



# *REPORT TO THE CONGRESS*

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## Measures Needed To Ensure Compliance With Contract Specifications In Construction Of Military Facilities B-171496

Department of the Army  
Department of the Navy

*BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES*

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COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON, D.C. 20548

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To the President of the Senate and the  
Speaker of the House of Representatives

This is our report on measures needed in the Departments of the Army and the Navy to ensure compliance with contract specifications in construction of military facilities.

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretary of Defense; and the Secretaries of the Army and the Navy.

Comptroller General  
of the United States

D I G E S T

WHY THE REVIEW WAS MADE

Because of the size of appropriations for military construction--\$4.8 billion for fiscal years 1967 through 1969--the General Accounting Office (GAO) has reviewed the inspection procedures of the Army Corps of Engineers and the Naval Facilities Engineering Command intended to ensure that construction is in accordance with contract specifications.

The Corps and the Engineering Command are agents for the Department of Defense (DOD) in construction of military projects.

FINDINGS AND CONCLUSIONS

The Army Corps of Engineers and the Naval Facilities Engineering Command need to tighten their procedures and practices for inspecting construction so that military projects will be constructed as contracts specify.

A number of military facilities accepted by the Government as completed were not built in compliance with contract requirements. As a result, the facilities were not fully satisfactory for their intended use and/or the Government had to spend additional time and effort having deficiencies corrected. (See pp. 5 to 9.) For example, neither the contractor nor the Government prior to acceptance by the Government detected that the roof on a \$2.4 million hangar had not been installed in accordance with specifications. After completion and acceptance of the hangar, portions of its roof were blown off on three occasions. The cost to repair the roof on the first two occasions was borne by the contractor, and responsibility for repair on the third occasion had not been resolved at the time of completion of GAO's fieldwork. (See p. 6.)

The two construction agencies need to improve (1) enforcement of contractor quality controls (see p. 8), (2) reports from and training of Government inspectors (see pp. 12 and 17), (3) evaluations by headquarters of field activities (see p. 23), and (4) coordination of activities of the two construction agencies in solving problems common to both (see p. 25).

RECOMMENDATIONS OR SUGGESTIONS

The Secretaries of the Army and the Navy should have the two construction agencies

- systematically monitor field offices' enforcement of contractor quality control programs (see p. 10);
- review inspection reporting practices of field offices, correct those not complying with agency regulations, and implement a system for prompt communication of inspection findings to district (Army) or division (Navy) construction management (see p. 16); and
- improve Army training programs for inspectors and establish such programs in the Navy (see p. 22).

Both construction agencies should perform more comprehensive reviews of field offices' implementation of agency procedures for inspection and supervision of military construction. (See p. 24.)

The Secretary of Defense should take action to ensure that the two construction agencies exchange information and coordinate activities in areas of mutual interest. (See p. 26.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

DOD agreed with GAO's findings and recommendations and reported that both construction agencies were making improvements to correct cited deficiencies. (See p. 10.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

This report is issued to inform the Congress of DOD actions to better ensure that the military services receive the quality of construction planned and paid for.

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#### ABBREVIATIONS

ASPR	Armed Services Procurement Regulation
DOD	Department of Defense
GAO	General Accounting Office

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## CHAPTER 1

### INTRODUCTION

The General Accounting Office examined the procedures and practices of the Army Corps of Engineers and the Naval Facilities Engineering Command for inspecting projects being constructed for the military services. Projects include facilities such as aircraft runways and hangars, housing, barracks, and administrative offices. The purpose of our review was to evaluate the need for improvement of the inspection procedures and practices to better ensure that military projects are completed in accordance with contract specifications. Our examination, which was conducted during the period June 1969 through May 1970, did not include an overall evaluation of the agencies' administration of the military construction program. Details on the scope of our examination are given on page 27.

The Corps and the Engineering Command are the designated construction agencies of the Department of Defense. As such, these agencies are responsible for the award and administration of construction contracts for the Army, the Navy, and other DOD organizations. ~~Their responsibilities~~ include ensuring that construction is ~~completed~~ according to contract specifications.

The Armed Services Procurement Regulation (ASPR) provisions 7-602.9, 7-602.10, and 7-602.11, set forth DOD guidelines for inspecting projects. The Corps and the Engineering Command have issued implementing instructions and regulations. The agencies have two primary controls available to ensure that contract specifications are met. These are (1) the contractor quality control systems, whereby the contractors take specific actions to ensure compliance with all contract terms and conditions and maintain records concerning the results of the quality control efforts, and (2) onsite inspection by Government inspectors during construction. These controls are required for each project with a price in excess of \$10,000.

The Congress appropriated about \$4.8 billion for the military construction program for fiscal years 1967 through 1969. The Corps and the Engineering Command have indicated

a significant interest in construction quality for the programs they administer. Both agencies had representatives from their top management officials participating on the Federal Construction Council of the Building Research Advisory Board, which in 1968 published the results of its study in a report entitled "Supervision and Inspection of Federal Construction." Many areas affecting construction quality were covered by the Federal Construction Council study, and a number of recommendations were made for improving the inspection and supervision of Government construction.

