

## Definition

Dusting is the occurrence of chalking or powdering at the surface of a concrete slab. This weak surface can be easily scratched with a nail, and gets its name by the constant accumulation of dust under nearly any traffic.

## Contributing Factors

A concrete floor dusts under traffic because the wearing surface is weak. This weakness can be caused by one or a combination of the following:

1. Any finishing operation performed while bleed water is on the surface. Working the bleed water back into the top 1/4 inch of the slab produces a very high water-cement ratio and, therefore, a low strength surface layer.
2. Placement over a non-absorptive subgrade or polyethylene. This reduces normal absorption by the sub-grade, increases bleeding and, as a result, the risk of surface dusting.
3. Insufficient or no curing. This omission often results in a soft surface skin which will easily dust under foot traffic.
4. Floating or troweling of condensation moisture from warm, humid air on cold concrete. In cold weather, the concrete sets slowly, in particular cold concrete basement floors. If the humidity is relatively high, water will condense on the freshly placed concrete. If this water is troweled into the surface, dusting is likely.
5. Inadequate ventilation in close quarters. Carbon dioxide from open salamander heaters, gas engines, generators, power buggies, or mixer trucks may cause a chemical reaction known as carbonation which greatly reduces the strength and hardness of the concrete surface.
6. Inadequate protection of freshly placed concrete from rain, snow, or drying winds.

## How to Minimize Dusting

1. In general, use concrete with a moderate slump, not to exceed five inches. Higher slump concrete may be used, provided the mixture is designed to produce the required strength without excessive bleeding or segregation. Higher slumps can be used in hot weather when setting times are reduced and time is available for bleeding. In cold weather, delayed set times will increase bleeding. Lower slump mixes should be used in cold weather. Concrete having a low water-cement ratio and moderate slump helps provide a strong, wear resistant surface.
2. Never sprinkle or trowel dry cement powder into the surface of plastic concrete to absorb bleed water. Remove bleed water by dragging a garden hose across the surface. Excessive bleeding of the concrete can be reduced by using air entrained concrete, modifying mix proportions, and reducing set times.
3. Do not perform any finishing operation with water present on the surface. Bleed water can be worked into surface fines from delayed bullfloating. Initial screeding must be promptly followed by bullfloating. Do not use a jitterbug to bring excess mortar to the surface.
4. Avoid direct placement of concrete on polyethylene or non-absorptive sub-grades. Place 2 to 3 inches of damp sand over polyethylene or non-absorptive sub-grade prior to concrete placement. On absorptive sub-grades, dampen the surface just prior to concrete placement.
5. Provide proper curing by using liquid membrane forming curing compound, or by covering with wet burlap. Protect the concrete from the environment.
6. When placing concrete in cold weather, use accelerators (non-chloride and/or chloride bearing).

## References

NRMCA CIP 1 (1998). *What, Why and How? Dusting Concrete Surfaces*  
National Ready Mixed Concrete Association