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***The Right Mix***  
***at***  
***The Right Place***



***Superpave  
for  
Local  
Government***

***Superpave  
for  
Low Volume  
Roadways***

*Should be...*

***HMA for  
Low Traffic Areas  
Using***

***Superpave Design System***

# ***What design system are we replacing?***

- Marshall design
- “What we have always used”
- Driveway mix
- Fine bin from batch plant
- What the plant is producing

## ***The problem is...***

- Lack of understanding the Superpave system





**From Bike path...**











**Cul-de-sac**

# Truck Parking





**Rutted  
Intersection**



**...and to the  
interstate**

**There is a  
Superpave Mix**



# How Superpave is Different...

## Traditional Maryland Method

- SC, SF, BC, BF, Gap Graded
- 3 surface options, 2 base options

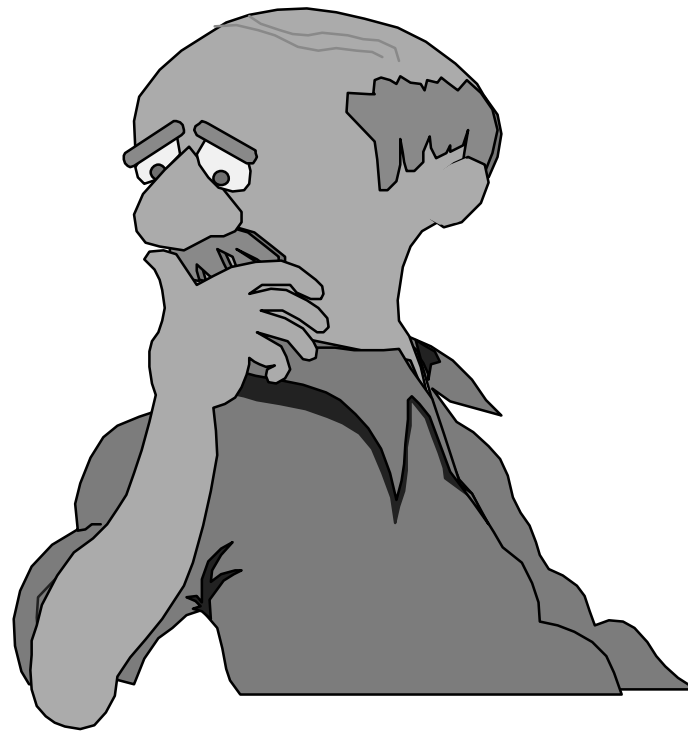
## Superpave Method - 71 options

- 4.75, 9.5, 12.5, 19.0, 25.0, 37.5
- PG 64-22, PG 70-22, PG 76-22, PG 70-22 P
- ESAL Category 1, 2, 3, 4 or 5
- 47 surface options, 24 base options

[times 2]



***What happens when we make the wrong choice?***



# ***Possible Failure!***



*What effect does the wrong compaction level have?*

**Too High**

- Reduce binder content
- Compaction Difficult

**Too Low**

- Possible Rutting

*What effect does the wrong  
Binder Grade have?*

**Too Stiff**

- Handling is difficult
- Compaction is difficult

**Too Soft**

- Possible Rutting

*What effect does the wrong  
Mix Size have?*

Too Large

- Compaction is difficult
- Permeability problems

Need:

