



# CRUSTED CONCRETE CAUSES & PREVENTATIVE MEASURES

## What is concrete surface crusting?

Temperature differences between the ground, the concrete, and the surface of freshly placed concrete can cause unfavorable finishing conditions. While the concrete at the surface appears to be ready to finish, the concrete below the surface can remain soft. Early symptoms that surface crusting is occurring or about to begin is a general lack of bleed water and a sticky feel to the concrete. For finishers experiencing surface crusting for the first time, the concrete feels like there is a major problem with the mix.

# TROUBLESHOOTING CRUSTED CONCRETE

## When does surface crusting occur?

The development of surface crusting is dependent on subbase permeability and temperature, concrete temperature, and several weather conditions such as wind speed, air temperature, and humidity. One easy rule-of-thumb used by some finishers is that when the temperature difference between the concrete and subbase is 20°F or greater, surface crusting is likely to occur. The problem can become more severe when the concrete is placed on an impervious subgrade like a metal deck or a vapor barrier. Thicker slabs are also more likely to experience surface crusting. Conditions for surface crusting are most common in the spring and fall when cool nights reduce the subbase temperature and sunny days can result in elevated temperatures at the concrete surface.

## Ways to prevent surface crusting?

- Consider using a plant added accelerator. Dosages as low as 1% have been used to help the bottom concrete catch up with the surface. Never use chemical retarders when surface crusting conditions may exist.
- Order micro synthetic fibers with your mix. For about 10¢ per square foot, MasterFiber M100 fibers minimize segregation, reduce evaporation by helping to retain water, and provide increased tensile strength at the surface to resist the shrinkage forces that can cause cracking during surface crusting.
- Use a monomolecular film / evaporation retarder such as Confilm to minimize moisture loss and surface drying.
- Cover the concrete with plastic or wet burlap between finishing operations.
- Place the concrete later in the day to allow the morning sun to warm the subgrade and reduce the temperature difference between the subgrade and the concrete.
- Cover the subbase the day prior to minimize heat loss from the subgrade.
- Shield the concrete surface from direct sunlight.
- Ask the architect/engineer if the vapor barrier can be placed 4-6" deeper and cover the plastic with stone sub-base. It still protects the slab and helps reduce the potential for crusting, excessive bleed water and curling.

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