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REPORT TO THE COMMITTEE
ON APPROPRIATIONS
HOUSE OF REPRESENTATIVES



Management Of Ship Overhaul And
Repair Programs, Fiscal Years
1972 And 1973 B-133170

Department of the Navy

BY THE COMPTROLLER GENERAL
OF THE UNITED STATES

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JUNE 7, 1973



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

B-133170

The Honorable George H. Mahon
Chairman, Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

In accordance with the request contained in your Committee Report on the Defense Appropriation Bill, 1973 (Report 92-1389) dated September 11, 1972, we have reviewed the Navy's ship overhaul and repair programs for 1972 and 1973. Our work on the 1973 programs shows the status of those programs as of March 1973.

This report points out that in both 1972 and 1973, the Navy did not overhaul as many ships as it said it was going to overhaul when it testified before your Committee. This occurred primarily because the Navy did not foresee and therefore did not budget for the substantial increase in the cost of overhaul and repair work in Navy shipyards during 1972 and 1973. The increased cost was caused by a combination of (1) more direct labor man-days required for overhauling than was planned and (2) higher man-day rates charged by the shipyards than was anticipated.

Currently the 10 Navy shipyards are not being fully used. They have an unused capacity which is causing an increase in their operating cost. Although the recent announcement of the planned closures of two shipyards should help this situation, we believe there are other options available to the Navy for reducing ship overhaul costs. These are discussed in the report.

During 1972 and 1973, the Navy transferred funds between the overhaul and repair programs involving several years. Further work is being done to determine whether these uses of funds were proper. We will advise you later of the results of our determination.

Our findings and conclusions were discussed with officials of the Department of the Navy, but we did not request written comments from them, in accordance with agreements made with your office.

As further agreed, a copy of this report is being sent to the Secretary of Defense and to the Secretary of the Navy for internal use only. We do not plan to distribute this report further unless you agree or publicly announce its contents.

Sincerely yours,

A handwritten signature in cursive script, reading "James B. Stewart". The signature is written in dark ink and is centered below the "Sincerely yours," text.

Comptroller General
of the United States

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ABBREVIATIONS

CINCPACFLT	Commander in Chief, Pacific Fleet
COMSUBPAC	Commander, Submarine Forces, Pacific
CONUS	Continental United States
FMP	Fleet Modernization Program
GAO	General Accounting Office
OSD	Office of the Secretary of Defense
SUBLANT	Submarine Forces, Atlantic

D I G E S T

WHY THE REVIEW WAS MADE

Fiscal years 1972 and 1973 were characterized by substantial changes in the Navy's ship overhaul program. Although the Navy received all the funds it requested in these years, fewer ships were overhauled than originally planned. Because of this, the House Committee on Appropriations directed that GAO review the Navy's ship overhaul and repair programs for 1972 and 1973.

As agreed, GAO did not request written comments from the Navy. However, GAO discussed the findings and conclusions in this report with Navy representatives and included their comments where pertinent.

FINDINGS AND CONCLUSIONS

The Navy did not anticipate, and therefore did not budget for, the substantial increase in the cost of overhaul work in Navy shipyards during fiscal years 1972 and 1973. Actual ship overhaul costs were 27 percent higher in 1972 than original estimates. As of March 1973 the 1973 ship overhaul costs were about 20 percent higher than the original estimates. (See p. 7.)

Because overhaul costs were higher than available funds, the Navy had to defer overhaul work planned for 1972 and 1973. The original 1972 overhaul schedule of 139 ships was reduced to 102 ships, and the 1973 overhaul schedule of 95 ships was reduced to 84. (See p. 7.)

Budget requests for fiscal years 1972 and 1973 were based on overhaul experience in fiscal years 1969 and 1970. Cost estimates were developed from (1) forecasts of the amount of repair that ships would need when they entered overhaul in 1972 and 1973, expressed as direct labor man-days, and (2) projections of man-day rates and material costs in those years.

The procedures used to forecast the number of man-days needed for overhaul were not accurate because:

- Generally, the man-days required for overhaul work were understated.
- Some planned work was not included in the estimates.
- Labor and material costs were allocated arbitrarily.
- Prior overhaul costs, which were incomplete, were used to estimate future work. (See p. 19.)

