Table A-1 *Asphalt Institute's Equivalent Axle Load Factors*

Axle load (Lb)	***Single Axle***	***Tandem Axles***	***Tridem Axles***
1000	0.00002		
2000	0.00018		
3000	0.00072		
4000	0.00209		
5000	0.00500		
6000	0.01043		
7000	0.01960		
8000	0.03430		
9000	0.05620		
10000	0.08770	0.00688	0.002
11000	0.13110	0.01008	0.002
12000	0.18900	0.01440	0.003
13000	0.26400	0.01990	0.005
14000	0.36000	0.02700	0.006
15000	0.47800	0.03600	0.008
16000	0.62300	0.04720	0.011
17000	0.79600	0.06080	0.014
18000	1.00000	0.07730	0.017
19000	1.24000	0.09710	0.022
20000	1.51000	0.12060	0.027
21000	1.83000	0.14800	0.033
22000	2.18000	0.18000	0.040
23000	2.58000	0.21700	0.048
24000	3.03000	0.26000	0.057
25000	3.53000	0.30800	0.067
26000	4.09000	0.36400	0.080
27000	4.71000	0.42600	0.093
28000	5.39000	0.49500	0.109
29000	6.14000	0.57200	0.126
30000	6.97000	0.65800	0.145
31000	7.88000	0.75300	0.167
32000	8.88000	0.85700	0.191

33000	9.98000	0.97100	0.217
34000	11.1800	1.09500	0.246
35000	12.5000	1.23000	0.278
36000	13.9300	1.38000	0.313
37000	15.5000	1.53000	0.352
38000	17.2000	1.70000	0.393
39000	19.0600	1.89000	0.438
40000	21.0800	2.08000	0.487
41000	23.2700	2.29000	0.540
42000	25.6400	2.51000	0.597
43000	28.2200	2.76000	0.658
44000	31.0000	3.00000	0.723
45000	34.0000	3.27000	0.793
46000	37.2400	3.55000	0.868
47000	40.7400	3.85000	0.948
48000	44.5000	4.17000	1.033
49000	48.5400	4.51000	1.120
50000	52.8800	4.86000	1.220
51000		5.23000	1.320
52000		5.63000	1.430
53000		6.04000	1.540
54000		6.47000	1.660
55000		6.93000	1.780
56000		7.41000	1.910
57000		7.92000	2.050
58000		8.45000	2.200
59000		9.01000	2.350
60000		9.59000	2.510
61000		10.2000	2.670
62000		10.8400	2.850
63000		11.5200	3.030
64000		12.22000	3.220
65000		12.96000	3.410
66000		13.73000	3.620

67000	14.54000	3.830
68000	15.38000	4.050
69000	16.26000	4.280
70000	17.19000	4.520
71000	18.15000	4.770
72000	19.16000	5.030
73000	20.22000	5.290
74000	21.32000	5.570
75000	22.47000	5.860
76000	23.66000	6.150
77000	24.91000	6.460
78000	26.22000	6.780
79000	27.58000	7.110
80000	28.99000	7.450

Equation:

$$EALF = A + B \times (AL) + C \times (AL)^2 + D \times (AL)^3 + E \times (AL)^4 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (A-1)$$

Coefficient	*A*	*B*	*C*	*D*	*E*
Single Axle	0.176000	-0.000100	1.28E-8	-4.55E-13	1.33E-17
Tandem Axles	0.598814	-8.43E-05	3.56E-09	-4.94E-14	9.18E-19
Tridem Axles	-0.09	1.65E-05	-9.53E-10	2.12E-14	3.59E-20

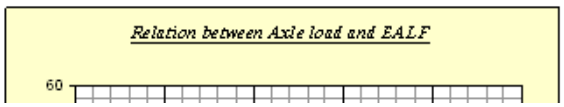

Figure A-1 *Relation between Axle load and EALF*

Table A- 3 Distribution of Truck Factors for Different Classes of Highways and Vehicles in the United States[a]

