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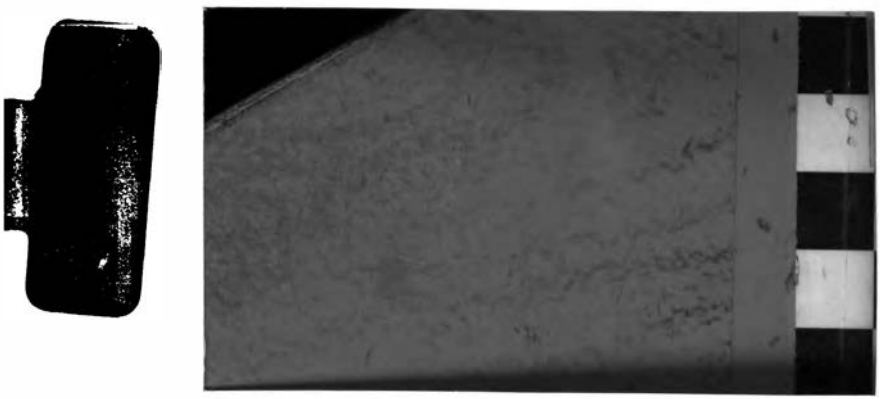

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Quality Control On Federal Construction Projects

Federal Construction Council
Consulting Committee on Contract Management

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INTRODUCTION

Although federal agencies have always been concerned about the quality of their construction projects, for the last 20 years there has been growing awareness of the need for well planned quality control programs. In the mid 1960s, for example, the Federal Construction Council (FCC), at the request of the sponsoring agencies, conducted a thorough review of the policies of federal agencies regarding supervision and inspection of federal construction projects (Federal Construction Council Task Group T-50, 1968). During the same period, the military agencies, in an effort to help improve construction quality began requiring construction contractors on their projects to accept direct responsibility for controlling the quality of their own work under a concept known as contractor quality control (CQC). Since that time, almost every federal agency has conducted at least one in-house study of construction quality control procedures.

This concern about construction quality control has been stimulated by recognition that the likelihood of problems occurring on federal construction projects has increased in recent years because:

1. Building systems (particularly mechanical and electrical systems) have become increasingly complex.
2. Margins for error and safety factors in construction have been reduced as designs have been refined to save materials and money.
3. As a result of competitive pressures, both contractors and design firms have reduced the amount of time they devote to coordination, supervision, and checking of their workers.

4. Due to budget cuts, agencies have had to reduce the number of project managers, design reviewers, inspectors, and field supervisors they employ.

Many of these same factors also apply to private construction work, and some private owners and developers of buildings and similar facilities have the same concerns as federal agencies about construction quality control. This was revealed by a survey conducted by the Business Roundtable* as part of its comprehensive Construction Industry Cost Effectiveness project (Business Roundtable, 1982 and 1983). A survey by the Opinion Research Division of Fleishman-Hillard, Inc. (1984) also showed that poor quality is considered a major problem by building owners. Specifically, 59 percent of the respondents listed quality of workmanship as either the first or second most serious problem facing the construction industry today.

Professional engineers also have indicated concern about construction quality control. The American Society of Civil Engineers, for example, held a three-day workshop on "Quality in the Construction Project" in November 1984, and as a result has begun work on a "Manual of Professional Practice for Quality in the Construction Project".

Finally, there is evidence that the widespread concern about construction quality control is justified. Engineering News Record (September 19, 1985), quoting a quality control firm, reported that 15 percent of all field labor goes to correct mistakes made either in design or construction. The Office of the Inspector General of the Department of Defense (1984) also found a sufficiently high rate of deficiencies on military construction projects audited in 1982 and 1983 "to warrant a concerted effort to improve inspections during construction."

Because of concern about quality control on federal construction projects, many federal agencies have been exploring new ways (both technical and administrative) of

*The Business Roundtable is a New York City based association in which the chief executive officers of some 200 major corporations meet to address a wide variety of public issues. It began in 1969 as The Construction Users Anti-Inflation Roundtable.

ensuring construction quality. However, relatively little information has been exchanged among the agencies on the results of these efforts. The sponsoring agencies of the FCC asked its Consulting Committee on Contract Management to undertake the project reported here to fill this information gap.

OBJECTIVE AND PROCEDURES

The committee's specific objective was to assemble information on the efforts of federal agencies to improve quality control on federal construction projects and on the results of those efforts.