Also, projections of man-day rates in Navy shipyards were substantially understated. Shipyard repair costs, expressed as a cost per man-day, increased from \$69 in 1969 to \$109 in 1973--an increase of almost 60 percent. Most of the \$40 increase, about \$28 a man-day, is attributable to wage and salary increases for direct and indirect employees. The remainder, about \$12 a man-day, is attributable to increased overhead costs. (See p. 25.)

Various factors contributed to the overhead cost increase, but the most significant factor was reduced employment at the shipyards. Employment dropped from about 90,000 in 1969 to an estimated 67,000 at the end of 1973--a decrease of about 25 percent. (See p. 26.)

The increased cost for overhauls in 1972 and 1973 revised the outlook for ship maintenance. Although the Navy originally anticipated that only 1 ship's overhaul would be overdue at the end of 1972, 21 ships with overhaul costs of \$87 million were overdue by June 30, 1972. Because this backlog carried over into 1973 and because overhaul costs increased, the number of ships overdue for overhaul has further increased. The Navy projects that 33 ships, with an estimated overhaul cost of \$233.4 million, will be overdue at the end of 1973. (See pp. 16 and 39.)

This undoubtedly will affect the plans for ship overhauls in 1974 and future years. Furthermore, the full impact of the Vietnam operation on overhaul costs may not have been totally realized or provided for in the 1974 overhaul program. (See p. 39.)

Because of the increased costs for overhaul in 1972 and 1973, the Navy made numerous schedule changes and transferred funds between the overhaul and repair programs involving several years. Further work is being done now to determine whether these uses of funds were proper. If found to be improper this will be reported separately to the Secretary of the Navy. (See pp. 9 and 39.)

The Navy has changed its procedures for estimating the work needed when ships are overhauled. These new procedures, which appear to be improve-

ments, were used to prepare the 1974 overhaul program. (See pp. 33 and 39.)

The Navy continues to be faced with high costs for repair work in its shipyards. Additional pay raises can be expected in the future as well as increased material costs. (See p. 39.)

The most significant cost influence is the low use of the Navy shipyards in terms of their capacity. If shipyard capacity is expressed as a function of shipyard employment levels, the 10 existing shipyards are operating at about 75 percent of their 1969 levels. Since overhead costs have not dropped proportionately to the use, the overhead cost per unit of production has increased.

The Navy has several options to control costs.

- Close selected shipyards and increase use of the remaining yards.
- Emphasize improving efficiency and cost effectiveness of its shipyards.
- Reduce fleet size by inactivating older ships with less reliability and high maintenance costs. (See p. 40.)

The recent announcements of closures of two shipyards should help this situation. Although we did not specifically review the effect of these closures, ship overhaul and repairs workloads at those yards can eventually be redistributed, to increase the level of use of other shipyards. (See p. 40.)

MATTERS FOR CONSIDERATION
BY THE COMMITTEE

The Committee may wish to discuss with Navy officials:

--The effect of shipyard closures on ship overhaul and repair costs and when this effect will be noticeable.

--The revised planning procedure the Navy has used in estimating overhaul and repair costs for fiscal year 1974.

--Plans the Navy may have for further

reducing the size of the fleets to help control overhaul costs.

--The Navy's estimates of costs per man-day for repairs in 1974 and future years.

--The impact of the deferred maintenance on the 1974 overhaul program and the readiness of the fleets. (See p. 40.)

CHAPTER 1

INTRODUCTION

The Deputy Chief of Naval Operations (Logistics), Ships Material Readiness Division, is the focal point for managing overhaul and repair programs in the Navy. The Naval Ship Systems Command has operational control of the Navy shipyards; it is responsible for developing repair standards and procedures, establishing shipyard personnel requirements, and overseeing shipyard workloads.

Fund requests for overhauls and repairs originate with the type commanders of the Atlantic and Pacific Fleets. Currently, there are type commanders for (1) cruisers and destroyers, (2) aircraft carriers, (3) submarines, (4) support ships, and (5) amphibious ships. The type commanders base their requests on the long-range overhaul schedules and funding and operating guidance provided by the Chief of Naval Operations. Their requests are reviewed, adjusted, consolidated, and forwarded as the Atlantic and Pacific Fleet fund requests.

Overhauls and repairs are carried out at 10 Navy shipyards, at numerous private shipyards in the United States, and at 5 overseas locations. In 1972 the Navy had about 23 percent of its ship overhauls done at private repair facilities. In 1973 this increased to about 36 percent.

