2010 MdQI Conference

ICC Construction QA/QC Lessons Learned
ICC Construction QA/QC Panel

- Mark Coblentz
- Scott Szympruch
- Robert Sebastian
- Rocky Goocharan
Mark Coblentz
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• Construction Manager for the $1.566B Inter County Connector
• 33 years Experience with Maryland State Highway Administration
• Assistant District Engineer for Construction in SHA District 5.
Scott Szympruch, P.E.
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• Construction Manager, ICC Contract A
• 16 solid years expr. on heavy highway projects
• Managed numerous complex and technically-challenging projects, including the
  – Benning Rd. Bridge replacement over Anacostia R.
Robert Sebastian, P.E.

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- CQC Manager for ICC Contract C
- 35 years of Construction QA/QC experience
- Managed numerous projects that involved
  - roadway construction
  - bridge construction and rehabilitation
  - quality control (QC) material testing
  - environmental monitoring activities
Rocky Goocharan
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• Materials Engineer on the Inter County Connector Project (ICC)
• 25 years Experience in Fabrication Plant Inspection and Materials Testing
• Partner with DB CQC Firms to develop a quality management system for off-site fabrication.
ICC Background

- Project Description
ICC Background

• Construction Organizational Structure
  – Design-Build Teams
    • Executive
    • Construction
    • Quality Control Engineer
  – ICC Project Management Team
    • Project Wide
    • Contract Specific
      – Administration
      – Quality Assurance
ICC Background

• Design – Builder QC
  – Builder
  – Project Quality Manager
  – QC Engineer
  – Construction QC Engineer
    • Contract General Provisions
    • Quality Control Plan

• ICC QA
  – Oversight
  – Independent Assurance – Through OMT
  – QA Oversight Database
Communication

• Document Control
  – Contractor Software
  – Quality Assurance Oversight System
  – Quality Records Database
  – Projectwise

Lessons

– Don’t rely upon only written documentation
– Start early with checking compatibility
– Understand limitations
– Know the end game
Communication

• Tracking Contract Compliance
  – Issue Identification
    • NC - Non Conformance (QA)
    • NCR - Non Conformance Reports (QC)
  – Issue Resolution
    • FDC - Field Design Change (DB Builder)
    • NDC - Notice of Design Change (DB Design)
    • FVR - Field Variance Request (DB Builder)
Communication

• Tracking Contract Compliance
  – Issue Identification
    • NC - Non Conformance (QA)
      – Assessments generated from QAO Database
      – 3 Priority Levels
      – Level 1 & 2 require a response
Communication

• Tracking Contract Compliance
  – Issue Identification
    • NCR - Non Conformance Report (QC)
      – Generated when Non-Compliance is identified
      – Work is stopped until the issue is resolved
Communication

- Tracking Contract Compliance
  - Issue Identification

- NCR - Non Conformance Report (QC)
Communication

• Tracking Contract Compliance
  – Issue Resolution
  • FDC - Field Design Change (DB Builder)
    – Used to resolve an NCR
    – Modification to approved design
    – Included in As-Builts
Communication

- Tracking Contract Compliance
  - Issue Resolution
- FDC - Field Design Change (DB Builder)
Communication

• Tracking Contract Compliance
  – Issue Resolution
    • NDC - Notice of Design Change (DB – Design)
      – Generated by the DB Designer to resolve a design error or conflict
      – Generated at the request of the DB Builder
      – Follows same review and comment cycle as initial design
Communication

• Tracking Contract Compliance
  – Issue Resolution

• NDC - Notice of Design Change (DB – Design)

SCOTT SYMPRUCH, P.E. – CORMAN CONSTRUCTION
Communication

• Tracking Contract Compliance
  – Issue Resolution
    • FVR - Field Variance Request (DB Builder)
      – Applicable to minor issues
      – DB Requests variance
      – QC Verifies FVR accuracy
      – QC Manager, DB-Designer & QA agree
      – Paperwork follows with required signatures
Communication

• Lessons Learned / Recommendations
  – Focus on issues that are critical to the quality of the project
    • Use Level 3 NC for Documentation / Trending minor issues
  • Don’t issue NC / NCR when corrections are immediate
Contract Compliance Resolution Process

• Parties Involved
  – Standard Bid / Build
    • Owner
      – Designer
      – 3rd Party
    • Contractor
      – Subcontractors
      – Suppliers
Contract Compliance Resolution Process

• Parties Involved
  – Design Build (ICC Contracts)
    • Owner
    • Quality Assurance
    • Owners Designer
    • DB Contractor
    • DB Designer
    • DB Quality Control
Contract Compliance Resolution Process

• Parties Involved
  – Design Build (ICC Contracts)
    • DB Builder responsible for Quality
    • QC role is to determine compliance with the design and project specifications
    • Owner is not responsible for project design but must approve all changes
Contract Compliance Resolution Process

• Lessons Learned / Recommendations
  – DB Builder needs to make Quality a core value
    • Don’t rely on QC or QA to identify issue
    • Become proactive not reactive
  – Simplify QC plan and processes to expedite issue resolution
    • Don’t set yourself up for failure
Contract Compliance Resolution Process

• Lessons Learned / Recommendations

– Empower key personnel on the DB Team to make decisions on the project

• Key personnel are submitted and approved

• Use their expertise to benefit the project
Non-Conformance Reporting

• QAO Database
  – Newly developed for SHA
  – Documents retained “forever”
  – Multi-use Quality Records Database (QRD)
  – Web based
Non-Conformance Reporting Lessons Learned

