

EVENRANGE

=====Australia=====

Concrete Treatment Solutions

CRAZING CONCRETE SURFACES

1. WHAT is Crazing?

Crazing is the development of a network of fine random cracks or fissures on the surface of concrete or mortar caused by shrinkage of the surface layer. These cracks are rarely more than 1/2 inch deep and are more noticeable on steel-troweled surfaces.

The irregular hexagonal areas enclosed by the cracks are typically no more than 1 1/2 inches across and may be as small as 1/8 inch to 3/8 inch in unusual instances.

Generally, craze cracks develop at an early age and are apparent the day after placement or at least by the end of the first week. Often they are not readily visible until the surface has been wetted and it is beginning to dry out.

Crazing cracks are sometimes referred to as shallow map or pattern cracking. They do not affect the structural integrity of concrete and rarely do they affect durability or wear resistance. However, crazed surfaces can be unsightly. They are particularly conspicuous and unsightly on concrete, which contains calcium chloride.

2. WHY Do Concrete Surfaces Craze?

Concrete surface crazing usually occurs because one or more of the rules of "good concrete practice" were not followed.

The most frequent violations are:

- a. Poor or inadequate curing. Intermittent wet curing and drying or even the delayed application of curing will permit rapid drying of the surface and provoke crazing.
- b. Too wet a mix, excessive floating, the use of a jitterbug or any other procedures, which will depress the coarse aggregate and produce an excessive concentration of cement paste and fines at the surface.
- c. Finishing while there is bleed water on the surface or the use of steel trowel at a time when the smooth surface of the trowel brings up too much water and cement fines. Use of a bull float or darby while bleed water is on the surface will produce a high water-cement ratio weak surface layer which will be susceptible to crazing, dusting and other defects.
- d. Sprinkling cement on the surface to dry up the bleed water is a frequent cause of crazing surfaces. This concentrates fines on the surface.
- e. Occasionally carbonation of the surface causes crazing. Carbonation is a chemical reaction between cement and carbon dioxide or carbon monoxide from unvented heaters. In such instances the surface will be soft and will dust as well.

A.C.N. 083 301 213

12 Frankstone Gardens Dve, CARRUM DOWN, Vic 3201 AUSTRALIA

Tel: 61 3 9782 3233

evenrange@pen.hotkey.net.au

Fax: 61 3 9782 3244

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3. HOW to Prevent Cracking

- a. To prevent cracking start curing the concrete as soon as possible. The surface should be kept wet by either flooding the surface with water, covering the surface with damp burlap and keeping it continuously moist for a minimum of 3 days or spraying the surface with a liquid membrane-curing compound. Curing retains the moisture required for proper combination of cement with water. This chemical reaction between cement and water is called hydration.
- b. Use moderate slump (\pm to 5 inches) of air-entrained concrete. Higher slump (up to 6 or 7 inches) can be used providing the mixture is designed to produce the required strength without excessive bleeding and/or segregation. Air entrainment helps to reduce the rate of bleeding of fresh concrete and thereby reduces the chance of cracking.
- c. NEVER sprinkle or trowel dry cement or a mixture of cement and fine sand into the surface of the plastic concrete to absorb bleed water. Remove bleed water by dragging a garden hose across the surface. DO NOT perform any finishing operation while bleed water is present on the surface. Dampen the subgrade prior to concrete placement to prevent it absorbing too much water from the concrete. If an impervious membrane such as polythene is required on the subgrade cover it with 1 to 2 inches of damp sand to reduce bleeding.

Follow These Rules to Prevent Cracking

1. Use moderate slump (3-5 inch) air entrained concrete.
2. Finish properly.
 - a. Remove bleed water before performing any finishing operations. DO NOT dust any cement onto the surface to absorb bleed water.
 - b. Avoid excessive manipulation of the surface, which can depress the aggregate, increase the cement paste at the surface and increase the water-cement at the surface.
 - c. Delay steel troweling until water sheen has disappeared from the surface.
3. Cure properly as soon as finishing has been completed.

EVENRANGE liquid impermeable-membrane curing compounds are "apply and forget" systems that effectively, efficiently and economically replace labour intensive curing systems such as wet hessian, polythene or ponded water. These latter systems whilst effective if utilised properly, require constant maintenance because they are very easily disrupted by atmospheric conditions such as winds or high temperatures.

EVENRANGE can supply the curing compound most suited to your needs whether it be water based, solvent based, bituminous and chlorinated rubber.

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2. "Slab Construction Practices Compares by Wear Tests" by L. Blake Fentress, ACI Journal, July 1973
3. "How to Prevent Concrete Slab Surface Defects Portland Cement Association (IS777.01)
4. "Solutions to the Problems of Scaling, Cracking, Dusting of Concrete Slabs" Modern Concrete, November 1963.

Your Manufacturer

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