Development and Use of Effective Quality Plans

National Concrete Consortium

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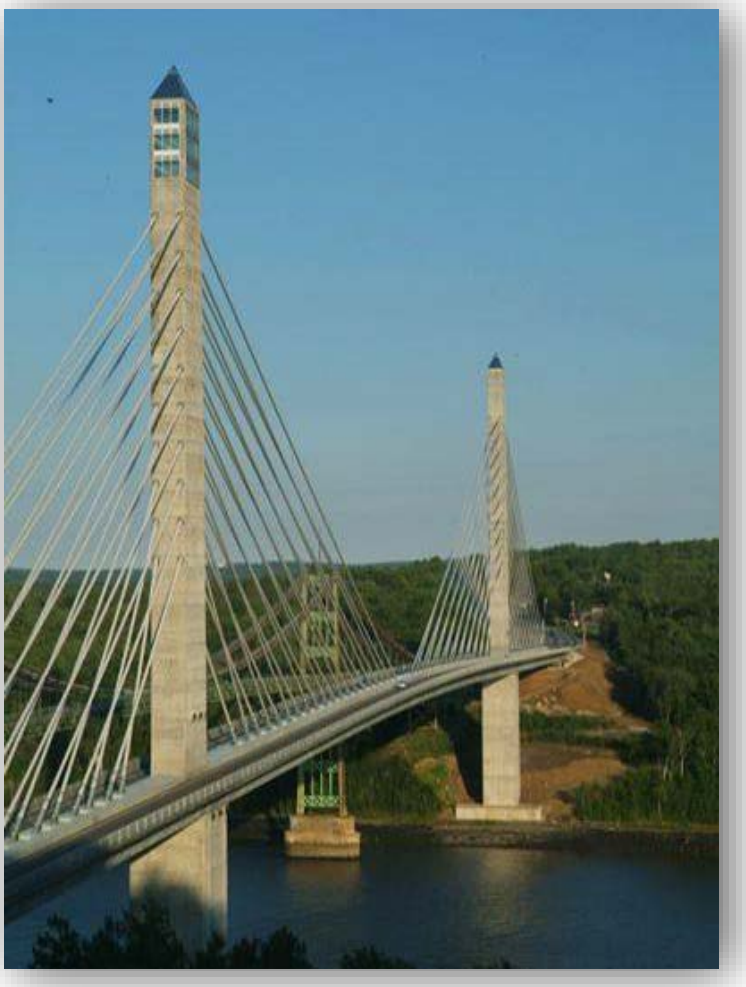
INTEGRITY • COMPETENCE • SERVICE

MaineDOT

Maine's QA Journey

- Fully implemented for HMA and PCC in 1998
- Team effort among DOT work groups, FHWA and industry
- Consultant review in 1999
- Numerous changes since then



QUALITY

1) Degree of excellence.
2) Satisfies the needs of a specific customer.
3) Conforms with a given requirement.

Quality is inversely proportional to variability.

