EVENRANGE

==========**Australia** ==========

Concrete Treatment Solutions

CURING CONCRETE SURFACES

1. WHAT is Curing?

Curing has a strong influence on properties of hardened concrete such as durability strength, watertightness, wear resistance, volume stability and resistance to freezing and thawing.

When Portland cement is mixed with water, a chemical reaction called hydration takes place. The extent to which this reaction is completed determines the strength, durability and density of the concrete. Most fresh concrete contains considerable more than enough water for completed hydration of the cement; however any appreciable loss of water by evaporation or otherwise will delay or prevent completed hydration. Since hydration is relatively rapid the first few days after fresh concrete is placed, it is important for the water to be retained during this period, that is, for evaporation to he prevented or at least reduced.

2. WHY Cure Concrete?

The objects of curing are:

- To prevent (or replenish) the loss of moisture
- To control the concrete temperature for a definite time

With proper curing, the concrete will become stronger and more resistant to stress, abrasion and frost. The improvement is rapid at early ages but continues more slowly for an indefinite period. When moist curing is interrupted, the development of strength continues for a short period and then topes. However, is moist curing is resumed, strength development will be reactivated. Although it can be done in a laboratory, it is difficult to resaturate concrete in the field. Thus, it is best to moist-cure the concrete continuously for the time it is placed until it has sufficient strength, impermeability and resistance to abrasion, freezing and thawing and chemical attack.

Loss of water will also cause the concrete to shrink, thus creating tensile stresses at the drying surface. If these stresses develop before the concrete has attained adequate tensile strength, surface cracking can result. All exposed surfaces, including exposed edges and joints, must be protected against moisture evaporation.

Hydration proceeds at a much slower rate when the concrete temperature is low. Temperatures below 10°C are unfavourable for the development of early strength; below 4.5°C the development of early strength is greatly retarded; and at or below freezing temperature, down to -10°C, little or no strength develops. In recent years, a maturity concept has been introduced to evaluate the development of strength when there is variation in the curing temperature of the concrete.

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"Maturity" is defined as the product of the age of the concrete and it's average curing temperature. It follows that concrete should be protected so that it's temperature is kept favourable for hydration and moisture is not lost during the early hardening period.

3. HOW to Cure Concrete.

a. PONDING
- Build dike, then fill with water to cover the entire concrete slab
- Avoid water or dike material that can stain the concrete
- Use curing water at temperature within 20°F of the concrete temperature
- Avoid premature of sudden release of ponded water, which can damage the surrounding environment

b. SPRINKLING OR FOG SPRAYING
- Keep surface continuously wet alternate wetting and drying cause craze cracking
- Use low water pressure and flow to avoid washing away the fresh concrete surface
- Use a water temperature within 20°F of the concrete temperature
- Avoid if water runoff can damage the surrounding environment

c. USING WET MATERIALS
- Very the concrete with wet hessian. straw. sawdust or sand
- Wet continuously or cover plastic sheets and wet frequently
- Avoid materials that discolour concrete
- Prevent materials from blowing away

d. USING PLASTIC SHEETS OR WATERPROOF PAPER
- Use flat. lap edges 6 inches. and cover exposed concrete edges
- Use minimum 4 mil thick plastic sheet: white in hot weather and black in cold weather
- Don't use on architectural Concrete
- Secure covering to prevent concrete exposure

e. USING CURING COMPOUNDS
- Apply to the concrete as soon as the bleed water has gone and the new concrete has hardened sufficiently so as not to be marked by the application process.

References.

"Design and Control of Concrete Mixtures. EB001.12T. Chapter 10. Portland Cement Association. 1980 Readymix (W.I.) Limited

Your Manufacturer

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