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BY THE COMPTROLLER GENERAL  
**Report To The Chairman,**  
**Committee On Appropriations,**  
**House Of Representatives**  
OF THE UNITED STATES

RELEASED

**Why Actual Costs Of Military  
Construction Projects Vary  
From Their Estimates**

Many military construction projects require additional funding above the original appropriation. GAO found that many of the factors responsible for differences between estimated and actual project costs were not related to the adequacy of the services' estimating procedures.

This report discusses the procedures followed by the military services in preparing their estimates and the reasons why estimated budget costs differ from the projects' actual costs.

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COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

B-201476

The Honorable Jamie L. Whitten  
Chairman, Committee on Appropriations  
House of Representatives

Dear Mr. Chairman:

In your November 27, 1979, letter, you asked us to review the Department of Defense's reprogramming of funds for military construction projects. You pointed out that the Department's need for additional project funds above that initially appropriated was increasing. You also asked us to determine (1) whether cost estimating procedures--including guidelines for inflation--were adequate, (2) how the Department's actual costs for fiscal year 1979 projects compared to its budget estimates and how its experience compared to that of other Federal agencies, and (3) whether changes in legislative policy for reprogramming were warranted.

To evaluate the military services' procedures for preparing budget estimates for construction projects, we selected and reviewed 83 projects from the fiscal years 1978-80 military construction programs. These projects were primarily major construction projects of the Active services, exclusive of family housing projects. Our selection was not made on a statistical sampling basis, but was designed to include (1) many different types of facilities constructed by the services and (2) construction projects with cost overruns, cost underruns, and costs close to the budget amounts. We attempted to (1) ascertain the basis for each cost estimate included in the budget submissions to the Congress for the 83 projects and (2) determine the reasons for differences between the cost estimates used in the budget submissions and the latest estimates of the projects' costs. Appendix I provides details of our findings.

COST ESTIMATING

In general, the services' cost estimating procedures for military construction projects appear reasonable. The Army

and the Air Force, and to some degree the Navy, primarily used historical cost data to prepare cost estimates for the projects we reviewed. The services adjusted these estimates to cover differences in geographical location, recent bid experience, and anticipated inflation.

Your Committee and other committees have stressed to the Department the need for all military construction projects to be at the 35- to 50-percent design stage at the time the projects are submitted to the Congress for authorization and funding. The reasons cited for having projects at this design stage were to increase the validity of cost estimates supporting the budget submissions and to make possible the start of construction soon after congressional approval. Many of the projects are at this design stage when they are submitted for congressional approval. However, our tests indicate that, except for Navy projects, most projects are not at this design stage when cost estimates are prepared.

Generally, cost estimates based on at least 35-percent design were somewhat closer to the current working estimates for the projects we selected. However, we found that this was not the case for all projects. We believe that attaining 35-percent design to support the cost estimates included in the budget submission would enhance the validity of the estimates, particularly on the more unique projects where prior historical cost data is limited.

We found that many of the factors responsible for differences between estimated and actual costs were not related to the adequacy of the services' cost estimating procedures. Differences occurred because of the degree of bidder interest in a particular project, fluctuations in certain material and labor costs, changes in the originally anticipated bid opening date, changes in requirements or design or both after the budget submission, and changes in site location for geographical and environmental reasons.

#### Estimating inflation costs

The Office of Management and Budget provides the overall inflation rate for the Department's purchases of goods and services. The Department spreads the inflation rate over five categories of purchases, including military construction. For fiscal years 1978 and 1979, the inflation factors used were much lower than actual costs. As of June 25, 1980, the Department projected that inflation rates for fiscal years 1980 and 1981 construction projects would be 12 percent and

10.8 percent, respectively. These rates were much higher than those furnished by the Office, and they were higher than the 7 percent and 8.9 percent used by the Department for cost estimating purposes. Consequently, funds requested for these fiscal years may be insufficient to cover the effects of inflation on the projected costs needed to complete the projects.

We did not determine to what extent the use of low inflation rates contributed to differences requiring reprogramming action. However, in February 1980, Department officials estimated that they would require an additional \$380 million to execute all projects previously approved. Officials further estimated that \$98 million of this shortfall was due to the use of low inflation rates. We do not know the number of projects requiring additional funds that meet the conditions for which express prior congressional committee approval is required. (See p. 10 for a discussion of these requirements.)

We also found that, based on projected inflation, each military service escalates its cost estimates for budget purposes to a different point in time. For instance, the Army will escalate estimates to the estimated midpoint of construction, while the Navy and the Air Force will escalate to January 1 and April 1, respectively, of the program year. We believe the Department should have all the services escalate estimates to the same point in time. However, using a hypothetical situation, it appears that the escalation rate difference between the various points in time to which the estimates have been escalated will not have a significant adverse impact on the estimates. However, if the bid date and the contract award date are delayed, the point in time to which estimates have been escalated becomes more critical, especially in periods of increasing costs. In our opinion, the Army's procedure of escalating estimates to the midpoint of construction is more realistic than Navy and Air Force procedures.

