

SLABS ON GROUND

For any slab on the ground, adequate preparation of subgrade for drainage and compaction is of prime importance. Dowelled expansion joints and weakened plane contraction joints should be carefully located, including expansion joints at all walls, columns, open pits, etc.

The design of slabs on the ground to distribute concentrated or uniform loads involves the elastic properties of the subsoil and the slab itself.* An analysis can be made but is quite involved. Slabs for the very lightest occupancy should be not less than 4" thick, and slabs for other occupancies may be empirically selected, the following being about minimum and sometimes less than required (ACI 10.5.3) for supported slabs:—

Occupancy **	Min. Slab Thickness	Reinforcement †
Sub-slabs under other slabs	2"	None
Domestic or light commercial (loaded less than 100 psf)	4"	One layer 6 x 6 10/10 welded wire fabric, minimum for ideal conditions; 6 x 6 8/8 for average conditions.
Commercial—institutional—barns (loaded 100-200 psf)	5"	One layer 6 x 6 8/8 welded wire fabric or one layer 6 x 6 6/6.
Industrial (loaded not over 400-500 psf) and pavements for industrial plants, gas stations, and garages	6"	One layer 6 x 6 6/6 welded wire fabric or one layer 6 x 6 4/4.
Industrial (loaded 600-800 psf) and heavy pavements for industrial plants, gas stations, and garages	7"	Two layers 6 x 6 6/6 welded wire fabric or two layers 6 x 6 4/4
Industrial (loaded 1500 psf) †	8"	Two mats of bars (one top, one bottom), each of #4 bars @ 12" c/c, each way
Industrial (loaded 2500 psf) †	9"	Two mats of bars (one top, one bottom), each of #5 bars @ 12" c/c, each way
Industrial (loaded 3000-3500 psf) †	10"	Two mats of bars (one top, one bottom), each of #5 bars @ 8" to 12" c/c, each way

* "Concrete Floors on Ground" and "Concrete Airport Pavement," Portland Cement Association, 1952; "Design of Concrete Floors on Ground for Warehouse Loadings," ACI Jour., Aug. 1957; "Design, Construction, and Performance of Slabs-on-Grade for an Industry," ACI Jour., Nov. 1978; and "Pavements and Slabs-on-Grade with Structurally Active Reinforcement," ACI Jour., Dec. 1978.

** For loads in excess of, say, 500 psf, use at least 3000 psi quality controlled concrete, and investigate subsoil conditions with extra care. Fill material and compaction should be equivalent to ordinary highway practice. If laboratory control of compaction is available, the load capacities can be increased in the ratio of the actual compaction coefficient, k, to 100.

† For loads in excess of, say, 1500 psf the subsoil conditions should be investigated with extra care and subbase should provide $k \geq 200$.

‡ Place first layer 2 in. below top of slab; second layer, 2 in. above bottom of slab.

Note: Floors on expansive subsoils require two-way slab-and-beam designs. See 1968 BRAB Report 33—Criteria for Selection and Design of Residential Slabs-on-Ground.