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THE FLEET MODERNIZATION PROGRAM: STILL ROOM FOR IMPROVEMENT. (U)  
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BY THE COMPTROLLER GENERAL

**Report To The Chairman,  
Subcommittee On Defense,  
House Committee On Appropriations  
OF THE UNITED STATES**

**The Fleet Modernization Program:  
Still Room For Improvement**

The Navy's fleet modernization program, although improved over recent years, still has problems. Better cost information, closer adherence to the Navy's own guidelines, and improved material management are needed to upgrade the fleet's capability at the lowest costs.

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

B-206962

The Honorable Joseph P. Addabbo  
Chairman, Subcommittee on Defense  
Committee on Appropriations  
House of Representatives

Dear Mr. Chairman:

As requested in your September 22, 1980, letter, we have evaluated the Navy's fleet modernization program.

This report discusses the delays which are occurring in the program, the problems in planning the modernization projects, and the subsequent material management issues which occur. As your Office requested, we obtained comments from Navy officials, and, where appropriate, have incorporated their comments into the report.

As arranged with your Office, we plan distribution of this report concurrent with its delivery to you.

Sincerely yours,

A handwritten signature in cursive script that reads "Charles A. Bowsher".

Comptroller General  
of the United States

D I G E S T

The Navy often does not follow its guidelines in managing its fleet modernization program. As a result, many ship alterations are deferred and data for cost estimates are not available. Also, the Navy does not always properly order material for the program, resulting in unnecessary procurements.

The Navy spends nearly \$1 billion a year in modernizing its ships. With growing concern over the readiness of the naval fleet, the Congress has increasingly scrutinized fleet modernization activities. The Congress is concerned that the Navy is wasting resources by not effectively managing the fleet modernization program.

The Chairman, Subcommittee on Defense, House Committee on Appropriations, requested that GAO review the fleet modernization program, with the review serving as a follow-on to previous work performed for the Committee by GAO.

Since GAO's earlier reports on the program, the Navy has made some improvements, particularly concerning the management of materials used in making the alterations.

However, ship alteration deferrals, late alteration plans and drawings, and questionable material ordering practices continue to hinder the Navy in getting its ships modernized. On the basis of an analysis of ship alterations planned in fiscal year 1980, GAO determined that the Navy deferred about 780, or 35 percent, of its congressionally budgeted alterations. Of these deferrals, 510 occurred because ship overhauls were rescheduled, and 270, or 12 percent, were deferred for reasons such as

- funds were needed to perform unscheduled emergency alterations,
- onhand material was insufficient, and
- plans and drawings were late. (See p. 4.)

Deferrals of programed alterations disrupt the normal alteration development process. Navy guidelines state that each alteration phase is developed dependent on the preceding phase and is essential to the next. Therefore, it is vital to the program that development steps be completed within the specified time frames. When this does not happen, which is often the case, the normal alteration development schedules have to be compressed.

#### PROGRAM GUIDELINES NOT FOLLOWED

The Navy's guidelines recognize the need for early alteration planning and timely completion of the steps in the alteration development process. However, because the guidelines often were not followed by program managers, critical milestones were missed, some alterations had to be deferred while still in the planning stage, and data for cost estimates were not often available.

In some cases, the Navy expected planning shipyards to develop basic ship class drawings for added alterations before it had resolved material and engineering problems related to the alteration. Because the Navy could not provide the technical information which would resolve the problems, the shipyards could not develop the drawings and the alterations had to be deferred. (See p. 8.) When the basic ship class drawings are not developed on time, they are also not available for developing the detailed material and staff-day cost estimates for budget purposes in planning future alterations. (See p. 9.)

The Navy should develop a reporting system to alert program management of slippages in alterations' development milestones since these slippages would affect the programing or deferment of other alterations.

Public shipyards and the Navy's Supervisors of Shipbuilding for private shipyards are required to submit, within 60 days after overhaul, the actual alteration costs incurred. But they seldom do. GAO believes the Navy could improve its budget cost estimates if it used the actual costs for previous alterations to assess the reasonableness of shipyards' cost estimates.

## MANAGING ALTERATION MATERIALS

Previous GAO reports pointed out the need to improve visibility of ship alteration material at the wholesale and shipyard levels. In these reports, GAO found that better controls were needed to separately account for alteration material and to prevent unnecessary procurements.

The Navy is taking steps to improve visibility at both levels. More could be done, however, to improve the effectiveness of material management and to reduce material costs. For example during the review, GAO found that:

- Shipyard personnel did not always use the properly assigned document numbers when requisitioning material. Therefore, these requisitions were erroneously treated as additional requirements. (See p. 15.)
- Unnecessary, additional procurements were sometimes made when the inventory managers did not know that material had been requisitioned under the wrong requirement numbers. (See p. 16.)
- Some material ordered to support alterations was not used because it was ordered before alteration plans were defined or was ordered through both the Federal supply system and the commercial market. (See p. 17.)
- Much of the material ordered to overhaul the U.S.S. Constellation was received after the overhaul had been postponed. The material, which is being retained at a shipyard until the overhaul starts in fiscal year 1983, should be used to fill high-priority requisitions. (See p. 18.)

## RECOMMENDATIONS

GAO recommends that the Secretary of the Navy:

- Institute controls to ensure that program managers follow naval instructions on alteration development milestones and program only those alterations which can be fully developed to support scheduled installations. (See p. 12.)

- Direct the Commander of the Naval Sea Systems Command to establish a system of exception reporting for alterations which do not meet development milestones. (See p. 13.)
- Require that actual cost information on completed alterations be used to review alteration cost estimates. (See p. 13.)
- Direct shipyard commanders to emphasize the importance of using assigned planned requirement numbers because of the overstated requirements and unnecessary procurements that result. (See p. 19.)
- Instruct material managers to not order material before alteration plans and drawings are developed sufficiently enough to define material requirements. (See p. 19.)

There are other recommendations contained on pages 13, 19, and 20 of the report.

AGENCY COMMENTS

The Navy generally concurred with GAO's recommendations in this report but offered some clarifying comments (see app. I). The report has been revised to reflect the appropriate Navy comments.

