

Technology in Practice

What, Why & How?



TIP 4 - Aggregate Sample Reduction for Laboratory Testing

This TIP helps understand reducing field samples to representative aggregate samples for testing

WHAT is Aggregate Sample Reduction?

At a ready mixed concrete plant aggregates are typically stored in a bin or a stockpile. Samples are obtained to evaluate the aggregate quality or to measure properties required for proportioning and producing concrete mixtures. Larger samples are generally more representative of the supply source. ASTM D75 outlines procedures for obtaining a field sample of aggregate that is representative of the nature and condition of the aggregate that is in its storage location (TIP 3). However, most tests require a smaller quantity of aggregate to conduct an aggregate test or for a laboratory concrete trial batch. The larger field sample is reduced to a smaller test sample size required or convenient for each test. ASTM C702 provides procedures for reducing samples to the size required for testing. This process ensures that the smaller test sample is most likely representative of the larger field sample, and thus of the total supply.

WHY is Aggregate Sample Reduction Important?

By following ASTM D75 for aggregate sampling and ASTM C702 for sample reduction a smaller size of aggregate test sample that is truly representative of the whole stockpile can be obtained for aggregate testing. Aggregate sample reduction to maintain the characteristics of the aggregate lot is equally as important as the tests conducted on the aggregate sample. Following these procedures will ensure that the aggregate test results are not biased due to sample preparation that might cause other problems in producing quality concrete.

HOW is Aggregate Sample Reduction Done?

There are three methods for the reduction of larger field samples of aggregates discussed below. For sample reduction of a fine aggregate a mechanical splitter works best if the aggregate is drier than the saturated surface dry (SSD) condition. For wet fine aggregate use the quartering or miniature stockpile procedure. It is permissible to change the aggregate moisture condition so that a specific sample reduction procedure can be used. For coarse aggregate and mixtures of coarse and fine aggregates the sample splitter is the preferred method but the equipment may not be commonly available, in which case the quartering procedure should be used.

Mechanical Sample Splitter

Sample splitters are mechanical devices that reduce sample size by means of passing the sample through a number of adjoining chutes that direct the flow of the aggregate into two different containers. Material from one of the containers is then eliminated or set aside for further reduction and/or additional aggregate testing. Material from the other container is returned through the sample splitter. The process is continued until the sample reaches the required size for testing. Mechanical sample splitters are available in different sizes to process fine and coarse aggregate. The aggregate should be introduced uniformly so that approximately equal amounts will flow through each chute.

Quartering

Place the original sample on a clean, hard and level surface. Using a shovel or scoop mix the material