#### FISCAL YEAR 1979 PROJECTS

Time did not permit our obtaining and comparing the current working estimates of the hundreds of fiscal year 1979 military construction projects with the budget estimates submitted to the Congress for these projects. However, we compared the budget estimates with the current working estimates for all fiscal year 1979 projects which were managed by the construction activities at which we performed fieldwork on our sample of 83 projects. We found that 98 of the 160 projects

were being constructed for less than the budgeted amounts, and 62 projects were experiencing overruns. On the basis of the Department's information, about 50 percent of these projects are expected to cost within 10 percent of budgeted amounts, and about 87 percent are expected to cost within 25 percent of budgeted amounts.

COST VARIANCES ON OTHER  
AGENCIES' PROJECTS

We also discussed construction cost estimating procedures and differences between budget estimates and actual costs with officials of other Federal agencies. We learned that these agencies used procedures which were similar to those the services used. However, these agencies were faced with other uncertainties, such as land acquisition. For example, in some cases, agencies submitted cost estimates when the sites had not been selected. Whereas, in the services, site acquisition was not generally a problem that could affect the accuracy of cost estimates.

These other Federal agencies, none of which had as many projects as the Department, also experienced both underruns and overruns on their projects which were as severe as those the services were experiencing. (See p. 9.)

REPROGRAMMING

The increase in the military services' reprogramming requests being received by the Congress appears to be largely the result of several factors other than inadequate cost estimating procedures.

Committee reports accompanying the fiscal year 1979 Military Construction Appropriation Act lists seven specific circumstances under which funds may be reprogrammed with the express prior congressional committee approval. One of the seven deals with increases in costs of previously approved projects. Although the Department submitted 134 reprogramming requests to the congressional committee during fiscal year 1979, cost overruns on Active service projects in the United States were responsible for less than one third of the requests. In addition to National Guard and Reserve forces' construction projects, increases to projects previously reduced by the Congress, emergency projects, and replacement projects were responsible for the other reprogramming actions.

We also examined the 113 fiscal year 1980 reprogramming requests the Department had submitted through July 30, 1980. Only 35, or 31 percent, of the requests were for cost overruns on Active service projects in the United States.

LEGISLATIVE POLICY

Since many of the factors causing differences between budgeted and actual costs on military construction projects are not related to the adequacy of cost estimating procedures, we believe a more stringent legislative policy on reprogramming would not result in a significant improvement in cost estimating. Further, such a policy may cause the services to make more frequent and/or greater changes in projects' scopes to assure that projects can be built within budgeted and authorized amounts.

AGENCY COMMENTS

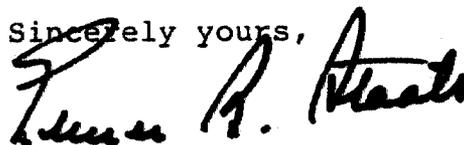
In a letter dated December 3, 1980 (copy attached as app. II), the Department advised that it was in nearly complete agreement with the report. The Department agreed that our analysis of factors contributing to inaccurate cost estimates is correct and that a more stringent reprogramming policy by the Congress would not improve construction cost estimating procedures.

The Department agreed that it is better to estimate costs to the projected midpoint of construction. However, the Department pointed out that we were not accurate in stating that the Navy and the Air Force do not estimate to the midpoint of construction. We disagree since the activities we visited were escalating estimates to January 1 and April 1 of the project year and not the midpoint of construction. Navy and Air Force officials also said that the estimates were escalated to January 1 and April 1 of the project year.