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ABBREVIATIONS

BACD	basic alteration class drawings
GAO	General Accounting Office

## CHAPTER 1

### INTRODUCTION

The Navy's fleet modernization program provides for improving the ships' characteristics. The modifications, called ship alterations, are developed and made when safety, technical, or military characteristic improvements can upgrade the reliability and maintainability of equipment and improve combat capability. Despite funding constraints and the increased complexities of ship alterations, in fiscal year 1980, the Navy made more than 2,500 alterations on 151 ships at a cost of nearly \$1 billion.

The program is managed by the Deputy Chief of Naval Operations (Logistics), Ship Maintenance and Modernization Division; however, day-to-day program execution responsibility is assigned to the Naval Sea Systems Command. Procurement of the material for ship alterations is budgeted under the appropriation "Other Procurement - Navy" and "Weapons Procurement - Navy." The appropriation "Operations and Maintenance - Navy" includes program funds for installation costs and materials, procurement of initial spare parts, and alteration and design work.

#### PRIOR REPORTS ON THE FLEET MODERNIZATION PROGRAM

In a March 1976 report, 1/ we pointed out several ways in which the Navy could improve its program for managing ship alterations. These included improving fleet modernization planning, matching material procurements with planned alterations, and improving management control over outstanding alterations. We recommended that the Navy

- establish a management information system to assist in monitoring the program,
- reduce the ship alteration deferral rate, and
- establish controls over inventories (see p. 4).

Subsequent to our 1976 report, the Naval Audit Service issued two audit reports 2/ on the fleet modernization program. Some of the more significant findings included in those reports were:

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1/"Improvements Needed in the Navy's Fleet Modernization Program" (LCD-76-406, Mar. 15, 1976).

2/"Fleet Modernization Program at the Naval Sea Systems Command" (C-35239 P-1, Oct. 15, 1979, and C-35239 P-2, Apr. 25, 1980).

- Estimated staff-days for doing ship alterations were overstated in budget requests.
- Actual alterations deviated extensively from those budgeted.
- Completed alterations were included in current year budget requests.

The Navy disputed some of the Naval Audit Service's findings and contended that the findings were not representative of the program.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

The Chairman, Subcommittee on Defense, House Committee on Appropriations, asked us to review the Navy's fleet modernization program. This review was to serve as a follow-on to previous work performed for the Committee by us on the program. To do so, we reviewed the actions the Navy had taken on prior GAO and Naval Audit Service report recommendations. Then, we reviewed recent congressional testimony by Navy officials to obtain updated information and additional insight about the program and its problems.

Our objectives were to

- determine the effectiveness of the Navy's efforts to improve the management of the fleet modernization program,
- identify the major problems still facing the program, and
- assess the Navy's plans for the future.

Our review included the key Navy organizations in the fleet modernization process, the Chief of Naval Operations, the Naval Sea Systems Command, the Ships Parts Control Center (the material inventory control location), and the Puget Sound Naval Shipyard (selected because it is one of the largest of the eight naval shipyards).

Our review was performed in accordance with our current "Standards for Audit of Government Organizations, Programs, Activities, and Functions." We examined the Navy's ship alteration development process and its control of the materials used in the program. This involved interviewing responsible agency officials and examining (1) all of the 780 ship alteration deferrals for 1980 to determine reasons why they were deferred, and the effect it had on the program, (2) the effect late plans and drawings had on alteration completions, (3) ship alteration cost estimating accuracy, (4) the validity of planned material requirements, and (5) the extent of material requisitions.

## CHAPTER 2

### PROGRESS AND PROBLEMS IN

#### THE FLEET MODERNIZATION PROGRAM

Through the fleet modernization program, the Navy continually modifies its ships to upgrade combat capability, reliability, and maintainability. In view of the program's limited funds, only high-priority ship alterations can be made and costs must be kept as low as possible. The Navy therefore must have an effective process for planning, developing, and scheduling its ship alterations. Some elements essential to such a process are

- early determination of those alterations which offer the maximum benefits in terms of improved fleet capability;
- identification of available personnel, capabilities, funds, and other resources;
- accurate and early cost estimates, including the costs for material and labor;
- good visibility of materials at all inventory levels;
- completion of alteration plans and drawings at the earliest possible date;
- proper identification of material and engineering requirements; and
- complete records on the actual costs of completed alterations.

Flexibility is necessary in a program as broad and complex as the fleet modernization program, but planning should be as definitive as possible to provide program stability and to maximize the use of funds. The Navy has effective guidelines for program planning and development but often does not follow them (see ch. 3). In addition, due to inadequate control over the procurement and handling of alteration material, some requirements are overstated and unused material has accumulated at shipyards (see ch. 4).

#### ALTERATION PROGRAM DEVELOPMENT AND DISRUPTIONS

Proposed alterations are submitted for approval to the Chief of Naval Operations for military improvements and to the Naval Sea Systems Command for technical improvements. Then, at the annual fleet modernization conference--attended by the Chief of Naval Operations and representatives of the Atlantic and Pacific Fleets and naval systems commands--priorities are established and are grouped to form the military/technical improvement plan. On the

basis of these priorities, the long-range alterations needed for each ship are formulated. Because the improvement plan generally contains more alterations than can be done in a given overhaul period, alterations are programed for each scheduled overhaul on the basis of what can be realistically accomplished, considering industrial capabilities, personnel skills, fiscal constraints, overhaul length, and availability of material and design.

Additions and deferrals to the programed alterations in the execution year are approved by the Chief of Naval Operations, who handles the financial matters related to these changes through an escrow account. In the account, the monies previously allocated to deferred alterations are allocated to finance unbudgeted cost increases, emergency alterations, or added alterations.

Although all of the alterations programed each year have high priority, the Navy has deferred many of them in past years. In fiscal year 1980, the Navy deferred about 780, or 35 percent, of its 2,228 congressionally budgeted ship alterations. Of the 780 deferred alterations, 510 occurred because ship overhauls were rescheduled to accommodate funding reductions made by the Office of the Secretary of Defense. The remaining 270 were the result of Navy program management decisions. Additional reasons for these deferrals include inadequate alteration design and engineering development, emergency alterations, insufficient material on hand, late plans and drawings, and unanticipated cost increases for other alterations.