The Navy shipyards operate as nonprofit revolving funds. They pay for labor, material, utilities, and similar expenses and are reimbursed by selling their services to such customers as fleet commanders, the Naval Ship Systems Command, and other Government agencies. During 1972 the Navy shipyards had total sales of over \$1.8 billion and an average employment of over 71,000.

Overhauls, compared with repairs, are more complex and costly, take longer, and are scheduled at intervals depending on ship type. Repairs are made as needed between overhauls. Overhauls and unscheduled repairs are funded from the Navy Operation and Maintenance appropriation.

While ships are being overhauled or repaired, certain alteration work usually can be carried out also. An alteration modifies or improves a ship system. A conversion,

although similar to an alteration, makes a major change in the ship, usually affecting its mission capability. Alterations are funded primarily from the Other Procurement, Navy, appropriation, whereas conversions are funded from the Shipbuilding and Conversion appropriation.

The Navy's regular ship overhaul and unscheduled repair programs are the major maintenance programs for the Navy fleet; in 1972 they had a combined cost of about \$650 million. The 1973 programs are expected to cost almost \$770 million.

An important factor bearing on the management of overhaul and repair programs in recent years has been the changing composition of the Navy fleet. Older ships have been inactivated or transferred to the Naval Reserve and new ships have been added. During 1972 and 1973 a total of 170 ships will have been removed from the active fleet and 62 ships will have been added. At the end of 1973 the active fleet will consist of 594 ships. Maintaining ships that are 20 or 25 year old has been a problem; but even the newer ships have added new problems. More complex equipment on board and little maintenance experience made repair and overhaul forecasting even more difficult.

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CHAPTER 2

THE EFFECT OF INCREASED COSTS

ON THE 1972 AND 1973 OVERHAUL PROGRAMS

The Navy did not anticipate, and therefore did not budget for, the substantial increase in the cost of overhaul work in Navy shipyards in fiscal years 1972 and 1973. Actual ship overhaul costs in 1972 were about 27 percent higher than original estimates; overhaul costs in 1973 were about 20 percent higher than estimates.

Because overhaul costs were higher than available funds, the Navy had to defer overhaul work planned for 1972 and 1973. The original 1972 overhaul schedule of 139 ships was reduced to 102 ships, and the 1973 overhaul schedule of 95 ships was reduced to 84, as follows:

	<u>1972</u>	<u>1973</u>
Ships originally planned for overhaul	139	95
Ships deleted	51	24
Ships added	14	13
Net ships in the program	102	84

THE 1972 OVERHAUL PROGRAM

Planning for the 1972 overhaul program began in late 1969 and early 1970. Most of the 1972 overhaul cost estimates were based on experience from overhauls completed in 1969. Chapter 5 discusses how overhaul cost estimates were prepared. The Navy's final overhaul program, as submitted to the Office of the Secretary of Defense (OSD), was for 119 ships. In December 1970, during the late stages of OSD's budget review, \$55 million and 20 overhauls were added to the program. This was an attempt by OSD and the Navy to close the gap on deferred maintenance which had been developing over the preceding years.

At this point the Navy and OSD budget managers viewed the 1972 overhaul program as well funded. The Navy estimated that only one ship in the active fleet would be overdue for overhaul at the end of the year. The Congress supported this objective, and the entire budget request of \$502.8 million for 139 overhauls was appropriated.

Execution of the 1972 program

Shortly after the start of fiscal year 1972. OSD redirected \$30 million of overhaul funds, as follows:

	<u>Amount</u>
	(millions)
Budget Activity 2, general-purpose forces	
Base operations:	
Costs incident to base realignment	\$ 4.3
Station operating costs (fuel, utilities, tariff rates, and material)	6.6
Civilian personnel costs at west coast activities	5.7
Facility repairs at naval activities in Europe (boilers, dredging, expansion of school and exchange facilities)	<u>2.1</u>
Total	18.7
Construction battalion--deployment costs	3.7
Nonscheduled ship repair--unfunded workload at Ship Repair Facility, Yokosuka, Japan	<u>5.0</u>
Total	27.4
Budget Activity 8, training, medical and other:	
General personnel support--medical facility costs	<u>2.6</u>
Total	<u>\$30.0</u>

Transferring \$30 million from the overhaul program had the effect of deferring 10 overhauls. The actual overhaul cost increases that were to cause major funding problems in the program were not yet apparent. These did not become known until the formalized midyear budget review that occurred between December 1971 and February 1972.