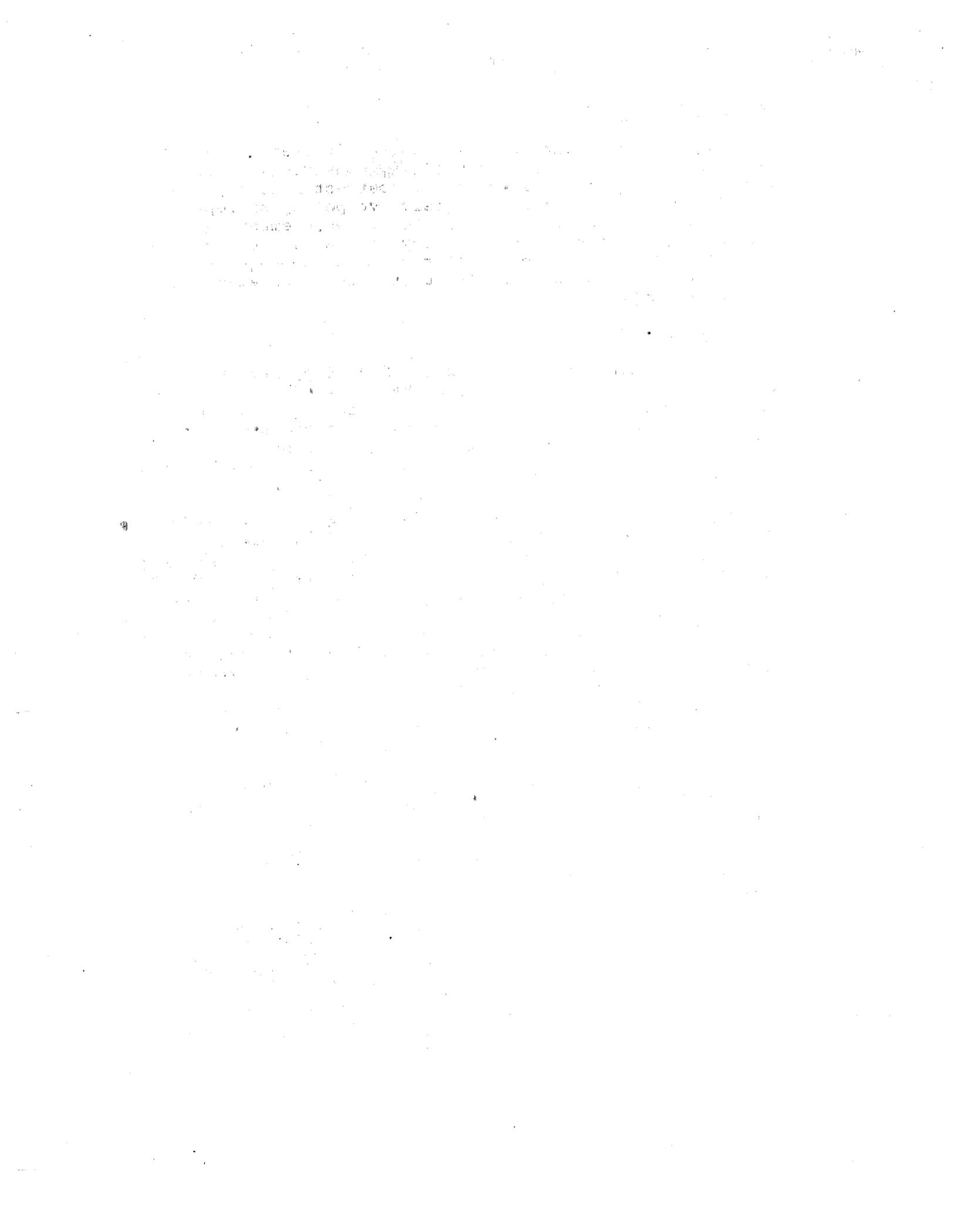
The Department also said that in the future the three agencies would escalate to the midpoint of construction computed from actual projected dates.

As arranged with your office, we are sending copies of this report to the Secretaries of Defense, the Army, the Navy, and the Air Force. We plan no further distribution until 10 days after the date of the report. Then, we will send copies to the Director, Office of Management and Budget, and other interested parties and make copies available to others upon request.

Sincerely yours,



Comptroller General  
of the United States



ARE INADEQUATE ESTIMATING PROCEDURES RESPONSIBLEFOR INCREASES IN REPROGRAMMING REQUESTS?

We reviewed 83 military construction projects authorized and funded during the past 3 years. Forty-four of the projects had been or were being constructed for less than the budgeted amount, while 39 exceeded the budgeted amount.

PREPARATION AND REVIEW  
OF BUDGET ESTIMATES

Although the services use some of the same historical data and economic indicators to arrive at military construction estimates, their procedures and levels of review are different.

Army

Several weeks before the budget request goes to the Congress, the Office of the Chief of Engineers calls for a budget estimate of each project included in the Army's program. Using information from an installation project book concerning size, purpose, and siting of the proposed facility, cost estimators in the Corps of Engineers district offices prepare budget estimates. Estimators use the Army pricing guide to establish the cost per square foot for the type of structure involved. Estimators adjust this cost in light of the facility's size, the geographic location of the installation, and recent bid experience in the particular district. To estimate the related supporting facilities costs, district engineers determine requirements for utilities, roads, sidewalks, parking areas, landscaping, and certain other items. They then prepare their cost estimates for these items using current prices in the area and recent bid experience. These costs and the estimated cost to construct the building become the budget estimate for the project. To allow for inflation, the Army escalates the estimated cost for each line item to the estimated midpoint of construction.

The district office forwards its budget estimates to the Office of the Chief of Engineers, which prepares the cost estimates (DD Forms 1391) that are included in the budget submission to the Congress. The Office of the Chief of Engineers and the Army Programming Branch occasionally revise district estimates because of budget constraints or changes in project scope or both.