We reported in our 1976 report that weaknesses in the Navy's program monitoring were keeping some programed alterations from being made. Also, we said the Navy needed better data on program execution and why alterations were being deferred. As recommended in that report, the Navy has developed a management information system to assist in monitoring the program. This system, working through an escrow account, keeps track of the justification for alteration changes.

As discussed in chapter 3, better cost information should be used to formulate the program's budget and each step in the alteration development process should be carried out as outlined in Navy instructions.

#### MANAGEMENT OF ALTERATION MATERIALS

Historically, a lack of visibility and reporting has been one of the greatest obstacles to efficient management of Navy inventories. Inventories for alterations generally are procured and stocked by the wholesale level until requested by the appropriate shipyard. Once obtained by the shipyard, material is carried in the shipyard's direct material inventory account.

Visibility over assets in the wholesale distribution system is generally accomplished through daily transaction item reports, which inform program managers of changes in item stock status.

Some visibility is also provided over ship inventories through periodic asset reporting, but the Navy has no system for obtaining visibility of shipyards' direct material inventories. Although the Navy is taking steps to improve its control over inventories, additional opportunities are available to improve the management of alteration materials.

#### Wholesale alteration inventories

In March 1976 we reported that the Navy needed to improve its visibility of ship alteration material at the wholesale level. 1/ Our report showed that the inventory control point system's procedures did not separately account for material procured for alterations when it was received, stored, and issued for eventual end use. We recommended that the Navy establish controls over the inventory on hand and relate the inventory to alterations to be made, thereby forming a basis for future alteration scheduling and additional procurements.

Since our 1976 report, the Navy has evaluated several methods for controlling ship alteration material. It decided that, because the master data file has the capability for handling more than one inventory code number, assigning alteration material its own number was viable. However, because of the continually evolving requirements to support other levels of material and to accommodate the Department of Defense's Retail Inventory Management and Stockage Policy program, the Navy believed a reevaluation of methods was necessary. The development of a master file capable of reflecting multipurpose codes was approved as a means of satisfying all requirements. However, the master file is not expected to be completed until December 1983.

In the interim, a plan was approved to use one of the two-purpose codes currently available in the master file. Navy officials informed us that this plan became effective on June 27, 1981, for the two naval supply centers--Norfolk and Oakland--handling material requirements for the program.

#### Shipyard direct material inventories

In our June 1980 report, we stated that greater efficiency and effectiveness would be possible if the supply system had better visibility of shipyard inventories. 2/ Generally, the wholesale inventory managers had no visibility of the shipyards' material inventories and, as a result, were buying materials that were available at shipyards.

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1/"Improvements Needed in The Navy's Fleet Modernization Program" (LCD-76-406, Mar. 15, 1976).

2/"Navy Has Opportunities to Reduce Ship Overhaul Costs" (LCD-80-70, June 17, 1980).

As a result of our report, the Navy initiated a study in 1980 to determine the value and feasibility of centralized visibility of shipyards' direct material inventories and unassigned direct material assets. Visibility of these items as a result of the study was achieved by requiring the shipyards to transmit monthly data processing tapes of their direct material inventories to the supply system inventory manager. The tapes were then converted into hard copy listings for use by the inventory manager. On the basis of the listings, the inventory manager identified those materials for use in satisfying high-priority requisitions when wholesale and retail supply systems' material would not be available in time. At the time of our review, the inventory manager was still receiving the data processing tapes of inventories, and the Navy had not made an overall determination of the study's effectiveness.

#### Other opportunities for improvement

The Navy's attempts to improve visibility over alteration inventories are steps in the right direction. More could be done, however, to improve the effectiveness of material management and to reduce material costs. As discussed in chapter 4, better control over the procurement and handling of material could alleviate the

- overstatement of material requirements,
- accumulation of unused material at shipyards, and
- supply system from buying more materials than needed and at prices higher than necessary.

#### CONCLUSIONS

As discussed in chapters 3 and 4, the fleet modernization program could be more effective and efficient if the number of ship alteration deferrals were substantially reduced. We believe this could be accomplished if the Navy

- improved the accuracy of its cost estimates,
- scheduled timely delivery of drawings and materials, and
- identified more accurate material requirements.

## CHAPTER 3

### SHIP ALTERATION DEVELOPMENT

#### NEEDS IMPROVEMENT

Every effort should be made to stabilize ship overhaul schedules and to reduce ship alteration deferrals. Deferrals of programed alterations disrupt the normal alteration development process and touch off a chain reaction of problems.

The Navy's guidelines recognize the need for early alteration planning and timely completion of alterations. The guidelines state that each alteration development phase is developed dependent on the preceding phase and is essential to the next. Therefore, it is vital to the fleet modernization program that development steps be completed within the specified time frames. But often this is not the case.

When first-time alterations are not adequately defined until late in the development process, the normal alteration development schedule has to be compressed. As a result, important milestones are often missed, alterations have to be deferred, and data for cost estimating is not available.

#### DEVELOPMENT MILESTONES OFTEN MISSED

The Navy has assigned installation drawing responsibilities to planning shipyards before defining the technical requirements. Therefore, the shipyards do not always have guidance to develop the installation drawings. As a result, the Navy has to drop some alterations before it submits the fleet modernization budget.

Naval regulations require that the beginning of the scope (an early step in the development process) through the completion of the basic alteration class drawings (BACDs), which are required for alterations on the first ship of every class to be overhauled, should take no longer than 24 months. However, Navy records show that it takes 15 to 36 months to complete this effort, depending on the complexity of the alteration.

#### Development guidance

Naval instructions require that planning shipyards complete BACDs no later than 12 months before overhauls start, to allow time for preparing supplemental drawings. The following table shows the Navy's time schedule for alteration development.

