

QA of Painting on DB/P₃ Projects- Contractor vs Owner

Mid-Atlantic Quality Assurance
Workshop

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Kenneth A. Trimber
KTA-Tator, Inc.



The Issues

1. On Design Build (DB) and Private Public Partnership (P3) projects, the Owner is hiring a Construction Team to design, build, and potentially maintain the bridge for a certain period of time.
2. The Construction Team retains sole responsibility for in-process quality control and overall quality assurance to assure that the project is completed in accordance with the agreed upon design documents and industry standards
3. How much involvement should the Owner assume in Quality Assurance (QA) and project oversight?

Agenda

1. Background
 1. Definition of quality
 2. Quality Assurance (QA) and Quality Control (QC)
 3. Typical QC Paint Inspections
2. Questionnaire
3. Results of the Questionnaire
4. Conclusions

Defining Quality

- Quality (from a coatings perspective):
 - The characteristics of a product or service that meet its stated needs (aesthetically pleasing corrosion protection)
 - The degree to which a product or service is free of non-conformances (applied/cured under proper temperatures)
 - Meeting specified requirements (SP cleanliness and DFT)

Quality Assurance/Quality Control in Traditional Design-Bid-Build

- Quality Control is performed by the contractor
- Quality Assurance is performed by the Owner

Contractor
QC



BRIDGE PAINTING
PROJECT

Owner
QA



Quality Control (QC) in Traditional Design-Bid-Build

- QC encompasses the observations, testing and documentation necessary to verify that the work meets or exceeds a minimum standard (e.g., the specification)
- QC verifies that each phase of the work is in compliance with the specification through routine, systematic, inspection and testing

Quality Control (QC) in Traditional Design-Bid-Build (con't)

- Includes verification that equipment, materials, personnel qualifications, inspection methods, inspection equipment, close out, and documentation meet the contract and specification requirements
- More than field testing and documentation - starts at project inception and continues through project completion

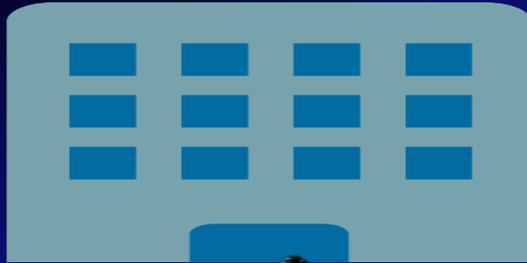
Quality Assurance (QA) in Traditional Design-Bid-Build

- Quality Assurance is performed by the Owner or a third party on behalf of the Owner
- QA verifies that the quality control implemented by the contractor meets the requirements of the specification and that the QC accurately reports and documents the work performed
- “Audit” function

Quality Assurance (QA) in Traditional Design-Bid-Build (con't)

- QA may be performed by:
 - Observing contractor QC perform a test or observation
 - Review of a test or document provided by contractor QC
 - Duplicate testing of certain hold points

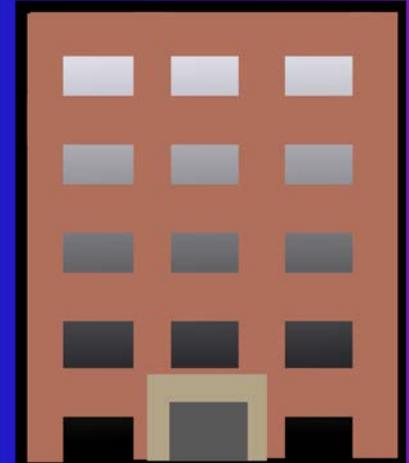
Contractor



QA



Owner (DOT)



Design-Bid-Build

QC



BRIDGE PROJECT
(PAINTING)

QA



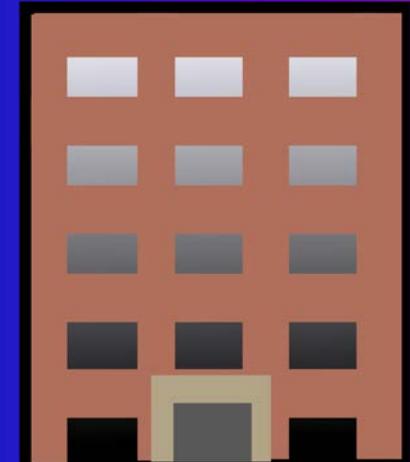
Contractor



QA



Owner (DOT)