Sources of Variability

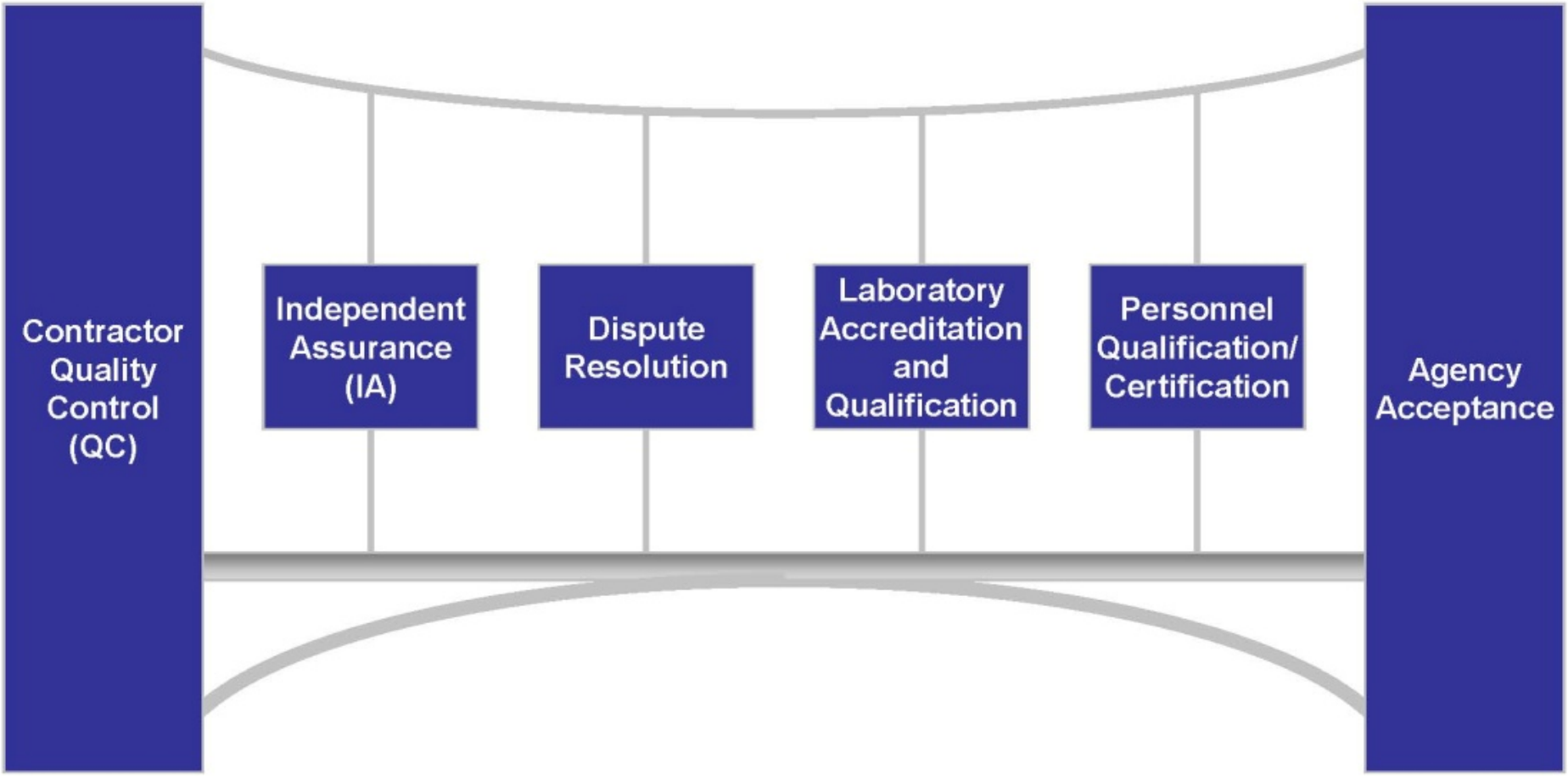
Materials

Construction

Sampling

Testing

Core Elements of a Quality Assurance Program



Courtesy of NETTCP

Quality Control

- Focus on materials & processes
- Prevent defective material
- Can be used to improve quality
- Proactive

Acceptance

- Focus on final product
- Identify defective material
- Used to measure quality
- Reactive

Mistaken Ideas

- Quality Control = Testing
- “QC is a good idea, but it’s not required.”
- “It’s the DOT’s tests that count – QC results don’t matter.”
- “If we approve the QC Plan, how can we reject work?”
- Acceptance testing will assure quality.
- QA pay reductions will offset poor quality.