## Ship Alteration Guidelines

<u>Document</u>	<u>Latest completion date before overhaul</u> (months)
Ship alteration scope	18
Ship alteration record	16
BACD	12
Supplemental alteration drawing	8

Supplemental drawings tailor BACDs to the unique configurations of particular ships. Because the drawings are the final step in alteration development, they represent the Navy's last chance to identify material requirements that were not discovered earlier.

According to naval instructions, all previously developed alteration documents, including alteration proposals, records, and scopes, should be provided to planning shipyards for use in developing BACDs. We examined three ships (U.S.S. Tarawa, U.S.S. Truxtun, and U.S.S. Long Beach), whose BACDs were being developed by the Puget Sound Shipyard, and found that the Navy was not providing all of the required documents or was providing inadequate documents. The Tarawa, for example, did not receive adequate technical guidance for 16 alterations. As a result, nine alterations had to be canceled. Although the Navy had not dropped any ship alterations from the Truxtun at the time of our review, only 10 alterations of 46 had adequate technical guidance. Technical guidance for the U.S.S. Long Beach appeared to be adequate.

To determine whether planning shipyards provided BACDs in time, we reviewed alterations for the U.S.S. Yosemite, U.S.S. Stoddert, U.S.S. Mahan, U.S.S. Yarnell, and U.S.S. Dewey, which were completing overhaul. In each case, the planning shipyard had forwarded BACDs to the overhaul shipyard months late.

Late BACDs cause delayed supplemental drawings. According to a Navy official, material managers and engineers could not provide the technical information, which would resolve some of the problems expected during alterations, because the alterations were often not well-defined. If the technical issues cannot be resolved, the technical guidance needed to support the alteration will not be available. This means that shipyards often cannot develop BACDs or develop them on time.

Some alterations are more complex than others, thus requiring more extensive development. Recognizing this, several naval shipyards, responding to the Navy's proposed revision to an instruction on alterations, called for an extended development period for complex alterations. Also, these naval shipyards recommended that earlier time frames for ship alteration development events be established. The following table shows the current and the shipyards' recommended time frames for each alteration development event.

<u>Event</u>	<u>Current</u>		<u>Recommended months prior to availability</u>
	<u>Months to complete</u>	<u>Months prior to availability</u>	
Alteration installation requirement	4	32-34	38-40
Ship alteration proposal	2	28-30	34-36
Scope	6	26-28	32-34
Ship alteration record	2-4	20-22	26-28
BACD	6	18	24

As shown in the above table, the BACD event is inalterably driven by the preceding events. Thus, the months to complete each event impose a rigid schedule on these events, which must be met if the alterations are to be developed on time. In commenting on the proposed revision, one shipyard recommended the establishment of a permanent, high-level audit/inspection team chartered to ensure continual compliance with program directives by both headquarters and field activities. We believe the Navy should also develop a reporting system to alert program management of slippages in alteration development milestones since these slippages would affect the programming or deferment of other alterations.

ALTERATION COST ESTIMATES COULD IMPROVE

Cost estimates and, consequently, the management of ship alterations could be improved if detailed material and labor information from prior alterations were used to formulate the program's congressional budget submission. Although material information is included in BACDs, and BACDs are used to develop labor estimates, many BACDs had not been completed when the budget was formulated. Furthermore, the Navy's review of budget estimates did not always include the actual costs for previous alterations.

One of the most important steps in the alteration development process is the preparation of BACDs. BACDs are used to develop labor estimates, to specify material requirements, and to formulate budget cost estimates. If BACDs are not completed on time, the congressional budget submission may not be realistic.

The Navy developed BACDs for the 800 ship alterations requiring them, or about one-third of the alterations made under the fiscal year 1980 modernization program. However, many BACDs had not been completed when the budget was formulated because the planning shipyards often had not received the required technical guidance from the Navy. The primary reason for this situation is that the Navy assigns alteration development responsibilities to planning shipyards before it adequately defines the requirements.

Ship alteration cost estimates are too low

When BACDs are not developed on time, they are, therefore, unavailable for developing the material requirements and the staff-day cost estimates required for budget purposes.

An alteration scope, an early step in the development process, includes only initial labor and material cost estimates. Navy officials responsible for establishing labor and material cost estimates said that many estimates are based on scope information and admitted that a scope contains only "ball park" information. According to naval instructions, scope estimates should be within a 40-percent accuracy range, whereas the more detailed BACD estimates should be within a 15-percent accuracy range.

To determine the effect late BACDs had on cost estimates, we reviewed BACDs for seven ships that had cost increases of \$19 million above their initial funding total of \$79 million. Because program financial managers withhold 10 percent of the money authorized for each ship to manage cost growth, we determined that these ships had a cost increase of about 24 percent. The majority of alterations requiring BACDs for six of the seven ships were completed late, and BACDs for five of the ships were consistently late, as shown below.

<u>Ship</u>	<u>Number requiring BACDs</u>	<u>Percent with late BACDs</u>	<u>Average number of months BACDs were late</u>
U.S.S. <u>Yosemite</u>	18	72	9
U.S.S. <u>Stoddert</u>	15	87	11
U.S.S. <u>Mahan</u>	2	100	2
U.S.S. <u>Yarnell</u>	4	100	23
U.S.S. <u>Dewey</u>	7	100	3

While we found these specific problems, Navy officials recognize that it has an agencywide problem with late BACDs and the effect it has on cost. For example, in an October 16, 1980, memorandum, the Deputy Chief of Naval Operations (Logistics) said the percentage of alteration deferrals resulting from lack of plans/drawings was significant, since only high-priority alterations were programmed in the first place. He added that cost growth incurred by lateness in delivery of drawings caused overhaul extension schedule disruptions and, in the case of private sector overhauls, costly change orders. The Navy's inability to adequately resolve the problem of late BACDs results in cost estimates not having the detailed material and labor information needed for developing the budget.

