What Does a Good Concrete Field Quality Control Technician Really Need to Know?

By Fernando Rodriguez, II, Regional Quality Control Manager Mid-Atlantic Region, Aggregate Industries

There is no question about it, a good quality control (QC) technician is a valuable asset to a ready mixed concrete producer.

It is extremely difficult to measure the savings that a QC technician accrues over the years. QC technicians can save money for a concrete producer in many ways. For example, by adjusting loads in the field or checking the fineness modulus of the fine aggregate prior to batching concrete. These value-added skills make the QC technician a critical component of project success. However, a QC tech is required to do much more. It is difficult to completely outline a job title and/or job description for a technician. But, in today’s economy, a technician is part engineer, part negotiator, part salesperson, part loader operator and part batch man.

A general statement of objectives for the QC technician is:

- Follow established quality control procedures to ensure concrete produced meets the purchaser’s requirements
- Monitor quality of concrete produced to minimize the chance of delivering concrete that does not meet the purchaser’s requirements
- Follow procedures to troubleshoot concrete problems delivered to the purchaser to help identify the cause of the problem.

In a well structured quality control program, the time spent on the last point should be minimized by ensuring proactive quality control in the first two points.

In terms of the engineering or technical aspects of their jobs, what does a quality control technician really need to know to perform his or her job? Some of the basic requirements are basic math, some geometry, good report writing skills, and in today’s world, a basic working knowledge of computers. These skills should be considered a given.

Certification is another must for the good QC tech. Certifications not only give the technician enhanced credentials, but they also help instill the confidence needed for the technician to perform his or her job. These qualifications should go beyond certifications to perform standard tests to a broader knowledge of fundamental concrete technology. Based only on the author’s experience, it is appalling how many independent testing laboratories have non-certified technicians stationed at the projects with the authority to reject loads of ready mixed concrete.

A good technician is well versed in his company’s concrete mixes and proportions, but more importantly, in the interactions of the different combinations of local materials. Technicians usually know which sand requires more water to attain a certain slump; they know which cement sets faster and which has a faster rate of strength gain.

They are also able to make air-entraining admixture dosage rate adjustments to air-entrained mixes when the need arises, such as when a sand source has been changed.

Technicians should know the basic performance characteristics of chemical admixtures. They do not need to be chemists, however; they should know how the admixtures enhance the performance of the concrete. They should be able to identify if too much or too little admixture is going into a load of concrete. They should be able to recognize when the levels of high range water reducer will cause retardation of the set time in a load of concrete.

It is important to know the state or local government concrete mix specifications. These specifications are usually very stringent and most, if not all, concrete batches are tested at the project by agency representatives. Therefore, a good technician is also involved in the state certification program.

Their capability to calculate volumes, unit weights and yields are paramount. In today’s economy, customers want exactly what they are paying for. If a customer orders 10 cubic yards of concrete, they expect 10 cubic yards of concrete. It is important to demonstrate that the batching equipment is performing as designed and is batching to required tolerances and batch quantities are recorded. The technician must be able to go to the plant that batched the concrete in question, retrieve the batch records and calculate the yield, assuming they ran a unit weight prior to placement of the concrete. If a fresh unit weight test was not performed, the technician can at least verify that all of the materials were weighed properly and introduced into the mixer.

Also, at some point early in the technician’s career, he or she should have read and understood the responsibilities of the ready mixed concrete producer stated in ASTM C94, Specification for Ready-Mixed Concrete. At the very minimum, they should have a copy of basic ASTM standards in their vehicle and readily available to reference. They should also have an understanding of the general
requirements for acceptance and rejection of fresh and hardened concrete stated in ACI standards. The concrete contractor should see the technician as a valuable resource for his organization as well. Contractors may need the answers to questions that a technician may not know, but it is important that a good QC technician knows where to find those answers.

A strong working relationship with the concrete contractor is extremely valuable. The trust that is developed helps both parties during a concrete placement and during the duration of a project. When a contractor gains a sense of confidence in the concrete producer, it makes the job easier for everybody.

A working relationship with the concrete delivery professionals (CDP) is also very important. CDPs are an excellent source of information. The CDPs see and hear a lot of things that can help resolve issues in the field. The CDP is there when the concrete was placed, he/she knows who placed it, how it was placed, and many other details that are not available to the quality control manager when conducting an investigation.

CDPs may share this information with the technician due to the fact that they see them more often than the QC manager.

A good QC technician is able to perform in-place non-destructive tests in the field and will give those results to the QC manager conducting the investigation. Experience with the Windsor probe system or rebound hammer is very important, since it is a good indicator of potential low strength issues. However, these devices can be very sensitive to field use and are often misunderstood. A QC technician with these devices can save a ready mixed concrete producer a lot of money at a minimal investment to the company.

A basic understanding or experience with the batch plant operations is also helpful. The technician may be able to help solve certain issues with this knowledge. An example might be, having familiarity with the batching sequence can help with non-uniform mixing, air content issues or yield problems.

The technician must know his or her equipment! In markets where air-entrained concrete is produced the most important piece of equipment in the technician’s inventory is the air meter. Not only can it be used to run an air content test, but it can also run a density (unit weight) test. The air meter bucket must be calibrated in order for it to be useful. The air meter should indicate the latest calibrated initial pressure, along with bucket weight and bucket volume inscribed on the side along with the date of the latest calibration. An experienced technician should be able determine if the total air content of a sample is high or low simply by determining the weight of the concrete in the air meter bucket.

In conclusion, although it is difficult to calculate the savings generated by a good QC technician, there is no doubt that the Quality Control Technician is an essential part of the successful ready mixed concrete company. A good QC technician is the heart of a Quality Control department and should be seen as a valuable resource and asset to the management team.

For more information, contact Mr. Rodriguez at Fernando.Rodriguez@aggregate-us.com.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.