क्रेजिंग / CRAZING

Crazing can occur both in plastic as well as in hardened state on the top surface of Concrete or mortar in the form of discontinuous and closely spaced surface hair cracks (a network of fine random cracks or fissures) caused by shrinkage of the surface layer.

These cracks are rarely more than 3 mm deep and are more noticeable on steel troweled surfaces. The irregular hexagonal areas enclosed by the cracks are typically not more than 40 mm across and may be as small as 12 or 20 mm in unusual instances.

Generally, these 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 visible only when surface begins to dry out. They do not affect the structural integrity of concrete and its durability or wear resistance.

Crazing cracks are sometimes referred to as shallow map or pattern cracking, which is not pleasing to the eye and should be prevented as far as possible.

कॉक्रीट सतह पर क्रेजिंग क्यों होती है।
Why do concrete surface craze

Hard steel troweled concrete surfaces often have craze cracks due to shrinkage of the concentrated dense-paste layer at the surface. Concrete surface crazing can also occur because of one or more of the rules of “good concrete practices” are not followed. The most frequent factors when crazing occurs are:

a. Poor or inadequate curing - the delayed application of curing or even intermittent wet curing and drying after the concrete has been finished.

b. Environmental conditions conducive to high evaporation rates, such as low humidity, extremes in ambient temperature, direct sun light, and drying winds on a concrete surface when the concrete is just beginning to gain strength, cause rapid surface drying resulting in craze cracking.

c. Too wet a mix, excessive floating, the use of a jitterbug or procedures that will depress the coarse aggregate and produce an excessive concentration of cement paste and fines at the surface.

d. Finishing operations performed while bleed water remains on the surface or the use of a steel trowel in a manner that the smooth surface of the trowel brings up excessive water and cement fines.

e. Use of a bull float on the surface while the concrete continues to bleed will produce a high water-cement ratio at the surface resulting in a weak surface layer that will be susceptible to crazing, dusting, scaling and other surface defects.

f. Sprinkling cement on the surface to dry up the bleed water is a frequent cause of crazing. This concentrates fines on the surface. Spraying water on the concrete surface during finishing operations will result in a weak surface susceptible to crazing or dusting.

g. Occasionally carbonation of the surface causes crazing. Carbonation is the chemical reaction between cement and carbon dioxide or carbon mono oxide from the un-vented heaters, in such instance the surface will be soft and will dust as well.

क्रेजिंग को कैसे रोकें।

How to prevent Crazing

- *Start curing the concrete as soon as possible*.

  Curing retains moistures required for proper reaction either floating with water or by covering it with damp burlap and keeping it continuously moist for a minimum 3 days. Alternatively, the surface can be sprayed with a liquid membrane curing compound.

- *When placing, use moderate slump (75 to 125 mm) concrete*.

  Higher slump (150 to 175 mm) can be used, if the mixture is designed to produce the required strength without excessive bleeding and or segregation. This is generally accomplished by using water reducing admixture.

- When high evaporation rates are anticipated, lightly dampen the sub grade prior to concrete placement to prevent it absorbing too much water from the concrete.

- Never sprinkle or trowel dry cement or a mixture of cement and fine sand on the surface of the plastic concrete to absorb bleed water.
- Do not sprinkle water on the slab to facilitate finishing.



- Do not perform any finishing operation while bleed water is present on the surface or before the bleeding process is completed.
- Do not over work or over finish the surface.



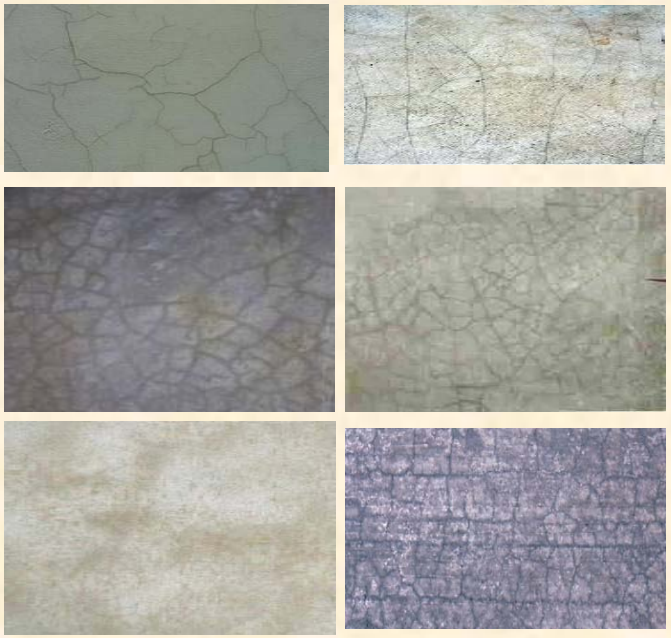
- Avoid alternative wetting and drying of concrete surface at an early age.

याद रखें / Remember

Follow the following points to prevent crazing:

- ➢ Use moderate slump air entrained concrete.
- ➢ Finish properly
  - Remove bleed water before performing any finishing operations.
  - Do not dust any cement on to the surface to absorb bleed water.
  - Avoid excessive finishing of the concrete surface, which can depress the coarse aggregate, increase the cement paste at the surface, and increase the water cement ratio at the surface.
  - Delay steel troweling until water sheen has disappeared from the surface.
  - Cure properly as soon as finishing has been completed.

क्रेजिंग के छाया चित्र / Photographs of crazing



Disclaimer

The information contained in this pamphlet does not supercede any existing provisions laid down in RDSO & Railway Board instructions. This document is not statutory & instructions given in it are for the purpose of guidance only.

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भारत सरकार. रेल मंत्रालय
GOVERNMENT OF INDIA - MINISTRY OF RAILWAYS

क्रेजिंग / CRAZING



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