The Corps and the Engineering Command have each conducted several internal studies and have also arranged for independent research groups to perform studies of areas in which construction administration could be improved.

Each agency has also established review groups at the headquarters level that have the responsibility for evaluating the success of construction activities of their respective field offices.

The principal officials responsible for administration of activities discussed in this report are listed in appendix 11.

## CHAPTER 2

### NEED TO ENSURE EFFECTIVE IMPLEMENTATION

#### OF CONTRACTOR QUALITY CONTROL SYSTEMS

We found that the Army Corps of Engineers and the Naval Facilities Engineering Command needed to improve their procedures to ensure that contractors effectively implemented required quality control systems.

Pursuant to ASPR provision 7-602.10, dated November 1961, a clause is included in construction contracts in excess of \$10,000 directing contractors to implement and maintain an adequate inspection system to ensure that the work performed conforms to all contract requirements. The contractor must also maintain and make available to the Government adequate records of the inspections made.

#### THE CORPS PROGRAM

In December 1966 the Corps issued a regulation to its field offices providing guidance on the proper implementation of contractor quality control systems and the effect of the systems on the requirements for Government inspection. The regulation stated that each contractor would be required to develop a specific quality control plan to meet the inspection needs of each construction contract. The plan was to be reviewed and approved by the Corps prior to the start of any major construction. The regulation emphasized that the contractor quality control plans were not intended to reduce the inspection efforts of the Government but were intended to promote better quality construction.

At the Los Angeles District, we identified a number of projects in which the contractor quality control systems were not functioning properly. Following are some of the projects and problems noted.

A high-altitude test runway built by the Corps at Coyote Flats near Bishop, California, at a cost of \$422,000 had not been utilized for its intended purpose since its completion in October 1968 because of poor surface conditions.

In October 1969 the Air Force advised the Corps that, because of large rocks in the surface of the runway and the erosive effect of one winter season, the runway could not be used to test the vertical takeoff and landing and short takeoff and landing aircraft for which it was designed. Our review in May 1970 indicated that the runway was still not being used as intended and that the Air Force did not have sufficient funds for repairs.

We found that the contractor for this project did not have a specific quality control program in effect. The contractor's reports to the Government provided no information as to what actions, if any, the contractor had taken to ensure that construction met contract specifications. Further, as discussed on page 13 of this report, we were unable to locate the Government inspector's reports for this project.

**An** aircraft hangar built by the Corps at Edwards Air Force Base, California, at a cost of \$2.4 million had portions of its roof blown off on three occasions after the roof installation had been completed, supposedly in conformance with contractual requirements. The cost to repair the roof on the first two occasions was borne by the contractor, and responsibility for repair of the roof damage on the third occasion had not been resolved at the time of completion of our fieldwork.

We found that the roofing subcontractor had not complied with contract specifications in installing the hangar roof. The hangar roof, as installed, contained various construction deficiencies, such as insufficient fastening of insulation to the deck, insufficient nailing of the roofing to the insulation, and incorrect lapping of the roofing sheets. The prime contractor on the project did not have an effective quality control program and, therefore, did not advise the Government of the subcontractor's poor roofing installation. The contractor's quality control reports for the hangar provided a partial description of the construction activity on a daily basis; however, the reports did not disclose what inspections were being performed by the contractor to ensure that construction met contract specifications.

A \$1.8 million runway constructed by the Corps at Williams Air Force Base, Arizona, although currently in operation, was described as being only a marginal facility by the Construction Evaluation Branch at Corps headquarters. The Corps contemplates no corrective action at this time as the extent of the deficiency will not be known until some time in the future.

The runway project was described as a marginal facility because tests conducted after the placement of certain runway materials disclosed that the materials did not conform to contractual requirements. The tests which disclosed the nonconforming materials should have been conducted prior to placing the materials in the runway. The tests were not conducted at the time required, and the contractor's quality control reports did not indicate the reasons for omitting the tests.

Although the quality control reporting for the runway did provide some information on construction progress, the extent of inspection and testing reported by the contractor for the project was not in sufficient detail to enable the Corps to determine whether an effective quality control program existed.

The Los Angeles District had delegated authority for the review and approval of contractor quality control plans to its supervisory engineers at field sites. During our review we noted some projects for which contractor quality control plans had not been submitted and other projects where contractors had submitted quality control plans but had received no formal notice of approval or disapproval by the supervisory engineers at the field sites.

We presented to district officials our views of the need for greater emphasis on the review and approval of contractor quality control plans. The district promptly issued a directive which stated that all future contractor quality control plans would be reviewed by the district office as well as supervisory engineers in the field.

In the Baltimore District we found a significant variance in quality control reports concerning construction progress, contractors' inspection of construction, and the results of the contractors' inspections. Contractor quality

control reporting for some of the projects seemed to be complete, while reporting for other projects was minimal.

We also examined the Baltimore District's procedure for review and approval of contractor quality control plans prior to construction. As in the Los Angeles District, the review and approval authority had been delegated to supervisory engineers in the field.