The committee decided that the best way to obtain the desired information would be by means of a questionnaire. In its questionnaire, which was sent to the agencies represented on the committee, information was sought on the following matters relating to quality control: Definitions of quality control terms used; general quality control approaches employed; views on trends in construction quality; recent actions taken to improve quality control and the results achieved; and additional actions being considered.

Responses to the committee's questionnaire were received from six agencies: The Army Corps of Engineers, The Naval Facilities Engineering Command, The Veterans Administration, The General Services Administration, and The Public Health Service. The responses are presented in the following chapters.

At the time the study was being initiated, the Army Corps of Engineers (CoE) offered to provide funding for an in-depth analysis of the views of Air Force (AF) officials on the quality of construction being procured for them by the CoE and the Naval Facilities Engineering Command (NAVFAC). The Committee accepted the offer and asked the BRB staff to make the necessary arrangements. Two former USAF Officers, General Bryce Poe and Lieutenant General DeVol Brett, were retained to interview officials at various AF installations. In the course of their investigation, Generals Brett and Poe visited USAF headquarters, four major AF commands, and nine AF bases and interviewed 20 AF officials. They also interviewed several CoE officials. The results of the investigation were summarized in a report to the committee. That report (Brett and Poe, 1985) discusses a

broad range of topics relating to the management of the Air Force construction program, including quality control. Pertinent comments of AF officers regarding quality control from that report are presented in this report.

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DEFINITION OF TERMS

There is considerable disagreement and in some cases confusion about terms used in connection with quality control. In hopes of eliminating some of the disagreement, the committee asked the agencies to define the terms they use. Following are the responses.

CORPS OF ENGINEERS

The Corps of Engineers provided definitions of four terms:

- Quality Management--All control and assurance activities instituted to achieve the product quality established by the contract requirements.
- Contractor Quality Control (CQC)--The construction contractor's system to manage and control and document its own, its supplier's and its subcontractor's activities to comply with contract requirements.
- Quality Assurance--The procedures by which the Government fulfills its responsibility to be certain the CQC is functioning and the specified end product is realized.
- Inspection--The process by which ongoing and completed work is examined.

NAVAL FACILITIES ENGINEERING COMMAND

The Naval Facilities Engineering Command submitted definitions of three terms:

- Contractor Quality Control (CQC)--The quality control and inspection system established and maintained by the contractor that assures compliance with the contract drawings and specifications.
- Quality Assurance--The surveillance and inspection system by which the government assures that the CQC system is functioning properly and that construction is in accordance with contract requirements.
- Inspection--Actual observation, testing, and review of materials and work.

VETERANS ADMINISTRATION

The Veterans Administration (VA) submitted definitions of three terms; however, the VA emphasized that the definitions were not official:

- Quality--In the Office of Construction, quality is defined by our published documents such as construction standards, design criteria, and standard specifications. These documents reflect the latest safety codes, recent technology developments, and the VAs past experience in hospital construction and operation.
- Quality Assurance--The VA visually verifies the contractor's conformance with the specified construction contract documents, while simultaneously being alert for conditions which may warrant a change to ensure the quality, quantity, and propriety of the final product.
- Inspection--Inspection is an activity of the VAs quality control program that is concerned with checking on the conformance of a product to the established standards. It can be defined further as a visual examination of products, materials, methods and workmanship sufficient to develop a knowledgeable evaluation of the adequacies or deficiencies of the item being examined.

GENERAL SERVICES ADMINISTRATION

The General Services Administration submitted definitions of three terms:

- Quality Control--Those actions taken at the operational or regional level to obtain quality; i.e., inspections and other contract administration activities.
- Quality Assurance--Those actions taken at the headquarters level to ensure quality on construction, such as establishing guidelines and quality programs.
- Inspection--The physical act of inspecting construction in progress to monitor compliance with contract requirements.

PUBLIC HEALTH SERVICE

The Public Health Service (PHS) reported that it has not formally defined the terms quality control and quality assurance as they pertain to construction. However, PHS has defined the term construction surveillance as follows in terms of the objectives of surveillance and the techniques used:

Objectives--to assure that all construction projects proceed on the approved schedule and any variations in either time, design or cost are monitored and appropriate changes are approved according to HHS/PHS policy.

