

## Why Trust Anyone Else?

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### Scaling and/or Spalling

Scaling or spalling is the shedding of flakes of hardened concrete at the surface. It can be caused by a number of conditions:

- Exposure to freezing and thawing can cause scaling, which can be made worse by the application of de-icing salts.
- Concrete that has been improperly cured or that has inadequate air entrainment will be less resistant to scaling caused by freezing.
- Finishing operations started while bleed water is still on the surface can weaken the surface layer and cause dusting or scaling. When concrete is placed during hot and dry conditions, the bleed water may appear to be gone, but the surface may still be actively bleeding. The bleed water may be evaporating as it reaches the surface. During such conditions, finishing operations may be started under the mistaken impression that the surface is done bleeding.
- Over-working the surface during finishing will reduce the air content of the surface concrete, leaving it weaker and more vulnerable to scaling due to freezing conditions.
- Fertilizers, such as ammonium sulfate and ammonium nitrate, will chemically attack the concrete surface.
- Poor drainage causes water to pool, and water containing de-icing salts can also lead to pooling on the surface for extended periods of time. This can happen where snowplows pile snow on sidewalks and driveways.



*Small patches of flaking*



*Smaller patches of damage have expanded to form a large area of damage.*

In addition to properly timing finishing operations, proper curing will help prevent dusting and scaling. In hot and dry environments, the sub-grade should be dampened before the concrete is placed, and the surface should be kept damp to keep it from drying too quickly. In cool and damp environments, a water-repelling sealer should be applied to keep the surface from absorbing too much water. Concrete is most fragile during the first year after placing, so de-icing chemicals should be avoided during that time, and the concrete should be protected from absorbing moisture just before freezing weather develops.

The most common places to find this type of damage are driveways and garage floors. Even if ice-melt is not used on walkways by a home's occupant, the undercarriage of vehicles can accumulate frozen slush from roadways that contains chloride solutions. This slush will melt from cars parked in driveways and garages and be absorbed into the concrete. Poor finishing practices, such as over-working the concrete or working bleed water back into the surface, will leave the surface weak and more likely to flake. Concrete less than a year old that may be exposed to chlorides should have a sealer applied that is designed specifically for concrete to help prevent freeze damage. Sealers may have to be re-applied periodically, depending on the type of chemicals used on the roadways in a given area, as well as the climate zone. It is sometimes possible to remove a weak or damaged surface layer of concrete and apply a thin, bonded re-surfacing product based on Portland cement, latex-modified concrete or polymer-modified mortar. Inspectors can recommend that their clients investigate products or methods that have been used successfully in the area where the home is located.

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