Design-Bid-Build

QC



BRIDGE PROJECT
(PAINTING)

QA



- Inspect 100%
- Observations and Physical Tests
- Document Results

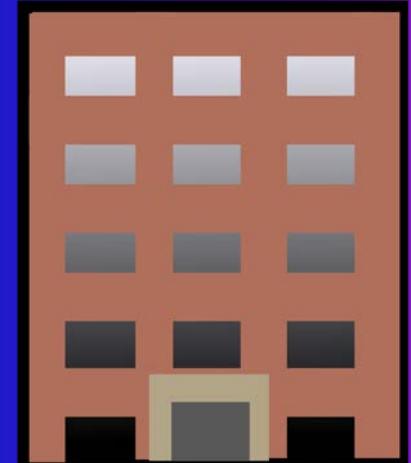
- Observe QC tests
- Review QC docs
- Duplicate tests at hold points

Construction Team



DB/P3?

Owner (DOT)



QA & QC



BRIDGE PROJECT
(PAINTING)

Traditional QA,
limited oversight, or
“nothing”



Typical QC Paint Inspections

- Substrate Condition
 - Weld spatter
 - Weld flux
 - Rough welds
 - Sharp corners
 - Laminations

Typical QC Inspections (con't)

- Surface Preparation
 - Weather suitable for cleaning
 - Protective coverings/containment
 - Grease/oil removed
 - Abrasive type and cleanliness
 - Surface profile
 - Surface cleanliness
 - Surface defects corrected
 - All dust removed

Typical QC Inspections (con't)

- Coating Material (per coat):
 - Specified material
 - Correct color
 - Correctly mixed and agitated
 - Correctly thinned
 - Induction times
 - Has not exceeded shelf life or pot life

Typical QC Inspections (con't)

- Coating Application (per coat)
 - Weather and conditions suitable for painting
 - Protective coverings/containment
 - Clean surface, still meets spec
 - Wet film thickness
 - Dry film thickness
 - No flaws: runs, sags, overspray dry spray, holidays, shadow-through, etc.

Owner QA in DB and P3 Projects ?

- None  Full Time
- Project pressures (schedule, financial) could impact paint quality by pushing steel out the door even though 100% of the specification is not met (e.g., a given coat is too thin or thick; temperatures during application are too cold), but is it of concern since the Construction Team has long-term responsibility?

Questionnaire

- Question #1 – Assume you're involved on a P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction?
- Question #2 – Assume you're involved on a DB project and the Owner wants a coating system that will not require total removal and replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team?

Questionnaire Returns

Group	Returned
Transportation Agencies	10
Contractors	0
Engineering Firms	2

Question #1

- P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction?

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction?

- DOT – Yes, Owner should always be invested in overseeing their interests
- DOT – Finance and equity pieces of the concessionaire will be undertaking a QA role and may have more at stake than the DOT, but the DOT will still have an interest and should also provide QA.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- DOT – Yes, although it may be slightly diminished. May not have the operation and maintenance responsibility initially, but the public will still look to the DOT with questions/concerns. Also need to be assured that the facility will perform such that it will not cost more to repair or replace.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- DOT – The Owner should never relinquish full responsibility for QA of any project. In XXDOT, we still maintain a full QA presence. We are responsible to the taxpayers of the state.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- DOT – The Owner should have a QA role. Obvious issues are the quality of the work, but also the quality of the oversight provided by others (the construction team). The Owner should take an active interest in both what is expected in the field, and what is being achieved.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- DOT – QA oversight to ensure that the process is being done. I have been involved with some projects where QA was only window dressing or lip service to the Owner
- DOT – The Owner should have responsibility for QA, either directly or through a trusted engineering firm as our representative QAM. It is critical to establish communication and expected QA goals with the QAM at the beginning stages of the project

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- DOT – The Owner should have oversight responsibility to ensure that the requirements for fabricated products are being met, and to ensure public safety is not being jeopardized by a 3rd party whose contractual requirements stop at 25 or 30 years. In XXDOT we look at handback in 25 years, which is a quarter of the 100-year life expectancy