Costs for previous alterations  
need closer scrutiny

In addition to more timely BACD development, Navy estimates could benefit from using actual cost information from previous alterations. Naval instructions require public shipyards and the Navy's Supervisors of Shipbuilding for private shipyards to submit, within 60 days after overhaul, ship departure reports containing the alteration costs incurred. Public shipyards provide actual cost information, while the Supervisors of Shipbuilding provide only estimates of costs incurred by contractors in private shipyards. These reports--the only source available on costs incurred--are intended to help plan and budget alteration work; however, many reports are not submitted. For ship alterations scheduled for completion during fiscal year 1980, we found that only 17 percent of the required reports were submitted.

The cost histories contained in ship departure reports are an excellent tool for determining the reasonableness of the shipyards' cost estimates for succeeding alterations. When asked what methods they used to determine whether the shipyards' cost estimates were reasonable, some program managers said their ship cost estimate records. However, these records simply show the number of days required to complete ship alterations. To update and supplement these records, other program managers use estimates developed from previous alterations and ship departure reports. They believe departure reports should also be used in conjunction with other alteration information, such as length and type of overhaul, when preparing the budget.

About halfway through an overhaul, naval shipyards provide final alteration cost estimates. Currently, program managers use available, actual cost information on previous alterations as a basis for reviewing these estimates when the estimates have increased substantially. This practice, though useful, is not done in every case because, according to a program manager, developing the actual cost information needed would require more resources than are available.

We believe the Navy should enforce the 60-day requirement for shipyards' submitting ship departure reports. Also, we believe that the Navy should routinely use, as a tool, actual cost information on past alterations when preparing the budget and reviewing shipyards' cost estimates.

#### CONCLUSIONS

Alteration deferrals in the fleet modernization program could be reduced if better cost information were used in formulating the program's budget. Although naval instructions provide for historical cost information, the Navy does not regularly use it because:

- Alteration design is not always completed on time which causes delays in accurately estimating alteration costs.
- Shipyards seldom submit actual cost information on previous ship alterations.

The Navy frequently diverges from its guidelines for ship alteration development. For example, it often does not resolve material and engineering problems until late in the development process. In addition, some of the material needed for alterations is not identified until after the overhaul begins--much too late.

The Navy proposed a revision to an alteration development instruction to reflect the varying complexities of alterations. The proposed revision, which calls for earlier development of the more complex alterations, would help alleviate some of the program's problems.

The Navy should develop a reporting system to alert program management of slippages in alteration development milestones since these slippages would affect the programing or deferment of other alternatives.

Overall, simply by adhering to its own ship alteration guidelines, the Navy could ensure that fewer alterations are deferred.

#### RECOMMENDATIONS

We recommend that the Secretary of the Navy:

- Institute controls to ensure that program managers follow naval instructions on alteration development milestones and program only those alterations which can be fully developed to support scheduled installations.
- Direct the Commander of Naval Sea Systems Command to establish a system of exception reporting for alterations which do not meet development milestones.

- More strictly enforce the requirement that both public and private shipyards submit ship departure reports within the required 60 days after overhaul completion.
- Require that budget developers use actual cost information from previously completed alterations when developing alteration cost estimates.

#### AGENCY COMMENTS AND OUR EVALUATION

The Navy generally concurred with our recommendations but offered some clarifying comments. The Navy concurred with the recommendation that it institute controls to ensure program managers follow naval instructions on alteration milestones and plan only those alterations which can be fully developed, and it also agreed tighter controls are needed. However, the Navy does not concur if it means that alterations not meeting development milestones should be deferred. We are not advocating that the Navy defer alterations that do not meet milestones, instead we believe that only by adhering to its own guidelines can the Navy ensure that fewer alterations are deferred. Also, we revised the recommendation to require program managers to follow guidelines.

We proposed that the Navy establish a system of exception reporting for alterations which do not meet development milestones. The Navy agreed with this and has established a program to track BACD development which, according to the Navy, will be in field operation by October 31, 1982. We commend the Navy for the positive action toward tracking alteration development.

Regarding the conclusion that shipyards seldom submit actual cost information on previously installed ship alterations, the Navy partially concurred. The Navy said that it is true that its Supervisors of Shipbuilding have been lax in submitting return cost information for private sector overhauls, but public shipyards are generally complying. As mentioned in the report, we found that only 17 percent of the required reports were submitted. We agree with the Navy that actual costs from public shipyards must also be weighed with other factors, but this cannot be done if the actual cost information is not submitted. The Navy acknowledges the problem at both public and private shipyards by stating in its comments to this report that direction will be re-emphasized to both to submit the required cost information on time.

The conclusion that budget managers seldom use actual cost information when they receive it has been revised to reflect use of the information when available.

The Navy concurred with the recommendation that it require budget developers to use actual cost information to review ship

alteration cost estimates. We agree with the Navy's comment that budget developers must and are using actual cost information; but, as discussed earlier, they cannot always do this because so few ship departure reports are being submitted on time by the shipyards.

## CHAPTER 4

### MATERIAL SUPPORT COSTS CAN BE REDUCED

Although the Navy has improved its visibility of materials used for ship alterations and repairs, additional opportunities are available for improving the effectiveness of material management and for further reducing material costs. By requiring the proper ordering and use of material, the Navy could better ensure that supply system requirements are valid and that only the material needed for alterations is procured and provided to shipyards.

#### SUPPLY SYSTEM REQUIREMENTS OVERSTATED

Supply system material requirements consist of both planned and forecasted needs. Planned requirements are nonrecurring and therefore cannot be predicted. Forecasted requirements, on the other hand, are recurring and can be predicted on the basis of past demand experience. Properly coded requisitions are the key to accurate forecasted requirements.

Valid material requirements are necessary to ensure that enough--but not too much--material will be available to support ship alterations. But due to the Navy's improper ordering practices, some requirements were overstated and, as a result, unnecessary procurements were made.

#### Invalid planned requirements

In April 1980, the Navy estimated its planned requirements for ship alteration material to be \$141 million. However, some of these requirements were invalid because the material had already been obtained by shipyards.

Each ship's 180-day authorization letter, the document used to authorize the accomplishment of ship alterations, lists authorized ship alterations and special program material as well as the document numbers assigned to planned material requirements. Shipyard personnel use the document numbers to requisition material from supply system inventory managers. When material is issued under the assigned document numbers, related planned requirements are deleted from the inventory managers' files. However, if material is not requisitioned under the assigned numbers, the requirements remain in the file until 90 days before an overhaul's start date.