Air Force

Air Force procedures for preparing budget estimates are similar to the Army's except that the Air Force has no counterpart to the Army Corps of Engineers. Base civil engineers prepare the initial cost estimates for projects at installations in the same manner as Army cost estimators. Base civil engineers use the Air Force pricing guide to determine costs per square foot and adjust these costs for the facility's size, the geographic location, and recent bid experience at the installations. To allow for inflation, the Air Force escalates estimates to April 1 of the fiscal year the project is submitted to the Congress for authorization and funding.

Base civil engineers forward the initial estimates through the major commands to the Air Staff which prepares the project cost data to be included in the budget submission. On the basis of the Air Staff's knowledge of what similar projects have cost, Air Staff personnel revise the initial estimates, as they consider necessary, and ensure that similar projects at various locations are comparably priced.

Navy

Naval Facilities Engineering Command (NAVFAC) division cost estimators prepare budget estimates for those projects which do not reach 35-percent design in time for budget submission. To prepare their estimates, they use documents, such as cost estimates from the installation, a current edition of Building Construction Cost Data, Historical Military Construction Cost Engineering Data, the Department of Defense's (DOD's) Military Construction Cost review guide, and DOD-established escalation rates. As in the other services, NAVFAC estimators adjust costs per unit (square foot, etc.) by a size factor, a geographic area factor, and an inflation factor. They also make allowances based on professional knowledge, judgment, and experience with similar projects in the division.

At the 35-percent design point, the architect/engineer (A/E) firm submits a project engineering documentation package to the cognizant NAVFAC division office. This package includes a cost estimate which is based on material "take-offs"--the A/E firm estimates the cost of the project by applying material and labor costs to the quantities of material to be used in the project.

Using the A/E firm's estimate, the NAVFAC division office prepares the cost data to be used in the budget submission. To allow for inflation, the Navy escalates its estimates to January 1 of the fiscal year the project will be submitted to the Congress for authorization and funding or to the anticipated bid opening date. The division office sends its budget estimates to NAVFAC headquarters, which revises the estimates as required by changes in scope, budgetary constraints, and experience with similar projects at other locations.

### Observation

We observed that each military service escalates the estimated project cost for budget purposes to a different point in time. We believe DOD should have all the services escalate costs to the same point in time. However, using a hypothetical situation, it appears that the escalation rate difference between the various points in time will not have a significant adverse impact on the cost estimates. However, if the bid date and the award date are delayed, the point in time to which escalation is provided becomes more critical, especially during periods of increasing costs. In our opinion, the Army's procedure of escalating estimates to the midpoint of construction is more realistic than the escalation dates used by either the Navy or the Air Force.

In commenting on a draft of this report, DOD said that it will advise all three agencies that cost projections should be based on actual projected bid opening dates where possible, with cost projections reflecting inflation to the midpoint of construction computed from the actual projected dates.

### Escalating factors

DOD receives inflation guidelines from the Office of Management and Budget (OMB) in the form of a percentage to be used for each budget year. OMB sometimes revises these guidelines weekly. However, guidelines generally used in estimates for the President's budget are those issued in December of the preceeding year and revised in the following June or July for the mid-session budget review. OMB revises these guidelines again in December before the final review and budget submission in January.

DOD spreads the inflation factor among five budget categories, including military construction. The weighted average of the factors assigned the categories cannot exceed, in the aggregate, the OMB inflation rate. DOD reviews budget submissions to assure itself that, in the aggregate, it does not exceed the guidelines amount.

Historically, OMB's inflation guidelines have been low, according to DOD officials. The guidelines used for the fiscal years 1978 and 1979 budgets were lower than actually experienced (9.6 percent), and for fiscal years 1980 and 1981, the guidelines used were lower than what DOD had projected. Consequently, funds requested may be insufficient to meet the expected costs needed to complete the projects.

We have not determined whether the lower rates contributed to the increase in reprogramming requests. DOD officials estimate that of the \$380 million shortfall between funds needed for congressionally approved and funded projects and appropriated funds, \$98 million is due to use of low inflation rates.

Escalation factors used for inflating cost estimates for fiscal years 1978-81 are shown below, and fiscal years 1980 and 1981 factors are compared with DOD's latest inflation projection for that period.

<u>Fiscal year</u>	<u>OMB guidelines</u>	<u>Factors used by DOD for military construction</u>	<u>Latest projection for the period</u>
1978	6.0	6.0	N/A
1979	6.2	7.0	N/A
1980	7.0	7.0	12.0
1981	8.3	8.9	10.8

#### Percent of design completion

Although the services are reporting that nearly all of the projects in their budget requests have achieved design of 35 percent or better, we found that only about one fourth of the budget estimates in our sample were based on estimates prepared by A/E firms. Most of these were prepared for the Navy. Only 18 percent of the Army estimates in our sample and 9 percent of the Air Force estimates were based on 35-percent design completion.

