Technology in Practice

What, Why & How?

TIP 19 - Reuse of Returned Concrete

This TIP provides guidance to concrete producers on managing returned concrete and options for disposal or reuse. It includes guidance on reusing freshly mixed returned concrete in accordance with ASTM C1798

WHAT is Returned Concrete?

Concrete that is retained in the truck mixer in a plastic or unhardened state when it is returned to the plant after a delivery is referred to as returned concrete. The minimal amount of concrete coating the inside of a mixer after the full load has been discharged is not considered returned concrete. It is normal practice to batch a new load in a buttered (coated) mixer without washing out this material.

Concrete can be returned to the plant if the purchaser orders an excess quantity or if concrete fails to meet the requirements of the purchaser or specifications on a project. In some cases a load may be batched incorrectly and identified before it leaves the plant or the order may be cancelled. Estimates of returned concrete from producers vary from 1 to 5%, and in some cases as high as 10%, of the volume produced at the plant. Higher return volumes are often reported at plants with smaller footprints in urban areas that typically supply to projects with comprehensive specifications and more challenging delivery schedules and placement requirements. Managing returned concrete at these locations is more challenging. The volume of returned concrete in each returning truck can vary significantly and is generally unpredictable.

Based on NRMCA surveys, the volume of returned concrete due to inadequate quality or specification non-compliance is less than 1%. This suggests that most of the returned concrete results from over-ordering by the purchaser. To minimize returned concrete due to over-ordering, customers should be requested to re-estimate volume of concrete required towards the end of the placement. If returned concrete volume is related to quality or specification non-compliance, the producer should improve quality management systems to reduce rejected loads due to these reasons; and should coordinate delivery schedules and manage extended deliveries by using admixtures to avoid loads being rejected due to delays at the jobsite that can exceed delivery limits.

WHAT are the Options to Manage Returned Concrete?

Managing returned concrete represents a cost to the ready mixed concrete producer, and often to the contractor. There are many options available to the producer. All options will require some investment of capital, personnel, and other resources. With some options the producer can recuperate some of the costs. Because of the variable and unpredictable nature of returned concrete, a specific plant will need several alternative options to manage returned concrete.

Some of the options used in the industry:

- Identify alternate customers who are willing to receive loads of returned concrete that are of adequate quality for their applications
- Pave or use the material for fill at the concrete plant or other company properties
- Produce precast products such as blocks for retaining walls, highway barriers, and other applications
- Discharge material on the ground in windrows, allow it to harden and break it up for reuse, either as recycled aggregate in some loads or sell the crushed material for fill or base materials. In some cases, separation of crushed hardened returned concrete into coarse and fine fractions better leverages the