Rick Bradbury

Rick is the Director of Materials Testing and Exploration for the Maine Department of Transportation. Early in his career he spent 12 years as a field testing technician and concrete plant inspector. He's involved regionally and nationally with quality assurance and performance specifications.

INTEGRITY • COMPETENCE • SERVICE

MaineDOT

FHWA Perspective on Quality Control

Spring 2021 National Concrete Consortium Webinar

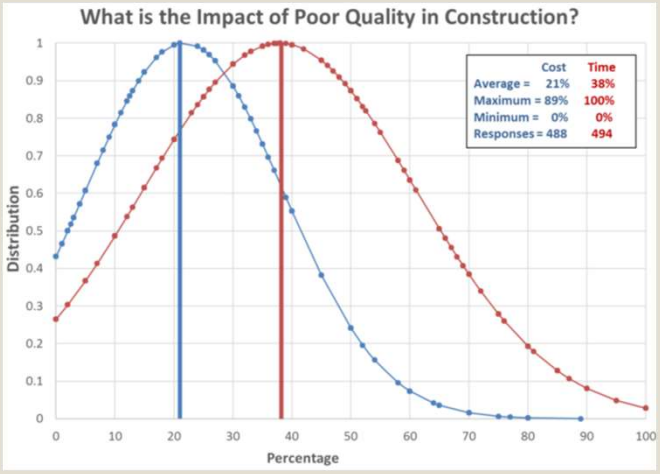
RICK BRADBURY
DIRECTOR OF MATERIALS TESTING & EXPLORATION
MAINE DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration
Office of Infrastructure

FHWA is the source for all images unless otherwise noted.

Why does the agency care about QC?

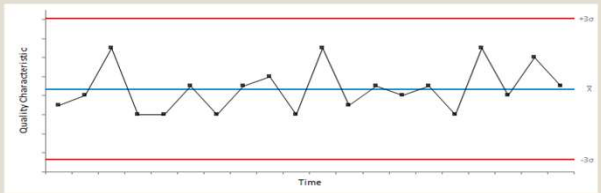
- Cost of rework is substantial
  - 9 – 15 percent of project cost
- Less experienced people
  - Need good systems in place
- Critical to success of Performance Specifications



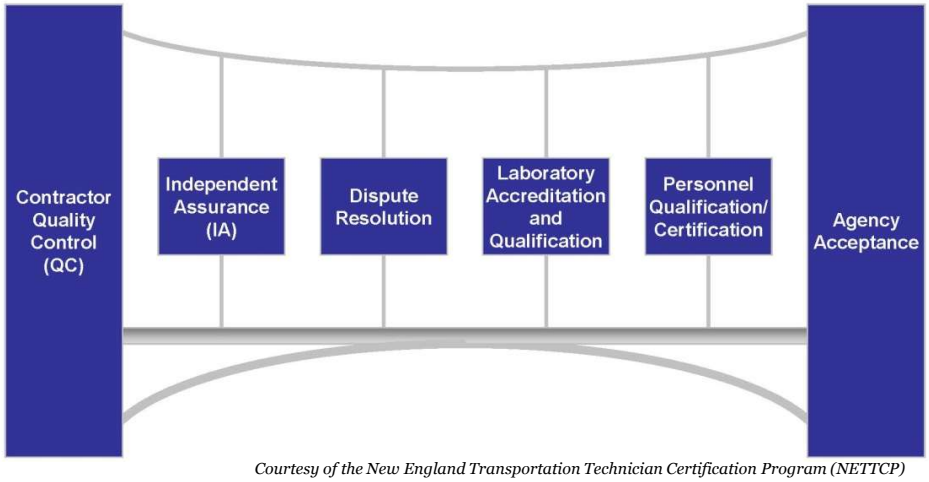
Why does the agency care about QC?

- QC is necessary to provide first-time quality
- Understanding the role of variability
- Chance v. Assignable Cause
  - Predicting future output
  - Managing a process economically

