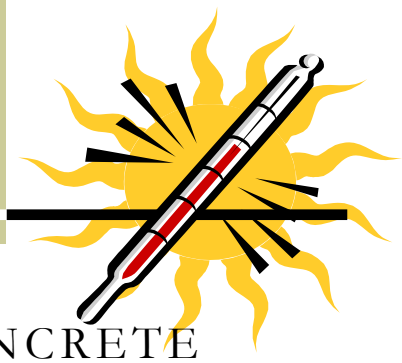
The Concrete Promotional Group

Volume 2, Issue 8

HOT WEATHER CONCRETE



ON THE BACK FIND:

HOT WEATHER CONCRETE

What is Hot Weather Concrete?

Hot weather is any period of high temperatures which require special precautions to be taken in order to ensure proper handling, placing, finishing and curing concrete.

This is most often associated with summer conditions, however high winds, low humidity and solar radiation can occur anytime, especially in arid or tropical climates.

Hot Weather Conditions Include:

- High Ambient Temperatures
- High Concrete Temperatures
- Low Relative Humidity
- High Wind Speed
- Solar Radiation

Why bother with hot weather concreting practices?

- **Durability and Surface Life.** Proper curing leads to better surface hardness thus better wear and abrasion resistance.
- **Strength gain.** Controlled tests show us that concrete in dry, hot, arid environments can lose up to 50% of it's potential strength due to water loss, than concrete placed in moderate temperatures with moist curing. Concrete placed in high temperatures will typically gain early strengths but can compromise later strength gain. Proper curing can resolve some of these issues. Planning for them ahead of time makes all the difference in the world.
- **Better Service and Appearance.** Proper curing will reduce the opportunity for crazing, dusting and scaling. A slab that "dried out" before it was done hydrating will have a weak surface and thus poor resistance to wear and tear.
- **Save Expensive Repair Costs or Replacement Costs.** Properly placed, jointed and cured concrete will last a long time without expensive maintenance or replacement costs.
- **Do it Right the First Time.** If you are going to place concrete at all you might as well do it "right the first time". Preplanning, preparation, proper workforce, proper tools and good old fashion hard work will produce a durable and strong concrete surface to hold up to nature and wear and tear!

Wet burlap and white curing compound two different types of concrete curing.

Plastic Shrinkage Cracks

Plastic shrinkage cracks form when the water evaporates from the surface faster than it can travel to the surface during the bleeding process; creating rapid drying shrinkage and tensile stresses in the surface that result in short, irregular cracks.

Typical characteristics include:

- Parallel surface cracks
- Spaced in an irregular fashion
- Occur soon after the concrete has been placed or finished or shortly thereafter
- Crack length a few inches to 3 feet
- Very shallow and stay on the surface

Plastic Shrinkage Cracks are typically associated with Hot Weather Concreting, or low air temperature, high concrete temperature, low humidity and high wind speed. These are often identifiable by their parallel structure, as in the picture above.

Other Sources:

National Ready Mixed Concrete Association (NRMCA)
CIP series #11, #12
888-84NRMCA
www.nrmca.org

American Concrete Institute (ACI)
Hot Weather Concreting, ACI #305R
How to Eliminate Scaling Feb. 1980, Farmington, MI
Standard Practice for Curing Concrete ACI 308
Standard Specification for Curing Concrete ACI 308.1
Cold Weather Concreting ACI 306R
(248) 848-3700
www.aci-int.org

Portland Cement Association (PCA)
Hot-Weather Concreting, Chapter 18 in Design and Control of Concrete Mixtures, ed. 17
(847) 966-6200
www.cement.org

American Society for Testing Materials (ASTM)
Specification for Sheet Materials for Curing Concrete, ASTM C117
Specification for liquid Membrane Forming Compounds for Curing Concrete ASTM C309
(610) 832-9585
www.astm.org

Rules for Hot Weather Concrete

1. Recognize that high ambient temperatures, high wind speeds, low humidity are in fact a BIG reason to make plans for Hot Weather Concreting. Be prepared ahead of time.
2. Modify concrete mix designs. Retarders moderate the heat of hydration. Slag & fly ash used in proper conditions slow the setting time. Your ready-mix supplier can help make suggestions for mix changes.
3. Limit the addition of water at the job site and add water only with care. A water-reducer may be a better choice to attain a more workable slump with out compromising water/cement ratio and durability properties.
4. Have adequate manpower to place, finish and cure the concrete in a quick efficient mode.
5. The use of evaporation retarders applied after the screeding and before the final finishing/brooming, will protect the surface from unwanted evaporation. Evaporation retarders should NOT be used as a finishing aid.
6. Begin final finishing as soon as the water sheen has left the surface, don't wait until the next day. By then it is usually too late.
7. Cure immediately after the finishing phase. Make sure the ENTIRE surface is sufficiently covered.
8. Curing methods can include wet burlap, plastic sheeting, liquid membrane compounds, or water, etc... Plastic sheeting can "model" (discolor the surface where the plastic sheeting touches or has a wrinkle in the fabric) the surface. When using liquid curing compounds make sure the entire surface is covered sufficiently. The white pigmented version gives a visual that the surface is completely covered and the white tint reflects the heat away from the slab below.
9. Protect test cylinders at the jobsite by shading and preventing evaporation as well. Field curing boxes with ice or refrigeration, maintaining the curing temperatures 60°F to 90°F, are always recommended.
10. Be careful using accelerators in hot weather, they can increase the possibilities for plastic shrinkage cracks.
11. Work with your local ready mix producer to fine tune a good hot weather mix design with the local materials in your marketplace.

The Concrete Promotional Group, Inc.

913-341-5800
15700 College Blvd., Suite 103
Lenexa, KS 66219
www.concretepromotion.com

Dedicated to quality concrete construction