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- DOT – The Quality Assurance roles are not as well understood by the P3s and the DBs, and they often do not have the experience with transportation work that DOTs (and those that do QA work for DOTs) do. The owner responsibilities are not the same as in the building world, which most of the DB and P3s are familiar with, which adds to the confusion. Add to the fact that when it comes to testing and inspection, the DOT's typically have a large central laboratory, which gives us a type of economy of scale when testing materials for QA purposes, whereas a private lab procured by the DB and P3 does not.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- Authority (toll bridges) – We do not want responsibility for QA. The partnership is required to provide a well-maintained structure at the end of the term. If there were problems and we did QA, they could try to say that we have some responsibility. They may also not take QA seriously if we were involved.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- Engineering Firm – I prefer to have the QA in the control of the Owner. Having the Developer in charge proposes a contrast of interests. The Developer has a fixed amount of money – the more QA that is performed, results in less profit. There is the pressure to provide inspections with minimal personnel. There is the added risk as the Developer will hold the inspection company responsible if not adequately performed despite the monetary pressure.

Note: in response to Question 2, the respondent notes that a QA role (in P3 and DB) also comes with some responsibility if there is a later failure, but it might be mitigated by a contract that leaves responsibility on the Developer regardless how much QA is performed by the Owner.

#1-P3 project with handback to the Owner at 30 years. Should the Owner have responsibility for QA during construction? (con't)

- Engineering Firm – I feel that it's appropriate for the owner to maintain QA oversight. Significant pressure can be placed on the delivery of steel. Unfortunately, paint often doesn't receive the same respect as other disciplines like welding, so a "slight" reduction in full compliance can be easier to overlook and accept to meet the schedule. But that reduction in compliance can have long-term consequences in the performance of the coating and potentially affect the extent and cost of maintenance after the 30-year handback, so the DOT should be engaged to protect their interest.

Question #2

- DB project and the Owner wants a coating system that will not require total removal and replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team?

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team?

- DOT - Same response as #1 above. The Owner should remain involved to ensure that decisions are made which protect both the long term and short term interests of the owner. The Owner should not make every decision but needs to retain a level of authority which ensures safety, regulatory compliance, fiscal responsibility, sustained durability, etc. This does not overshadow the fact that the Contractor also has QA roles and responsibilities.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – The DOT should take on the QA. For the QA, this is not that much different from a DBB project. When the construction is complete XXDOT has full responsibility for the maintenance. We may contract QA out or may place some burden on the DB team, but XXDOT needs oversight. Plus we are managing the public's road funds and are ultimately responsible for insuring they are getting what they paid for.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – While QC can be the responsibility of the DB team, we believe the Owner should lead the QA role on DB projects. At the end of the DB project, we own the asset so we need to be involved in making sure we get a high quality product.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – Unlike DB where we maintain a full QA presence, for P3 we take a secondary position as regarding QA, but still maintain final approval authority. The reason is quite simple - at the end of the day XXDOT is the responsible party to the taxpayers of the state.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – As a minimum, the Owner needs to have oversight to ensure that QA is being performed with qualified personnel and a real QA process, rather than just completing paper to fill a filing cabinet.
- DOT – I cannot imagine a situation where we would not, at a minimum, have a checks and balance system in place. Our agency would need to be involved in the QA process, even if it would be in the shadow of an outside QAM hired for the project.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – Same as Question #1 – The Owner should consider some QA. Obvious issues are the quality of the work, but also the quality of the oversight provided by others. The Owner should take an active interest in both what is expected in the field, and what is being achieved.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – QA should remain in the hands of the owner. The DB team has QC requirements during fabrication. Note the XXDOT is looking for the coating to meet our 100 year expectation for our structures. Therefore as we do now, QA is done by the Department QA program.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- DOT – Same as Question #1. The Quality Assurance roles are not as well understood by the P3s and the DBs, and they often do not have the experience with transportation work that DOTs (and those that do QA work for DOTs) do.

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- Authority (toll bridges) - We typically perform QA to ensure that the contractors' QC is being followed. The DB team and contractors are walking away when the job is completed. The owner likely has only a one year warranty. Our opinion is you end up with a better product if you do QA

Note: for Question #1 (P3) they did not want a QA responsibility

#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- Engineering Firm – Interesting question. If the Owner takes on the QA role he then takes on some of the responsibility if there is a later failure. It can possibly be circumvented if the contract clearly leaves the responsibility in the hands of the Developer no matter how much QA is performed by the owner.

