



Module 7: MAKING THE SYSTEM WORK

Objectives: After completing this module, you will be able to:

- List problems, which may occur during construction.
- Name and discuss the means by which requirements may be enforced.
- List corrective measures that may be taken by the Government and the authority for each.

A. **Problem Categories:** Problems encountered during construction vary according to the specific project. Most problems, however, fit into one or more of the following categories:

- **Delays.** There may be delays in submittals, in the correction of deficiencies, or because of lack of contractor's acceptance of the CQC principles.
- **Planning and Control.** Many problems can be caused by a lack of planning and control and a failure to take corrective action in the planning and control process.
- **Testing.** Improper, inadequate, or untimely testing can adversely affect the project.
- **Documentation.** Problems occur because of late, incomplete, or incorrect documentation. Making a written record of quality control action and test results is as important as taking the actions. The CQM reporting system may cause appropriate action to be taken, or may be the basis of settlement of expensive claims at a future date, after people directly involved are no longer available. If documentation is inadequate, communications break down, and then the legal positions of both the government and the contractor are jeopardized.
- **Misunderstanding of CQC Responsibility.** This problem is often the result of a lack of review of the contract QC requirements, a lack of familiarity with the QC Plan, or failure to communicate roles to other personnel involved in the QC process. For example, completion

testing on all component systems, e.g. Duct Air Leakage Tests (DALTS), Testing and Balancing Systems (TABS), HVAC Controls System, electrical hi-pot tests. When possible, these misunderstandings should be solved at the field level.

Personal one-on-one discussion and actions at the field level often provide acceptable solutions to the problems. If discussions with onsite personnel are not fruitful, the problem must be elevated to the next level. The important thing is for the problem to be identified early so that it can be prevented or corrective action can be taken. If an agreement cannot be reached, the Government makes the final determination.

B. **Government Options:** Proper effective QC can prevent adverse Government actions. However, if efforts at the field level do not bring the desired result, the Government has no choice but to initiate action under the Contract Clauses of the contract that provide the means for enforcing contract compliance.

- Requiring contractor removal and replacement of deficient materials and/or workmanship - Contract Clause, Inspection of Construction, FAR 52.246-12.
 - This contract clause allows the Government to require the contractor to expose, test, and ultimately remove and replace deficient work.
 - If necessary the Government may employ another contractor to make the corrections performed if he refuses to correct it himself. If adversarial relationships develop, which could be costly to the contractor, a copy of directive type letters to the contractor should be furnished to the surety company.
- Withhold Payment - Contract Payment Clause.
 - Grounds for withholding payment include the contractor's failure to:
 - Perform in accordance with the terms of the contract,
 - Provide the Quality Control Plan giving assurance of his intent and ability to comply with quality standards,
 - Build to quality standards.

- While the Government is obligated to pay for satisfactorily completed work, it has no obligation to pay a contractor for deficient work.
- Requiring removal of unqualified personnel - Contract Clause, Material and Workmanship, FAR 52.236-5. If contractor personnel are deemed to be incompetent, careless, or otherwise objectionable, the Government can require the removal of such personnel from the project. However, under other provisions of the contract, if the Government deems the QC staff to be too small, but not incompetent, it may direct the addition of personnel.
- Requiring the contractor to assume personal supervision - Contract Clause, Superintendence by the Contractor, FAR 52.236-6. If the contractor does not provide an adequate superintendent, the contract allows the Contracting Officer to require the contractor to assume personal supervision of the work.
- Halting Work. Another Government option is halting work until deficiencies are corrected.
 - The Contracting Officer may direct the contractor to cease work and any item or work feature pending satisfactory correction of any deficiency in that work--particularly if the defective work is to be become inaccessible if further work proceeds.
 - If the contractor refuses to stop and correct the deficiency immediately, a letter from the Contracting Officer may be issued, directing the contractor to cease that particular operation.
- Issuing an unsatisfactory performance appraisal.
 - If the contractor fails to correct serious deficiencies in his performance, he may be cited as unsatisfactory at the conclusion of the project.
 - Interim unsatisfactory appraisals may be issued at any time before construction is completed. This will afford the contractor the opportunity to correct his deficient operations and avoid issuance of a final unsatisfactory appraisal at contract closeout.
 - Even a single unsatisfactory appraisal can have an effect on future awards of Corps and NAVFAC contracts to that contractor.

- Conversely, outstanding work by a contractor is reflected in outstanding performance appraisals, safety awards, and public recognition.
 - Terminate the Contract - Contract Clause, Default (Fixed-Price Construction) FAR 52.249-10. The most drastic type of action is to terminate the contract. In most cases, termination for default is not in the best interest of the Government. Termination action is taken only after all else fails.
- C. **Making the "System" Work:** The QC Manager must act quickly and confidently when problems are discovered. He cannot sit back and hope that problems will correct themselves. His job is to control construction quality by taking action to make certain that problems are corrected and prevented. The Government is serious about CQC and will hold the contractor responsible for contract compliance.
- D. **Quality Assurance Personnel:** Quality Assurance personnel will use the ASSESSMENT WORKSHEET FOR CONTRACTOR QUALITY CONTROL PROGRAM, to evaluate the contractor's CQC system. The results of this assessment can be used to provide a final performance rating to the contractor at the end of the project. (NAVFAC contracts only! For sample of form see NAVFAC P-445.)

etc., which was in violation of the specifications. Work was stopped, and after some investigation, contractor advised the resident engineer that the best delivery on treated lumber was eight weeks, which would delay enclosing the building and ultimately delay turnover to the client/customer. The contractor requested waiver of treated lumber requirement.