- Minimum - (3) times  
Nominal Maximum Size

# ***Selection Process***

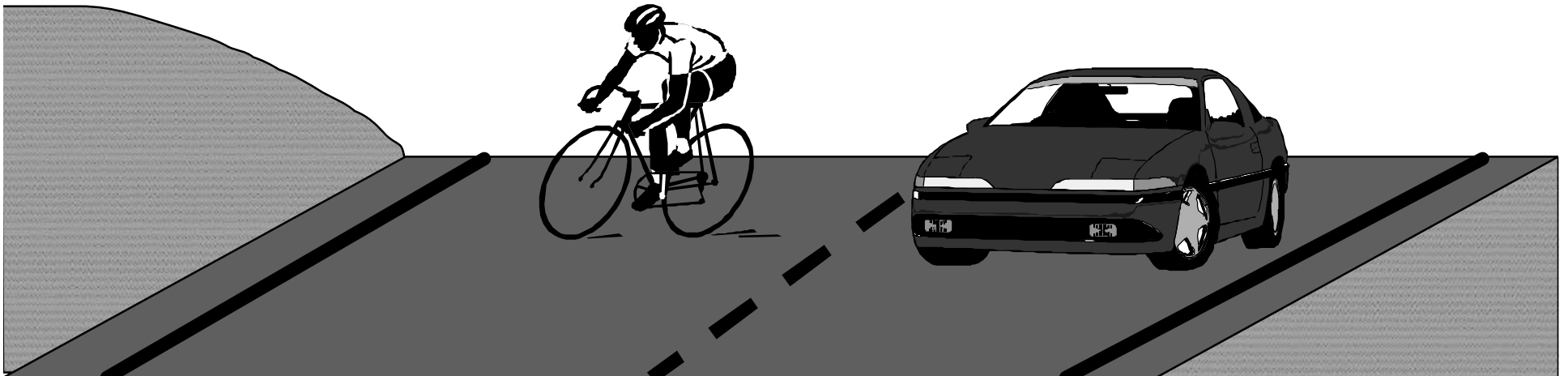
- 1 - Select Compaction Level
- 2 - Determine Pavement Thickness
- 3 - Select Mix
- 4 - Select Appropriate Binder

*To select mix...*

***You need to know!***

- Compaction Level
- Mix Size
- Binder Grade

***Compaction level is a function  
of traffic and depth of layer***





# SGC Compaction Effort

ESAL's	$N_{ini}$	$N_{des}$	$N_{max}$	App
< 0.3	6	50	75	Light
0.3 to < 3	7	75	115	Medium
3 to < 10	8	100*	160	High
10 to < 30	8	100	160	High
$\geq 30$	9	125	205	Heavy

Base mix (< 100 mm) option to drop one level, unless the mix will be exposed to traffic during construction.

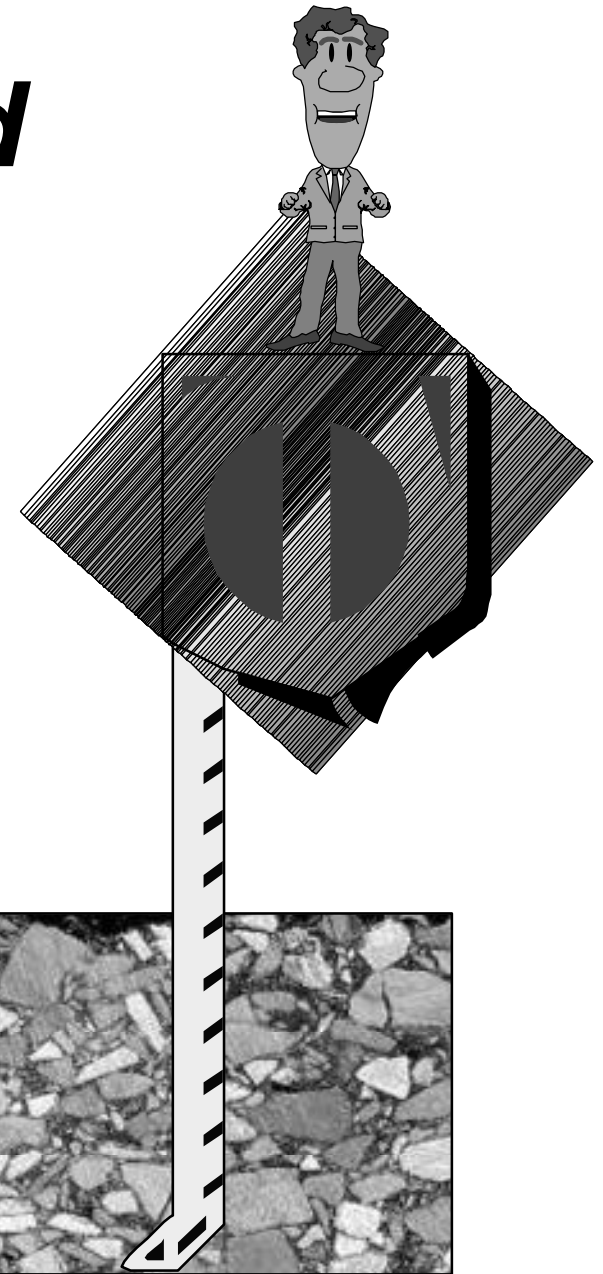
Design ESAL's Million	N initial	N design	N max
<b>&lt; 0.3</b>	<b>6</b>	<b>50</b>	<b>75</b>

