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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

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NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

JUL 19 1983

General George K. Withers, Jr.
Commander
U.S. Army Engineer Division, Europe
APO New York 09757

Subject: Improvements Needed in the Army's Design Process
For Military Construction Projects In Europe
(GAO/NSIAD-83-22)

Dear General Withers:

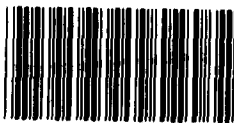
We have reviewed the design process for military construction projects in Europe. The review was made primarily at each of the services' design agents that are responsible for the design and construction of all Department of Defense projects within their designated geographic areas of Europe--Army Corps of Engineers' Engineering Division, Frankfurt, Germany; Naval Facilities Engineering Command's Office in Charge of Construction, Madrid, Spain; and U.S. Air Force 7502 Civil Engineering Squadron, Ruislip, England.

During our review we identified certain problems that we believe warrant your attention and corrective action:

- The potential over staffing of the Corps' Engineering Division in Frankfurt.
- Design agencies were not assuring that proposed Army construction projects meet the congressional goal for projects to be at the 35 percent design stage when submitted to the Congress for construction authorization and funding.
- The Corps' Engineering Division was not assuring that timely value engineering studies were made during the design of construction projects in Europe.

ENGINEERING DIVISION STAFFING LEVEL

During our review, the Corps' Engineering Division in Frankfurt was planning to increase the Technical Engineering Branch's staffing level, in fiscal year 1983, by 11 positions at an annual cost of \$500,000. Our review and analysis of the Division's design process and workload indicate that the



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planned staff increase may not be needed and, in fact, that reductions may be possible. We also noted that additional staff reductions could be made in another branch. In an internal draft study, the Division reported that the General Engineering Branch was duplicating some functions in funds control and that the duplication should be eliminated.

Discussions with Technical Engineering Branch section chiefs revealed that staff reductions may be possible. Some section chiefs stated that they have insufficient workload to keep their staff busy, and others believed their sections were properly staffed. Further, our evaluation of the branch's October 1981 workload analysis supporting the fiscal year 1982 staffing level showed that the analysis did not accurately show staff needs.

The workload analysis was based on 2-1/2 design reviews per project for the number of programmed projects for fiscal years 1982, 1983, and 1984 expected to be reviewed. This computation resulted in the Corps projecting a fiscal year 1982 workload of 453 design reviews. This projection was compared to the branch's fiscal year 1981 workload to determine the percent of increase and additional staff needs. This analysis, however, assumed the 1981 staffing level was correct and did not consider the planned change in the mix of design methods for fiscal year 1982. In fiscal year 1982, the Engineering Division planned and used more host government designs which take less time to review than architect/engineer designs and should have offset part of the branch's fiscal year 1982 computed staffing needs.

The Division increased its use of host government designs from 48 percent in fiscal year 1981 to 72 percent in fiscal year 1982. It also planned to increase the use of host government designs to 84 percent in fiscal year 1983. Our analysis of the Technical Engineering Branch's design review hours showed that the branch required an average of 8 percent less review time for host government designs than architect/engineer designs. The chart below shows the results of our analysis for a sample of projects.

Design method (note a)	35 percent review		90-100 percent review		Total average average hours used
	No. of projects	Average hours used	No. of projects	Average hours used	
Architect-engineer	4	227	18	471	698
Host government	25	202	13	443	645

a/The projects sampled, excluded highly complex type of project reviews such as hospitals and troop construction which are usually designed by architect-engineer firms.

The Division's draft study reported that the General Engineering Branch and the Resource Management Office were duplicating some functions in funds control. The study recommended that only the Resource Management Office perform these functions and that the General Engineering Branch be reduced by two staff years and an additional four positions within the next 2 years. An Engineering Division official acknowledged that some duplication exists and said that it may continue until the Resource Management Office is able to provide the financial information the branch needs. Although we did not independently assess the extent of duplication, our review of the General Engineering Branch and the Resource Management Office indicates that both are responsible for funds control.

In summary, we believe that considering the increased use of host government designs, a workload analysis of the Technical Engineering Branch would show less staff needed for design reviews. We believe that you should consider having a workload evaluation made of the branch's staff needs. We also believe that the General Engineering Branch and the Resource Management Office should coordinate their efforts in funds control to eliminate the duplication.

