4-6-2002

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HOT WEATHER PRECAUTIONS FOR POURING CONCRETE

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High temperatures accelerate the hardening of concrete and more water is generally required to maintain workable consistencies. If the water-cement ratio is not maintained by adding additional cement, strength and durability will be reduced. For example, if the temperature of concrete is increased from 50 degrees F to 100 degrees F, about 33 pounds (roughly four gallons) of additional water is needed per cubic yard of concrete to maintain a three-inch slump. If the water content of concrete is increased without increasing the cement content, the strength and other properties of concrete are adversely affected.

High water contents also mean greater drying shrinkage. Furthermore, setting is accelerated which shortens the time within which the concrete can be handled and finished. Curing concrete requires that it be kept damp so that hydration can be completed, therefore, it cannot be allowed to dry too rapidly.

Keeping equipment such as mixers, chutes, wheelbarrows, etc. in the shade or covered with wet burlap will reduce the effect of the sun’s heat. Forms, reinforcing steel, and subgrade should be sprinkled with cool water just before the concrete is placed. Wetting down the area cools the surrounding air and increases the relative humidity. This not only reduces the temperature but also minimizes the evaporation of water from the concrete. However, be sure there are no puddles or standing water on the subgrade prior to placing the concrete. Sometimes, if it can be scheduled that way, delaying the placing of concrete until evening or late afternoon may result in improved conditions.

Cooling the water and aggregates is probably the most practical method of controlling concrete temperatures in hot weather. Water is probably the easiest ingredient to cool and the most effective, pound for pound. Cool water should be used when cement mixing, and if water must be stored, it should be stored where it is not in the direct rays of the sun. Tanks should be placed in the shade, and painted white to maintain water at the lowest possible temperature. Water can also be cooled by adding ice or by refrigeration.

Aggregates have a pronounced effect on fresh concrete temperature because they represent 60 to 80 percent of the total weight of concrete. Stockpiles should be shaded from the sun and kept moist by sprinkling. Since evaporation is a cooling process, sprinkling provides effective cooling, especially when the relative humidity is low. Cement temperature has only a minor effect on the temperature of freshly mixed concrete because it represents a relatively small percentage of the total mixture.

Curing is a hydration process and requires water to be present. Forms should be sprayed with water to keep them damp, or they will absorb part of the mixing water. As soon as the concrete has set sufficiently to prevent marring the surface, it should be covered with straw, burlap, or other materials such as sand and kept moist for several days. Covering with polyethylene plastic sheets or using curing compounds helps in preventing evaporation by air or wind. Anything to prevent rapid dehydration will be helpful.