#### Actions to improve implementation

During July and August 1969, the Office, Chief of Engineers, conducted seminars on construction quality control. The seminars were conducted because of evidence that the contractor quality control programs were not fully effective. A summary of the findings of the quality control seminars noted that improved construction quality, as well as other benefits, could be derived by both the contractor and the Government with effective quality control programs.

Subsequent to the quality control seminars, Corps officials were revising regulations to provide the field offices with additional guidance on proper implementation and enforcement of contractor quality control systems. Corps officials advised us that the revised quality control directive was being completed and should be issued during fiscal year 1971.

#### THE ENGINEERING COMMAND PROGRAM

At the Western Division and Southwest Division of the Command, we found that, although the required clause for contractor quality control was being inserted in construction contracts in excess of \$10,000, the contractor quality control systems were not functioning properly in a number of projects. Following are some of the projects and problems noted.

Bachelor officers' quarters constructed by the Engineering Command at the Naval Training Center, San Diego, California, at a cost of \$2.4 million received both interior and exterior water damage after acceptance by the Government. Responsibility for performing needed repairs on this project had not been resolved at the time of our review.

The interior and exterior water damage resulted from (1) the omission of gutters and downspouts for proper drainage from the roof, (2) the omission of caulking where the walls met the ceilings and floors, and (3) failure of the contractor to properly apply a liquid sealer to the exterior of the porous masonry block walls. Application of the liquid sealer was required in the contract specifications but installation of the gutters and downspouts and the application of the caulking were not.

In an aircraft maintenance facility built by the Engineering Command at the Naval Auxiliary Air Station, Imperial Beach, California, at a cost of \$1.3 million, the hangar doors would not function and a noticeable sag had developed in the roof.

On this project, there was a disagreement between the Government and the contractor as to whether the problems resulted from poor construction or inadequate design. The contractor did not have a specific quality control program for effective supervision of his subcontractors and did not provide the Government with quality control reports disclosing job progress and the contractor's quality control efforts, if any.

The Engineering Command concluded that it did not have sufficient evidence to demonstrate poor construction and that, therefore, design errors had caused the problems. As a result, a contract change order was issued for about \$13,000 for repair of the hangar doors. The roof sag was not corrected.

Officials at both the divisions cited advised us that they had not enforced the requirement for contractor quality control and that they did not require their contractors to provide reports on the results of any inspections conducted. The officials also stated that they had not received any direction from Engineering Command headquarters on the proper implementation of contractor quality control. Since the two divisions did not require specific quality control systems, there were no contractor-prepared reports available for the projects concerning job progress, inspections performed, or results of inspections.

## Actions to improve implementation

In October 1969 Engineering Command officials advised us that a regulation was being drafted which, when issued, would provide specific guidance to field divisions on the proper implementation of contractor quality control systems. The instruction was issued on April 10, 1970, and shortly thereafter headquarters officials visited field divisions to assist them in implementing the procedure. This instruction provides guidance for implementation of contractor quality control systems on construction contracts of \$1,000,000 or more, awarded after July 1, 1970. The instruction contains the statement that it is the policy of the Commander, Naval Facilities Engineering Command, to implement the ASPR requirement on a progressive basis. The base, presently \$1,000,000, is to be progressively lowered, depending on the rate of assimilation capability of Engineering Command field divisions.

## CONCLUSIONS

The Corps and the Engineering Command have recognized the need for procedures which will ensure that contractors implement effective quality control systems, and the two agencies are currently attempting to achieve that goal. After implementation of quality control systems, the headquarters level of each agency should systematically review the implementation to ensure that it is consistent and effective at all field sites and is meeting agency goals.

## RECOMMENDATION

We recommend that the Secretary of the Army have the Chief of Engineers establish and the Secretary of the Navy have the Commander, Naval Facilities Engineering Command, establish procedures for systematically monitoring field offices' enforcement of contractor quality control programs.

## AGENCY COMMENTS

In a letter dated October 19, 1970 (see app. I), the Deputy Assistant Secretary of Defense (Installations and Logistics) advised us that DOD concurred in our findings and recommendations and stated that, as indicated in our draft report, both construction agencies had been developing and were continuing to develop improvements in the



areas cited. We were further advised that our draft report had been helpful in noting areas for further improvements and would be of assistance to both agencies in their development of improved procedures and policies for construction quality assurance.

### CHAPTER 3

#### NEED FOR BETTER INSPECTION REPORTING

We found that inspection reporting needed to be improved to provide the management at Corps districts and Engineering Command divisions with better information on construction progress, inspection activities, and potential problems. Information of the type described was not being prepared for all military construction projects, although it was required by each agency's inspection reporting regulations.

The Government inspector is responsible, under ASPR 7-602.11, for conducting onsite inspections of military projects. His observations and testing of the work being performed by the contractor are the primary assurance to the Government that the contractor is performing the construction in accordance with the drawings and specifications and is meeting all contractual requirements.

The Government inspector communicates the results of his observations and testing through his daily reports. Well-prepared reports should tell management whether job progress is satisfactory and should also indicate to management how well the inspector is fulfilling his responsibility. The inspector's report may be used as a legal document in the event of a dispute between the Government and the contractor.

The Corps and the Engineering Command have various other reports for assisting management in administering the military construction program, but the inspector's daily report is the only report prepared by the Government based on continuous onsite inspection which is intended to present in detail the construction progress.

