

2004 WFL Contractor Conference

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Construction

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CONTRACTOR QC / QA

Status, Vision
and Future

Contractor QC QA, a few simple concepts

- **Plan**
- **Communicate – QC Plan**
- **Perform**
- **Monitor – Inspect**
- **Deal with, changes, deficiencies problems, and unexpected events.**
- **Confirm - Assure**
- **Some slides to illustrate.....**

The foundation is **planning**. A good, well thought out **plan** is an investment.



It's also **communicating** the plan! Everyone is on board..... (you strive for this..)



Including ANDY! Everyone involved needs to know the plan.



You want to avoid this..... When someone has to ask..Do you know what's going on? Where did they go? They are not done.



It's about **performance**... it's good when a plan comes together...



Everyone is coordinated.



You want to avoid wasting efficient performance.... the grade checker asks...why are you undercutting this slope??



It is finding **problems** making **corrections** and **communicating** changed plans quickly



What do we **do** when .. “Cow”paction.....test results are headed south...?



How do we systematically plan, communicate, perform, change plans, monitor, and confirm that we are obtaining the right product?..... Hmmmm.. Id rather be fishing....



We continually **verify** (check the truth of) with QC (planning, communicating and monitoring) and by performing QA (confirming)



To get to an end



Satisfactory finishes....



**Very satisfactory finishes....scenic well constructed roads..
For the public, built by joint effort between the Highway
Construction Industry and the USDOT... we get it done!**



CONTRACTOR QC/QA

- The past
- Vision of QC/QA
- Current specification
- Recommendations

QC QA

In the past.....

Mid 60's, Libby, Montana BPR Kootenai River Bridge Project



Past practices - FHWA QC Montana style!



FHWA QA Montana style! We checked safety nets too!



Jerry Bruyer FHWA RET

We were in to it.



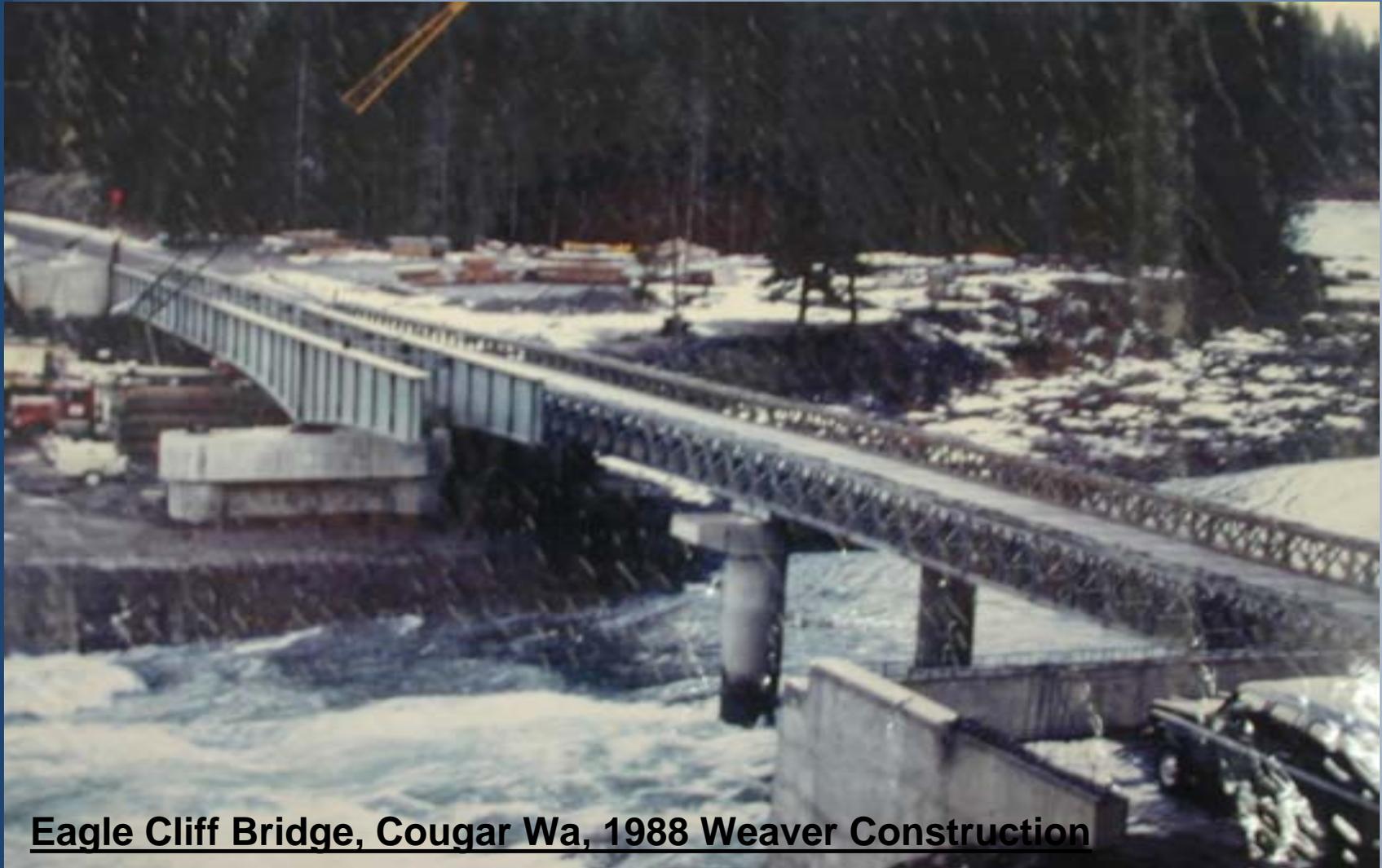
Larry Adams FHWA RET.