Applications would include roadways with very light traffic volumes such as local roads, county roads, and city streets where truck traffic is prohibited or at a very minimal level. Traffic on these roadways would be considered local in nature; not regional, intrastate, or interstate. Special purpose roadways serving recreational sites or areas would also be applicable to this level.

Design ESAL's Million	N initial	N design	N max
<b>0.3 to &lt; 3</b>	<b>7</b>	<b>75</b>	<b>115</b>

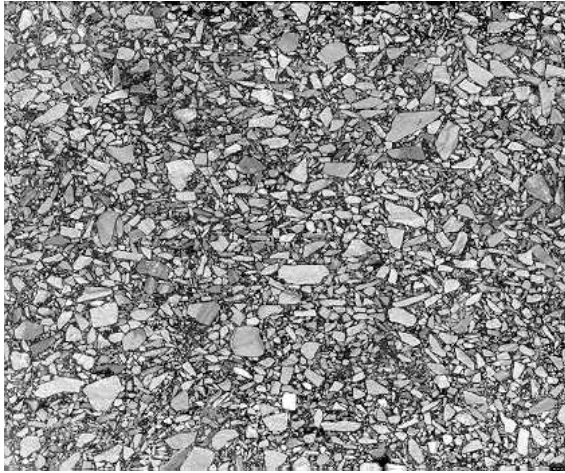
Applications would include many collector roads or access streets. Medium trafficked city streets and the majority of county roadways would be applicable to this level.