We found that even when Army estimators had an A/E firm's estimate available, the estimators resorted to the Army pricing guide to determine the costs per square foot for the structure involved. We also found that the estimates which were based on 35-percent design were generally somewhat closer to the latest estimate of the costs for the project selected. However, this was not the case for all projects. We believe that attaining 35-percent design, particularly on the more unique projects where historical cost data is limited, would enhance the validity of the estimate.

However, requiring that design work be 100-percent complete at the time budget estimates are prepared will not necessarily ensure that cost estimates will always be indicative of the actual construction costs. For example, we noted one project where the low bid exceeded the Government estimate by 56 percent. The fiscal year 1979 project involved road and parking lot improvements at the Charleston Naval Shipyard, Charleston, South Carolina. The Government estimate, prepared just before the bid opening and based on the A/E's estimate at 100-percent design, was for \$1.996 million. Although five bids were received on the project, and all bids were in the same general range, the low bid of \$3.115 million exceeded the Government estimate by \$1.119 million, or 56 percent.

By contrast, we noted another project where the low bid was 21 percent less than the Government estimate. The fiscal year 1978 project involved modernizing the electrical distribution system at the Charleston Naval Shipyard. The project's budget was \$5.4 million. The Government estimate, prepared just before the bid opening, was \$3.945 million. Six of the seven contractors bid below the Government estimate. The lowest bid was \$3.102 million, or 21 percent less than the Government estimate. A NAVFAC engineer explained that 70 to 80 percent of the cost of this project was related to materials, and major suppliers wanted their products installed at the installation to ensure future business. As a result, the suppliers may have sold the materials to the contractor at or below cost to achieve this objective.

The services gave us several reasons why the majority of the budget estimates were based on in-house estimates and not A/E estimates. For example, agencies submit estimates to the Secretary of Defense several months before they are submitted to the Congress. At the time the estimates are required by DOD for budget purposes, the A/E may not have completed the 35-percent design stage. Moreover, the magnitude of DOD's construction budget hinders frequent changes of individual

project estimates as more current estimates are generated. Also, once the total amount of military construction funds to be requested by each service is established by DOD, any increase to an individual project would necessitate a corresponding change to another project in order to stay within the established total. Finally, estimates for projects added late in the budget cycle must be prepared on short notice using the best information available.

Why actual costs vary  
from budget estimates

In all probability, because we are dealing with estimates which are determined at least 18 months before the projects are bid and awards are made, the actual cost will be ultimately less or more than the budget estimate submitted to the Congress. Even if estimates are made based on the most accurate information available, the actual cost of any project is influenced by the bidding and by the contractors' economic condition and motivation at the time the bid is made. Consequently, it is not unusual for the contract amount to be above or below the estimated amount.

We attempted to identify the reasons for differences between the budget estimate of the project and its cost (current working estimate). In some cases we relied on cost estimators' opinions which we could not verify. For most projects, it is virtually impossible to identify such reasons with any degree of certainty. However, our analysis shows that differences probably occurred because of the degree of bidder interest in a particular project, scope reduction and expansion, and fluctuations in certain material and labor costs.

The degree of bidder interest probably affects the costs more than any other single factor. When several contractors are interested in a project, the competition often results in lower bids. Conversely, when only two or three contractors bid, the cost is apt to be higher. For example, the Navy experienced strong bidder interest on an enlisted quarters project with a Government estimate of \$1.472 million. Eleven contractors bid on the project, and the low bid was \$1.236 million, or 16 percent below the Government estimate. On the other hand, the Air Force received only three bids on a runway apron project estimated at \$0.474 million. The low bid was \$0.768 million, or 62 percent more than the Government estimate. The highest bid was nearly double the Government estimate. Factors,

such as the type and location of the project and the amount of other construction work available to the potential bidders, also affect bidder interest. In preparing their bids, contractors can make severe alterations in amounts included for profit and overhead, depending on how badly they want a particular contract. Such desire is difficult to predict 2 years in advance when the services are preparing their cost estimates for military construction projects.

In addition, fluctuations in costs of certain materials and labor cause budget estimates and actual costs to vary. Uncontrollable and unforeseen economic factors of supply and demand sometimes cause the price of a particular material or a particular skill to rise or fall at a rate in excess of the overall inflation rate. Therefore, when a particular project includes significant quantities of one or more of these fast-changing items, the budget estimate may not reflect their prices at the time of the bid opening. Suppliers are reluctant to provide Government estimators the same cost data they give to their favored customers.