QC QA Today

- **We don't do it like we used to.**



My first Contractor QC experience



Eagle Cliff Bridge, Cougar Wa, 1988 Weaver Construction

There was a lot of torque wrench work to do. The Project Engineer informed me that the contractor would perform their own QC, and we would do QA. There was no pay item, no FP guidance (FP85), just the FAR.



Inspection of Construction

- FAR 52.246-12 Inspection of Construction (Aug 1996)
- The contractor shall maintain an adequate inspection system
- The contractor shall perform inspections to ensure.....

The second and third bullets first appeared in DoD solicitations in 1961

Inspection of Construction

- The contractor shall maintain inspection records
- Is subject to Government inspection at all places and reasonable times to ensure strict compliance....and....
- Does not relieve the contractor of responsibility for providing adequate quality control measures

CONSTRUCTION QC/QA

- Current specification. SCR adopted in 2002
- Provides direct payment to contractor for QC/QA effort
- The contractor provides QC and QA for all work items. Government performs QA.
- The contractor creates own program for QC/QA, incorporating the guidance from FAR and requirements from the SCR
- The contractor's quality control plan is the road map for all of us to follow.



QA (WFL)

QUALITY ASSURANCE

IN COMPLIANCE WITH
(CONTRACT REQUIREMENTS)



QC

PLANNING
ACTIONS
COMMUNICATIONS

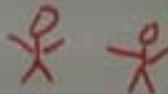
QA

QUALITY CONTROL

QUALITY ASSURANCE

(CONTRACTOR)

(CONTRACTOR)



Findings over the summer of “03” (mixed bag)

- **Many still think of QC as materials testing only**
- **In some cases QC QA as per specifications not championed**
- **Some are only making the motions, not performing the intent**

Findings over the summer of “03”

- **SCR is not clear and is difficult to determine what expectations are.**
- **There have been successes.**
- **Bottom line is that, it works, but it takes effort to make it work! It is not something we are used to.**

Contractor QC QA Vision

- **Some thoughts**
- **Benefits to contractors**
- **Benefits for us**
- **Misunderstandings**
- **What we want**

Benefits for the Contractor-----VISION

- Effective QC promotes completing work correctly the first time
- Reduced costs result in higher profits
- Planning processes are improved
- Higher quality performance improves reputation and image
- Contractor takes pride in delivering a quality product

Benefits to the Government ----VISION

- Manpower is more effectively used
- Effective contractor QC/QA results in fewer deficiencies and corrective actions
- Public relations and customer satisfaction are improved if projects are completed successfully on time
- We take pride in delivering a quality product.