We reviewed 100 planned requirements, valued at about \$469,000, from the April 1980 list of ships that were within 150 days of their overhaul start dates at the Puget Sound Naval Shipyard. Of these requirements, 40, or over \$297,000 worth, were either not requisitioned under the assigned document number or not requisitioned at all. In 13 instances, the material was

never requisitioned from the supply system mainly because requirements had changed. In 27 instances, material was drawn under document numbers other than those assigned. Consequently, planned requirements were overstated and remained in the supply system's files months after the items had been obtained, as illustrated by the following table.

<u>Item</u>	<u>Date requirement number assigned</u>	<u>Date shipyard obtained material</u>	<u>Purge date</u>	<u>Months that requirement was overstated (note a)</u>
Pipe flange	02/01/80	12/15/79	7/06/80	5
Stowage locker	12/15/79	12/11/79	7/06/80	7
Amplifer	12/17/79	10/29/79	7/06/80	7
Rotary switch	02/02/80	03/14/80	7/06/80	4
Rodmeter	10/23/79	11/13/79	7/06/80	8
Switch	06/10/79	06/26/79	7/03/80	12
Air filter	10/25/79	03/24/80	7/03/80	3
Antenna	10/22/79	09/19/79	5/19/80	7

a/Number of months the requirement was overstated or based on a comparison of the purge data to either the date the number is assigned or the date the shipyard received the material, whichever is later.

While we did not go to other shipyards, we noticed in an April 8, 1982, letter to the Naval Sea Systems Command that the Ships Parts Control Center had identified several other shipyards that were also requisitioning material using the wrong requirement numbers. Although we did not determine the extent of this at these shipyards, we believe planned requirements could be overstated by several million dollars if it is occurring to the same degree as at the Puget Sound Shipyard.

#### Unnecessary procurements made

Overstated requirements have caused the procurement of unneeded items. In some instances, the inventory manager was unaware that material had been requisitioned under a number different from the one assigned and therefore initiated an additional procurement. For example, on February 3, 1980, a planned requirement for 12 signal call stations was established at the system level. Four days later, a requisition was received from the Puget Sound Shipyard for this requirement. Because the requisition did not cite the assigned number, the supply system purchased 24 call stations to satisfy both the planned requirement and the shipyard's

requisition. In another instance, on July 7, 1979, a planned requirement was established for two washer extractors having a unit price of \$17,650. About 1 month later, a requisition was received from the Puget Sound Shipyard for the requirement, but the assigned number was not cited. Not knowing that the requisition was for the planned requirement, the inventory manager purchased four washer extractors. As a result, at least two washer extractors were unnecessarily purchased.

In addition, unnecessary procurements were made because the Puget Sound Shipyard did not use the correct demand coding on some requisitions. Of the 27 requirements for which the shipyard used document numbers other than those assigned, 18 were erroneously coded "recurring." Although the supply system has a technique for validating and screening demand codes, the system did not identify 10 of the 18 erroneously coded requisitions. Based on our recalculation of requirements after eliminating the erroneous demand, we estimate that unnecessary procurements valued at \$49,000 were made for these items.

MATERIAL ORDERED FOR SHIP  
ALTERATIONS BUT NOT USED

A shipyard's objective when ordering alteration material is to obtain the proper amounts as efficiently and effectively as possible. However, for the one shipyard we visited, Puget Sound, this objective may not be met because (1) items are ordered before alteration plans are definitized and drawings are completed and (2) material is ordered through both the Federal supply system and the commercial market. As a result, ordered material that may not be used becomes excess.

At the Puget Sound Shipyard, we found that more than 12 percent of the material ordered to support completed alterations on four ships was not used, as the following table shows.

<u>Ship</u>	<u>Material</u>		<u>Percent not used</u>
	<u>Obtained</u>	<u>Unused</u>	
	(000 omitted)		
U.S.S. <u>Waddell</u>	\$1,168	\$123	10.5
U.S.S. <u>Decatur</u>	5,360	44	12.2
U.S.S. <u>Cavalla</u>	1,306	163	12.4
U.S.S. <u>Fox</u>	<u>2,891</u>	<u>376</u>	<u>13.0</u>
Total	<u>\$5,725</u>	<u>\$706</u>	<u>12.3</u>

Of the \$706,000 of unused material, about \$569,000, or more than 80 percent, was applicable to 22 alterations. Of this amount, we

reviewed material valued at \$465,000. Almost half, or \$211,000, had been ordered before alteration plans were defined and drawings were completed and \$60,000 worth of material had been double ordered; that is, ordered through both the Federal supply system and the commercial market. We could not determine why the remaining material was unused.

Before overhauling the U.S.S. Long Beach, the Puget Sound Shipyard purchased material valued at over \$169,000 from the commercial market. Our review of the material ordered commercially showed that \$111,000, or about 65 percent, of it was also ordered from the supply system. Further, we found that the shipyard had received material valued at \$35,000 from both sources because it had not canceled the applicable supply system requisitions or had not canceled them in time. For example, our review of 15 double-ordered items disclosed that 9 requisitions were either not canceled or not canceled in time. The supply system contracted to satisfy five of these and issued material from inventories on hand to satisfy the remaining four.

#### PREMATURE INVESTMENT IN MATERIAL FOR THE U.S.S. CONSTELLATION'S OVERHAUL

Navy policy is to ensure that all material is readily available before a ship overhaul starts. Therefore, material is generally requisitioned several months in advance of an overhaul's start date. However, as we found at the Puget Sound Shipyard, this practice may cause unnecessary retention of material and procurement costs, as illustrated by the U.S.S. Constellation's overhaul.

Originally, the U.S.S. Constellation's overhaul was scheduled to begin in November 1980. Accordingly, the Navy obtained \$13 million of material in advance--much of it after June 1979, after the overhaul's date had been delayed. This material, according to Puget Sound Shipyard officials, will be retained at the shipyard until the ship is overhauled in fiscal year 1983 and will be used for other overhauls as a last resort.

