

Technical Bulletin 09-015

Slab-on-Grade Cracking Due to Improper Control Jointing

The cracking in the slab of your home may be caused by improper control jointing.

Specifically, the slab-on-grade is typically not considered a structural aspect of the building; therefore, minor slab-on-grade cracking is generally not an overall structural concern.

In addition, ACI Concrete Craftsman Series CCS-1 states:

“Shrinkage is unavoidable. It is normal to experience some drying shrinkage cracking on every concrete slab project. Slabs on grade can be expected to curl because most of the shrinkage occurs at the top of the slab. Joints are made in concrete in attempts to limit the cracking and control its location. Joints allow the concrete to move slightly. Concrete slabs move because of (1) settlement, (2) shrinkage of the concrete, (3) temperature and moisture changes, and (4) loads. If there are no joints, the concrete tries to absorb these movements by pulling or pushing whatever the concrete is attached to. The tensile strength of concrete is fairly low, and when loads exceed that strength, concrete cracks...”

Curling

The shrinkage of concrete as it dries usually amounts to about 1/8 in. in 20 ft. A concrete slab on grade does not dry uniformly from top to bottom. The top of the slab dries and shrinks more than the bottom. As a result, the slab tends to curl or dish so that the edges are higher than the center. Friction between the supporting subgrade and the slab resists normal shrinkage of the concrete, causing it to crack.

Contraction Joints

To avoid random cracks, contraction joints are used to create straight-line planes of weakness in the slab. As the slab shrinks and tends to curl, the joints open slightly and cracks occur at the predetermined locations instead of randomly over the slab...

Fig. 6.1 shows a typical layout of contraction joints in a floor on grade. Contraction joints should be placed on or straddling column lines, with intermediate joints between column lines to keep the maximum distance between joints at 24 to 36 times the slab thickness (8'-12'). The resulting panels should be as nearly square as practical, dividing a large floor area into relatively small panels. Avoid elongated and L-shaped panels. Never make the long side more than 1 ½ times as long as the short side. Make all contraction joints continuous, not staggered or offset...

Contraction joints should also be located at re-entrant corners such as those shown in Fig. 6.3; otherwise, cracks are likely to radiate from the corners.”¹

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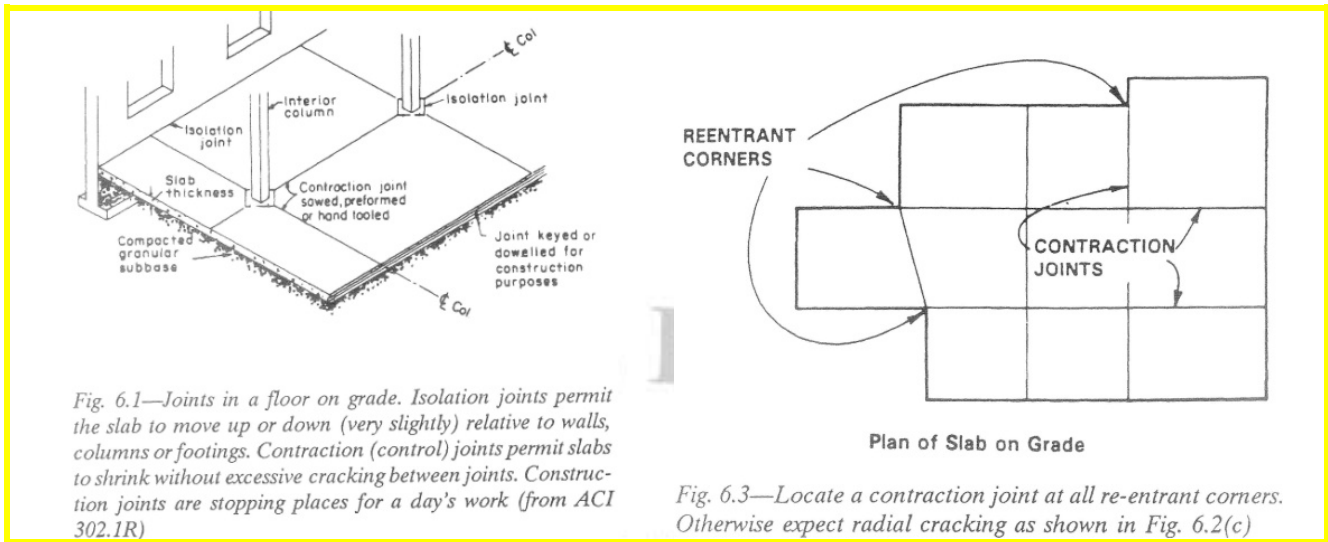


Figure 1 – Excerpt from Pages 75-79¹

Reference:¹ Hurd, M.K. (May 2008). *Concrete Craftsman Series – Slabs on Grade* (2nd Ed., pg. 75-79). Farmington Hills, MI: American Concrete Institute.

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