Techniques--all construction projects are monitored by designated facilities personnel and all changes in work progress or design are reviewed and approved only by designated HHS/PHS approval authorities. Spot checks are made of work order changes, periodic progress reports, and similar documentation to assure that monitoring has been in effect.

The PHS Food and Drug Administration (FDA) reported that although it (like PHS) has not formally defined the terms inspection, quality control, and quality assurance, most FDA personnel would concur with the following informal definitions:

- Quality Control--As the term is used by FDA it means the internal inspection and testing which is the responsibility of the contractor necessary to eliminate defects in the construction.
- Quality Assurance--As the term is used by FDA it means the process, including inspection and testing by agency personnel, by which the Government satisfies

itself that the contractor is complying with the minimum requirements of the contract documents.

- Inspection--It is the right of the Government, as set forth in the contract, to observe the contractor's work (at reasonable times and places). Note here that inspection is for the sole benefit of the Government and does not relieve the contractor of the responsibility for supervision of the work, quality control, or compliance with the contract requirements. The government has the obligation to communicate to the contractor the findings of the inspection but has no duty to search out and find all defects and deficiencies.

INFORMATION FROM OTHER SOURCES

The members of the Business Roundtable study team that investigated quality assurance (Business Roundtable, 1983) were sufficiently disturbed about the lack of agreement on the meanings of the terms quality assurance and quality control that they felt obliged to define the terms themselves, as follows:

- Quality Assurance--a planned and systematic pattern of all actions necessary to provide adequate confidence that a product will conform to established requirements.
- Quality Control--implements the quality plan by actions necessary for conformance to established requirements.

Although the Federal Acquisition Regulation (FAR) does not define the terms quality control or quality assurance per se, the FAR does define various other terms related to quality assurance, including the following:

- Contract quality requirements--means the technical requirements in the contract relating to the quality of the product or service and those contract clauses describing inspection, and other quality controls incumbent on the contractor, to assure that the product or service conforms to the contractual requirements.
- Government contract quality assurance--means the various functions, including inspection, performed by the government to determine whether a contractor has fulfilled the contract obligations pertaining to quality and quantity.

- **Inspection--means examining and testing supplies or services (including, when appropriate, raw materials, components, and intermediate assemblies) to determine whether they conform to contract requirements.**

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GENERAL APPROACHES TO CONSTRUCTION QUALITY CONTROL

Federal agencies are required by the Federal Acquisition Regulation (48 CFR 52.246-12) to include a standard clause regarding inspection in all fixed-price contracts for construction in the United States when the contract amount exceeds the small purchase limitation. If agencies wish, they may also use the clause for small contracts. The essence of the clause is summed up in paragraph b, which requires the contractor to "maintain an adequate inspection system and perform such inspections as will ensure that the work called for by this contract conforms to contract requirements" and to "maintain complete inspection records and make them available to the government" but reserves for the government the right to perform additional inspections and tests.

Most federal agencies consider the standard clause to be only the starting point, the foundation for their construction quality control efforts; consequently, most have developed various additional procedures and requirements to supplement or expand on the provisions of the standard clause. However, the nature of the supplemental requirements, are markedly different for different agencies. Some agencies, for example, basically reinforce and emphasize the idea that the contractor is responsible for ensuring the quality of his own work. Other agencies stress the need for additional inspections and tests either by government personnel or firms under contract to the government.

Knowing that the various agencies had very different concepts of how quality control should be handled, the committees asked each agency to describe its basic approach.

CORPS OF ENGINEERS

The Corps of Engineers, like all military agencies, uses the contractor quality control (CQC) approach on all major construction projects. Under the approach, contractors are required to assume responsibility for the quality of their work. Corps of Engineers personnel check to ensure that contractors meet their contractual responsibilities regarding quality control, which include performing the following inspections:

