Number: E-05-001

Date: 02/14/2005

ENGINEERING DIRECTIVE

CHIEF ENGINEER

JOBSITE CONCRETE SLUMP ADJUSTMENT

Supersedes Engineering Directive E-03-001, dated May 15, 2003.

Purpose

This Engineering Directive establishes an alternative procedure to adjust concrete slump at the location of concrete placement.

Hold-Back Water

MassHighway Standard Specification M4.02.10 states, in part, "Concrete may be tempered only once before initial set with the permission of the Engineer and only with an approved superplasticizer to bring the slump back to within the specification."

However, due to the sensitivity of superplasticizer, small slump adjustments cannot be easily achieved or controlled with the addition of superplasticizer.

When concrete arrives at the project with a slump lower than allowed by specification, hold-back water may be considered as an alternative to superplasticizer to temper concrete to bring the slump back to within specification. Hold-back water is the portion of the design mixing water which was held back during the initial mixing at the concrete plant. This tempering may only be done once before initial set with the permission of the Engineer.

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Plant Approval

Concrete producers may request prior approval from the District Materials Engineer for permission to hold back batch water during concrete production in an amount not to exceed 5 gallons per cubic yard of concrete. The District may disallow the use of hold-back water at any time if the concrete producer fails to follow the procedures outlined in this Directive. The concrete producer's representative (batch person or quality control representative) shall be responsible for calculating the amount of water to be held back during production based on the approved mix design.

The amount of water held back during production shall be clearly stated and printed on the delivery ticket to indicate the maximum amount of water that may be added at the location of concrete placement for slump adjustment. MassHighway project personnel shall monitor and verify the amount of hold-back water to be added and shall sign off on the delivery ticket at the location of concrete placement.

Water Tank Sight Gauge

Water tank sight gauges shall be readable in both Metric and English units and shall be maintained by the concrete producers in accordance with the manufacturer's recommendations. Trucks with broken sight gauges will not be allowed to temper concrete with hold-back water.

Jobsite Slump Adjustment Guidelines

- The maximum amount of hold-back water allowed to be added at the job site shall not exceed 5 gallons per cubic yard of concrete.
- Concrete may only be tempered once with hold-back water or superplasticizer.
- All tempering must be done in the presence of MassHighway field personnel.
- All water added to the concrete at the project must be measured, verified by the sight gauges and recorded on the delivery ticket. Hold-back water should be added to the entire batch. No tempering shall be allowed if more than 10% of the batch load has been discharged.
- MassHighway field personnel shall monitor and verify the amount of hold-back water addition and shall sign off on the delivery ticket.
- The adjusted concrete slump must be within the acceptable specification limits.

- The total water content shall not exceed the amount specified in the approved concrete mix design. Concrete with water in excess of the design amount shall be rejected.
- The time limit between batching and placement/discharge, as specified in the Standard Specifications, shall not be exceeded.
- The concrete shall be mixed for an additional 30 revolutions at mixing speed after the addition of water or superplasticizer.
- For superplasticized concrete, only superplasticizer shall be allowed to temper the load.
- Upon attaining the desired slump, no further addition of water shall be permitted.