The Federal Construction Council, in its 1968 report (see p. 4), recommended that Government agencies issue instructions for the preparation and maintenance of complete and accurate records for each construction project. The recommendation further stated that reports should contain all facts pertinent to the project and should be transmitted to higher echelon supervision in a manner that will ensure

timely and effective communication. The Council concluded that effective central or regional office control of the quality of construction projects was dependent, to a large extent, upon preparing and maintaining complete and accurate records and reporting information to management in a systematic manner.

The Corps and the Engineering Command have issued regulations to their field offices on the proper preparation of inspector's reports. The regulations state that inspector's reports are to be prepared on a daily basis for each construction project inspected. The reports are to be an accurate detailed history of job progress with the purpose of keeping management advised of construction activity.

Our tests revealed, however, that the reporting did not always provide sufficient information to keep management advised of conditions at the construction site. Examples of inadequate inspection reporting are discussed below.

During our review of the high-altitude test runway (see p. 5), we were not able to locate the inspector's reports. Corps officials in the Los Angeles District also were unable to locate the reports. After the incident of the lost records, the district issued a directive to its field offices on the procedures for maintenance, handling, and storage of construction project records to reemphasize their importance. The district also issued instructions requiring periodic assessments by representatives of its construction division to determine whether field inspection reporting was being properly completed and maintained.

The available project files did not provide sufficient information to determine construction progress. It was not possible to determine if the project was constructed in accordance with the contract specifications or what actions were taken by the Government inspector to ensure compliance with the construction contract.

Regarding the \$2.4 million hangar project which had various deficiencies in the construction of the roof (see p. 6), we were advised that the Government inspector had not examined the roof. However, the failure to examine the roof was not disclosed in the inspector's reports. Also, there was no information in the inspector's reports as to

what alternative action, if any, was taken by the inspector to ensure that the roof was properly installed. Incomplete reporting, as described above, undermines construction management's awareness of potential problems such as the bad roof.

Concerning the \$1.8 million runway (see p. 7) constructed by the Corps' Los Angeles District for the Air Force, the inspector's reports, in conjunction with other available information, provided a fair description of the day-by-day construction activity. The reporting was not in sufficient detail, however, to advise management of the actions taken by the Government inspector to ensure that construction met contract specifications. There was no explanation as to why certain tests were omitted, although the tests were necessary to determine whether the base-course materials used in the project met the requirements in the specifications. Tests conducted after placement of the materials indicated that the materials did not meet specifications.

We found that inspection reporting on the bachelor officers' quarters project (see p. 8), which was constructed for the Navy by the Southwest Division of the Engineering Command, was not in sufficient detail to determine construction progress. Nor was it possible to determine from the reports what efforts were made by the inspector on a day-by-day basis to ensure that construction met contract specifications.

We found that inspection reporting on the \$1.3 million maintenance facility (see p. 9), which was built by the Southwest Division, provided very little information on the progress of construction or the adequacy of the contractor's construction practices. The reports covering the 60-day period just prior to the discovery that the hangar doors would not operate indicated that the inspector made only three tests during that time to provide assurance that construction was in accordance with specifications. It was not possible to determine from the reports what other actions were being taken by the inspector during the 60-day period to ensure that construction met specifications.

On the basis of our review of the inspection reporting practices followed for the five projects described and our

overall review of inspection reporting practices at the locations visited, we believe that difficulties experienced in obtaining properly constructed military facilities are attributable, in part, to failure of inspection reporting to meet the established requirements of the Corps and the Engineering Command.

#### PROCEDURES FOR ADVISING MANAGEMENT OF INSPECTION RESULTS

The results of inspections, to be effective as a management tool, must be made known to management on a timely basis in order that prompt action can be taken on problems noted.

In reviewing the procedures and practices of the Corps and the Engineering Command regarding the communication of inspection results from the field to management levels, we found that standardized procedures for advising management of inspection results had not been developed.

We found, at the Corps' Los Angeles District, that the inspector's reports were retained in the field until project completion and only the inspector's immediate supervisor was responsible for reviewing the reports. The only opportunity for district office officials to review the reported results of inspections was during the periodic field visits by representatives of the district's construction division.

We found, at the Baltimore District, that reports were also retained at field sites. However, the inspector's supervisor prepared a daily report on each project which was forwarded to the district office on a daily basis. This report, when properly completed, provided the district with an accurate detailed history of job progress.

At the Western Division and Southwest Division of the Engineering Command, the inspectors' reports were generally forwarded to the inspectors' supervisors in the field on a daily basis.

The Western Division had directed its field supervisors to forward the reports to the division weekly. Southwest Division had not provided guidance to its field

supervisors as *to* the frequency for submitting the reports, and the supervisors' practices varied considerably.

#### CONCLUSIONS

We believe that construction inspection reports, which are accurate and complete and which identify the actions being taken by the Government inspector, can provide the Corps and the Engineering Command with the type of information needed to more effectively manage the progress of construction in the military construction program. To be useful, the results of inspections must be made known to management on a timely basis in order that prompt action can be taken on noted problem areas.