But....generally, it is a misunderstood system

CQC is a misunderstood system.----- The misunderstanding is caused by an absence of guidelines (structure) for implementing the system. The result has been a jumble of management methods. There has been a lack of communicating specific requirements, vision and expectations between ourselves and our contractors. Generally industry wide

CQC is a tool.----- Like any tool, if it is not used or if it is incorrectly used or maintained, benefits will not be realized. Efforts could be wasted.

For CQC to work it must be championed, supported and reinforced. It is not a black and white product like a density or a gradation or a lift thickness, it is a practice. It is difficult to put your hands on.

Traditional responsibilities

- Traditionally the construction industry has accepted a system of control in which the contracting agency or owner continually advised the contractor on what was right, what was wrong and what remained to be done
- This restricts contractors and burdens contracting agencies, and places the details of the responsibility for control of construction quality with the agency

We are asking you to.....

- Plan
- Self inspect
- Self confirm
- Share information (document)
- Most of this you are already doing
- Materials testing has been transferred to the industry.
- Construction survey has been transferred to the industry

We are looking for you to...

Plan for and control quality

of the work with a thoroughly documented system of planning, preparatory and inspection activities described in your QC Plan. The QC plan should not be placed in the file and forgotten. It should be a living document to be used. The QC plan should be continually amended as new items of work begin.

Communicate

Effective communication through the framework of the QC plan and day to day discussion is **VITAL** (sharing information). It is the heart of it. It is the vehicle that transports the intent and directs the action.

Include the following with all projects.

(WFL Supplemental)

Delete this Section and substitute the following:

Section 153.02- CONTRACTOR QUALITY CONTROL AND ASSURANCE

Description

153.01 This work consists of establishing and maintaining an effective system to control and assure that work being performed is according to the contract requirements. This Section supplements FAR Clause 52.246-12, Inspection of Construction.

Construction Requirements

153.02 General. Provide a system to address quality control and quality assurance.

Submit a written quality control and assurance plan for acceptance, 14 days prior to commencing work. Modifications or additions to the plan may be required to meet quality requirements. Supplement the plan as work progresses and whenever there are changes in procedures or personnel. Include work accomplished by subcontractors and suppliers, both on and off-site. Defer submission of a quality control and assurance plan for items of work not immediately scheduled to begin when approved by the CO.

A maximum of 10 percent of the total progress payment amount will be retained if the quality control and assurance plan is not approved, required updates are not submitted and accepted or the plan is not being followed.

Furnish 48 hours notice prior to the start of each segment of work.

153.03 Quality Manager. Provide an onsite quality manager(s) available during all phases of work. Duties include coordinating and supervising the quality control and assurance system for all work including subcontractors and suppliers. The quality manager is permitted to perform inspection duties. Allow sufficient authority to assure work is performed according to requirements, which includes stopping work that is not in compliance. The quality manager is not to directly supervise crews.

Furnish a manager with at least five years experience in highway or road construction, specifically in the areas of material testing, inspection, management, supervision, quality control or quality assurance. Submit in writing the name, experience, and line of authority for acceptance. Identify an alternate to serve in the event of the manager's absence. Select an alternate with comparable experience and knowledge to the quality manager.

Include the following sentence with all projects except those less than \$1 million or refuge road projects. Coordinate with COE.

SCR 153 Contractor QCQA –1A

- Description of work. FAR is referenced. Provide effective system to control and assure work is performed.... The SCR supplements
- **Provide Quality Control and Assurance plan**
- Provide within 14 days of commencing work
- Defer submission for work not scheduled to begin immediately
- Supplement plan as work progresses
- 10% of total progress payment will be retained if plan is not approved or plan is not followed.
- Provide 48 hour notice prior to starting each segment of work

SCR 153 Contractor QCQA –1B

- **Provide on site Quality Manager**
- **5 years of experience**
- **Available during all phases**
- **Coordinate and supervise QCQA including subs and suppliers**
- **Provide sufficient authority to QCM to halt work**
- **QCM cannot directly supervise crews**
- **Five years experience in highway or road construction**
- **Provide an alternate**

Do not designate the superintendent, project manager, or project foreman as the quality manager.