CONGRESSIONAL DESIGN GOAL

The Congress has emphasized to Defense the importance of having the design of military construction projects at the 35 percent stage when the construction projects are submitted for congressional authorization and funding. This goal is intended to provide the Congress more accurate project cost estimates and to facilitate the start of construction soon after congressional approval.

Using December 31, 1981, as the cutoff date for determining project design status, we found that approximately 39 percent of the projects we sampled in the Army fiscal year 1983 military construction budget for Europe did not meet the congressional design goal. The following shows the results of our analysis.

	<u>Number</u>
Projects submitted for funding	75
Projects sampled (note a)	61
Projects not 35 percent design complete	24
Percent of projects sampled that did not meet design goal	39

a/We did not analyze all projects submitted because the 35 percent design completion dates were not available on all projects.

In response to our inquiries about why the projects failed to meet the congressional design goal, the Corps' Engineering Division officials indicated that the time spent negotiating, coordinating, and defining project criteria with facility users or host countries delayed the start of design on many projects. However, the Corps considered some of the projects to be at the 35 percent design stage using criteria other than 35 percent design completion. For example, if the 35 percent design would be complete within a reasonable period or advance plans and cost estimates were available for review, the Corps considered the design 35 percent complete for budget purposes.

We compared the budget estimates for the 24 projects not meeting the 35 percent design goal with the later estimated construction costs for the same 24 projects when they were at the 35 percent design stage. The budget estimates were about \$2.1 million more than justified based on the later 35 percent stage estimates. Documentation on the projects also indicated that the 35 percent design stages were completed an average of 3-1/2 months after the December 31, 1981 cutoff date, and the range to reach the 35 percent design on the 24 projects was from about 1 to 7 months after the budget submission date.

We believe that when projects are not at the 35 percent design stage at the time of budget submission to the Congress, the appropriate committees should be informed of those projects as well as when the projects are expected to reach the 35 percent design stage. Another alternative would be to defer those projects until the next budget submission. This latter alternative appears appropriate for those projects not meeting the 35 percent design stage until a significant time after the budget submission.

VALUE ENGINEERING STUDIES ON PROJECTS

At the time of our review, the Engineering Division's value engineering reports indicated that the fiscal year 1981 value engineering program expenditures exceeded savings by \$807,000. We selected a sample of 12 value engineering studies from the fiscal year 1981 program to identify those with no savings and the reasons for the studies not resulting in any savings. Our sample contained eight value engineering studies with no realized savings. Our analysis showed that the studies proposed design changes with estimated savings of \$22 million. Not all of the proposals were acceptable, but those that were acceptable were generally rejected because the value engineering studies were initiated too late in the design process.

According to the Society of American Value Engineers, the optimum time to use value engineering is during the early design stage because architects/engineers decisions greatly affect cost once standards and criteria have been established. Performing value engineering early in the design phase has other advantages: the prospects for implementing changes are greatest at an early stage and effects on implementation costs and the construction schedules are less.

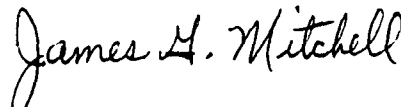
Our discussions with the Corps' Engineering Division project managers confirmed that value engineering study proposals were commonly rejected because they were done too late and identified savings could not be used without costly redesign and construction contract award delays.

At the completion of our review, the Division was taking steps to ensure the timeliness of value engineering studies for fiscal year 1984 projects. For example, the value engineering officer planned to keep a design submission schedule for monitoring all projects which will be subjected to value engineering studies. This schedule will be used to identify the design stage at which the value engineering study should be initiated on each project so that any acceptable proposals can be incorporated into the final design. Since the design submission schedule had not been fully implemented, we could not determine its effectiveness in preventing untimely value engineering studies. However, we believe that the action initiated by the Division should result in more timely value engineering studies.

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We would appreciate your comments and notification of any actions you plan to take on the matters discussed in this letter. Copies of this letter are being sent to the Secretary of the Army and the Army Office of the Chief of Engineers.

Sincerely yours,



James G. Mitchell
Associate Director