(1) Where did the contractor's control system break down?

(2) Where did the Government assurance system break down?

(3) What are the resident engineer's courses of action?

b. Contract involves construction of a major barracks complex including 25 dormitories. Project is 75% complete and occupied by troops when the client/customer complains that the opaque panel in the lower window section is allowing precipitation to penetrate during driving rain. The leaks have stained carpet and ceiling tile. Investigation reveals that leaking panels are improperly glazed and do not conform with the contract drawings and specifications. All windows had been factory glazed and were warehoused onsite. Although a vinyl strip covered the glazing, careful examination of the windows prior to, and after, installation would have revealed the construction deficiency.

(1) Identify the steps within the CQC system that failed, thereby creating the construction deficiency.

(2) Identify the steps within the Government's QA system that failed to detect the breakdown in the contractor's QC system.

(3) Keeping in mind that there are 4,200 windows involved in the contract, what corrective measure should the resident engineer employ?

(4) What action should be taken on remaining buildings not

completed?

- (5) Assume, because of the magnitude of the problem, that the contractor and window manufacturer refuse to comply with your directive; what tools in the contract does the resident engineer resort to?

c. Contract is for a large barracks complex involving 47 buildings. There are 1,500 fan coil units to be installed throughout the project. As the fan coil units were delivered to the site, the mechanical subcontractor discovered that the units contained 1/2" valve in lieu of a 3/4" as indicated on the contract drawings. Contractor's shop drawings also indicated a 3/4" valve. Contractor immediately advised the resident engineer of the discrepancy. The contractor further advised that the supplier's standard unit is furnished with a 1/2" valve and requested permission to use units as delivered. All units were delivered in one large shipment, and some were needed for immediate installation.

- (1) Was the subcontractor quality control system working?

- (2) Where does the supplier fit into the problem?

(3) What measures should Government QA personnel now employ?

(4) In this instance, should the resident engineer investigate possible design error in specifying a 3/4" valve?

d. Project includes several masonry buildings requiring joint reinforcement. Contractor proceeded with sample masonry panel erection without approved materials despite Government QA personnel objection. Contractor has now completed wall erection on one building and Government QA personnel discover the contractor is using wrong joint reinforcement. Contractor superintendent states bar joists will be erected tomorrow morning.

(1) What questions first come to mind as to the effectiveness of the contractor's quality control system?

(2) Where did the Government's quality assurance role first break down?

(3) What Contract Clauses should be employed by the resident engineer at this point in time?

- e. Project is a small flood control dam with reinforced concrete outlet structure. Contractor testing requirements are specified in detail, and require full-time quality control personnel at concrete batch plant. Concrete production has commenced, and after one week concrete cylinder breaks indicate extremely low compressive strength. It is immediately discovered that the plant measuring devices had not been calibrated.

- (1) What is the government's first corrective action to be taken?
- (2) What apparent deficiency existed in the contractor's quality control system?
- (3) Basically, where did the Government quality assurance role fail?
- (4) What Contract Clauses must now be employed by the Government?

f. On an underground electrical distribution project, the contractor was to install a run of 2/0 cable in the system. The project had been completed and accepted two years ago, when it was discovered that this run of cable was #2 instead of 2/0 and totally inadequate for the future load.

(1) What corrective measure, if any, is available to the Government to have the deficient cable replaced?

(2) Should the contractor's quality control system and Government's assurance system prevent isolated instances of this type? How?

g. The contract for construction of the outlet works at a flood control and recreation reservoir required steel gates. The prime contractor to a fabricator in Los Angeles subcontracted the gates. All CQC requirements on the gates were delegated to the fabricator. The resident engineer arranged for Government periodic QA visits to the plant. The plant inspector advised the resident engineer that the welding procedures and the welders had not been certified prior to commencement of fabrication. The QC contained no entry on this subject.

(1) In this instance, what role does the prime contractor assume?

(2) Where did the prime contractor fail in the quality control system?

(3) Where did the Government's QA role break down?

(4) What steps does the Government take now?

- h. The contract was for construction of multipurpose classrooms at the Air Force Academy. The rooms were to receive carpet that had been color-coordinated with the room furnishings. Carpet was scheduled for delivery August 1, which allowed only 3 weeks for laying and completion of project prior to start of classes. Carpet was delivered August 1, and it was immediately discovered that the carpet did not adequately match the approved sample.

- (1) Could the CQC system have prevented this? How?

 - (2) Did the Government fail in its QA role by not inquiring as to the status of carpet manufacture?

 - (3) What steps should the Government take now?
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- i. Contractor on a major multi-building project started his first concrete placement this morning. Contractor is placing a monolithic foundation using a leased concrete pump truck. Two-thirds of the foundation had been placed when the concrete pump failed. No standby placement equipment was available as required by the contract, which created a cold joint before the pump could be repaired.
 - (1) What was the first step that failed in the contractor's QC program?

- (2) How could the Government's QA role have prevented this incident?
- (3) Would proper QC reports alerts to a failure of this type in the system?
- (4) What corrective measures should the Government employ to prevent further incidents of this type?
- j. An airfield project involved placement of a concrete apron for helicopters. The specifications required the use of jet fuel-resistant joint sealant. The sealant was required to be Government tested and approved prior to use. The specifications further required that the joints be sealed immediately after the curing period. Contractor started placement of concrete when it was discovered that the sealant had not been submitted for testing.

