

NONSTRUCTURAL CONCRETE SLAB REINFORCEMENT

The subgrade drag equation referenced in ACI 360, "Design of Slabs on Grade," can be used to determine temperature and shrinkage control joint spacing in slabs based on the amount of steel reinforcement used. The equation is:

$$A_s = \frac{FLw}{2f_s} \quad \text{or} \quad L = \frac{A_s 2f_s}{Fw}$$

- A_s = cross sectional area of steel reinforcement in square inches per lineal foot
- f_s = allowable stress in the reinforcement in psi; use $0.70 \times f_y$ (yield strength of the steel: 60 grade = 42,000 psi;)
- F = friction factor; use 1.5
- L = distance between control joints in feet
- w = dead weight of the slab in pounds per square foot; use 12.5 pounds per square foot per inch of slab thickness

The number 2 in the subgrade drag equation is not a safety factor. The value of 2 is based on the assumption that the slab will shrink in such a manner that each end will move an equal distance towards the center.

Maximum Distance Between Control Joints (L) using the Subgrade Drag Equation

BAR Size	SPACING (in.)	A_s (sq. in./ft.)	5" SLAB L (ft.)	6" SLAB L (ft.)	7" SLAB L (ft.)	8" SLAB L (ft.)
#3	18	0.07	66	55	47	41
#3	15	0.09	79	66	56	49
#3	12	0.11	99	82	70	62
#4	18	0.13	119	100	85	75
#4	15	0.16	143	119	102	90
#4	12	0.20	179	149	128	112
#5	18	0.21	185	154	132	116
#5	15	0.25	222	185	159	139
#5	12	0.31	278	231	198	174
#6	18	0.29	263	219	188	164
#6	15	0.35	315	263	225	197
#6	12	0.44	394	329	282	246

Page 17-WI-74 is intentionally left blank