

# Did You Mix QA with QC? You Monster!

Okay, we're going to have a little fun here at the expense of academic researchers and probably someone at the Federal Highway Administration, who we'll refer to as Trent, but along the way, we might accidentally learn you something about quality assurance in the work you do or have done by contractors.



We should probably pause here to note that no animals were harmed in the writing of this article and all names, characters, and incidents portrayed in this little vignette are fictitious because, well, this is partly intended to be humorous. Trent is a fiction of our imagination and no identification with actual persons (living or deceased), places, buildings, and products is intended or should be inferred. Okay?

Let the good-natured mocking begin. Did you know that the Transportation Research Board (TRB) dedicated 48 pages to [Circular Number E-C235](#), Glossary of Transportation Construction Quality Assurance Terms? Oh, it gets geekier – this is the Seventh Edition. It's been revised six times. Seriously. You're suddenly feeling better about that collection of vintage metal beer cans you have in the garage, right? Well, if it is that dynamic a topic, we better have a look at what the excitement is about.

Here's the Executive Summary. First, Quality Assurance (QA) is not Quality Control (QC). Oh gosh, don't even kid about it, because that is a sore spot with Trent. QC is a subset of QA, along with Independent Assurance (IA), verification sampling and testing, validation (it's only one word, so it doesn't get a cool abbreviation), dispute resolution, and acceptance. QA is all the stuff an owner organization does to pursue high-quality construction, whereas QC are all the specific tests and processes required of the contractor to (ironically) *assure* to the owner that everything is tip-top shape. We had a flow chart almost done that would explain everything, but the software we were using curled up in the corner and wept most of the morning, so we just put caution tape around it and moved on. The point is, QA is the Big Dog and basically, all roads in construction lead back to QA (the flow chart was just a big circle with arrows along the way). And whatever you do, do not, DO NOT, ever, EVER say QA/QC – unless you want to watch Trent's head explode.



Figure 1 An Example of Quality Assurance

Alright, we've had our fun. But as we increasingly move many aspects of construction in the public works arena towards performance specifications, the roles of QC, validation, IA, and other aspects within a QA program become more important if, for no other reason, to be clear where the responsibilities for each rests.

In the Circular, the TRB Committee defines QA as, “all those planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service; or making sure the quality of a product is what it should be” (see Figure 3, which does little to illustrate what this means). In our world of public infrastructure, QA addresses the overall process of obtaining quality in the construction of that infrastructure. So, as the Committee says, “QA includes the elements of quality control (QC), independent assurance, acceptance, dispute resolution, laboratory accreditation, and personnel certification.” But by association, you have to also think of all the contract documents, bid plans, specifications, and so on that map out QA requirements and establish expectations for the contractor.



Figure 2 An Example of Quality Control

QC is the, “process specified by the agency for a contractor to monitor, assess and adjust their production or placement processes to ensure that the final product will meet the specified level of quality.” Notice that this is a requirement for the contractor to carry out and it is often detailed in standard or project-specific specifications. “QC includes sampling, testing, inspection, and corrective action (where required) to maintain continuous control of a production or placement process.” Often, some of these elements (e.g., asphalt compaction testing) are also used as a basis of payment.

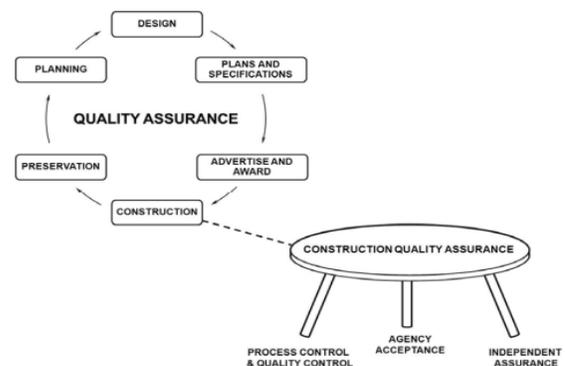


Figure 3 QA System Elements (TRB Circular E-C235)

When you think of QC, you likely think of compaction testing, concrete cylinder breaks, surveying confirmation, and so on. While those are pretty exciting, you should also think about some of the more banal elements of inspection, such as checking material labels to verify expiration dates, pot life, temperature limitations and so on. It is easy to think of QC as a series of required tests, but it also includes things like material sources (e.g., where does the aggregate come from and does it comply with our specification). QC can also be processes or plans. For example, if a mass concrete pour is planned, special activities are essential to ensure full and homogenous hydration of the concrete, so the contractor is normally required to submit a plan detailing how the pour will be controlled.

QC is also about corrective action. What? You never had a bad day? All your work is pure gold? Well, Dilbert, some people have the occasional hiccup. Good QC looks for quality issues as construction proceeds and when something turns out substandard, the key is to recognize the problem immediately through the process of good inspection, discuss acceptable alternatives to correct the error, and remedy the problem.

Anyway, the Circular goes on for some time and gets into weeds that Round-Up couldn't even address and do we think a 48-page document defining terms suggests the system is broken? No, not really. But we like to poke fun anyway.

You don't actually have to be a QA geek to appreciate the importance of defined terms, defined roles, and expected outcomes in our public works projects. If you have been involved in any project with more than trivial drama, you can probably point, partly, to a lack of definition along these lines or a failure to follow the processes with due diligence. We are in the business of designing, constructing, maintaining, and operating complicated, expensive public works and we will make mistakes and overlook things. The measure should be that problems arose despite our diligent preparedness, along with how we developed and implemented corrective action.



*Figure 4 A Quality Assurance Meeting  
(We jest of course; there's no coffee - you can't  
possibly survive a QA meeting without coffee)*