• Focus on important/repetitive issues
• Use process efficiently
  – “seasoned” individual as “gate keeper”
• Speed up the transfer of info.
  – Work already corrected
  – Document “all facts” or “corrections needed”
    • Why document when work is resolved?
Non-Conformance Reporting Lessons Learned

- How to speed up close-out
  - Use database as record search engine
- Good for QA and QC
Internal Non-Conformance

• Contractor’s reporting system (Contract C)
• QC responsibility
  – Parallel to QAO program
  – High quality standards
  – Single “gate keeper”
  – Excel log
  – Two step process (1-7 days)
Internal Non-Conformance

• *Constructware* database
  – Available by subscription
  – Utilized by D/B team
  – LARGE amount of data
  – Multi-use
  – Web based
Internal Non-Conformance Lessons Learned

- Write INCS to **facilitate** correction/closure
- Document discrepancies at end of day
- Diligently pursue corrections
  - Workmanship
  - Materials
  - Administrative – time consuming
Internal Non-Conformance Lessons Learned

• Verbal communication is fastest
  – Gets results 90%
• Document unresolved problems
• Good written documentation necessary
  – Experienced QC inspectors
  – Sufficient number of QC staff / schedules
  • Managers & technical
Internal Non-Conformance Lessons Learned

- Quality Check Points
  - QC notifies QA ready to check work
  - Double check
  - QCP promotes quality work
Source of Supply Approval

• QC responsibility
  – Independent firm
  – First time for SHA

• Inertia of standard SOS process

• Pre-approved list
  – QPL
  – SHA website
Source of Supply Approval

• “Partnering” with OMT staff
  – Specialists in several fields
    • Unique expertise
      – Coatings, chemists, cement testing, etc.
  – Knowledge of many suppliers
  – Good communication among QA/QC managers
    • Sharing of knowledge
      – Heads-up to avoid pitfalls
Source of Supply Lessons Learned

• It takes a team!
  – Large amount of information
  – Learning curve for approval of source
    • Variety of materials
    • History of material performance
    • Updated information
    • National & MD source knowledge
    • D/B is not the same process
Source of Supply Lessons Learned

• D/Bs don’t know who supplier will be
  – Cannot set up list before construction starts
  – React quickly to new suppliers
Off-Site Fabrication

- Inspection – Quality Control
  - Design Builder’s CQC Engineering Firm
- Verification – Quality Assurance
  - Administration (ICC Team/SHA/OMT)
Off –Site Fabrication
Examples of Fabricated Products

Girders

• Structural Steel
• Pre-Stressed Concrete
Off-Site Fabrication – Design Builder’s CQC Engineering Firm

- Accepts fabricators test results as their QC results
- Reduced inspections in the plant by their authorized agent/agency
- Random Inspections of the Fabricator’s processes or products for verification of conformance with Contract requirements and QC Plan
Off-Site Fabrication Administration – ICC Team/SHA/OMT

• Performs QA verification inspection and testing
• Perform audits to verify the fabricators compliance with their approved Quality Control Plan
• Perform audits to verify the Design Builder’s Quality Control processes
Off-Site Fabrication Lessons Learned

• Fabricators were unaware of the roles and responsibilities of the Design Builder and the Administration (SHA/OMT)
• Design Builder does not have the resources to perform additional tests to confirm fabricators QC test results.
Off-Site Fabrication Lessons Learned

• Design Builder needed additional resources to perform the inspections in the plant.
  – Hired an agency with the expertise and close proximity to the plant to perform the inspections.

• QC Engineer and SHA/OMT must cooperate and communicate so that quality issues can be quickly addressed and resolved.
Off-Site Fabrication Lessons For The Future

• Have some patience—big changes don’t happen overnight
• Expect some mistakes, be willing to work them out
• Poor quality impacts schedule and can lead to rework
On Site Sampling & Testing

• Frequency Guide
  – QC vs. QA
  – Long list of requirements

• Testing & Acceptance
  – By QC firm
  – Extremely large amount of data to track
  – Use of QAO/QRD database and QC Plan
  – Plot compaction results on plan & profile
On Site Sampling & Testing

• On-Site delivery
  – Various locations on large sites

• Documentation
  – Paperwork tracking
  – QC inspection stamp from plant
    • Variety
  – Filed for final audit in CW
    • Transferred to SHA Projectwise
Testing Lessons Learned

• Need accurate results – credibility
• Independent QC needs highest quality staff
  – MARTCP and other certifications
  – Experienced on new construction of highway or bridge
Testing Lessons Learned

• D/B contractor requires **rapid** results
  – QC must keep job moving!
  – Advance notification of close-out info.
  – QC is part of the solution
  – Contractor wants quality too!

• Need to “Partner” everyday with Team
  – contractor, QC, QA, designers, ICC staff
Sediment & Erosion Control Lessons

- Design-Build Responsibilities
  - Multiple Roles
    - D-B Environmental Team
    - Environmental Manager
    - ESCM
    - QC Team
      - Need to have specific E&S construction experience
      - Need preemptive / planning focus
      - Could benefit from an incentive
Sediment & Erosion Control Lessons

• ICC QA
  – Providing more of a QC function
• Roles could better be defined between parties
  – MDE, IM’s, QC, QA, ESCM, EM