During the midyear review, the Navy was concerned about the substantial cost increases of many overhauls. A fund shortage of over \$73 million was projected for the 1972

overhaul program at this time. The causes of this shortage are summarized below.

	<u>Amount</u>
	(millions)
Overhaul increases:	
Nuclear submarines	\$30.9
Carriers	11.4
Destroyers	6.2
Guided missile destroyers	4.1
U.S.S. PROTEUS (AS 19)	6.2
Transfers to nonscheduled repairs	<u>14.8</u>
	<u>\$73.6</u>

The Navy identified several options to compensate for this shortage. The deferral of the overhaul of the ABRAHAM LINCOLN (SSBN 602) to fiscal year 1973 released about \$21.3 million. However, \$10 million of this was transferred to the Special Projects Office to support the Fleet Ballistic Missile Program. Of the remaining funds, \$6.2 million was used for the increased overhaul cost of the PROTEUS, \$4 million for the THEODORE ROOSEVELT (SSBN 600), and \$1 million for the advanced planning for overhaul of the ABRAHAM LINCOLN. Deferring additional overhauls became necessary. Thirty-seven ships were deleted from the 1972 overhaul program. An analysis of reasons for ship deletions is shown on p. 14.

Reprogramming in 1972

To help alleviate the funding problem, the Navy submitted a reprogramming action (DD 1415), number 72-55, dated March 10, 1972, to the House Appropriations Committee to obtain approval for transferring \$33 million from the Procurement, Marine Corps, appropriation to the Operation and Maintenance, Navy, appropriation. The Navy brought ships into the shipyards and expected the Committee's automatic approval. When the Committee did not approve the action, the Navy found that it had made commitments for ship overhauls for which it did not have funds. The Navy was able to use some funds already in the 1972 overhaul program, but the net funding shortage aggregated about \$24.7 million. The Navy used 1973 overhaul funds to make up this difference.

During 1972 the Navy also used 1971 funds to pay for overhauls. This was done at the Pacific Fleet Headquarters by adding additional 1971 funds, using advanced planning project orders. Further work is being done now to ascertain if these uses of funds were appropriate. If found to be improper, this will be reported separately to the Secretary of the Navy.

The increased cost for overhauls revised the outlook for ship maintenance. Although the Navy originally anticipated that only 1 ship's overhaul would be overdue at the end of 1972, 21 ships with overhaul costs of \$87 million were overdue by June 30, 1972. This backlog of maintenance carried over into 1973.

Although ships were deleted from the overhaul program, certain minimum repairs had to be made to keep them operating. Total funds spent on overhauls in 1972 decreased, but funds spent for nonscheduled repairs increased, as follows:

	<u>Regular overhaul</u>	<u>Non- scheduled repairs</u>	<u>Total</u>
	(millions)		
Original 1972 congressional submission	\$502.8	\$142.1	\$644.9
Status of the 1972 program in March 1973	<u>450.4</u>	<u>200.6</u>	<u>651.0</u>
Change	<u>-52.4</u>	<u>58.5</u>	<u>6.1</u>

THE 1973 OVERHAUL PROGRAM

In March 1972 the Navy submitted to the Appropriations Committee the 1973 program for 95 ships at a cost of \$433.9 million. The Navy realized that this was not possible

with available funds, so it began to delete ships from the program. In July 1972, 24 ships were deleted and 12 were added. Later, 1 of the deleted ships was restored, bringing the total to 84 ships as of March 1973.

Supplemental appropriation for overhaul

In July 1972 the Navy received a supplemental appropriation of \$23.5 million for overhaul of ships in 1973. Of this, \$12.7 million applied to three ships that were previously planned for overhaul in 1972 but were slipped to 1973. These were:

	<u>Amount</u>
	(millions)
U.S.S. KILAUEA (AE 26)	\$ 4.7
U.S.S. NAVASOTA (AO 106)	3.7
U.S.S. GUADALUPE (AO 32)	<u>4.3</u>
	<u>\$12.7</u>

The remaining \$10.8 million was requested to cover the increased cost for 27 ships to be overhauled later in the year. The higher cost was attributed to an increased tempo of operations in Southeast Asia. The Navy estimated these overhauls would cost about \$400,000 more per ship because, during the increased operations, the ships' personnel would not be able to carry out routine maintenance.

The increased operations began in April 1972 as a result of increased combat activity. Steaming reports for the 27 ships showed that 24 operated at an increased tempo during the 6 months after April 1972 compared with the 6 months before April 1972. The three ships operating at a lesser tempo were the U.S.S. GRAYBACK (LPSS 574), the U.S.S. CHICAGO (CG 11), and the U.S.S. HITCHITI (ATF 103).

