

New Flexible Pavement Design Example 1993 AASHTO Pavement Design

Project Name and Location:

Route 123, MP 7.3 – 11.0
Hometown, NJ

Description:

This project will consist of the construction of a new flexible pavement to extend Route 123 to intersect with Route I-80 in North Jersey.

General Information:

Reference:

Initial Serviceability, p_o	4.2	II-10 & NJ serviceability loss
Terminal Serviceability, p_t	2.5	II-10 & NJ serviceability loss
Reliability Level, R	90%	I-53 to I-64 or II-9 & NJ Reliability
Overall Standard Deviation, S	0.45	I-62 or II-9 & NJ Standard Deviation
Performance Period	20 years	II-5 to II-8 & NJ Performance Period

Traffic Data and Analysis:

Initial AADT	30,127	Based on data supplied by the NJDOT Project Manager
Final AADT	47,179	
CAR%	84	
CAR _f	0.0006	
LT%	8	
LT _f	0.163	
HT%	8	
HT _f	1.655	
Year	20	
Days	365	
DD%	58	II-7 & NJ Directional Distribution
DL%	90	II-7, 8 & NJ Lane Distribution

Accumulated ESALs Over 20 years in all lanes in each directions:

II-7 to II-9 & D-3 to D-11 & II-7 & II-8 & NJ Directional and Lane Distribution Factors

$$w_{18} = \left(\frac{AADT_i + AADT_f}{2} \right) * (Car\% * Car_f + LT\% * LT_f + HT\% * HT_f) * Years * 365 \text{ day/year}$$

$$w_{18} = \left(\frac{30,127 + 47,179}{2} \right) * (84\% * 0.0006 + 8\% * 0.163 + 8\% * 1.655) * 20 * 365 \text{ day/year}$$

$$= 41,180,566$$

Design ESALs (in Design Lane) Initial Performance Period:
 Design ESALs = Accumulated ESALs * D_D * D_L
 41,180,566 * 0.580 * 0.90 = 21,496,255

Effective Roadbed Soil Resilient Modulus Data:

Month	Monthly MR
1 January	20000
2 February	20000
3 March	2800
4 April	4500
5 May	6500
6 June	7200
7 July	7600
8 August	8000
9 September	8000
10 October	7500
11 November	1000
12 December	18000
Effective MR	6000

II-12 to II-16 & I-13 to I-15 &
 III-91-97 &
 NJ Regional Season Lengths

Laboratory MR values for estimated conditions and stress levels.

Design Structural Number Calculation, $SN_f = 6.30$

Figure 3.1 II-32

Layered Thickness Design

(Thickness precision: Round up to nearest 1/2 inch)

Layer	Material	Layer Coefficient	Drainage Coefficient	Thickness	Layer Structural Number, SN
1	HMA 12.5H76 Surface Course	0.44	1	2	0.88
2	HMA 19H76 Intermediate Course	0.44	1	2.5	1.10
3	HMA 25H64 Base Course	0.44	1	6.5	2.86
4	DGABC	0.14	1	8	1.12
5	Subbase, Designation I-3	0.08	1	6	0.48
				Total SN	6.46

SN (6.46) > $SN_f = 6.30$ Acceptable Design