- Preparatory Inspection. This inspection is performed prior to beginning any work on any definable feature of work. It includes a review of contract requirements; a check to assure that all materials and/or equipment have been tested, submitted, and approved; a check to assure that provisions have been made to provide required control testing; examination of the work area to ascertain that all preliminary work has been completed; and a physical examination of materials, equipment, and sample work to assure that they conform to approved shop drawings or submittal data, and that all materials and/or equipment are on hand. The Contracting Officer's Representative (COR) must be notified in advance of the preparatory inspection and the inspection must be made a matter of record in the contractor's quality control (CQC) documentation. Subsequent to the preparatory inspection and prior to commencement of work, the contractor must instruct each applicable worker as to the acceptable level of workmanship required in his CQC plan in order to meet contract specifications.
- Initial Inspection. This inspection is performed as soon as a representative portion of the particular feature of work has been accomplished and includes examination of the quality of workmanship and a review of control testing for compliance with contract requirements, use of defective or damaged materials, omissions, and dimensional requirements. The COR must be notified at least 24 hours in advance of the initial inspection, and the inspection is made a matter of record in the CQC documentation.
- Follow-up Inspections. These inspections are performed daily to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. Such inspections are made a matter of record in the CQC

documentation. Final follow-up inspections must be conducted and deficiencies must be corrected prior to the addition of new features of work.

NAVAL FACILITIES ENGINEERING COMMAND

The general approach to controlling quality on Navy construction projects is to assign every contract to a Resident Officer in Charge of Construction (ROICC). The ROICC is responsible for administering the contract to ensure conformance with contract requirements and for final acceptance of the facilities. The ROICC's staff includes inspectors, construction representatives, and engineers. When necessary, personnel to supplement this staff can be obtained (on a full-time or on-call basis) through contracts with private architect-engineer firms or specialized inspection organizations.

The construction contractor is required to provide an adequate inspection system to assure that the work conforms to contract requirements and to maintain records and submit daily inspection reports.

When the contract requires the development of a Contractor Quality Control (CQC) system, the construction contractor must have a separate CQC representative, supplemented as necessary by additional personnel, and he must prepare and submit for approval a CQC plan.

VETERANS ADMINISTRATION

The Veterans Administration's general approach to controlling quality on construction projects is to place primary responsibility on full time resident engineers assigned to the construction site. The resident engineers utilize any technical expertise within the architect-engineer's office, the Office of Construction, commercial testing laboratories and even specialized consultants in unique situations. In addition, periodic inspections by the Project Director's office are conducted to provide oversight and to promote objectivity.

GENERAL SERVICES ADMINISTRATION

The General Services Administration (GSA) does not use the contractor quality control (CQC) approach on its construction projects. There is strong sentiment in GSA against using CQC for construction because of the potential conflict of interest that is inherent in the arrangement. Because of staff cuts, GSA is increasing its use of independent third party contractors to perform construction quality control services.

PUBLIC HEALTH SERVICE

The Public Health Service (PHS) has a Facilities Manual (currently being updated) that establishes policies and procedures to be used in planning, design, and construction of health facilities. The manual includes procedures to be used in construction inspection and management. It also discusses specific duties of the construction engineer, including the scheduling, preparation, and conduct of the final inspection. In general PHS favors hiring the design architect-engineer (AE) firm to provide quality control service on construction projects costing more than $1 million. For small construction projects, PHS generally favors the use of in-house staff for quality control. However, PHS gives its operating programs considerable latitude in implementing general policies; thus some PHS programs have established their own practices; specifically:

- The Indian Health Service (IHS) staff is directly involved in construction quality control on all contract and "force account" work (i.e., construction performed by federal employees and/or by tribal operators and laborers under a cooperative agreement with the IHS). IHS engineers and para-professional technicians perform most of the on-site construction inspection. However, some of the inspection is performed by private engineering firms under contract.
- Most Food and Drug Administration (FDA) construction projects are performed under firm, fixed-price contracts that require the contractor to deliver an acceptable facility when all work is completed. The government specifies the minimum quality it will accept in its plans and specifications. Once the contract is

awarded it is the government's duty to obtain from the contractor strict compliance with the specifications. FDA philosophy is that inspection should be performed by agency personnel, including resident engineers and consultants when necessary. Since many problems develop during construction that involve defective specifications, it is a conflict of interest to have the design architect-engineer inspect the work. Inspection by an independent AE or testing firm eliminates the conflict of interest aspects, but the independent firm must work under the supervision of agency personnel since inspection is a government right.

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VIEWS OF AGENCIES ON TRENDS IN CONSTRUCTION QUALITY

In order to determine if, from the agencies' perspective, construction quality has declined in recent years as some commentators have suggested, the committee asked the agencies to give their views on the subject, supplemented with statistics if possible. Their answers are summarized below. It will be noted that most of the agencies responded in terms of the definition of quality that most procurement officials use; namely, that quality is achieved when the requirements of the contract documents (especially the plans and specifications) are fully satisfied.