Other reasons why the actual costs vary from the budget estimates are:

- The Congress appropriates less than DOD has requested for the projects.
- Delays in starting the projects increase costs because of inflation.
- Changes in requirements and/or design occur after budget estimates are prepared.
- Changes in the intended location of a project because of geographic or other reasons affect the cost of supporting facilities (water, gas, sewage, electrical lines, paving, etc.)
- Estimates in the budget submission are simply poor estimates based on old preliminary designs.

Many of the projects in our sample were experiencing cost differences because they had bypassed the normal programming/budgeting procedures. Projects in this category included those added at the last minute by the services because of new mission requirements, those added by the congressional committees, and those which the Congress authorized in one fiscal year but funded in a subsequent year.

The fiscal year 1979 parking lot improvements project at the Charleston Naval Shipyard is an example of a "poor" budget estimate" because the project bypassed the normal programming/budgeting procedures. We were told that this project was not a part of the Navy's fiscal year 1979 program. However, since it was considered urgent, it was recommended during the hearings that it be added. The Shipyard's Public Works Office quickly prepared a budget estimate of \$1.7 million without NAVFAC's assistance. When the project reached 100-percent design, the current working estimate was \$2.211 million or 30 percent over the budget estimate.

Other unique situations involved:

- An area being rezoned as an earthquake area after the budget estimate was prepared, necessitating redesign of the building.
- A budget estimate being based on a recent award to a firm which subsequently went bankrupt because its bid was too low.

We believe that the services do a creditable job of estimating costs for hundreds of projects each year, considering the magnitude of the military construction program, the leadtime necessary to prepare, process, and approve the budget, and the number of unknown and known variables which are involved in cost estimating.

COMPARISON OF DOD'S ACTUAL AND ESTIMATED COSTS FOR FISCAL YEAR 1979 PROJECTS

While time did not permit an analysis of DOD's entire military construction program, we did compare actual and estimated costs for those 1979 projects which were being managed by the construction activities at which we performed our fieldwork.

We compared the amounts supporting the services' requests for fiscal year 1979 military construction funds with the current working estimates for 160 Navy, Army, and Air Force projects in the United States. We found that 98, or 61 percent, of the projects were being constructed for less than the requested or budgeted amounts. The total underrun was \$48.1 million. Sixty-two of the projects, or 39 percent, were experiencing overruns in a total amount of \$24.3 million. The current working estimates for 50 percent of the 160 projects

were within 10 percent of the budgeted amounts. Only 21 projects, or 13 percent, varied from the budgeted amounts by as much as 25 percent or more.

While the 160 projects were not randomly or statistically selected, they represented about 34 percent of the major construction projects for Active service in the United States for fiscal year 1979. We believe these results support the conclusion that cost estimating procedures are reasonable for budget purposes.

#### Analysis of fiscal year 1980 reprogramming requests

During the period October 4, 1979, through July 30, 1980, the Committee received about 113 requests for \$235.6 million in reprogramming actions. About 51 requests, involving \$146 million, represented Active service projects in the United States. After we eliminated requests for minor construction items, claim settlements on old projects, accounting transactions, space transportation projects, and duplicate requests, there were 35 requests, for a total of about \$60 million, of the type we included in our sample.

Without any further detailed analysis, it is obvious that the fiscal year 1980 reprogramming actions being received appear to be largely the result of factors other than inadequate cost estimating procedures.

#### OTHER AGENCY COMPARISONS

The General Services Administration (GSA) and the Veterans Administration (VA) use a prospectus procedure to obtain the oversight committee's approval to acquire space. The prospectus contains information on the amount of space required and the cost estimate for space acquisition. Both GSA and VA prepare cost estimates in house, using pricing indices similar to those the services use. GSA and VA generally prepare the estimate before a site is selected and without any knowledge of how the building will look. The approved prospectus becomes the authorization to construct the building and also the basis for the ceiling or fund limitation. In some cases, GSA waits several years after a prospectus is approved before funds are budgeted and appropriated. As a result, the validity of the cost estimate submitted to the Congress years earlier is affected. Also, trying to predict the cost of real estate 2 or 3 years before an agency acquires land is almost impossible and surely affects the accuracy of the cost estimate. Section 7(b) of the

Public Buildings Act of 1959, as amended, states that the estimated maximum cost on a construction project may be increased up to 10 percent from the date each prospectus is sent to the Congress for approval. On the basis of this section, GSA seeks the Committee's approval if the approved prospectus amount (estimated maximum cost) exceeds 10 percent.

In cases where actual costs exceed the prospectus by more than 10 percent, GSA can either submit an updated prospectus for congressional approval or rescope the project to be within the cost initially approved and funded.