Let’s get back to fundamentals

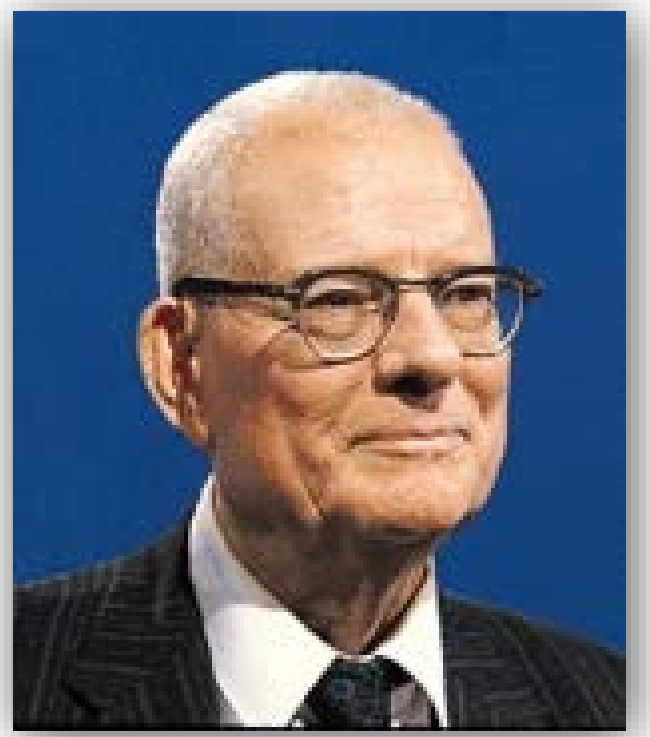
Walter Shewhart

- Bell Telephone labs, 1924
  - Memo describing SPC as means to improve quality
- Introduced control charts
- Variability
  - Chance cause v. assignable cause

Recognized that continual process-adjustment in reaction to non-conformance actually increased variation and degraded quality.

W. Edwards Deming

- 20th century leader in quality management
- Focus should be on process improvement
- Warned against reliance on statistical acceptance plans
  - Cannot directly improve quality



"A bad system will beat a good person every time."

Quality Control Plans – Why?

Translates customer requirements into actions

Quality Control Plans

- Should be:
  - Project specific
  - Detailed
  - Current
  - Reviewed/approved
  - Implemented & Enforced
- Should not be:
  - Generic
  - Paper exercise
  - Regurgitation of specs

QC Plan Approval

- MaineDOT specifies two plan types:
  - Standard QC Plan: company-wide QC practices
  - Project specific QC Plan: detailed for single project
- Standard plan approval:
  - Team of statewide QA personnel & FHWA
  - Provides consistency of review
  - Prevents changes from being missed
- Project specific plan approval
  - Combination of statewide personnel & project team

Quality Control Plans - Maine

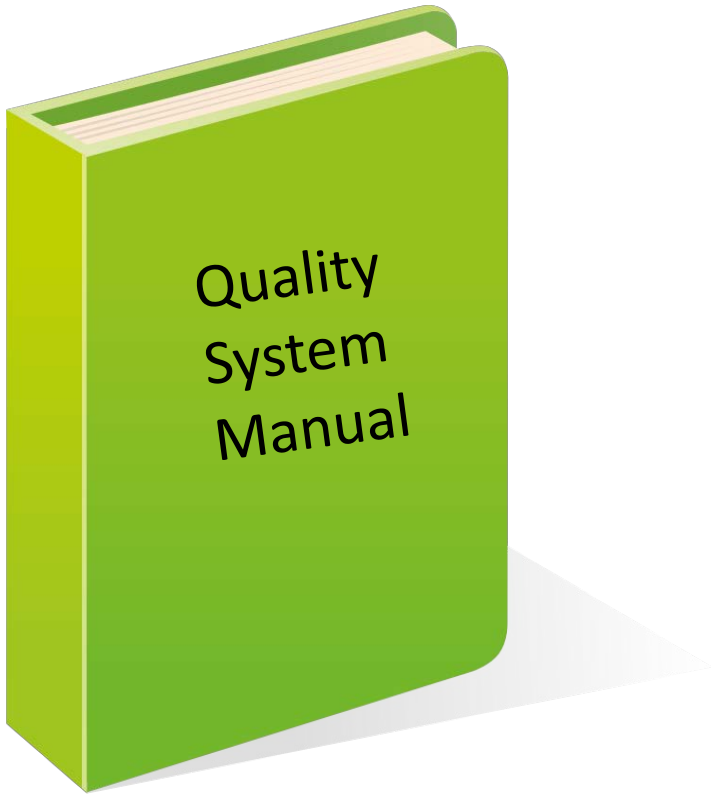
- Approved plan becomes a contract document
- Specification includes financial penalties for noncompliance
  - 1st incident – written warning
  - 2nd incident – work suspension and 1% penalty
  - 3rd incident - work suspension and 2% penalty
  - 4th (and subsequent) - work suspension and 3% penalty
- Penalties intended to encourage QC Plan compliance – not related to material quality

QC Plan Administrator

- Responsible for plan implementation
- Minimum requirements - Concrete:
  - P.E. + 1 year experience
  - E.I.T + 2 years experience
  - B.S. in Civil Engineering + 3 years
  - NETTCP QA Technologist
- Minimum requirements - Asphalt:
  - NETTCP QA Technologist

QC Plans – future?