***Mix size is determined  
by thickness of layer***

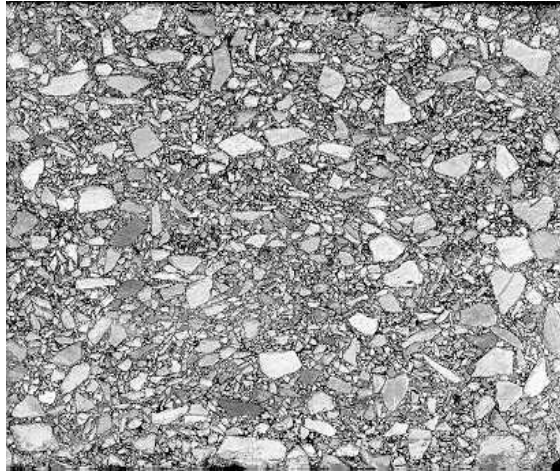


# Superpave Dense-Graded

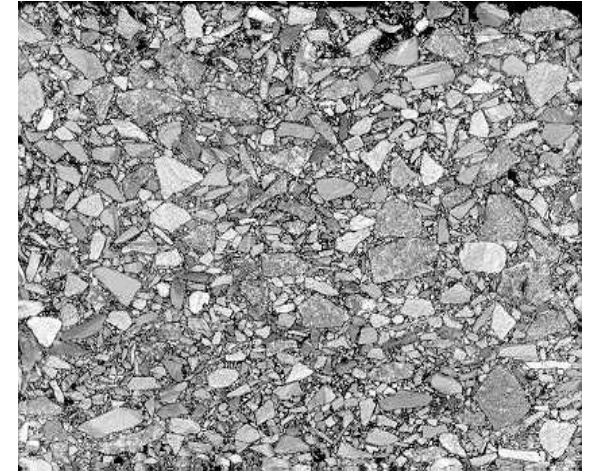
4.75 mm



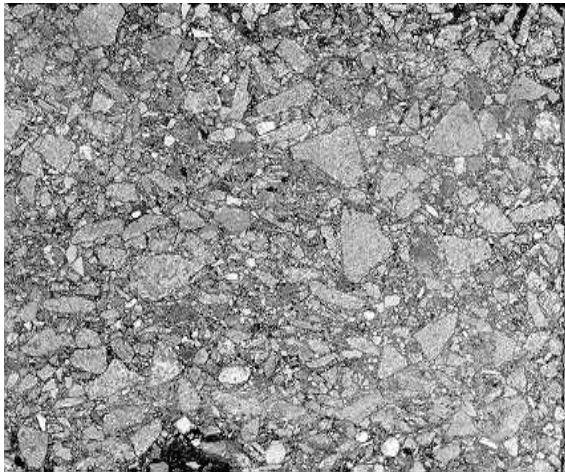
9.5 mm



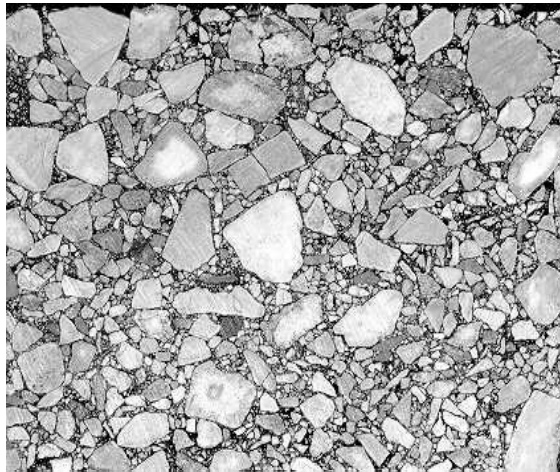
12.5 mm



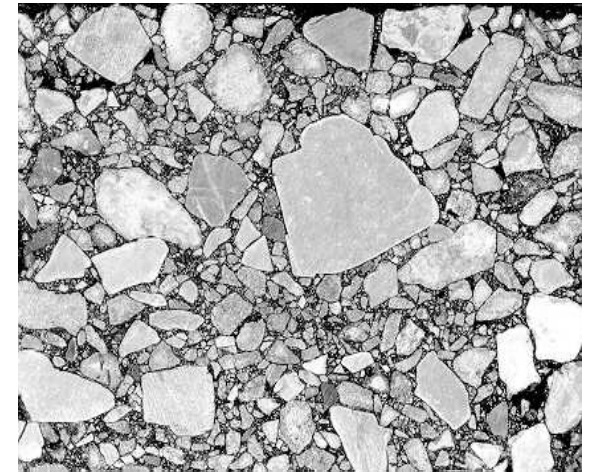
19.0 mm

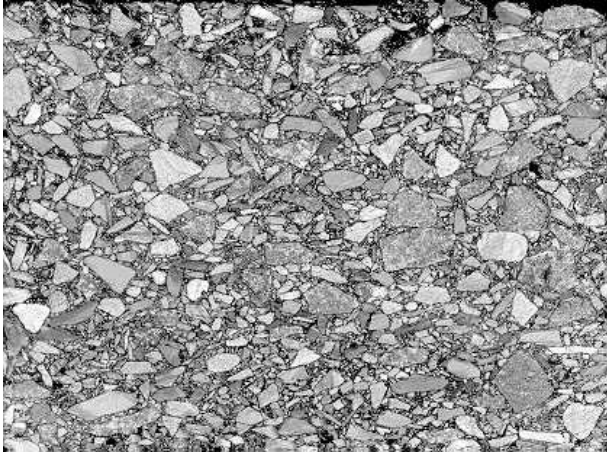


25.0 mm



37.5 mm





12.5 Dense

## Dense Graded / Gap Graded

12.5 SMA



# *Mix Selection*

Mix	Application
4.75	Surface Treatment, Rut Fill
9.5	Surface Course, Leveling
12.5	Surface Course, Thin Patch
19.0	Surface Course, Base Course, Patching
25.0	Base Course, Deep Patching
37.5	Base Course

