Design Criteria 2360 (Gyratory Mixes including SMA)

For Combined 2360/2350 (Gyratory/Marshall) Specification Rev. 01/31/06

20 yr. ESAL's [6] **Design Lane X 10^6**		**Non Wear (>100 mm (4") from surface)**	**Wear (≤ 100mm (4") from surface)**
All	Specify [2]	SPNWB_ 30_ [5]	SPWEB _ 40_ [5] [7] SPWEB _ 30_ [7] [8] SMWEE640H [9]
	Option to Specify	Agg. Size A, C	Agg. Size A

Where: SP= conventional gyratory; SM= stone matrix asphalt gyratory; WE=wear; NW=non-wear

General Notes:

1. Minimum Lift thickness:
   Agg. **Size A** (12.5 mm **(1/2") Maximum**, 9.5 mm Nominal) – 40 mm (1 ½") minimum
   Agg. **Size B** (19.0 mm **(3/4") Maximum**, 12.5 mm Nominal) – 40 mm (1 ½") minimum
   Agg. **Size C** (25.0 mm **(1") Maximum**, 19.0 mm Nominal) – 60 mm (2 ½") minimum
   All wear courses shall be at least 40 mm (1 ½") thick minimum.

2. Aggregate sizes specified and options listed should be used unless lift thickness precludes a larger aggregate size. Except for SMA, the Contractor has the option to supply recycled mixture, unless otherwise designated in the Special Provisions. With the approval of the Engineer, the Contactor may supply a gradation with a smaller max. aggregate size than that specified, i.e. size A in lieu of size B.

3. Specify size A when course/lift is less than 40 mm (1 ½").

4. Typical Sections should delineate individual lifts/courses.

5. For mainline paving select the asphalt binder grade from the most current PG Guidelines.
   For shoulders where traffic is allowed, generally, use the same binder grade as the mainline.
   For shoulders where traffic is prohibited select either PG 52 - 34 or PG 58 - 28 by matching the mainline low PG number. **I.E.. Mainline PG 64 - 28=> Shoulder PG 58 - 28**

6. For slow traffic consider selecting a higher mix type and/or higher high temperature binder grade. For shoulders where traffic is allowed consider selecting a higher mixture type.

7. For new construction, including cold inplace recycle (CIR), reclaiming, and reconstruction, specify PG XX-34 in the top 100 mm (4") of the pavement structure.

8. Designation for wear mixture placed on shoulders - Note: 3.0 % air voids. The term Wear applies to all wearing courses (mainline and shoulder).

9. Specify minimum PG 70-28 (H) for SMA mixtures. Use SMA on final wearing surface only (1.5"-2" lift).

Mixture Designation Example: **SPWEB440E**

Type	Lift	Max Agg. Size	Traffic Level (ESAL's X 10^6)	Air Voids	Binder Grade	
SP	***WE***	A (SP 9.5)	2 (<1.0)	30 (3.0)	Standard Grade	Specialty Grade
SM	NW	**B (SP 12.5)**	3 (1 - 3)	***40*** (4.0)	B = PG 58 - 28	A = PG 52 -34
		C (SP 19.0)	***4*** (3 - 10)		C = PG 58 - 34	D = PG 58 - 40
		E (SMA)	5 (10 - 30)		***E = PG 64 - 28***	G = PG 64 - 40
			6 (SMA)		F = PG 64 - 34	H = PG 70 - 28
					L = PG 64 - 22	I = PG 70 - 34

The format for 2360 Pay Items will be as follows:

2360.501 Type SP __._ _____Course Mixture (_,_)……metric ton (English ton)

An example of the pay item for the above mixture designation is:

2360.501 Type SP12.5 Wearing Course Mixture (4,E)……metric ton (English ton)

Note: Numbers in parenthesis denote the traffic level and the PG grade.

Design Criteria 2360 (Marshall Mixture Design)

For Combined 2360/2350 (Gyratory/Marshall) Specification Rev 01/31/06

20 yr. ESAL's [6] [7] Design Lane X 10^6		Non Wear > 75 mm (3") From Surface	Wear ≤ 75 mm (3") From Surface
< 1 and Shoulders	Specify [2]	LVNW35030_ [5]	LVWE35030_ [5] [8]
(AADT ≤ 2300)	Option to Specify	Agg. Size 2, 4	Agg. Size 4
1 - 3	Specify [2]	LVNW35030_ [5]	MVWE35035_ [5] [8]
(2300 <AADT < 6000)	Option to Specify	Agg. Size 2, 4	Agg. Size 4

Where: LV = low volume; MV = medium volume; WE = wear; NW = non-wear

General Notes:

1.All wear courses shall be at least 40 mm (1 ½") thick minimum.

2. Aggregate sizes specified and options listed should be used unless lift thickness precludes a larger aggregate size. Minimum lift thickness is twice the maximum particle size, except as noted in 1 above. Contractor has the option to supply recycled mixture unless otherwise designated in the Special Provisions. With the approval of the Engineer, the Contactor may supply a gradation with a smaller max. aggregate size than that specified, i.e. size 4 in lieu of size 3.

3. Specify size 4 or 5 when course/lift is less than 40 mm (1 ½"); Specify size 5 for thin lift leveling identified as 19 mm (3/4") thickness or less.

4. The term Wear applies to all wearing courses (mainline and shoulder). Typical Sections should delineate individual lifts/courses.

5. For mainline paving select the asphalt binder grade from the most current PG Guidelines.
For shoulders where traffic is allowed, generally, use the same binder grade as the mainline.
For shoulders where traffic is prohibited select either PG 52 - 34 or PG 58 - 28 by matching the mainline low PG number. **I.E. Mainline PG 64 - 28=> Shoulder PG 58 - 28**

6. For slow traffic consider selecting a higher mix type and/or higher high temperature binder grade. For shoulders where traffic is allowed consider selecting a higher mixture type.

7. Use gyratory mixture design criteria when ESAL's > 3 million (AADT > 6,000).

8. For new construction, including cold inplace recycle (CIR), reclaiming, and reconstruction, specify PG XX-34 in the top 75 mm (3") of the pavement structure

Mixture Designation Example: **MVWE35035B**

Traffic Level	Lift	Max Agg. Size	No. Blows	Air Voids	Binder Grade	
LV	***WE***	2 (1")	***50***	30 (3.0)	Standard Grade	Specialty Grade
MV	NW	***3 (3/4")***		***35 (3.5)***	***B = PG 58 - 28***	A = PG 52 -34
		4 (1/2")			C = PG 58 – 34	D = PG 58 - 40
		5 (3/8")			E = PG 64 - 28	G = PG 64 - 40
					F = PG 64 - 34	H = PG 70 - 28
					L = PG 64 - 22	I = PG 70 - 34

The format for 2350 Pay Items will be as follows:

2350.501 Type __ _ Wearing Course Mixture ___ metric ton (English ton)

An example of the pay item for the above mixture designation is:

2350.501 Type **MV 3** Wearing Course Mixture **B** metric ton (English ton)

Note: PG grade **is** included in the pay item.