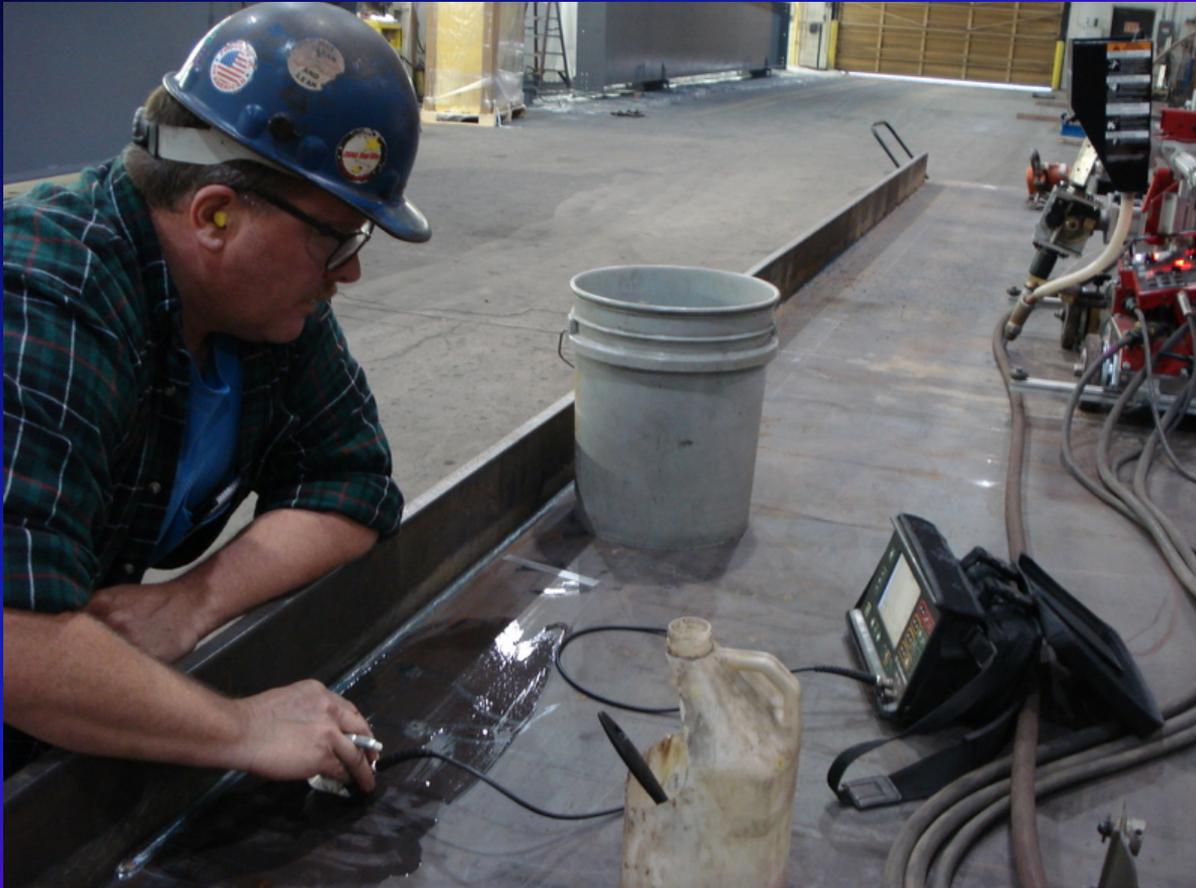
#2-DB project - Owner wants a coating system that will not require replacement for at least 50 years. Should the Owner take on a QA role, or relinquish the QA responsibility to the DB team? (con't)

- Engineering Firm – I see the response being the same as the first question. It's in the Owner's best interest to have a QA role in verifying compliance with the contract documents.

Summary

- Overall, the transportation agencies and engineering firms are very consistent – the Owner should have a QA role in both P3 and DB projects, although opinions on the extent of this involvement vary.
- The Owner has the ultimate long-term responsibility for the structure and is accountable to the public for safety, so it is important to have a degree oversight to confirm that the work meets the specifications.
- There is an implied perception that there is a conflict of interest if the Constructor is solely responsible for QA and QC.

Questions?



Ken Trimber – 412-788-1300, x204
(ktrimber@kta.com)