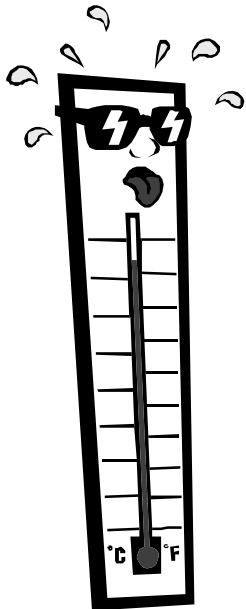
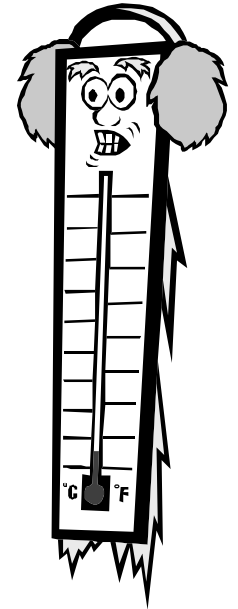
# ***Surface Course Selection***

Mixes - 4.75, 9.5, 12.5 and 19.0 mm

	Lift Thickness (inches)		
Mix	Min	Pref	Max
4.75	0.5	0.75	0.75
9.5	1.0	1.5	2.0
12.5	1.5	2.0	2.5
19.0	2.0	2.5	3.5



# ***Binder Grade is a function of environment and traffic level***



# ***Select Binder***

- 1) Identify if Rutting Exists
- 2) Identify Traffic Loading Rate
  - Standing - avg. < 12 mph
  - Slow - avg. 12 to 43 mph
  - Standard - avg. > 43 mph
- 3) Define Quantity of HMA
  - < 1,000 tons
  - > 1,000 tons