As of December 31, 1979, GSA had 19 active or recently completed (during 1979) construction projects. Of the total projects, 13 had current estimated maximum costs that were greater than the initial cost estimates, and 6 projects had current estimated maximum costs that were less than the initial cost estimates. Eleven of 19 met the same criteria that require DOD to obtain congressional committee approval for reprogramming actions. GSA also receives its guidelines for inflation from OMB. GSA has spread its inflation rate to construction projects in a range from 6 to 12.5 percent in the last 3 years.

#### PRIOR APPROVAL REPROGRAMMING

Committee reports accompanying the fiscal year 1979 Military Construction Appropriation Act directed that funds may be reprogrammed with the express prior congressional committee approval under the following circumstances:

- For replacement projects.
- For emergency projects.
- For increases to currently approved projects when such increases exceed 25 percent of the amount previously approved for the projects by the Congress, or \$1,000,000, whichever is lesser.
- For any increase to a project previously reduced by the Congress.
- Under lump-sum appropriations for the Guard and Reserve components, for any project which was not among those justified to and approved by the Congress.

--For any increase to any subdivision of the Family Housing Defense appropriation.

--Within the amounts authorized and appropriated for minor construction, for any transfer of funds between the amounts approved, in total, for the category of exigent or urgent minor construction, and that category considered elective.

To comply with these requirements, DOD submitted 134 reprogramming requests to the appropriate congressional committees during fiscal year 1979. Our analysis of the 134 reprogramming requests indicated that 41, or 31 percent, were associated with cost increases on Active service projects in the United States. The remainder involved Guard or Reserve projects (57 percent), overseas projects, emergency projects, family housing projects, or other categories as mentioned above.

In response to the Committee's concern over the adequacy of cost estimating procedures, we directed our efforts primarily toward Active service projects in the United States. Fourteen of the projects required prior approval reprogramming because increases exceeded 25 percent of the amount previously approved, or \$1,000,000, whichever was less. We found that often circumstances other than weaknesses in DOD's cost estimating procedures caused the cost overruns. The Container Restuffing and Consolidation Facility at the Military Ocean Terminal, Sunny Point, North Carolina, exemplifies this point. The project was originally a fiscal year 1978 project with a November 1976 estimate of \$1.147 million. When the project was moved to the fiscal year 1979 program, the Army escalated the budget estimate to \$1.228 million. The Congress authorized but did not fund the project for the fiscal year 1979 budget. An Army programming official said that an arbitrary decision was made to include the project in the fiscal year 1980 budget request at the authorized \$1.228 million, even though a 100-percent design estimate indicated the project would cost \$1.602 million.

Additionally, before the contract was let, paving costs increased dramatically, and the Army had to add a \$40,000 drainage system for environmental reasons. Fortunately, bidder interest was high, and the low bid was \$700,000 below the Government estimate of total contract cost at 100-percent design of \$2.273 million. However, total costs, including an amount for contingencies and supervision, inspection, and overhead, still exceeded the budget amount by \$0.5 million, necessitating prior approval reprogramming.

Another example is the addition to the alert apron at Bardsdale Air Force Base, Louisiana. The Congress authorized and funded this fiscal year 1979 project at \$0.510 million. A few months before the first bid opening, a tornado hit the area which created destruction and caused the local construction market to be overloaded. In addition, other large construction projects were underway in the same area. As a result, the low bid was \$0.826 million which included the bid price, plus allowances for contingencies and overhead. The Air Force rejected all bids, reduced the scope of the project, and readvertised the contract. The second bid opening, about 5 months later, resulted in a low bid of \$0.824 million, including allowances and contingencies and overhead, or 62 percent over the budget amount.

#### CHANGES IN REPROGRAMMING POLICY

Since many of the factors causing differences between budgeted and actual costs on military construction projects are not related to the adequacy of cost estimating procedures, we do not believe that a more stringent legislative policy on the reprogramming of funds would result in substantially better or more accurate cost estimates for military construction projects. Such a policy may cause the services to make more frequent and/or greater changes in projects' scopes to assure that projects can be built within budgeted and authorized amounts. As already cited, even estimates which are based on 100-percent design and are prepared just before the bid opening can vary substantially from the actual cost.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

To determine and evaluate DOD's procedures for preparing budget estimates, we selected 83 Active service military construction projects over the past 3 fiscal years for the three military services. We excluded minor construction and family housing projects. Our selection included a cross section of the various types of projects the services were building and included projects which were experiencing both cost overruns and cost underruns, as well as projects which were being built close to the budgeted amounts. We did not attempt to randomly select or statistically sample projects to review because it would be impractical and too time-consuming to review project files at widely dispersed construction activities' offices. We did, however, select two geographical areas where construction projects for all three military departments were being performed.

We interviewed officials and reviewed pertinent regulations and project files at the headquarters levels of each service in Washington, D.C., as well as at field offices of the three military services' construction activities. We performed our fieldwork at the following locations:

Army

Corps of Engineers division offices -- San Francisco, Calif.  
Atlanta, Ga.

