



CURLING OF CONCRETE SLABS

Curling is the distortion of a slab into a curved shape by upward or downward bending of the edges. This warping effect can lift the edges away from the base and result in an unsupported edge or corner that can crack under heavy loads. Curling is most often related to dry shrinkage, or to temperature variations within the slab. When one surface of the slab changes size more than the other because of these factors, it will warp at its edges in the direction of relative shortening. Curling can occur at an early stage or over an extended period of time.

Why Curling Occurs

- The top part of the slab dries faster than the bottom and shrinks, which curls the edges upward.
- Poor curing and rapid surface drying. Anything that increases drying shrinkage, such as an admixture, will tend to increase curling.
- Temperature differences between the top and bottom of the slab. When the top of the slab is exposed to the sun, it will expand relative to the cooler bottom, resulting in upward curling of the edges. When the top cools and contracts relative to a warmer sub-grade, a downward curling of the edges can result.

What to Do About It

- Use the lowest practical slump and avoid adding retempering water.
- Use the largest practical maximum size aggregate and/or the highest practical coarse aggregate content to minimize drying shrinkage.
- Avoid a higher than necessary cement content. Dense, impermeable concrete will produce larger top-to-bottom moisture differentials and curl more.
- Cure the concrete thoroughly, including joints and edges.
- Thin un-bonded toppings are more prone to curl, so joint spacing needs to be fairly close.
- Avoid using polyethylene vapor barriers unless covered by two inches of damp sand. Placing concrete directly on polyethylene tends to promote shrinkage.

Products Used: Tamms Cure and Seal Compounds.