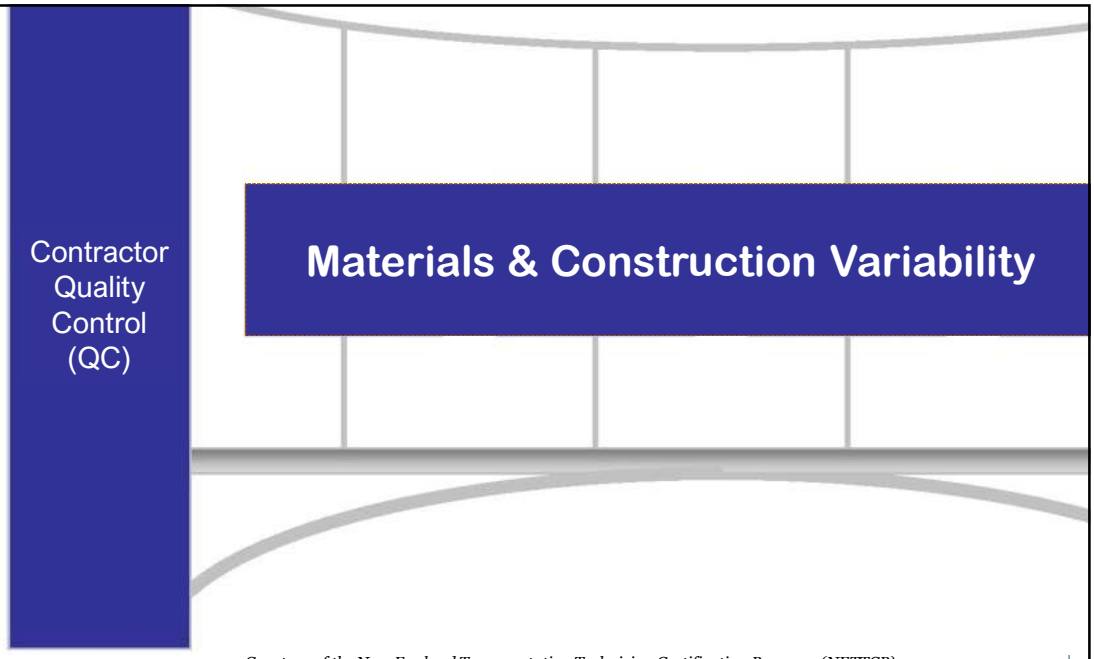
Walter A. Shewhart



Quality Assurance Program Core Elements

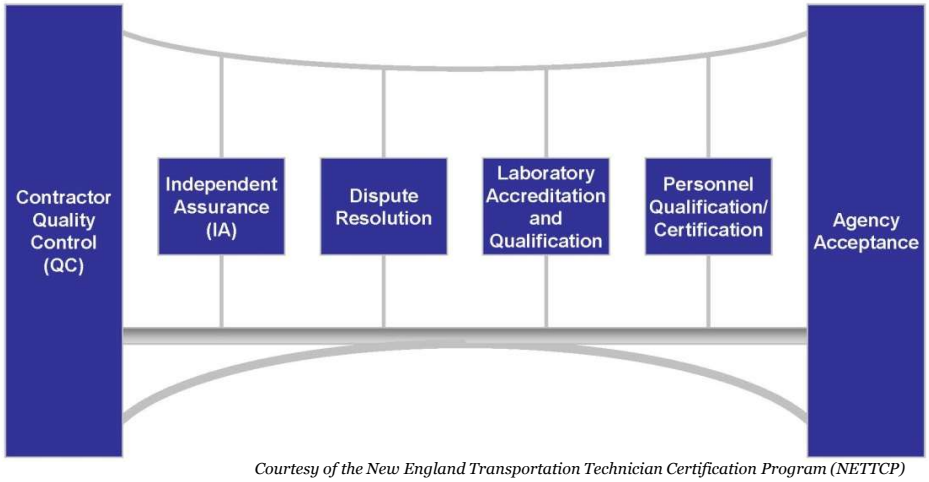


Courtesy of the New England Transportation Technician Certification Program (NETTCP)



Courtesy of the New England Transportation Technician Certification Program (NETTCP)

Quality Assurance Program Core Elements



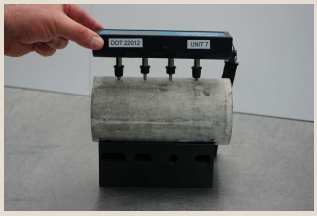
Courtesy of the New England Transportation Technician Certification Program (NETTCP)

Prescriptive vs. Performance Specifications

Prescriptive/Method	Performance
○ Agency dictates how the material or product is formulated and constructed ○ Based on past experience ○ Minimal/uncertain ability to innovate ○ Requires agency to have proper manpower and skill set to provide oversight	○ Agency identifies desired characteristics of the material or product ○ Contractor controls how to provide those characteristics ○ Maximum ability to innovate ○ Reduced oversight burden on the agency

Characteristics of a Performance Specification

- Acceptance testing that relates to performance

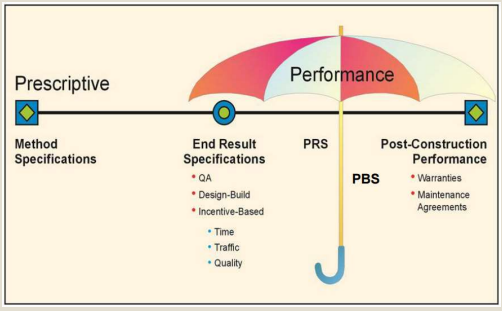


Characteristics of a Performance Specification

- Development and integration of enhanced/robust Quality Control practices and oversight
- Specification changes—moving from prescriptive to performance
  - Slump
  - Minimum cement content
  - Single aggregate gradation requirements

Why Move to Performance-type Specifications?

