

Table A1.1—Allowable distributed loads for unjointed aisle with nonuniform loading and variable layout (Packard 1976)

Slab thickness, in.	Subgrade k , $^{\circ}$ lb/in. ³	Allowable load, lb/ft ² ¹			
		Concrete flexural strength, psi			
		550	600	650	700
5	50	535	585	635	685
	100	760	830	900	965
	200	1075	1175	1270	1370
6	50	585	640	695	750
	100	830	905	980	1055
	200	1175	1280	1390	1495
8	50	680	740	800	865
	100	960	1045	1135	1220
	200	1355	1480	1603	1725
10	50	760	830	895	965
	100	1070	1170	1265	1365
	200	1515	1655	1790	1930
12	50	830	905	980	1055
	100	1175	1280	1390	1495
	200	1660	1810	1965	2115
14	50	895	980	1060	1140
	100	1270	1385	1500	1615
	200	1795	1960	2120	2285

¹ k of subgrade; disregard increase in k due to subbase.

²For allowable stress equal to 1/2 flexural strength.

Note: Based on aisle and load widths giving maximum stress.

A1.4—Other PCA design information

Tables A1.1 and A1.2 are also included for uniform load applications. Refer to examples of their uses in PCA (2001) and Ringo (1985).

APPENDIX 2—SLAB THICKNESS DESIGN BY THE WIRE REINFORCEMENT INSTITUTE (WRI) METHOD

A2.1—Introduction

The following two examples show the determination of thickness for a slab-on-ground based on an unreinforced slab. Place a nominal quantity of distributed reinforcement in the upper 1/3 of the slab. The primary purpose of this reinforcement is to limit the width of any cracks (when they occur) that may form between the joints. The following examples presented are in inch-pound units. A table for converting the examples to SI units, along with an example of the process, is provided at the end of the Appendixes.

The design charts are for a single axle loading with two single wheels and for the controlling moment in an aisle with uniform loading on either side. Tension on the bottom of the slab controls the first situation. Tension on the top of the slab controls the second situation. Both procedures start with use of a relative stiffness term D/k , and require the initial assumption of the concrete modulus of elasticity E and slab thickness H , as well as selected the allowable tensile unit stress and the appropriate subgrade modulus k .

A2.2—The WRI thickness selection for single-axle wheel load

This procedure selects the concrete slab thickness for a single axle with wheels at each end of the axle, using Fig. A2.1,

Table A1.2—Allowable distribution loads, unjointed aisles, uniform loading, and variable layout; PCA method

Slab thickness, in.	Working stress, psi	Critical aisle width*, in.	Allowable load, lb/ft ²					
			At critical aisle width	At other aisle widths				
				6 ft aisle	8 ft aisle	10 ft aisle	12 ft aisle	14 ft aisle
Subgrade $k = 50$ lb/in. ^{3†}								
5	300	5.6	610	615	670	815	1050	1215
	350	5.6	710	715	785	950	1225	1420
	400	5.6	815	820	895	1085	1400	1620
6	300	6.4	670	675	695	780	945	1175
	350	6.4	785	785	810	910	1100	1370
	400	6.4	895	895	925	1040	1260	1570
8	300	8.0	770	800	770	800	880	1010
	350	8.0	900	935	900	935	1025	1180
	400	8.0	1025	1070	1025	1065	1175	1350
10	300	9.4	845	930	855	850	885	960
	350	9.4	985	1085	1000	990	1035	1120
	400	9.4	1130	1240	1145	1135	1185	1285
12	300	10.8	915	1065	955	915	925	965
	350	10.8	1065	1240	1115	1070	1080	1125
	400	10.8	1220	1420	1270	1220	1230	1290
14	300	12.1	980	1225	1070	1000	980	995
	350	12.1	1145	1430	1245	1170	1145	1160
	400	12.1	1310	1630	1425	1335	1310	1330
Subgrade $k = 100$ lb/in. ^{3†}								
5	300	4.7	865	900	1090	1470	1745	1810
	350	4.7	1010	1050	1270	1715	2035	2115
	400	4.7	1155	1200	1455	1955	2325	2415
6	300	5.4	950	955	1065	1320	1700	1925
	350	5.4	1105	1115	1245	1540	1985	2245
	400	5.4	1265	1275	1420	1760	2270	2565
8	300	6.7	1095	1105	1120	1240	1465	1815
	350	6.7	1280	1285	1305	1445	1705	2120
	400	6.7	1460	1470	1495	1650	1950	2420
10	300	7.9	1215	1265	1215	1270	1395	1610
	350	7.9	1420	1475	1420	1480	1630	1880
	400	7.9	1625	1645	1625	1690	1860	2150
12	300	9.1	1320	1425	1325	1330	1400	1535
	350	9.1	1540	1665	1545	1550	1635	1795
	400	9.1	1755	1900	1770	1770	1865	2050
14	300	10.2	1405	1590	1445	1405	1435	1525
	350	10.2	1640	1855	1685	1640	1675	1775
	400	10.2	1875	2120	1925	1875	1915	2030
Subgrade $k = 200$ lb/in. ^{3†}								
5	300	4.0	1225	1400	1930	2450	2565	2520
	350	4.0	1425	1630	2255	2860	2990	2940
	400	4.0	1630	1865	2575	3270	3420	3360
6	300	4.5	1340	1415	1755	2395	2740	2810
	350	4.5	1565	1650	2050	2800	3200	3275
	400	4.5	1785	1890	2345	3190	3655	3745
8	300	5.6	1550	1550	1695	2045	2635	3070
	350	5.6	1810	1810	1980	2385	3075	3580
	400	5.6	2065	2070	2615	2730	3515	4095
10	300	6.6	1730	1745	1775	1965	2330	2895
	350	6.6	2020	2035	2070	2290	2715	3300
	400	6.6	2310	2325	2365	2620	3105	3860
12	300	7.6	1890	1945	1895	1995	2230	2610
	350	7.6	2205	2270	2210	2330	2600	3045
	400	7.6	2520	2595	2525	2660	2972	3480
14	300	8.6	2025	2150	2030	2065	2210	2480
	350	8.6	2360	2510	2365	2405	2580	2890
	400	8.6	2700	2870	2705	2750	2950	3305

*Critical aisle width equals 2.209 times the radius of relative stiffness.

¹ k of subgrade; disregard increase in k due to subbase.

Notes: Assumed load width = 300 in.; allowable load varies only slightly for other load widths. Allowable stress = 1/2 flexural strength.