#### RECOMMENDATIONS

We recommend that the Secretary of the Army and the Secretary of the Navy have the Chief of Engineers and the Commander, Naval Facilities Engineering Command, respectively, review the current inspection reporting practices of their field offices, correct those not complying with agency regulations, and implement a system for prompt systematic communication of inspection findings from the field offices to the construction management levels.

#### AGENCY COMMENTS

DOD concurred in our findings and recommendations. Its comments are discussed on page 10 of this report.

## CHAPTER 4

### NEED FOR IMPROVED TRAINING PROGRAMS

#### FOR INSPECTION PERSONNEL

Our review has revealed that the Army Corps of Engineers and Naval Facilities Engineering Command need to improve the training programs for inspection personnel in order that inspectors will be better qualified to protect the Government's interest in the military construction program. The Government construction inspector performs the onsite evaluation of military construction as required by the ASPR and in so doing is the primary means by which the Government ensures that construction conforms to contract specifications.

The Government Employees Training Act of July 7, 1958 (72 Stat. 327), directed Government agencies on the need for training of civilian personnel. The act stated that, to promote efficiency and economy in Government operations and to develop maximum proficiency in Government employees, Government-sponsored training programs should be provided to employees to develop the skills, knowledge, and abilities which will best qualify them for their position.

Federal regulations require training programs to be continuous in nature. The head of each agency is responsible for determining the training needs of his agency and establishing and operating training programs to meet those needs. The agency head is also responsible for extending agency training programs to employees of other agencies, establishing criteria for the selection of employees for training, evaluating the results of training, and conducting research to improve his agency's training programs. The Army and Navy implemented the Federal training requirements through their respective civilian personnel regulations.

The Federal Construction Council reported in 1968 that Government inspectors should possess training and experience sufficient to ensure recognition of improper construction and should be assigned to inspect only that construction in which they have had adequate training and experience.

An inspector may be assigned to any one of many diversified projects such as runways, housing, barracks, waterways, dams, and hangars. Rather than being assigned to one major facility, he may be required to inspect several smaller projects concurrently. The inspector also has responsibilities in the areas of quality of materials, safety, and administrative matters related to the job.

The Civil Service Commission has established the requirements for attaining the position of construction inspector. An individual's starting position is based on his experience and education. As an inspector gains experience and demonstrates ability, he may be advanced to positions of higher authority which might entail administrative and supervisory responsibility in addition to inspection activities.

The inspection personnel of the Corps and the Engineering Command generally are individuals who have had work experience in one aspect of construction. In conducting inspections of military projects, an inspector frequently encounters aspects of construction outside his area of work experience; and, therefore, for an inspector to be effective, his work experience must be supplemented by agency-sponsored training programs in other areas of construction.

#### CORPS TRAINING PROGRAMS FOR INSPECTION PERSONNEL

We found that the Corps had an agencywide training program for inspection personnel. There were **23** different courses available for inspection personnel, although the number and content of the courses given could vary from year to year.

The headquarters of the Corps administered the agency training program for inspection personnel but did not maintain centralized records of training given. Corps headquarters had no formal means for determining training needs of inspectors. The headquarters had assigned to its field offices the responsibility for selecting inspection personnel to attend the various agency training courses. From the recommendations by field offices on inspection courses to be given and personnel to attend, headquarters developed an annual training program for inspection personnel.



We found at the Corps' Los Angeles District that there was no formal means for determining the training needs of inspection personnel. The district's supervisory engineers in the field had been assigned the responsibility for selecting inspection personnel to attend the headquarters' training courses, but the engineers did not have information available by which to compare inspectors' training with the future inspection needs of the agency. Also, the engineers had to rely on their observations of inspectors' performances in selecting personnel to attend training, because inspectors were not tested to determine areas of inspection weakness and information was not available concerning the types of construction deficiencies which had not been detected by inspectors.

The headquarters training was supplemented by periodic seminars given in the district, but the district did not maintain information on the frequency and content of the local seminars. The district did not have centralized records, other than individual personnel files, of agency training received by inspection personnel, and no record was maintained of local training given inspectors.

The inspectors' personnel files showed that **23** inspectors had received no training after being employed by the Corps, 17 had taken one of the agency's courses, 15 had taken two courses, 10 had taken three courses, six had taken four courses, and 17 inspectors had taken five or more of the agency 'courses.

We found that the Baltimore District had no formal means for determining the training needs of its inspection personnel. The supervisory engineers in the field were responsible for recommending specific inspectors for the agencywide training program but were subject to the same limitations as the supervisory engineers in Los Angeles in selecting inspection personnel to attend training. The supervisory engineers developed seminars for the inspectors under their supervision to supplement the training provided by headquarters.

The Baltimore District recorded all training received by inspectors on centrally maintained training files. Training information for individual inspectors, or the

inspection force as a whole, was readily available in the central file.

