/10/2003	General	approved	SILT FENCE
Dan Stottliemyer	24	09/10/2003	General	approved	SILT FENCE
Dan Stottliemyer	25	09/10/2003	General	approved	SILT FENCE
Dan Stottliemyer	26	09/10/2003	General	approved	SILT FENCE
Dan Stottliemyer	27	09/15/2003	General	approved	CLEAR & GRUBB

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Interactive Pavement Guide

This document (or "Guide" for short) is a multimedia CD-ROM based document whose primary purpose is to provide a general pavement overview covering all aspects from materials to design to construction to maintenance. It functions both as a learning tool and a ready reference; users can learn about pavements as well as use it as a reference to look up typical values, methods, practices and resources.

Preview the Interactive Pavement Guide at: http://hotmix.ce.washington.edu/wsdot_web

The version on the web for preview is a WSDOT-specific version. A general CD-ROM based version for member use is planned for late 2004. This version will not have state-specific information in it, but will have the PTC logo and be oriented towards member agencies. A brief summary of the proposed Interactive Pavement Guide work plan is as follows:

- **Late 2004: Produce CD-ROM version for PTC members.** Information will not be state-specific. We anticipate producing several master CD-ROMs and then distributing them to members. Member agencies can then choose to reproduce this CD-ROM.
- **2005: Convert the CD-ROM version to an entirely web-based version.** This will effectively divorce content (the pictures, videos, animations and text) from delivery (the "look and feel" of the site - like the title bar and green borders in the picture below). This content will then be divided up into small discreet "chunks" (e.g., a page on stone matrix asphalt) that the user can select to view. Viewing is customized to user specifications. For instance, if Maryland is viewing, the border and title bar and SHA logo would appear around the information. Users can select one bit of content to view or can set up an entire list of content to be viewed. In this way, one could enter the site and set up a list of content to be viewed by field





X Pactor



X Pactor is a Virtual Hotmix Compactor Simulation that is designed to allow users to experience hot mix rolling through their computer. It also provides a realistic simulation of hot mix cooling physics through the use of the MultiCool software. The ultimate goal is to bring cost-effective interactive 3D training environments to contractors, state and federal agencies. The X Pactor is the first product toward that goal.





PMSView

PMSView is an Internet application that allows pavement related data to be accessed and analyzed from any geographic location through a straightforward navigation and display scheme on a web browser. PMSView extends beyond the typical pavement management boundary by providing the ability to incorporate pavement design, construction, and usage data into the interface. PMSView can be populated through a wide variety of electronic data sources, including spreadsheets, existing databases and mainframes, map-based spatial data, among others.