CORPS OF ENGINEERS

The Corps of Engineers has no statistics on quality. The CoE's quality control/quality assurance program is designed to assure compliance with the contractual requirements. The contractor is responsible for correction of all defects.

NAVAL FACILITIES ENGINEERING COMMAND

The Naval Facilities Engineering Command has not noticed much change in the quality of construction work over the past 5 years. In general, work is completed in accordance with the standards established in the contract documents. The most serious quality problems have been encountered with projects involving the installation of complicated mechanical and electrical systems,

particularly those with the newer types of electronic equipment. Roofing, with both the older and newer types of material, also is a source of problems.

VETERANS ADMINISTRATION

The Veterans Administration is unable to provide data on trends in the quality of work performed on its construction projects over the past five years due to the lack of records on the subject. However it is the general concensus in the VA that overall quality over the past five years has changed only to the degree that VA design standards have changed.

GENERAL SERVICES ADMINISTRATION

The General Services Administration noted that quality is the most difficult element in construction to measure. Quality is a variable that increases or decreases as time and resources (funds and personnel) increase or decrease. GSA has frequently sought ways to measure quality, but with limited success to date.

GSA believes that it is fair to describe the quality of work performed on its contracts as "meeting the requirements of the contract documents."

INFORMATION FROM OTHER SOURCES

Many of the Air Force officials interviewed in the course of the special investigation carried out under the committee's auspices (Brett and Poe, 1985) were less reticent about expressing their views on trends in quality than those who responded to the committee's questionnaire. This was probably due in part to the fact that most of the Air Force officials apparently used the broad definition of the term quality that the American Society for Quality Control has adopted; namely that quality is "the totality of features and characteristics of a product or service that bears on its ability to satisfy a given need."

Using this interpretation of quality, many Air Force officials expressed dissatisfaction with the current level of quality of Air Force construction. However,

many of those who expressed dissatisfaction, also recognized the link between quality control and contract documents, and they suggested that the first step should be to improve the contract documents. (Contract documents were, of course, not the only source of construction quality control problems identified by Air Force officials.)

RECENT ACTIONS TAKEN TO IMPROVE CONSTRUCTION QUALITY CONTROL

The committee asked the agencies to describe recent actions they had taken to improve quality control on their projects and to discuss the results achieved.

CORPS OF ENGINEERS

The Corps of Engineers reported that it had taken three steps to improve the quality of its projects:

- Regulation ER 415-1-11, Bidability, Constructability and Operability, was modified to require district commanders to ensure that plans and specifications are thoroughly reviewed and the review comments are fully considered before invitations for bids are issued.
- Regulation ER 415-3-11, Post Completion Inspection Feedback, was modified to ensure that completed facilities are inspected and the results of the inspection will be passed on to those responsible for agency design criteria.
- Regulation ER 415-1-10, Contractor Submittal Procedures, was changed to reduce the number of submittals contractors are required to provide and to ensure that master lists of required submittals are prepared during design and are made part of the contract documents.

The CoE reported that it had not yet gotten data on the impact of these actions.

NAVAL FACILITIES ENGINEERING COMMAND

The Naval Facilities Engineering Command reported that the improvement of construction quality is considered to be very important. Some actions being taken are:

1. Review of Navy guide specifications to put more emphasis on requirements and quality.
2. More careful review of contract plans and specifications during design to ensure thorough coordination of all disciplines and to verify site conditions, utility requirements, and special construction requirements.
3. More emphasis on the review of shop drawings to ensure that they include complete information and details.
4. Additional training of government inspectors in quality control, especially with regard to mechanical and electrical installation work.
5. Development of special inspection manuals and training courses for problem areas such as Energy monitoring and control systems and roofing.
6. Upgrading of personnel in the Resident Officer in Charge of Construction (ROICC) offices to ensure that such offices have personnel with the necessary training and experience.

NAVFAC reported that these actions have resulted in better construction. The increased emphasis on reviews has helped identify errors before they become problems. Having better trained and more experienced personnel in ROICC offices has improved project coordination and relations with contractors.

VETERANS ADMINISTRATION

Following are some specific actions taken in recent years to improve quality control, quality assurance, and inspection work on Veterans Administration construction projects.

1. Revision of VA Master Specifications either to set more rigid standards or to clarify the required standards.

2. The establishment in 1983 of inspection procedures, including the listing of the responsibilities of each VA representative.

