TECHNICAL BULLETIN # 7

Retempering Concrete

Concrete is designed and proportioned to meet industry standards and project specifications to provide a durable and long lasting product. The producer is expected to deliver a consistent product from one load to the next. A number of circumstances can produce challenges to the producer to meet this end and occasionally loads will need to be adjusted on site before placement in the forms. Standards and codes often limit the extent to which a load can be adjusted on site and as such accurate measurement and assessment of the relevant parameters of a load are crucial before selecting and implementing any measure to adjust the load.

Both the driver and his support team (QC and Dispatch) should be well aware of the apparent sensitivity of all parameters of the load on board in order to select the most appropriate adjustment tool. Any retempering decision to address slump or air content usually has a secondary effect that must be considered before implementation to avoid falling outside of other specification limits (and short of owner expectations) which could result in the unnecessary rejection of the load.

With the exception of intentional site adjustments of loads for workability such as when site addition of a superplasticizer is planned, most retempering actions should be avoided. When they can't be avoided, they should only be implemented when the required adjustment is a relatively minor one. Assessing the need to make an adjustment starts with accurate field testing of the concrete in its plastic state by experienced certified testing technicians. The observed site result should be weighed against any QC test results from the load when it left the plant along with anticipated shifts in parameter values that have been observed historically with the mix design and the materials contained within. A decision can then be made on the viability of adjusting the load to bring it back to within the parameter ranges stipulated in standards, codes or project specifications.

Once the decision to adjust the load is taken, it should be done once, and in many circumstances that is all that is allowed by standard or the project specification. The single adjustment selected should be the one most likely to bring all parameters of the concrete back into their desired ranges of acceptance. Though this may not always be achievable, the decision to accept the result should always be based upon the likelihood that the final placed material will provide the intended durability and service life.

CSA A23.1:19 Clause 5.2.5.3 Control of slump or slump flow and air content, outlines the protocol for retempering a mix including the time limits for doing so, the quantity of water that can be added to a mix, on whose instruction the water may be added, the mix design and mix sequencing limits that determine whether water may be added and the required record keeping of any retempering activities. It also stipulates minimum remixing criteria for any retempering activity to ensure the effect is distributed evenly throughout the load.

The quantity, proportions and the source of each cementing material in the mix will have a direct influence on the type and degree of response of any retempering activity. The concrete temperature, ambient weather conditions and the elapsed time from batching will not only have a direct influence on the need to retemper but also the response that can be expected from retempering.

In summary, planned site adjustment of a load such as the intentional addition of a High Range Water Reducer (Superplasticizer), should be well defined in advance of concrete placement and agreed to by all parties. Unplanned retempering of a load should be a measure implemented once and only as an exception when unavoidable or unanticipated plastic properties of concrete are encountered upon initial offloading onsite.