A district official advised us that their training plans called for each inspector to take at least one of the agency courses each year. Our review of training records indicated that inspection personnel in the Baltimore District had received a substantial amount of training at both the agency and district levels,

In April 1970 Corps officials in Washington, D.C., advised us that a procedure was being implemented whereby personnel of the Corps' Construction Evaluation Branch at headquarters would be reviewing the adequacy of inspection during the branch's periodic evaluations of Corps' field activities. The observations of the branch concerning adequacy of inspection by individuals, as well as the inspection forces as a whole, would be reported to the appropriate district and division levels in order that needed improvements in the area of inspection could be accomplished. This action by the Corps, when fully implemented, should provide better information as to needed improvements to individual inspectors and to the inspection forces as a whole, and should assist the Corps in developing training programs for inspectors.

ENGINEERING COMMAND TRAINING PROGRAMS  
FOR INSPECTION PERSONNEL

We found that the Engineering Command did not have an agencywide training program for inspection personnel. The training of inspection personnel was determined and established by each division. The Engineering Command headquarters had not monitored the training activities of its divisions to determine whether the programs for inspectors were in accordance with Federal criteria.

At the Western Division of the Naval Facilities Engineering Command, there was no formal training program for inspectors. Training provided was in the form of seminars, but these were not systematically scheduled. At the time of our review, all training for inspectors had been discontinued. The division had no formal technique for determining training needs of inspection personnel. The division did not maintain centralized records of training received,

and inspectors' personnel files disclosed that training had not been consistently recorded since 1965.

We found also that the Southwest Division had no formal program for training of inspectors. Periodic seminars on construction, human relations, and safety were conducted for inspectors; but the seminars were not given to all inspectors and were not systematically scheduled. The topics presented were determined on the basis of seminars available, not on the basis of areas identified as inspection weaknesses. The division did not have a systematic means for determining training needs of inspectors and did not maintain centralized records of training provided.

During 1962 and 1963, the division tested its inspection personnel to determine their knowledge of construction practices. Test results demonstrated that inspection personnel did not have sufficient knowledge in the areas of cement, concrete, plumbing, electricity, painting, and in many other aspects of construction which they would frequently encounter in their inspection duties. The division had not developed a training program or taken any other action to improve the inspectors' capabilities in the areas of demonstrated weakness.

#### Development of agencywide training programs

In October 1969 Engineering Command officials advised us that agencywide training programs were being developed for all civilian career personnel, including construction inspectors. Our review showed that a training program for inspectors was being planned but had not been definitized. In April 1970 we found that the program was still in the planning stage and had not been implemented.

#### CONCLUSIONS

We believe that the Corps and the Engineering Command should improve their training of inspectors and help them attain greater proficiency in the examination of military construction. Improvements in training given by the two agencies should provide added assurance that the Government's interests are protected in the military construction program.

## RECOMMENDATIONS

We recommend that the Secretary of the Army and the Secretary of the Navy have the Chief of Engineers--in improving the Corps of Engineers' current program--and the Commander, Naval Facilities Engineering Command--in developing a program for the Navy--respectively:

1. Establish a better means for determining training needs of inspectors and matching training to the inspection needs of the agency.
2. Develop a continuous systematic training program to meet the determined needs.
3. Maintain centralized training records to facilitate planning and evaluation of training for groups and individuals.

## AGENCY COMMENTS

DOD concurred in our findings and recommendations.  
*Its* comments are discussed on page 10 of this report.

## CHAPTER 5

### NEED FOR MORE COMPREHENSIVE REVIEW

#### OF FIELD OPERATIONS

We found that the Army Corps of Engineers and Naval Facilities Engineering Command needed to perform more comprehensive reviews of the construction practices and procedures at field locations to ensure that the field activities of the two agencies were complying with all agency policies relating to construction inspection and contractor quality control and were effectively carrying out their responsibilities in these areas.

#### CONSTRUCTION REVIEW PROGRAM OF THE CORPS

The Corps headquarters had delegated the authority for review of its divisions' and districts' construction practices relative to inspection and contractor quality control to its Construction Evaluation Branch. Officials of the branch have advised us that their review plans call for an examination of such practices at each district and division at 6-month intervals.. Due to shortage of staff, however, the reviews have been about 10 months apart. We found that the reports prepared by the branch identified deficient construction practices on a project-by-project basis. However, the reports generally did not indicate what problems, if any, existed within the division's or district's systems of implementation of Corps' policies and procedures. Also, the reports did not advise the division or the district as to what actions should have been taken to correct system weaknesses. We also found indications that the branch did not always make a timely follow-up to ensure that corrective action had been taken by field sites on deficiencies noted.

#### CONSTRUCTION REVIEW PROGRAM OF THE ENGINEERING COMMAND

During our reviews at the Western Division and Southwest Division, we found no evidence that the headquarters had reviewed the implementation of agency policies and procedures relating to construction inspection and contractor quality control. We were advised by headquarters officials

that prior to 1969 there had not been an organization within the Command which had responsibility for monitoring the adequacy of the field divisions' construction activities.

In May 1969 the Engineering Command announced the establishment of the Construction Engineering Division, and in January 1970 the division became operational. The new division was assigned responsibility for reviewing the construction activity of the field divisions to ensure that agency policies and procedures were being followed and that proper coordination was maintained between field divisions and between the divisions and headquarters. The review group has been assigned responsibility for formulating and administering construction plans, policies, and procedures. The review group is to identify weaknesses in the construction program and recommend corrective action. The group is also responsible for ensuring the training of inspectors and effective implementation of contractor quality control programs.

