



Construction and Materials TIPS

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HOT WEATHER CONCRETING

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The American Concrete Institute (ACI) publishes the *ACI Manual of Concrete Practice*, a five-volume document containing numerous reports and standards on concrete practices and procedures. ACI 305R91, "Hot Weather Concreting" is a very useful and practical document addressing the issue of placing, finishing and curing concrete during hot weather operations.

Hot weather is defined as any combination of conditions such as high ambient temperature, high concrete temperature, low relative humidity, wind velocity and solar radiation that tend to hurt the overall quality of freshly mixed concrete by increasing the rate of cement hydration and moisture loss.

Fresh concrete problems include a higher water demand and loss of slump, leading to the use of more water at the jobsite. Fresh concrete may harden faster, making it more difficult to handle, consolidate and finish. There is also increased risk of cold joints, a higher probability of plastic shrinkage cracking and greater difficulty in controlling air entrainment content.

There can also be problems with the hardened concrete. Such problems include lower 28 day strengths and an increased potential of drying shrinkage and differential thermal cracking due to the cooling of the structure or from differences in temperature within the concrete member.

All of these problems lead to a decrease in the overall durability of the concrete; therefore, it is important to take special precautions during hot weather conditions.

ACI recommends good planning and the use of cool concrete, which should be transported, placed, consolidated and finished with minimal delay, while protecting it from moisture loss at all times.

Another good source of information on hot weather concrete is in the Portland Cement Association's publication, *Design and Control of Concrete Mixtures*. Every district laboratory should have at least one copy of this publication.

The rate of cement hydration (driven by temperature) and moisture loss are the key concerns. If concrete temperature can be controlled and the concrete protected from moisture loss during placement and curing, problems during hot weather operations should be drastically reduced, if not eliminated.

For further information, please contact Andy Naranjo, PE., of the Rigid Pavements Branch, at 512-506-5858 or Andy.Naranjo@txdot.gov.