

- b. *DO NOT* use deicing salts, such as calcium or sodium chloride, in the first year after placing the concrete. Use clean sand for traction. When conditions permit, hose off accumulation of salt deposited by cars on newly placed driveways and garage slabs. Subsequently, use salt sparingly. *Never use ammonium sulfate or ammonium nitrate as a deicer*; these are chemically aggressive and destroy concrete surfaces. Poor drainage, which permits water or salt and water to stand on the surface for extended periods of time, greatly increases the severity of the exposure and may cause scaling. (This is often noticed in gutters and sidewalks where the snow from plowing keeps the surface wet for long periods of time.)
- c. Provide proper curing by using liquid membrane curing compound or by covering the surface of newly placed slab with wet burlap. Curing ensures the proper reaction of cement with water, known as hydration, which allows the concrete to achieve its highest potential strength.
- d. *DO NOT* perform any finishing operations with water present on the surface. Bull floating must promptly follow initial screeding. Delay finishing operations until all the bleed water has risen to and disappeared from the surface. This is critical with air-entrained concrete in dry and windy conditions where concrete that is continuing to bleed may appear dry on the surface.
- e. Do not use a jitterbug or vibrating screed with high slump concrete, as it tends to form a weak layer of mortar on the surface.
- f. Protect concrete from the harsh winter environment. It is important to prevent the newly placed concrete from becoming saturated with water prior to freeze and thaw cycles during winter months. Apply a commercially available silane or siloxane-based breathable concrete sealer or water repellent specifically designed for use on concrete slabs. Follow the

manufacturer's recommendations for application procedures and frequency. Another option is a 1:1 mixture of boiled linseed oil and mineral spirits applied in two layers. The concrete should be reasonably dry prior to the application of a sealer. Late summer is the ideal time for surface treatment. The sealer can be sprayed, brushed, or rolled on the surface of the concrete. **CAUTION:** Linseed oil will darken the color of the concrete and care should be taken to apply it uniformly.

HOW to Repair Scaled Surfaces

The repaired surface will only be as strong as the base surface to which it is bonded. Therefore, the surface to be repaired should be free of dirt, oil or paint and, most importantly, it must be sound. To accomplish this, use a hammer and chisel, sandblasting, high-pressure washer, or jack hammer to remove all weak or unsound material. The clean, rough, textured surface is then ready for a thin bonded resurfacing such as:

- a. Portland cement concrete resurfacing
- b. Latex modified concrete resurfacing
- c. Polymer-modified cementitious-based repair mortar

References

1. *Guide to Durable Concrete*, ACI 201.2R, American Concrete Institute, Farmington Hills, MI.
2. *Scale-Resistant Concrete Pavements*, IS117.02P, Portland Cement Association, Skokie, IL.
3. *Protective Coatings to Prevent Deterioration of Concrete by Deicing Chemicals*, National Cooperative Highway Research Program Report No. 16.
4. *Guide for Concrete Floor and Slab Construction*, ACI 302.1R, American Concrete Institute, Farmington Hills, MI.
5. *Residential Concrete*, National Association of Home Builders, Washington, DC.
6. *Slabs on Grade*, Concrete Craftsman Series CCS-1, American Concrete Institute, Farmington Hills, MI.
7. Eugene Goeb, *Deicer Scaling: An Unnecessary Problem*, Concrete Products, February 1994.

Follow These Rules to Prevent Scaling

1. For moderate to severe exposures, use air-entrained concrete of medium slump (3-5 in. [75-125 mm]) and cure properly.
2. Do not use deicers in the first winter.
3. Seal the surface with a commercial sealer or a mixture of boiled linseed oil and mineral spirits.
4. Use correct timing for all finishing operations and avoid the use of steel trowels for exterior concrete slabs.
5. Specify air-entrained concrete. In cold weather, concrete temperature should be at least 50°F [10°C], contain an accelerating admixture, and be placed at a lower slump.