	Truck factors											
	Rural systems						Urban systems					
				Collectors								
Vehicle type	Interstate	Other Principal	Minor Arterial	Major	Minor	Range	Interstate	Other Freeways	Other Principal	Minor Arterial	Collectors	Range
Single-unit trucks												
2-axle, 4-tire	0.002	0.003	0.003	0.017	0.003	0.003–0.017	0.002	0.015	0.002	0.006	—	0.006–0.015
2-axle, 6-tire	0.21	0.25	0.28	0.41	0.19	0.19–0.41	0.17	0.13	0.24	0.23	0.13	0.13–0.24
3-axle or more	0.61	0.86	1.06	1.26	0.45	0.45–1.26	0.61	0.74	1.02	0.76	0.72	0.61–1.02
All single units	0.06	0.08	0.08	0.12	0.03	0.03–0.12	0.05	0.06	0.09	0.04	0.16	0.04–0.16
Tractor semitrailers												
4-axle or less	0.65	0.92	0.62	0.37	0.91	0.37–0.91	0.98	0.48	0.71	0.46	0.40	0.40–0.98
5-axle[b]	1.09	1.25	1.05	1.67	1.11	1.05–1.67	1.07	1.17	0.97	0.77	0.63	0.63–1.17
6-axle or more[b]	1.23	1.54	1.04	2.21	1.35	1.04–2.21	1.05	1.19	0.90	0.64	—	0.64–1.19
All multiple units	1.04	1.21	0.97	1.52	1.08	0.97–1.52	1.05	0.96	0.91	0.67	0.53	0.53–1.05
All trucks	0.52	0.38	0.21	0.30	0.12	0.12–0.52	0.39	0.23	0.21	0.07	0.24	0.07–0.39

a Compiled from data supplied by the Highway Statistics Division, U.S. Federal Highway Administration.
b Including full-trailer combinations in some states.
Source. After AI (1991).

Table A - 4 Traffic Growth Factors

Annual growth rate (%)	20-Year design period	40-Year design period
1.0	1.1	1.2
1.5	1.2	1.3
2.0	1.2	1.5
2.5	1.3	1.6
3.0	1.3	1.8
3.5	1.4	2.0
4.0	1.5	2.2
4.5	1.6	2.4
5.0	1.6	2.7
5.5	1.7	2.9
6.0	1.8	3.2

Source. After PCA (1984).

Design period (years)	No growth	2
1	1.0	1.0
2	2.0	2.0
3	3.0	3.0
4	4.0	4.1
5	5.0	5.2
6	6.0	6.3
7	7.0	7.4
8	8.0	8.5
9	9.0	9.7
10	10.0	10.9
11	11.0	12.1
12	12.0	13.4
13	13.0	14.6
14	14.0	15.9
15	15.0	17.2
16	16.0	18.6
17	17.0	20.0
18	18.0	21.4
19	19.0	22.8
20	20.0	24.3
25	25.0	32.0
30	30.0	40.5
35	35.0	49.9

Source. After AI (1981a).

Table A - 6 Truck Distribution for Multiple-Lane Highways

One-way ADT	Two lanes in each direction		Three or more lanes in each direction		
	Inner	Outer	Inner[a]	Center	Outer
2000	6	94	6	12	82
4000	12	88	6	18	76
6000	15	85	7	21	72
8000	18	82	7	23	70
10,000	19	81	7	25	68
15,000	23	77	7	28	65
20,000	25	75	7	30	63
25,000	27	73	7	32	61
30,000	28	72	8	33	59
35,000	30	70	8	34	58
40,000	31	69	8	35	57
50,000	33	67	8	37	55
60,000	34	66	8	39	53
70,000	—	—	8	40	52
80,000	—	—	8	41	51
100,000	—	—	9	42	49

[a] Combined inner one or more lanes.
Source. After Darter et al. (1985).

TABLE A-7 *Lane Distribution of Traffic for Pavement Design*

Number of Lanes per Direction	Recommendations by AASHTO (1993) Percentage of ESAL in design lane[a]	Recommendations by Asphalt Institute (1991) Percentage of trucks in design lane	Recommendations by PCA (1984) Percentage of trucks in design lane[b]
1	100	100	100
2	80–100	90 (70–96)	$1 - (\log_{10}ADT - 3)/5.34$
3	60–80	80 (50–96)	$0.875 - (\log_{10}ADT - 3)/5.23$
4	50–75	80 (50–96)	—

