



**NORWALK READY MIX
CONCRETE INC.**

**THE CAUSES
AND PREVENTION
OF COMMON
CONCRETE PROBLEMS**



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Crazing

What it is:

Crazing is fine and random cracking extending only through the surface. The appearance can be perpendicular to the length, in polygonal shapes or as “map cracking”

Causes:

- Inadequate or improper curing
- A surface film richer in cement and fines than the body of the concrete
- Excessive wetting or drying

Prevention:

- Start the curing process as soon as possible
- Do not overuse finishing tools such as a jitterbug vibrator, or a bull float
- Do not spray the top of the concrete while finishing





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Curling

What it is:

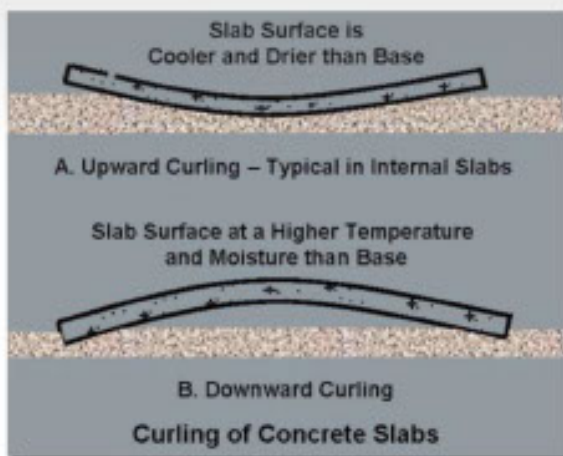
Curling is the upward movement of a slab's corners and edges due to differences in moisture content or temperature between the top and bottom of a slab. The top dries or cools and contracts more than the wetter or warmer bottom. Because of the reduced sub-grade support, cracks often develop parallel to joints and at the corners where the joints intersect.

Causes:

- Poor curing and rapid surface drying
- Thin slabs and long joint spacing
- Temperature differences between the top and bottom of the slab

Prevention:

- Use the lowest practical water/cement ratio
- Avoid higher than necessary cement content
- Cure the concrete thoroughly, including joints and edges. If membrane curing compounds are being used, apply twice the recommended rate in two applications at right angles to each other
- When minimizing curling is critical, use a joint spacing not exceeding 24 times the thickness of the slab.





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Dusting

What it is:

A powder substance on the surface of a hardened concrete slab

Causes:

- Carbonation is very often the cause of dusting in a slab. Concrete poured indoors with engines, heaters, salamanders or anything else that gives off carbon dioxide can inhibit the normal hydration process
- Condensation. When the temperature of the concrete on a floor made with cool material rises slower than the surrounding air. Common in the spring and fall
- Premature finishing. When a slab is prematurely finished, it can bring up excess water to the surface which in turn can weaken the paste.
- Dry curing. This occurs when there is insufficient moisture to complete the hydration process of the cement paste

Prevention:

- Use proper ventilation to vent all exhaust fumes outside of the area you are pouring. Proper ventilation is key for the health of your concrete as well as you and your help.
- Don't begin finishing the slab until all the free water has evaporated from the surface. This will help the concrete set enough to support the weight of the finisher.
- Pour on a grade that is not significantly cooler than your concrete. Blankets or heaters may be necessary to heat your grade prior to the pour.





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Pop outs

What it is:

The breaking away of small portions of a concrete surface due to localized internal pressure that leaves a shallow, typically conical, depression.

Causes:

Pop outs are most often caused by porous rock such as chert, weathered dolomite, or shale that are highly absorptive and have a relatively low specific gravity. If these aggregates become saturated and freeze, they either fracture due to internal pressure or push enough moisture into the mortar cover to cause the mortar to pop off. Pop outs usually range from about ¼" to several inches in diameter. Often times you will see a portion of or all of the aggregate that caused the pop out at the bottom of the hole.

Prevention:

- Use "imported" sand which has a lower deleterious material content, such as shale for example, and has a high resistance to pop outs. Talk to your Norwalk Ready Mix dispatcher for further details
- Do not use deicers (calcium, sodium chloride, etc.) on your driveway during the winter. Rather, use clean sand to provide traction on the snow and ice. When it is possible wash the salt that your car picked up from the roadways off of your garage and driveways.
- When pouring your exterior flatwork, ensure that the concrete has as low a water/cement ratio as practical.
- Slope exterior concrete for proper drainage

While pop outs are always possible, the preventions mentioned above will greatly reduce the chances for them to occur.





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Scaling

What it is:

Scaling is local flaking or peeling away of the near surface portion of hardened concrete as a result of exposure to freezing and thawing.

Causes:

- The use of non-air entrained concrete or too little entrained air in exterior concrete
- Application of excessive amounts of calcium or sodium chloride deicing salts on concrete with inadequate strength, air entrainment, or curing
- Any finishing operation performed while bleed water is still on the surface. If bleed water is worked back into the top surface of a slab the result is a top portion with a high water/cement ratio, resulting in a low-strength surface layer

Prevention:

- Any concrete exposed to freeze/thaw cycles must be air entrained. The air entrainment produces thousands of little bubbles in the concrete that act like pockets to gather the water before it freezes. Then the water expands while it is being held in these pockets which helps prevent scaling, cracking, and other freeze/thaw related problems
- 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 the weather allows, rinse off the salt transferred from cars on your garage and driveway
- Protect concrete from harsh winter environment. This can be accomplished by using a commercially available silane based, breathable concrete sealer or water repellent





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Plastic Shrinkage Cracks

What it is:

Small cracks in the surface of concrete. These cracks are often unsightly, but they generally do not pose a strength issue.

Causes:

High rate of evaporation of water from the concrete surface. This typically happens on extremely hot and/or humid days. Factors include wind velocity, ambient temperature, temperature of the concrete, and relative humidity.

Prevention:

- Dampen subgrade and forms
- Minimize placement and finishing times
- Begin curing as soon as possible after finishing using a curing compound, wet burlap, curing paper, etc. It is optimum to not let the surface dry out during the curing phase.
- Use confilm, available upon request, after screeding to maintain water/cement ratio at the surface of the concrete.