Corps of Engineers district offices -- Sacramento, Calif.  
Los Angeles, Calif.  
Savannah, Ga.  
Mobile, Ala.

Navy

NAVFAC division offices -- Charleston, S.C.  
San Bruno, Calif.

Air Force

Air Force Regional Civil Engineer  
offices -- Atlanta, Ga.  
San Francisco, Calif.

We also visited Camp Pendleton and Eglin Air Force Base to observe actual projects.

Through discussions with cost estimators and project managers and reviews of project files, we tried to ascertain the basis for each cost estimate sampled which was included in the budget requests submitted to the Congress. We inquired about any differences between the budget estimate and the current working estimate for the project.



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ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D. C. 20301

3 DEC 1980

Mr. R. W. Gutmann  
Director, Logistics and  
Communications Division  
U. S. General Accounting Office  
Washington, D. C. 20548

Dear Mr. Gutmann:

This is in reply to your letter of October 30, 1980 to Secretary Brown forwarding a copy of your draft Report B-945182 (FA-80-33) titled "Military Construction Projects Estimated Costs Differ From Actual Costs -- Why?" (OSD Case #5561).

We are in nearly complete agreement with the report. The analysis of factors contributing to inaccurate cost estimates is correct. The findings (on page 24 of the enclosure) that 61 percent of the projects cost less than budgeted amounts and 39 percent more, together with the findings (on page 6 of the report) that 50 percent of the projects were within 10 percent of the budgeted amount and 87 percent within 25 percent of the budgeted amount validate the adequacy of our current cost estimating procedures.

We agree that estimating costs to the projected mid-point of construction is better than estimating to bid opening dates. However, the statement that Navy and Air Force estimate to bid opening dates appears to reflect our inadequate explanation to the auditors. Navy and Air Force estimate costs at the mid-point of construction with relatively fixed bid opening dates of January 1 and April 1 of the program year based on historical experience of average bid opening dates. We will advise the Army, Navy and Air Force that cost projections should be based on the actual projected bid opening dates (not average bid opening dates) where possible, with the mid-point of construction computed from the actual projected dates.

We fully concur that a more stringent reprogramming policy by the Congress would not improve our cost estimating procedures. Basically our problem is predicting the conditions of the market place up to two and one-half years in advance. We will never be absolutely correct. A more stringent policy by the Congress would add burdensome administrative procedures to both the Department and to Congress which could only be avoided by deliberate over estimating of costs. This should be avoided as it would restrict the number of projects in any given budget and result in the creation of idle funds.

In the enclosure we have added a more complete explanation of some of our cost estimating procedures together with some comments on the problems that we have in this area.

Thank you for the opportunity to comment on this draft Report.

Sincerely,



Richard Danzig  
Principal Deputy Assistant  
Secretary of Defense (MRA&L)

Encl

FURTHER COMMENTS ON DEPARTMENT OF DEFENSE MILITARY CONSTRUCTION  
PROJECT COST ESTIMATING PROCEDURES

Cost Estimates Based on 35 Percent Design:

Most of the projects in the FY 1979 program surveyed by GAO were not at the 35 percent stage of design when the cost estimates were submitted to Congress. We have advanced the stage of design since then, and, while we will probably never be able to have all projects at this stage when submitted to Congress, we have greatly increased the percentage of projects at this stage. Therefore we anticipate the future cost estimates will be better. In FY 1979 and FY 1980 the Congress did not fully appropriate requested planning and design funds which made attainment of the 35 percent target difficult.

Use of Inflation Factors Established by the Office of Management and Budget:

The projected inflation in the construction industry was less than actually occurred for several years. We have increased the estimated inflation factors for FY 1981 and FY 1982 to an amount that is consistent with the best industry predictions that are available. In general we cannot predict with any accuracy beyond that time but we are using higher figures for long term predictions than we were using a few years ago. High predictions tend to be self-fulfilling and are to be avoided. Low predictions will result in budgeting inadequate funds. We will continue to do the best that we can using historical trends, known industry trends in material and labor costs and Office of Management and Budget guidance.

Late Bidding and Award Dates:

Bidding dates delayed beyond planned dates subject projects to the full impact of inflation. We have been working strenuously to improve our execution of the program by awarding contracts early in the budget year. We have improved and look forward to continued improvement which will not only make costs estimating more accurate but will reduce overall costs.

Revision of Costs Because of Budgetary Constraints:

The Headquarters of the Military Departments do occasionally reduce estimated costs in order to remain within budgetary constraints. This does not result in an unnaturally low estimate however since when it is done a corresponding action is taken to reduce the actual cost. Such actions may include a reduction in scope, a change from portland cement concrete to asphaltic concrete, deletion of a parking lot or landscaping, etc.

Enclosure



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