153.04 Quality Control System. Establish a system that directly monitors and controls the quality of work. Furnish inspectors with a minimum of 3 years experience in the work to be monitored. Address the following in the plan:

- (a) The name and experience of inspectors, testers, and company(s) providing quality control. Include lines of authority for both individuals and company(s);
- (b) Develop a chart of quality control inspections, which includes definable features, inspectors responsible, and inspection frequency of work. In addition to required inspection frequencies, list any additional inspections to ensure a quality project. Include all work of subcontractors and suppliers.
- (c) Procedures for managing reports, documents, charts, certifications, and submittals.

153.05 Quality Assurance System. Establish a system that provides assurance the project was constructed according to the contract requirements. Furnish experienced personnel to inspect, verify, test, and evaluate materials and workmanship to assure a quality project. Address the following in the plan:

- (a) The name and experience of individuals and company(s) providing quality assurance. Include lines of authority for both individuals and company(s).
- (b) Method for assuring material incorporated into the work is in compliance.
- (c) Process to assure personnel have received proper training to produce a quality product.
- (d) Procedures to assure necessary preliminary work is accomplished prior to the beginning of work (submittals have been approved, certifications verified, surveys completed, etc.).
- (e) Process that verifies quality control activities are performed and properly documented.
- (f) Process to identify and correct quality deficiencies in work being performed.
- (g) A process to assure that deficiencies are not repeated.
- (h) Method for assuring subcontractor and supplier work is in compliance.

153.06 Government Inspection. Provide written notification WFLHD 470 *Notification of Completion of Work* when the following work is ready to be inspected:

Edit requirements of paragraph (a) and (b) as required.

Coordinate with COE.

- (a) Allow 1 working day for the following work to be inspected.
 - (1) Survey and staking (field stakes and notes). Provide survey notes for the following:
 - (a) Control points – prior to disturbing original control points

SCR 153 Contractor QCQA –2A

- **Quality Control System**
- **Directly monitor and control quality of work**
- **Furnish inspectors (3 years experience)**
- **Develop chart of inspections for definable features of work (items) include subs and suppliers.**
- **Provide frequencies**
- **Provide procedure for managing records**

SCR 153 Contractor QCQA –2B

- **Quality Assurance System**
- **Method for assuring material to incorporate complies**
- **Assure training**
- **Assure preliminary work is completed**
- **Assure documentation**
- **Identify and correct deficiencies (and not repeat)**
- **Assure sub and supplier work is in compliance**

- (b) Clearing limits – prior to starting clearing and grubbing operations
- (c) Slope stakes – prior to starting excavation
- (d) Subexcavation – prior to backfilling
- (e) Guardrail – prior to starting installation
- (f) Bridge – prior to starting work on each component
- (g) Walls – prior to starting work
- (h) Fence – prior to starting installation

(2) Construction work.

- (a) Roadway – prior to placement of pavement structure.
- (b) Any layer of pavement structure requiring hubs – prior to placing next layer
- (c) Structural excavation – prior to backfilling

(b) Allow 1 working day (except as noted) to inspect the following work. Do not continue work on items listed below until receipt of WFLHD 470 *Notification of Completion of Work* indicating the work will not be inspected, the work was inspected and no deficiencies were found, or unless authorized by the CO. Work delayed in excess of the inspection period will be evaluated according to FAR Clause 52.242-14 Suspension of Work.

(1) Forms and reinforcing steel – prior to placing concrete

(2) Concrete deck – prior to placing concrete (perform checks of all deck pour requirements, including dry run results prior to inspection).

(3) Holes for drilled shafts – prior to placing rebar (inspections within 4 hours of receiving notice)

153.07 Records. Submit a list of all records and documentation that track quality control/assurance processes and issues. Indicate who will be responsible for maintaining the records and where the records will be located.

Provide the following documents:

Edit as required for the specific project.

Coordinate with COE.

(a) Notification of Completion of Work. Submit a completed WFLHD 470 *Notification of Completion of Work* when work is ready for inspection by the Government according to Subsection 153.06.