N 50



# Choices

4.75 mm

PG 64-22

9.5 mm

PG 70-22

12.5 mm

N 75



# Choices

9.5 mm

PG 64-22

12.5 mm

PG 70-22

19.0 mm

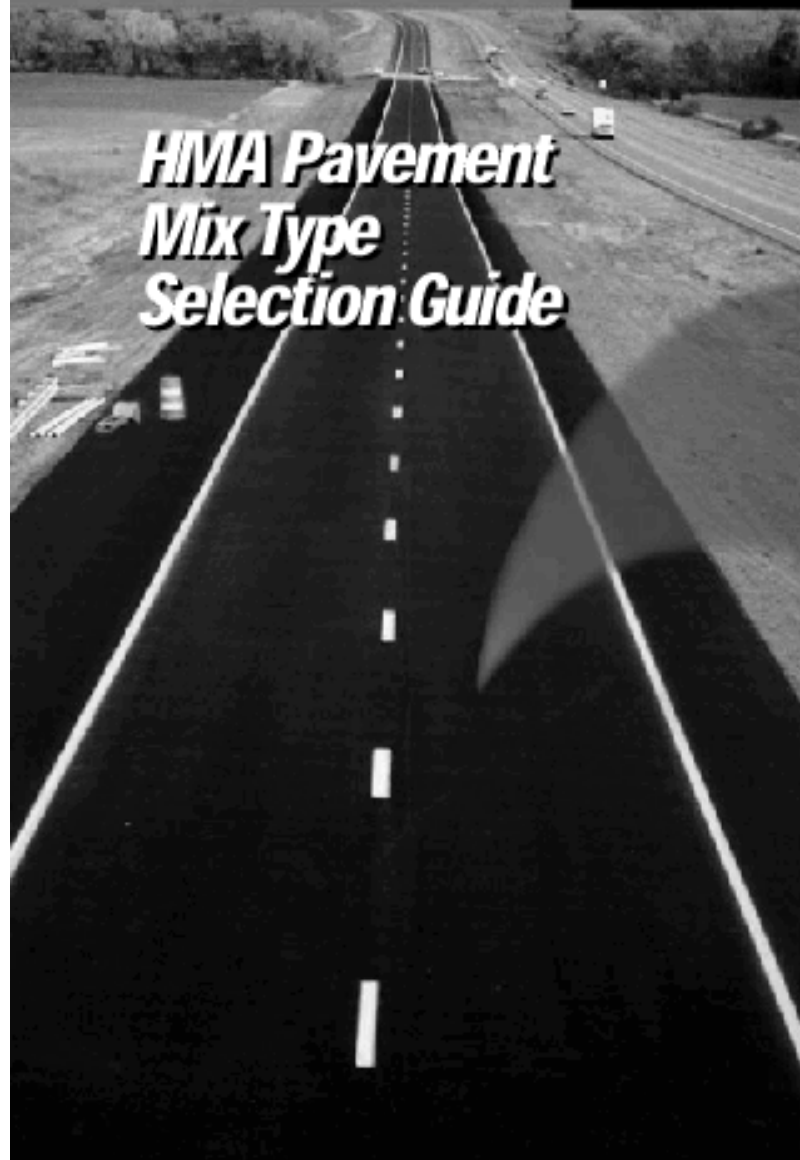
*Information Series 128*



U.S. Department  
of Transportation  
Federal Highway  
Administration



NATIONAL ASPHALT  
PAVEMENT ASSOCIATION



# *HMA Pavement Mix Type Selection Guide*



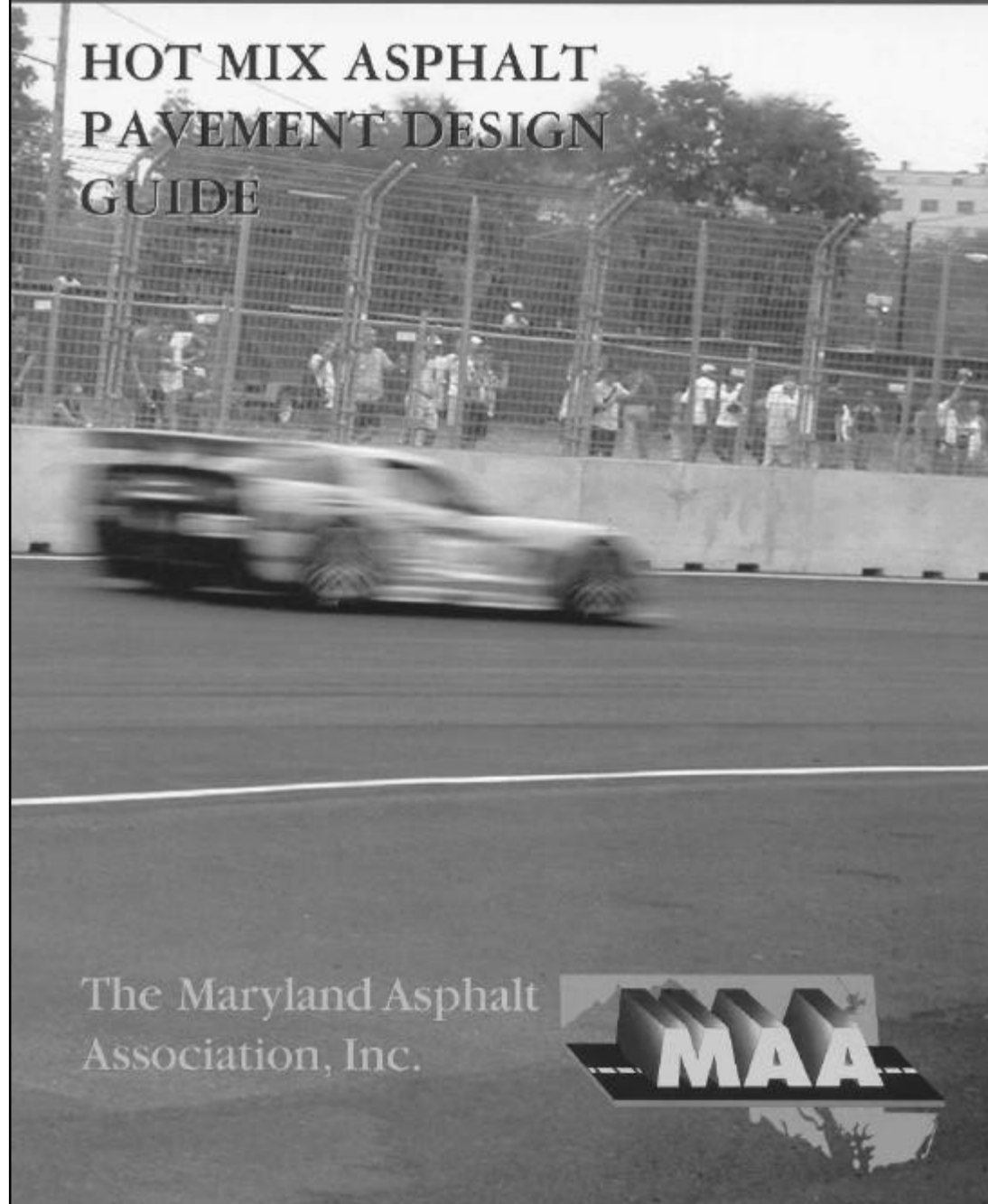


# Material Selection Guidelines



Eighth Edition 2003

# HOT MIX ASPHALT PAVEMENT DESIGN GUIDE



The Maryland Asphalt  
Association, Inc.



Low Volume Design Level					
	Aggregate Size	Binder Type	Compaction Level	Min. Compacted Thickness	Recommended Compacted Thickness
Surface	9.5mm	PG64-22	50 gyrations	1"	1.5"
Base	12.5mm	PG64-22	50 gyrations	1.5"	2"
	19mm	PG64-22	50 gyrations	2"	3"
Minor Arterial Design Level					
	Aggregate Size	Binder Type	Compaction Level		
Surface	9.5mm	PG64-22	75 gyrations	1"	1.5"
	12.5mm	PG64-22	75 gyrations	1.5"	2"
Base	12.5mm	PG64-22	75 gyrations	1.5"	2"
	19mm	PG64-22	75 gyrations	2"	3"
High Volume Design Level					
	Aggregate Size	Binder Type	Compaction Level		
Surface	12.5mm	PG64-22	100 gyrations	1.5"	2"
	12.5mm	PG70-22	100 gyrations	1.5"	2"
	9.5mm SMA	PG76-22	100 gyrations	1"	1.5"
	12.5mm SMA	PG76-22	100 gyrations	1.5"	2"
Base	12.5mm	PG64-22	75 gyrations	1.5"	2"
	19mm	PG64-22	75 gyrations	2"	3"
	25mm	PG64-22	75 gyrations	3"	4"



Traffic Designation	Equivalent Single Axle Loadings	Typical Roadway Applications