Table **(A-8)** *Standard Normal Deviates for various of Reliability*

R (%)	***Standard Normal deviates (Z_R)***
50	000
60	-0.253
70	-0.524
75	-0.674
80	-0.841
85	-1.037
90	-1.282
91	-1.340
92	-1.405
93	-1.476
94	-1.555
95	-1.645
96	-1.751
97	-1.881
98	-2.054
99	-2.327
99.9	-3.090
99.99	-3.750

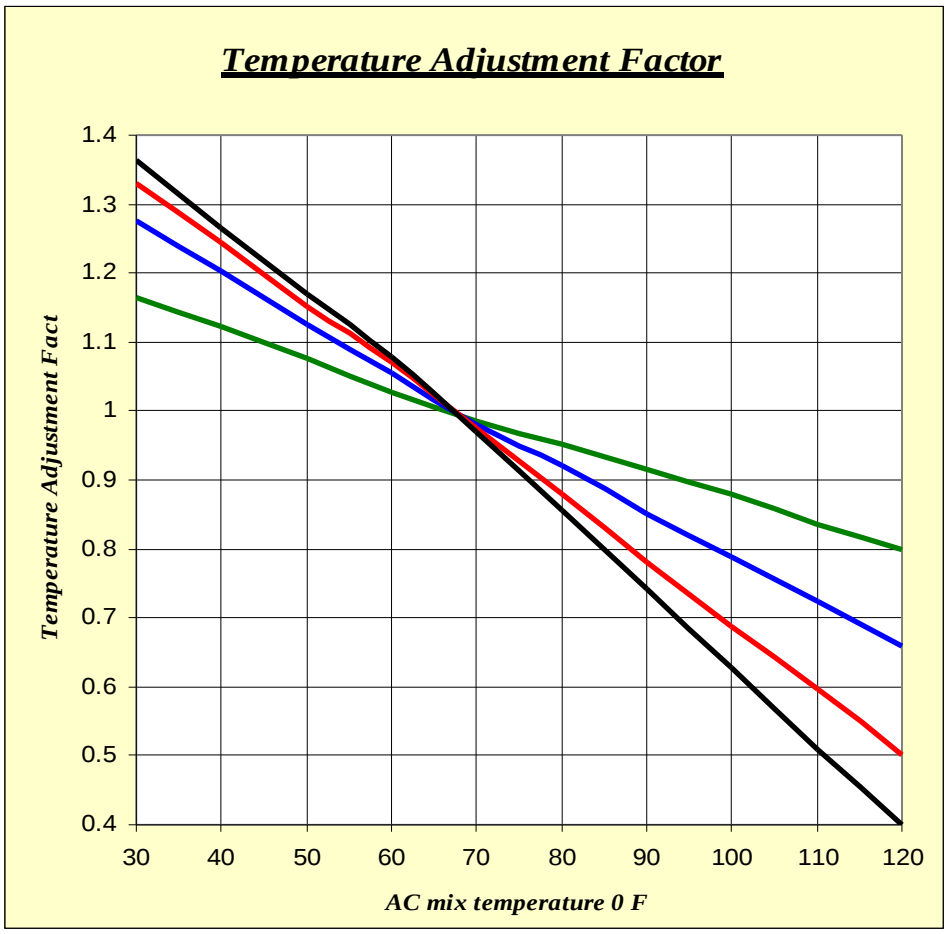

Figure A-2 *Temperature Adjustment Factor*

Equations:

For Asphalt Concrete surface = 2 in:

$$T_f = -0.004T - 1.2786 \ldots\ldots (R^2 = 0.9973) \ldots\ldots\ldots\ldots\ldots\ldots\ldots A-2$$

For Asphalt Concrete surface = 4 in:

$$T_f = -0.0068T - 1.4704 \ldots\ldots (R^2 = 0.9988) \ldots\ldots\ldots\ldots\ldots\ldots\ldots A-3$$

For Asphalt Concrete surface = 8 in:

$$T_f = -0.0093T - 1.6174 \ldots\ldots (R^2 = 0.9996) \ldots\ldots\ldots\ldots\ldots\ldots\ldots A-4$$

For Asphalt Concrete surface = 12 in:

$$T_f = -0.0108T - 1.7075 \ldots\ldots (R^2 = 0.9996) \ldots\ldots\ldots\ldots\ldots\ldots\ldots A-5$$