(b) Construction Operations Report. For each day of work, submit a completed WFLHD 465 *Contractor's Daily Record of Construction Operations* or an approved alternate form. Include the following certification signed by the person responsible for the construction operations:

"I certify that the information contained in this record is accurate."

(c) Quality Control and Assurance Report. For each day of work, prepare a Quality Control and Assurance Report. Record the phase all work is in and document all quality control and assurance activities associated with this work. List deficiencies and corrective

SCR 153 Contractor QCQA –3A

- **Government Inspection (Government QA)**
- Provide 470 form- written notification of completion of work
- **Survey Work**
- Provide survey and staking notes for described items
- Allow 1 day for inspection of survey and staking work. Proceed if not responded to
- **Construction work**
- Allow 1 day for roadway, layer of pavement structure, structural excavation at described milestone (proceed if not responded to)
- Do not proceed until responded to for formwork, reinforcing steel, concrete deck, and drilled shafts
- Work delayed in excess of Government inspection period may be evaluated under Suspension of Work clause.

SCR 153 Contractor QCQA –3B

- **Records**
- **Provide list of records and documentation to used to track, contractor developed.**
- **Contractor's daily record , every day. Contractor certifies information is accurate. Form WFLHD 465**
- **Quality control and assurance report , every day. Document all QC QA activities, discussions, status, corrections**
- **Attach testing reports**
- **Document exceptions (disagreements or concerns)**

actions taken or scheduled to be taken. Document meetings or discussions concerning quality control and assurance issues. Attach all test results from the day's operations. Include the following certification signed by the manager:

"I certify that the information contained in this record is accurate, and that all work documented herein complies with the requirements of the contract. Any exceptions to this certification are documented as a part of this record."

(d) Control Charts. Maintain linear control charts that identify the project number, contract item number, test number, each test parameter, the upper and/or lower specification limit applicable to each test parameter, and test results. Use the control charts as part of the quality system to document the variability of the process, identify production and equipment problems, and identify potential pay factor adjustments. Make corrections to the process when problems are evident.

(e) Pay Item Measurement Notes (FHWA 17348 Pay Item Record). Prepare notes according to Subsection 109.01. Calculate and maintain QL-Pay pay factors on appropriate items.

Submit **(b)** and **(c)** reports within one working day of the work being performed. When requested, resubmit incomplete or erroneous reports within one working day. When chronic errors or omissions occur, correct the procedures by which the reports are produced.

153.08 Acceptance. Quality control and assurance system will be evaluated under Subsection 106.02 based on the demonstrated ability of the quality control and assurance system to result in work meeting the requirements.

If the Government's testing and inspection indicate that the quality control and assurance system is ineffective or the plan is not being followed, make immediate improvements to the system to correct these inadequacies. Furnish notification in writing of improvements and modifications to the system.

Measurement

153.09 Measure quality control and assurance system by the lump sum.

Payment

153.10 The accepted quantity measured as provided above, will be paid at the contract price per unit of measurement for the pay item listed below that is shown on the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment of the lump sum will prorated based on the total work completed.

Payment will be made under:

Pay Item	Pay Unit
<u>15303 Quality Control and Assurance System</u>	Lump Sum

SCR 153 Contractor QCQA -4

- **Control charts**
- Maintain linear control charts for tested items
- Identify production and equipment problems
- Identify pay factor adjustments
- Make corrections to process

- **Pay notes**
- Prepare in accordance with section 109 (a thru h)
- When chronic omissions or errors occur correct procedure

- **Acceptance, and payment of item**
- If Government testing and inspection (QA) show Contractor QCQA not working, make immediate improvements
- Furnish notification in writing of corrections to system
- Lump sum payment, based on total work completed

Handout information



Mather project

Recommendations

- **Conduct QC QA coordination meeting. Discuss with contractor. Go over plan. Define expectations at all levels.**
- **In house training for contractors on larger projects.**
- **Revise (minimize) SCR for projects under a certain amount.**
- **Keep vision of contractor QC QA in mind always. We are in to a shift in traditional construction relationships.**
- **QC plan should continually be updated and reviewed as a living document**
- **Combine sections 153 and 154 for clarification. (Testing and QC)**
- **Make specification more clear in describing requirements and expectations**

DISCUSSION