<b>Low</b>	< 300,000 ESAL's	<ul style="list-style-type: none"> <li>• Roadways with very light traffic volumes such as local roads, county roads, and city streets where truck traffic is prohibited or at minimum.</li> <li>• Traffic considered local in nature, not regional, or interstate.</li> <li>• Special purpose roadways serving recreational sites or areas.</li> </ul>
<b>Moderate</b>	300,000 to < 10,000,000 ESAL's	<ul style="list-style-type: none"> <li>• Most local roadways.</li> <li>• Two-lane, multilane, divided, and partially or completely controlled access roadways.</li> <li>• Medium to highly trafficked city streets, state routes, U.S. highways, and some rural interstates.</li> </ul>
<b>High</b>	> 10,000,000 ESAL's	<ul style="list-style-type: none"> <li>• Two-lane, multilane, divided, and partially or completely controlled access roadways.</li> <li>• Medium to highly trafficked city streets, state routes, U.S. highways, and some rural interstates.</li> <li>• Truck-weighing stations or truck-climbing lanes on two-lane roadways.</li> </ul>

✓

## CONSTRUCTION DETAILS

Subgrade  
Class

Compacted  
Thickness

Design  
Level

Superpave  
Mix

Good  
Medium

**Surface Course**

3"

Low Volume  
50 Gyration

9.5 MM

Poor

**Surface Course**

4"

Low Volume  
50 Gyration

12.5 MM

9.5 mm & 12.5mm Surface should be placed by a paver.  
Hand work should be restricted where feasible.

## CONSTRUCTION DETAILS

Subgrade Class		Compacted Thickness	Design Level	Superpave Mix
Good Medium	<b>Surface Course</b>	1 ½"	Low Volume	9.5 MM
	<b>Base Course</b>	2 ½"	Low Volume	12.5 MM
	Subgrade CBR or Greater than 5			
Poor	<b>Surface Course</b>	1 ½"	Low Volume	9.5 MM
	<b>Base Course</b>	3 ½"	Low Volume	19 MM
	Subgrade CBR 5			

*What effect does Cold Weather Paving have?*



# QUESTIONS...