We reviewed 45 of the items that had been obtained for the Constellation's overhaul. We found that 23 items were on back-order and that 43 were being procured by the supply system at a cost of \$182,000. Most of the 23 back orders were high-priority requisitions for mission-essential items. Therefore, to provide support as expeditiously as possible, the supply system initiated direct delivery buys for five of the items. Direct delivery buys are made to satisfy high-priority, limited-quantity customer requisitions. However, because quantities are limited, direct delivery prices are much higher than stock prices.

Procurement costs could have been reduced if the material on hand for the Constellation had been used to fill other requisitions. For example, the Puget Sound Shipyard could have used the eight cabinet assemblies it had on hand for the Constellation's overhaul instead of submitting a high-priority

requisition for five additional assemblies. To fill the requisition, the supply system initiated a direct delivery buy at a cost of \$490 each. Assemblies were being procured for stock at a unit price of \$218 for delivery in December 1981 and January 1982. On the same day that the system awarded the direct delivery contract, the shipyard canceled its requisition. Consequently, the supply system shipped the five assemblies to Norfolk for stock. Unnecessary procurement costs were further compounded when the shipyard, after canceling the requisition, procured the assemblies commercially at the direct delivery price. In another instance, the supply system awarded a direct delivery buy for one stowage locker, at a cost of \$650, even though Puget Sound had six on hand. Several hundred of the lockers were being procured for stock at a unit price of \$285 for delivery in 1981, more than 1 year before they would be needed for the Constellation.

### CONCLUSIONS

Ensuring that all material is available prior to the start of ship alterations is essential. However, because Navy shipyards are requisitioning material before plans and drawings are completed and are using other than the assigned planned requirement number, requirements for alteration material are overstated and more material than needed is procured. This situation was further aggravated at the Puget Sound Naval Shipyard because it was double-ordering numerous items.

In addition, procurement cost could be reduced if premature material that is being retained by a shipyard is released to meet other needs. The Navy's plans to increase visibility over shipyard assets (see p. 6) should help to make the improvement possible. In view of these findings at the Puget Sound Shipyard, we believe that the Navy should ensure that other shipyards are not double ordering and are not prematurely requisitioning material.

### RECOMMENDATIONS

We recommend that the Secretary of the Navy direct:

- Shipyard commanders to (1) emphasize the importance of using assigned planned requirement numbers because of the overstated requirements and unnecessary procurements that result, (2) instruct material managers to not order material before alteration plans and drawings are developed sufficiently enough to define material requirements, and (3) direct material managers to cancel requisitions on the supply system when they initiate commercial procurement actions.
- Shipyard managers to provide supply system managers with visibility over shipyard assets and direct the use of these assets to avoid expensive direct delivery procurements.

--Shipyard managers to release, for systemwide and immediate use, assets which will not be needed in the near future and which can be readily replaced.

#### AGENCY COMMENTS AND OUR EVALUATION

The Navy generally concurred with our recommendations in this report but offered some clarifying comments. With regard to the recommendation that the Navy use the assigned planned requirement document number when requisitioning alteration material, the Navy concurred but said that the Naval Sea Systems Command issued an operations manual in October 1981 which covers the point. While the Navy implies that this action should correct the situation, we found that the problem still exists. In a letter to the Naval Sea Systems Command on April 8, 1982, the Ship Parts Control Center reiterated the problem. Therefore, we believe our recommendation is still valid. However, we revised it to stress the importance of shipyard commanders using the correct document numbers when ordering materials.

The Navy agreed with a proposal we made in our draft report that it use the correct demand coding of requisitions. In October 1981, the Navy issued an operational manual for the program which, according to the Navy, will take care of the problem of incorrect demand coding. We commend the Navy for this positive action and have eliminated the recommendation from our final report.

The Navy disagreed with our proposal that it not order material before alteration plans and drawings are completed. It believes the failure to order long leadtime material would cause either cancellation of numerous alterations or late delivery of critical material. We recognize the need for ordering materials on time and, therefore, have revised the recommendation to allow the ordering of material when plans and drawings are developed sufficiently enough to support the requirement. In subsequent discussions with the Navy, it concurred with the revised recommendation.

Regarding our recommendation that the Navy not order the same item from both the commercial market and the Federal supply system, the Navy agreed in principle. It noted that in certain instances the shipyard must locally procure or manufacture alteration material that cannot be provided by the supply system in time. According to the Navy, this may cause duplication but it may be good business practice to exchange a small investment in material to avoid costly schedule impacts. The Navy mentions that the \$35,000 of duplicate material is not a large amount. In a complex overhaul, \$35,000 relative to the \$150 million cost of the overhaul may not be a large amount, but we believe it is significant in terms of absolute dollars when the number of ships overhauled annually (60 to 70) is considered, particularly when the costs are avoidable. Furthermore, we believe that shipyards should cancel requisitions on the supply system when

they initiate local procurement and not wait until they know that their procurement efforts may lead to duplication.

The Navy is in the process of implementing the recommendation that it continue to provide supply system managers with visibility of shipyard assets and direct the use of these assets to avoid expensive direct delivery procurements. Also, the Navy plans to implement the recommendation regarding directing shipyards to release, for systemwide and immediate use, assets which are not needed for the near future which can be replaced. We commend the Navy for the planned action on both these recommendations.

NAVY RESPONSE (note a)ALTERATION DEVELOPMENT IMPROVEMENTS

CONCLUSION: SHIPALT development milestones not being met causing deferrals and adversely impacting on material procurement and cost estimates.

COMMENTS: Concur that improvements are needed in meeting alteration development milestones. Navy actions taken to date to improve this situation are:

- A program has been initiated to progress ship alteration design and material starting at A-21 months for individual ship overhauls.
- Fleet Verification Conferences have been initiated. Purpose of these conferences is to review alteration packages 13-15 months prior to start of installation. At these conferences validity of cost estimates, design and material status are reviewed. High risk alterations are identified and decisions made whether an alteration should be deferred or whether actions can be taken to reduce risk to an acceptable level.