- Federal-aid Highway Program is moving to a performance-driven approach in all areas
- Advance/allow/encourage innovation
- Take advantage of new technologies
- Agency personnel levels
- Change in agency skill set
- Change in contractor skill set



Contractor Responsibility for QC

- Agencies assume the QC responsibility under Method/Prescriptive Specifications
- Performance specifications transfer QC responsibility to the Contractor
- Party producing/placing the product controls quality
- Agencies communicate what they are willing to accept
- *Agency ensures QC takes place*

Mirror Design-Build (DB) Experience

- DB shifts control from agency to contractor
  - Risk shifts with control
- Agency retains responsibility and accountability to the taxpayers
- Contractor submits proposal including **how** they will develop and deliver the project
- Post-award, contractor submits a **detailed QC Plan**
- Performance specifications have a similar shift of risk and control

✓ QC Plans are analogous

Image Pixabay

Quality Control Plans

- Should be:
  - Detailed and Project specific
  - Current
  - Reviewed and "Approved" or "Accepted"
    - Plan approval does not imply product acceptance
  - Implemented & Enforced
- Should <u>not</u> be:
  - Generic
  - Paper exercise
  - Regurgitation of specs

Quality Control Plans

"We don't want a QC Plan. What we want is quality – to give us quality, you need to have a plan."

- Bob Lauzon, ConnDOT

Agency Acceptance Function

- Quality measurement is achieved through three acceptance activities:
  - Monitoring the adequacy of contractor QC
  - Performing acceptance inspection to identify visually deficient work
  - Performing acceptance sampling and testing for key quality characteristics, per the specification
- Agency is obtaining information to confirm that the product meets the specified quality level

Scope of Agency Monitoring Activities

- Periodic visual observation of QC inspection, sampling, and testing
- Review of QC records/documents to ensure properly prepared, maintained, with documented actions
- Providing feedback to contractor's personnel

AASHTO PP84

- Acknowledges the key role of QC in a performance specification
- Requires an approved QC Plan
  - Testing targets, frequency, and action limits
  - Equipment and construction inspection
- Requires QC testing and control charts
  - Unit weight
  - Air content/SAM
  - Water content
  - Formation Factor (via Surface Resistivity)
  - Strength

Image Pixabay

"You're Asking for a Lot of Change"

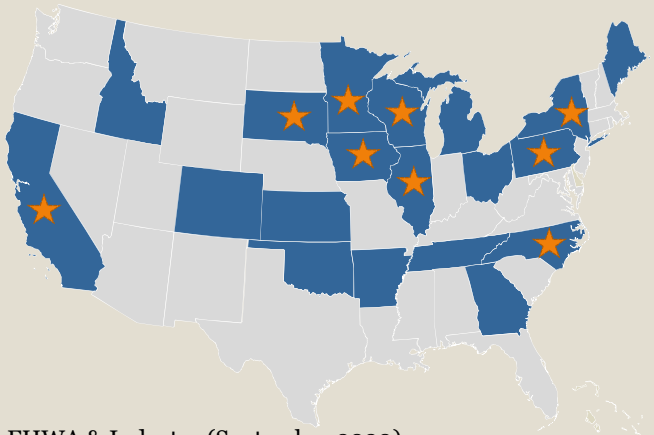
Change has already happened!

- Cements
- Widespread use of SCMs
- Advancements in chemical admixture technology
- De-icers
- Agency personnel and experience levels
- Industry knowledge base

Culture Change Moving Forward

- Agencies alter specifications to remove unnecessary prescriptive requirements (promote innovation)
- Agencies alter acceptance processes to include QC requirements and monitoring
- Incorporate new tests and technologies that facilitate real-time QC
- Contractors "up their QC game" (as needed)
- FHWA provides agency and industry guidance and funding to facilitate implementation

PEM Pooled Fund Participants



19 States + FHWA & Industry (September 2020)

★ PEM Implementation Incentive Pilot Project

- Contact info

Michael.Praul@dot.gov

207-512-4917