C - 14: Cold Weather Concrete

The ready mix producer faces many additional obstacles when producing concrete in the winter months.

Labor costs rise considerably due to additional time-consuming chores by plant people, as well as mixer drivers. Equipment maintenance costs escalate and hot water boilers need to be working well to maintain adequate concrete temperatures. Concrete mixer trucks must be drained of all water at the end of each workday (except those accommodated by inside heated storage). In general, even the easiest task is lengthened due to the below freezing temperatures.

Although quality concrete can be produced using either a dry batch or a central mix plant, it is somewhat easier to meet the challenges presented by cold weather with a central mix plant. As an example, slump control in a central mix plant takes place in the central mixer as opposed to being subject to the experience of the individual ready-mix driver in a dry batch plant.

Aggregate temperatures need to be monitored in the winter months. State and highway agencies demand accountability for aggregate temperature during cold weather.

If inside storage is not available for materials, a system of blankets and hot water plumbing through the aggregates can maintain sufficient temperatures.

In the field, quality control needs to be closely monitored. Concrete test cylinders must be maintained at a temperature between 60º F and 80º F (16º C and 27º C) at the job site for 24 hours until they are taken to a laboratory for curing.

Cylinders left out in sub-freezing conditions will have reduced strength gains. Extra precautions need to be taken to insure that a proper initial curing environment is reached and maintained for cylinders. Light bulbs can be placed in curing boxes to keep cylinders at the appropriate temperature. Blankets placed on top of insulated curing boxes can also achieve similar results.

Concrete can be placed throughout the winter as long as areas surrounding the placement have been heated prior to the arrival of the concrete. Heated enclosures and the use of tarpaulins can protect fresh concrete from the harsh winter environment. Properly vented interior space heaters can be utilized to maintain the ambient temperature at approximately 50º F (10º C) or higher.

With an increased emphasis on meeting deadlines, cold weather concreting is becoming a necessary part of our industry. If the extra precautions are followed, quality, durable concrete can be placed year round.