3. The use of certified industrial hygiene consultants for asbestos abatement.

4. Institution of the practice of having the designated Senior Resident Engineer (SRE) for a project review the design and site conditions prior to the bidding to identify possible errors or omissions and to ensure the "buildability" of the design.

5. The improvement of communications with facility directors to identify and resolve potential problems early in the design stages.

6. Increased training for resident engineers in mechanical and electrical inspections to broaden and improve the effectiveness of inspections.

7. The establishment of the requirement that the SRE must have all references cited in the specifications on hand at the site.

8. The distribution of the Corps of Engineer's inspection guide books, together with other technical books, to all resident engineers.

9. Holding periodic conferences of all VA resident engineer to identify solutions to common problems and actions that can be taken to improve quality.

10. The conversion of VA specifications to the Construction Specifications Institute (CSI) three-part format to help ensure that VA construction requirements are presented in a standard manner that is easily understood by the construction industry.

11. The use of feedback from completed projects and information on new developments in hospital construction technology to upgrade VA construction standards, design criteria and other documents used to establish quality on VA construction projects.

12. The introduction of computers in the design and analysis process.

13. The award of a consulting contract for the review of VA design documents and standards to identify cost-effective changes.

VA reported the following results of these actions:

1. Changes to and clarifications of VA master specifications have eliminated deficiencies and conflicts

noted on previous projects and have helped make VA specifications more easily enforceable.

2. Strengthened inspection procedures help ensure that all work on a facility is completed as specified and all systems are performing properly prior to final inspection. This minimizes the problem of manpower and travel funds being wasted on premature final inspections.

3. The use of certified industrial hygiene consultants has enabled the VA to identify and abate asbestos problems in VA facilities expeditiously and with minimal risk to employees, patients and the public.

4. Having resident engineers review designs prior to bidding has resulted in the identification and elimination of many potential problems, which has reduced the number of change orders and contractor claims during construction.

5. Increased technical training has increased the confidence of resident engineers and their ability to analyze and solve problems in various technical disciplines.

6. Having ready access to applicable codes and references enables resident engineers to answer questions and resolve problems relating such documents quickly.

7. The use of inspection guides enables less experienced resident engineers to grasp significant inspection factors quickly and perform more effectively.

8. Resident engineer conferences not only help resolve common problems, but also contribute significantly to better morale and team spirit.

9. The adoption of the CSI specification format has made VA specifications more consistent with industry practice.

10. The development of complete and authoritative construction standards, design criteria, and standard specifications has resulted in better VA hospital designs.

GENERAL SERVICES ADMINISTRATION

The General Services Administration (GSA) recently issued a new handbook on the design of facilities. However, the methods used to control construction quality remain essentially unchanged. A few years ago GSA issued pocket-sized inspection handbooks that included detailed

checklists for nearly every element of construction in all disciplines. A related handbook was issued that included checklists to be used for final inspections and acceptance of work. The most significant change relative to construction quality control is increased emphasis on contracting with private firms for "management and inspection" services. Whereas three to four years ago most inspection work on GSA construction projects was performed by government personnel, now more than half of such work (measured by value of construction put in place) is performed by employees of private firms under contract to GSA. The contracting out of inspection services is an attempt to maintain sufficient inspection frequencies on projects with diminishing in-house personnel resources.

GSA does not know if any of its initiatives has had an impact on construction quality, primarily because it is such a difficult matter to assess.

PUBLIC HEALTH SERVICE

The Public Health Service (PHS) has used construction managers (with phased construction) on several projects in hopes of improving its construction operations in various ways, including quality control. However, problems associated with the coordination of subcontractors were encountered. At present, PHS is reluctant to use the construction manager concept for laboratory and health facilities.

Individual PHS programs have taken actions on their own to improve quality on their construction projects; specifically:

- The Food and Drug Administration has implemented or is considering the following actions:

1. Offering short technical training courses for design engineers to keep them abreast of changes that are taking place in their respective disciplines.
2. Offering short technical training courses for construction inspectors, especially inspectors of complex mechanical and electrical systems used in laboratories and energy management systems.
3. Offering short training courses for other personnel involved in construction in such fields as:

a) Technical specification writing
b) Contract administration
c) Government construction contracting
d) Negotiated procurement
e) Construction contract modifications
f) Government contract claims

4. Requiring thorough reviews of plans and specifications--if necessary by contracting out for the reviews.

5. Making full use of the remedies that are available under government contracts for ensuring that unsatisfactory work is corrected, including withholding of payments.