RECOMMENDATION: NAVY institute controls to insure program managers follow naval instructions on alteration milestones and plan only those alterations which can be fully developed.

COMMENT: Concur that tighter controls to ensure compliance with alteration development milestones are needed. Ongoing initiatives to achieve this goal are listed above. However, do not concur with this recommendation if it means that alterations not meeting development milestones should be deferred. Majority of alterations missing one or more design and or material milestones are accomplished. Additionally, deferral of alterations in Engineering Operating Cycle Ships (modernization overhauls every 5-10 years) will have a long term impact on both reliability and military capabilities of these ships. Therefore, prior to alteration deferral, degree of risk versus required capability must be assessed.

RECOMMENDATION: NAVY establish a system of exception reporting for alterations which do not meet development milestones.

COMMENT:

NAVY has established a program to track BACD development. This program will be in full operation by 31 October 1982. The program will be expanded during FY 82 and FY 83 to track earlier

a/These comments represent the official Navy response on the report. The comments were received and discussed on February 12, 1982, with the Director, Ship Maintenance and Modernization Division, Department of the Navy.

events in the alteration development process, i.e., scopes, SHIPALT proposals, SHIPALT Records, etc. These reports will be used as part of the NAVY program to progress ship alteration design and material for individual ship overhauls. Additionally, generic problems impinging on ship alteration development process will be identified during the Planning Yard Technical Reviews. A forum (the Chief Design Engineers Workshop) has been created to resolve identified problems.

#### ALTERATION DEVELOPMENT IMPROVEMENTS

CONCLUSION: Shipyards seldom submit actual cost information on previously installed ship alterations...

COMMENT: Partially concur. While it is true that Navy SUPSHIPS have been lax in submitting return cost information for private sector overhauls, public shipyards are generally complying with this requirement. To improve availability of actual cost data direction will be reemphasized to Navy SUPSHIPS and public shipyards to submit required information on time.

CONCLUSION: ...and when they do budget managers seldom use it.

COMMENT: Do not concur. Actual cost information is a primary tool used by budget managers to make future estimates. However, it must be realized that while it is an important element in alteration cost estimating there are other factors which must be considered. For instance, private shipyards are not generally required to provide cost information on individual alterations. Navy SUPSHIPS must therefore make estimates of the man-days used on individual alterations. These may not correlate with costing information received from other shipyards, private or public. Actual costs from public shipyards must also be weighed with such factors as differences in installations, shipyard experience, prororation of services and other elements relating to individual overhauls and shipyards.

RECOMMENDATION: Require that budget developers use actual cost information to review ship alteration cost estimates.

COMMENT: CONCUR. Budget developers must and are using actual cost information combined with other factors discussed above to develop future alteration cost estimates.

MATERIAL SUPPORT COSTS CAN BE IMPROVED

CONCLUSION: Alteration material requirements are overstated, overpriced and amount of unused material is excessive due to improper ordering practices and poor use of assets.

COMMENT: Concur that alteration material management needs to be improved. Specifically with regards to ordering practices plus visibility and usage of shipyard assets. This has been a continuing problem, however, as mentioned in the report progress is being made. Latest Navy initiative to improve alteration material management is the Fleet Modernization Management and Operation Manual issued in October 1981. This manual addresses many of the deficiencies noted. Additionally, policies and procedures to improve shipyard material visibility and usage have or will shortly be initiated. These will be discussed under comments directed to specific GAO material management recommendations.

RECOMMENDATION - NAVY emphasized the importance of proper ordering practices and use of assets by directing shipyards to:

- Use the assigned planned requirement document number when requisitioning alteration material.

COMMENT - Concur. The FMP Management and Operations Manual issued in October 1981 directs the shipyards to use pre-assigned planned document numbers when requisitioning alteration material.

- Use the correct demand coding of requisitions.

COMMENT - Concur Shipyards have been directed to use the correct demand code on requisitions for alteration material. The most recent direction to the shipyards was published in the FMP management and Operation Manual issued in October 1981.

- Not order material before alteration plans and drawings are completed.

COMMENT - Do not concur. All material required for installation of a specific alteration may not be fully known until completion of Supplementary Alteration Drawings (SADS) by the installing activity. Shipyards order certain long lead time incidental material such as steel plate, bar stock, cable and piping during

the advance planning phase prior to completion of installation drawings. Failure to order this long lead material would cause either cancellation of numerous alterations and stretch out fleet introduction or cause late delivery of critical material with attendant delay and disruptions of overhaul schedules. Both results are undesirable and less cost effective than the small relative dollar value of incorrect material associated with early procurements.

- Not order the same item from both the commercial market and the federal supply system.

**COMMENT** - Concur in principle. It is noted that shipyards must locally procure or manufacture alteration material that cannot be provided by the supply system in time to meet installation schedules. In certain instances where the supply system is having difficulty obtaining the required material on time it may be prudent for the shipyard to explore commercial sources. As soon as shipyards know that their procurement efforts may lead to duplication they have been directed to cancel unnecessary planned requirements or shipyard generated system requisitions. Although this may sometimes cause duplication of material it may be good business practice to tradeoff a small investment in material to avoid costly schedule impacts. As mentioned in the report USS LONG BEACH (CGN 9) had \$35,000 of duplicate material. However, this is not a large amount in a \$150 million complex overhaul when avoidance of delay and disruption is the critical management objective.

- Continue to provide supply system managers with visibility over shipyard assets and directing the use of these assets to avoid expensive direct delivery procurements.

**COMMENT** - Concur. NAVY is currently in the process of implementing the procedures used during a recent six month test to provide supply system managers visibility and usage of naval shipyard Direct Material Inventory and Unassigned Direct Material (DMI/UDM) assets. The expected implementation of this notice in April 1982 will give supply system manager visibility and use of assets to avoid expensive direct delivery procurements.

- Directing shipyards to release for system-wide and immediate use, assets which are not needed for the near future which can be readily replaced.

COMMENT - Concur. The shipyards will be directed to release for system-wide and immediate use assets which are not required for near term installation and such release will not jeopardize future installation schedules. This direction will be promulgated in the notice cited previously.

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