#### RECOMMENDATIONS

We recommend that the Secretary of the Army have the Chief of Engineers take appropriate action to ensure that the Corps' Construction Evaluation Branch performs more comprehensive reviews of field offices' implementation of agency procedures for inspection and supervision of military construction.

We recommend also that the Secretary of the Navy have the Commander, Naval Facilities Engineering Command, take appropriate action to ensure that the Command's Construction Engineering Division develops an adequate system to monitor implementation by field offices of agency procedures for inspection and supervision of military construction.

#### AGENCY COMMENTS

DOD concurred in our findings and recommendations. Its comments are discussed on page 10 of this report.

## CHAPTER 6

### NEED FOR BETTER INTERAGENCY COORDINATION

Our review revealed a need for the Army Corps of Engineers and the Naval Facilities Engineering Command to coordinate their efforts directed toward improving the onsite inspection of construction projects. Each of the agencies is responsible for identifying and eliminating repetitive construction problems, training construction inspection staff, ensuring implementation of effective contractor quality control programs, and ensuring that construction conforms to specifications.

We found that each of the agencies had taken various actions to improve its administration of the military construction program. The results of such efforts by one agency should be useful to the other. Following are some of the actions which we believe would have been useful to both agencies.

The Corps contracted with the Texas A. & M. Research Foundation for a study of areas affecting construction quality. The study, on which a report was submitted in May 1968, covered many areas of concern to both the Engineering Command and the Corps, but we found no evidence that the study results had been conveyed to the Navy.

The Construction Division at Corps headquarters prepared and transmitted to Corps field offices lists of repetitive construction deficiencies which the division had noted in its field inspections. Information of this type could be used by Corps field officials for preparation of check lists of items for inspection personnel to consider. The Engineering Command could utilize such information in the same way if the Engineering Command were provided with the data.

The Corps had an agencywide training program for inspection personnel. It would be useful to the Engineering Command in establishing a training program for inspectors to know the type and content of the courses given by the Corps and the effect such training had on the quality of Corps inspections.

We pointed out to the Southwest Division of the Engineering Command that the Corps had developed a program requiring contractors to implement quality control systems. We forwarded to the division the quality control regulations and directives used by the Corps in order that those items might assist the division in developing a program for contractor quality control. The progress by the Corps in developing contractor quality control programs should be of significant benefit to the Engineering Command in its enforcement of contractor quality control.

In 1967 the Engineering Command performed an agency-wide study of change orders attributable to design problems and the type of design errors most frequently encountered. The Corps is often involved in change orders resulting from design problems and might have found the Engineering Command's study very useful in reducing or eliminating some of the causes of design errors.

The Command has conducted internal reviews of areas which affect quality in its construction programs and also has requested an independent research group to evaluate areas affecting construction quality. The results of such studies should be useful to the Corps as well as the Navy.

#### CONCLUSIONS

Because there are many areas of mutual interest to both the Corps and the Engineering Command, some of which we have described, we believe that closer coordination between the two agencies in areas of mutual interest can serve to better ensure that military facilities are constructed as specified.

#### RECOMMENDATION

We recommend that the Secretary of Defense take appropriate action to ensure that the two construction agencies coordinate activities in areas of mutual interest regarding construction quality assurance.

#### AGENCY COMMENTS

DOD concurred in our findings and recommendation. Its comments are discussed on page 10 of this report.



## CHAPTER 7

### SCOPE OF REVIEW

Our review was directed primarily to an examination of the practices and procedures of the Army Corps of Engineers and the Naval Facilities Engineering Command for onsite inspection of military construction projects. Our review was conducted at:

Headquarters, Army Corps of Engineers, Washington, D.C.  
Army Corps of Engineers, Los Angeles District, Los Angeles, California  
Army Corps of Engineers, Baltimore District, Baltimore, Maryland  
Headquarters, Naval Facilities Engineering Command, Washington, D.C.  
Naval Facilities Engineering Command, Southwest Division, San Diego, California  
Naval Facilities Engineering Command, Western Division, San Bruno, California

We also made visits to various military bases and military construction projects in progress.

For fiscal years 1967 through 1969, the Congress appropriated about \$4.8 billion for military construction: The cost of military construction at each of the four field sites at which GAO conducted its review was as follows:

<u>Audit site</u>	<u>Fiscal year</u>			<u>Total</u>
	<u>1967</u>	<u>1968</u>	<u>1969</u>	
	————— (000 omitted) —————			
Engineering Command, Southwest Division	\$21,076	\$ 71,966	\$ 62,469	\$155,511
Engineering Command, Western Division	21,467	48,896	12,901	83,264
Corps, Los Angeles District	29,655	33,344	39,773	102,772
Corps, Baltimore District	<u>11,604</u>	<u>20,281</u>	<u>19,850</u>	<u>51,735</u>
Total	<u>\$83,802</u>	<u>\$174.487</u>	<u>\$134,993</u>	<u>\$393.282</u>

From discussions with agency officials and scanning of project files, we identified a number of significant projects in which problems during construction were known to have occurred. At each of the above offices, we reviewed in more detail selected projects to confirm the occurrence of construction deficiencies involving a lack of compliance with contract requirements. Illustrative of our findings are the projects discussed in this report. Our purpose in selecting projects in which problems had occurred was to identify possible contributing causes and to determine if the two agencies could improve their inspection procedures and practices to reduce the possibility of recurrences of such problems.