- The National Institutes of Health (NIH) has taken three actions:

1. NIH is involving the sub-professional maintenance staff in the review of plans and specs. This provides a more practical, operations-oriented approach to design.

2. Maintenance personnel at NIH participate with project engineers in the inspection of construction. Having "operational" experience during inspection allows the opportunity to identify problems of accessibility, interference, or potentially hazardous situations not evident in plans and specifications.

3. Employee involvement programs at NIH, specifically quality circles, have offered the opportunity for collective creativity in improving quality and productivity in construction related activities.

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ADDITIONAL ACTIONS BEING CONSIDERED

In response to the committee's question about further actions being considered to improve the quality of construction work being received, the agencies provided the following information.

CORPS OF ENGINEERS

The Corps of Engineers reported that it is considering the following actions:

- Steps to improve career opportunities of quality assurance personnel assigned to field offices of the Corps of Engineers.
- Increases in quality control/quality assurance training programs.
- Institution of an award program for quality construction.

VETERANS ADMINISTRATION

The Veterans Administration reported that it is developing a new, better process for preparing long-range master plans for the development of VA stations. Such plans will permit VA stations to be developed in a way that is efficient, rational, and nondisruptive.

GENERAL SERVICES ADMINISTRATION

The General Services Administration reported that it expects to contract out for more construction inspection services in the future. In addition, GSA is considering the use of construction managers to oversee the design and construction of its facilities. These actions are expected to result in an improvement in construction quality with fewer in-house resources.

PUBLIC HEALTH SERVICE

The Public Health Service reported that it is working on methods of quickly solving contract disputes. One promising way to achieve this is to give resident engineers ready access to technical and legal assistance to help resolve complex disputes.

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SUMMATION

The committee received information from federal agencies on five subjects related to quality control of construction.

With regard to definitions of terms, the information supplied by the agencies verified the committee's belief that agencies use a variety of quality control terms and that the terms are defined differently by different agencies. However, it is not clear that such differences cause any confusion or problems. In fact, some of the differences are probably more apparent than real. For example, even though agencies use different words to define the terms "quality control" and "quality assurance," most agencies agree that quality control is what the contractor does and quality assurance is what the agency (the owner) does.

Agencies had widely differing views on the best basic approach to use to control quality on construction projects. The Army and the Navy both rely on the contractor quality control approach; i.e., they require the contractor to assume responsibility for quality control. The Veterans Administration relies primarily on government personnel for quality control. The Public Health Service generally favors using the design architect-engineer firm for quality control on large projects and in-house staff for quality control on small projects. However, two PHS programs (the Food and Drug Administration and the Indian Health Service) favor the use of in-house staff for all projects. The General Services Administration is opposed to the contractor quality control approach. When in-house staff is not available, GSA hires an independent third party inspection firm.

The agencies that responded to the committee's questionnaire were generally reticent about expressing views on trends in construction quality. The agencies gave various reasons for their reticence: lack of statistics, the difficulty of the task of quantifying quality, and the fact that quality actually is established by the contract documents with which contractors must comply, and if quality levels change it is due to changes in those documents.

In discussing actions taken to improve construction quality control, most agencies put more emphasis on steps taken to improve the quality of their designs than on actions taken to improve quality control per se. Although the information on steps taken to ensure better designs was, strictly speaking, not responsive to the committee's questionnaire, it was consistent with the view expressed by most agencies that quality is actually defined by the contract documents and that contractors can only be required to provide the level of quality stipulated in the plans and specifications. Thus, when seeking better quality, the place to start is with the preparation of plans and specifications and related documents.

Various agencies did, however, discuss steps being taken specifically to improve quality control on their construction projects, including: more training for inspectors and resident engineers, the distribution of inspection guides to inspectors, and hiring private firms to provide quality control services when government personnel are unavailable.

In response to the committee's question about additional actions being considered to improve the quality of construction work being received, agencies mentioned a variety of steps; some of the ideas mentioned were extensions of actions already being taken; e.g., providing more training for inspectors and using private firms for inspection. Other ideas were somewhat novel; e.g., improving career opportunities for quality assurance personnel (in order to attract and keep better qualified personnel in such work), and institution of an award program to give recognition to quality construction work.

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