- Considering move to Quality System Manuals for production facilities
- Comprehensive document outlining all aspects of quality management system
- Less frequent review/approval
- Supplement with QC Plans

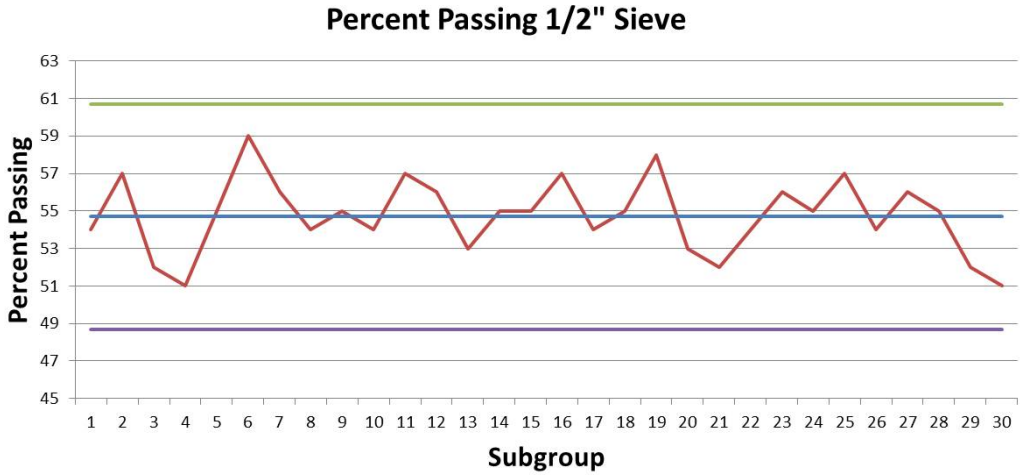


Rethinking QA in Maine

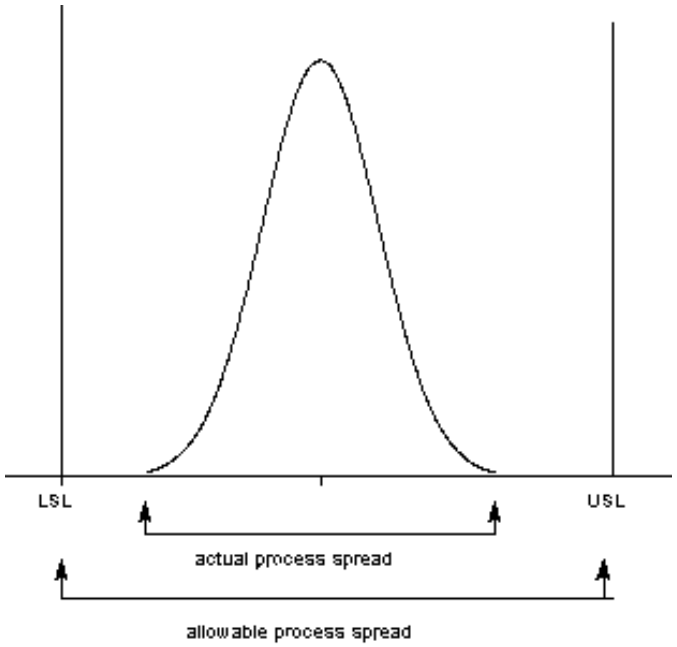
- In 20 years, have not seen continuous improvement
  - Quality levels static or slightly declined
- Too much focus on Acceptance provisions
- Possibly focusing QC effort too heavily on delivered product
- Not enough emphasis on controlling/improving processes
  - Is our specification hindering progress?
  - Are there truly incentives to improve quality?

We should be asking……

Is your process in control?



Is your process capable?



Department of Defense approach

- MIL-STD-414 (1957): focused on acceptance sampling plans
  - AQL = “contractually sufficient goal”
- MIL-STD-1916 (1996): focused on process control
  - Nonconformities = “opportunity for corrective action & improvement”

Takeaways

- Running tests ≠ Quality Control
- Acceptance testing & inspection cannot improve quality – only QC can do that
- Need to have an effective plan and implement it
- Focus on improving processes to reduce variability

Questions?