

StreetPave

Pavement Design & Analysis Software

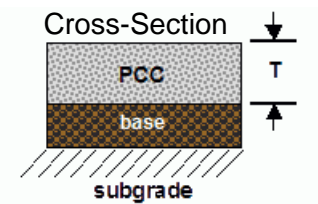
American Concrete Pavement Association

Report for Concrete Pavement Design

Project Name: Paving 94
Route: 94
Location: Chicago, IL
Project Description: New Concrete Construction
Owner/Agency: Paving USA
Design Engineer: Steve Walks

Recommended Concrete Pavement Design

Thickness 8.00 in
Joint Spacing 15 ft
Dowel Bars Use dowel bars with 1.25 in. diameter



Effect of Rounding on Thickness

Exact design thickness = 7.59 in

Theoretical Life of Rounded-Up Concrete Thickness
59 years @ 85% reliability

Rounded-Up Thickness

Reliability of Rounded-Up Concrete Thickness
92.6% reliability for 20-year design

8.00 in

Expected Life of Rounded-Down Concrete Thickness
15 years @ 85% reliability

Rounded-Down Thickness

Reliability of Rounded-Down Concrete Thickness
82.5% reliability for 20-year design

7.50 in

Inputs

Design Life 20 years

Reliability

Specified Reliability = 85%

Allowable Percent Cracked Slabs at End of Design Life = 10%

Traffic

Traffic Category: Major Arterial

Total Number of Lanes 4

Direction Distribution 50

Design Lane Distribution 90

ADTT 2000 per day
(average daily truck traffic, two-way, all lanes)

Truck Traffic Growth 2% per year

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Support Conditions

Subgrade:

CBR (California Bearing Ratio) 2
Calculated Resilient Modulus of the Subgrade 3120 psi

Subbase:

Top Layer = Cement Stabilized Subgrade

Modulus = 500,000 psi
Thickness = 4 in

Layer 2 = Not Selected

Modulus = 0 psi
Thickness = 0 in

Layer 3 = Not Selected

Modulus = 0 psi
Thickness = 0 in

Composite Modulus of Subgrade Reaction (K-value):

k = 246 psi/in

Concrete Properties

Flexural Strength (Modulus of Rupture, MR) = 600 psi

Modulus of Elasticity = 4050000 psi

Modulus of Elasticity (E) = 6750 x MR

Design Features

Load Transfer Devices (Dowel Bars) Needed? Yes

Diameter = 1.25 in.

Edge Support? Yes

(widened lane, tied concrete shoulder, or curb & gutter)

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Fatigue & Erosion Calculations

Traffic Category: Major Arterial			Fatigue Analysis			Erosion Analysis		
Axle Load, kips	Axles per 1000 Trucks	Expected Repetitions	Stress Ratio	Allowable Repetitions	Fatigue Consumed	Power	Allowable Repetitions	Erosion Consumed
Single Axles								
34	0.19	1517	0.622	3737	40.58	21.987	539626	0.28
32	0.54	4310	0.587	11344	38	19.477	842740	0.51
30	0.63	5028	0.553	43640	11.52	17.118	1413268	0.36
28	1.78	14207	0.518	228608	6.21	14.912	2640334	0.54
26	3.52	28096	0.483	1804086	1.56	12.858	5944161	0.47
24	4.16	33204	0.448	24814830	0.13	10.956	20269333	0.16
22	9.69	77343	0.413	738708064	0.01	9.206	819787795	0.01
20	41.82	333794	0.378	unlimited	0	7.608	unlimited	0
18	68.27	544910	0.342	unlimited	0	6.163	unlimited	0.01
16	57.07	455515	0.306	unlimited	0	4.869	unlimited	0
Tandem Axles								
60	0.57	4550	0.465	6400222	0.07	19.271	877660	0.52
56	1.07	8540	0.436	72648196	0.01	16.787	1535721	0.56
52	1.79	14287	0.407	unlimited	0	14.475	3062952	0.47
48	3.03	24185	0.377	unlimited	0	12.334	7787989	0.31
44	3.52	28096	0.348	unlimited	0	10.364	37773762	0.07
40	20.31	162108	0.318	unlimited	0	8.565	unlimited	0
36	78.19	624088	0.288	unlimited	0	6.938	unlimited	0.01
32	109.54	874314	0.258	unlimited	0	5.482	unlimited	0.01
28	95.79	764566	0.227	unlimited	0	4.197	unlimited	0.01
24	71.16	567977	0.197	unlimited	0	3.083	unlimited	0.01
Tridem Axles								
78	0	0	0.381	unlimited	0	17.863	1184615	0
72	0	0	0.354	unlimited	0	15.221	2391438	0
66	0	0	0.326	unlimited	0	12.789	6144913	0
60	0	0	0.298	unlimited	0	10.57	29686616	0
54	0	0	0.27	unlimited	0	8.562	unlimited	0
48	0	0	0.241	unlimited	0	6.765	unlimited	0
42	0	0	0.213	unlimited	0	5.179	unlimited	0
36	0	0	0.184	unlimited	0	3.805	unlimited	0
30	0	0	0.155	unlimited	0	2.642	unlimited	0
24	0	0	0.126	unlimited	0	1.691	unlimited	0
Total Fatigue Used:					98.1	Total Erosion Used:		4.3