In performing our review, we examined pertinent policies, procedures, regulations, correspondence, and documentation relating to individual construction projects, contractor quality control systems, inspection reporting, inspector training, and other aspects of the military construction program. We also interviewed military and civilian personnel responsible for administering the program.

In the course of our review at each military installation, we also contacted the cognizant military audit or internal review organizations to ascertain whether they had recently completed any reviews regarding the inspection of military construction projects. We were advised by these organizations that no such reviews had been performed.

## **APPENDIXES**



ASSISTANT SECRETARY OF DEFENSE  
WASHINGTON, D.C. 20301

19 OCT 1970

INSTALLATIONS AND LOGISTICS

Mr. C. M. Bailey  
Director, Defense Division  
U.S. General Accounting Office  
Washington, D. C. 20548

Dear Mr. Bailey:

We have completed our review of the draft report by the General Accounting Office on "Improved Inspections Needed to Assure Compliance with Contract Specifications in the Construction of Military Facilities" (OSD Case #3160) provided by your letter of 12 August 1970.

The draft report noted no significant discrepancies in the procedures of the Army Corps of Engineers (OCE) and the Naval Facilities Engineering Command (NAVFAC) field offices and divisions which were inspected during the period May 1969 to June 1970. However, the draft report did note that some improvements in the procedures and practices of the two agencies were required to provide better assurance that military construction projects were constructed in accordance with contract specifications. Specific areas in which the need for improvement was noted in the draft report are: (1) more effective implementation of contractor quality control systems; (2) more comprehensive inspection reporting by Government inspectors; (3) increased emphasis on training of Government inspectors; (4) more intensive evaluation of field activities by the two construction agencies' headquarters; and (5) increased coordination between the two construction agencies in resolving mutual inspection problems.

We concur with the GAO findings and recommendations and note that the findings are in accordance with current Department of Defense policies. As indicated in the draft report both OCE and NAVFAC have been and are continuing to develop improvements to their procedures in the areas cited.

[See GAO note]

The draft report has been most helpful in noting areas for further improvements to OCE and NAVFAC and will be of assistance *to* both agencies in their development of improved procedures and policies for construction quality assurance.

Sincerely,



Glenn V. Gibson  
Deputy Assistant Secretary of Defense

GAO note: These comments make reference *to* statements contained in the draft report which have been omitted in the final report.

PRINCIPAL OFFICIALS OF  
THE DEPARTMENT OF DEFENSE  
AND THE DEPARTMENTS OF THE ARMY AND THE NAVY  
RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES  
DISCUSSED IN THIS REPORT

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
<u>DEPARTMENT OF DEFENSE</u>		
SECRETARY OF DEFENSE:		
Melvin R. Laird	Jan. 1969	Present
Clark M. Clifford	Mar. 1968	Jan. 1969
Robert S. McNamara	Jan. 1961	Mar. 1968
DEPUTY SECRETARY OF DEFENSE:		
David M. Packard	Jan. 1969	Present
Paul H. Nitze	July 1967	Jan. 1969
Cyrus R. Vance	Jan. 1964	June 1967
ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS):		
Barry J. Shillito	Jan. 1969	Present
Thomas D. Morris	Sept. 1967	Jan. 1969
Paul R. Ignatius	Dec. 1964	Aug. 1967
<u>DEPARTMENT OF THE ARMY</u>		
SECRETARY OF THE ARMY:		
Stanley R. Resor	July 1965	Present
ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS AND LOGISTICS):		
J. Ronald Fox	June 1969	Present
Vincent P. Huggard (acting)	Mar. 1969	June 1969
Dr. Robert A. Brooks	Oct. 1965	Feb. 1969

Tenure of office	
<u>From</u>	<u>To</u>

DEPARTMENT OF THE ARMY (continued)

CHIEF OF ENGINEERS:

Lt. Gen. Frederick J. Clark	Aug. 1969	Present
Lt. Gen. William F. Cassidy	July 1965	Aug. 1969

DEPARTMENT OF THE NAVY

SECRETARY OF THE NAVY:

John H. Chafee	Jan. 1969	Present
Paul R. Ignatius	Aug. 1967	Jan. 1969
John T. McNaughton	July 1967	July 1967
Paul H. Nitze	Nov. 1963	June 1967

ASSISTANT SECRETARY OF THE NAVY  
(INSTALLATIONS AND LOGISTICS):

Frank Sanders	Feb. 1969	Present
Barry J. Shillito	Apr. 1968	Jan. 1969
Graeme C. Bannerman	Feb. 1965	Feb. 1968

COMMANDER, NAVAL FACILITIES  
ENGINEERING COMMAND:

Rear Adm. Walter M. Enger	Aug. 1969	Present
Rear Adm. A. C. Husband	Nov. 1965	Aug. 1969

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