The \$10.8 million for additional cost of overhaul was for Pacific Fleet ships. The Navy identified 9 of the 27 ships for which overhaul work had begun. This showed that

overhaul cost estimates had increased an average of \$500,000 a ship.

We discussed this matter with shipyard representatives. They told us that cost increases resulting from a higher tempo of vessel operations are not separately identified. Therefore we were unable to find out if the higher costs for overhaul were associated with the increased operations or were caused by the general increase of overhaul costs in 1972 and 1973.

Supplemental appropriation for repairs

Also in July 1972 the Navy received \$53.2 million for use in 1973 for increased repairs to ships also because of the increased operations. Excluding the 27 ships discussed above, 10 aircraft carriers and 150 other ships were operating in Southeast Asia for which these funds were requested. Part of this (\$10.3 million) was for interim repairs (selected restricted availability) for seven aircraft carriers. One carrier, the U.S.S. TICONDEROGA (CVS 14), was added to the program at a cost of \$4.3 million. The cost estimates for the other six carriers, already in the program, were increased by \$1 million each for a total of \$6 million.

The remaining \$42.9 million was for the expected increase in the cost of repairing ships in Southeast Asia. The Navy computed this on the basis of an average number of ships in Southeast Asia rather than actual number. The Navy estimated that 103 ships would be affected and that this would increase the average cost about \$400,000 a ship.

From April through September 1972, five aircraft carriers operated at an increased tempo while three operated at a lesser tempo than in the preceding 6 months. The other two were Atlantic Fleet ships. Of the remaining 150 ships, 104 operated at an increased tempo, 26 at a lesser tempo, and 20 were Atlantic Fleet ships.

Of the \$53.2 million provided for increased repair, \$9.2 million was allocated to the Atlantic Fleet. The remainder, about \$44 million, went to the Pacific Fleet's repair facility at Subic Bay, the Philippines.

Only two Atlantic Fleet ships that operated in Southeast Asia had returned for repairs, and as of February 1973, repairs on these ships had not been completed. Atlantic Fleet maintenance representatives said they do not attempt to separately identify repair costs attributable to Southeast Asia operations. Furthermore only about \$3 million of the \$9.2 million has been allocated for repairing returning ships. The Atlantic Fleet used about \$6 million to repair ships going to Southeast Asia as replacements.

Funds status of the 1973 program

In 1973 both overhauls and nonscheduled repairs increased because of the increased operations in Southeast Asia. A supplemental appropriation was provided to cover this added cost. The 1973 overhaul and repair program fundings are shown below.

	<u>Regular overhaul</u>	<u>Nonscheduled repair</u>	<u>Total</u>
	(millions)		
Original 1973 congressional submission	\$433.9	\$183.3	\$617.2
Southeast Asia amendment	<u>23.5</u>	<u>53.2</u>	<u>76.7</u>
	457.4	236.5	693.9
Status of the 1973 program as of March 1973	<u>498.2</u>	<u>271.0</u>	<u>769.2</u>
Change	<u>40.8</u>	<u>34.5</u>	<u>75.3</u>

REASONS FOR SHIP DELETIONS

According to the Navy, ships were deleted from the annual overhaul programs for a number of reasons, as follows:

<u>Reasons</u>	<u>Number of ships</u>	
	<u>1972</u>	<u>1973</u>
Funds not available	24	18
Operational commitments	11	-
Planned inactivation	5	3
Transferred to Naval Reserve	4	-
Loaned to Foreign Government	1	-
Transferred to preceding year to meet workload needs	<u>6</u>	<u>3</u>
Total	<u>51</u>	<u>24</u>

The overriding reason for deleting ships from the 1972 and 1973 programs was that the Navy did not have enough funds to pay for the ships it planned to overhaul.

Changes in the 1972 program

The deletions and additions to the 1972 overhaul program were almost evenly divided between the fleets.

	<u>Original quantity</u>	<u>Deletions</u>	<u>Additions</u>	<u>Net changes</u>	<u>Final</u>
Atlantic Fleet	73	27	6	-21	52
Pacific Fleet	<u>66</u>	<u>24</u>	<u>8</u>	<u>-16</u>	<u>50</u>
	<u>139</u>	<u>51</u>	<u>14</u>	<u>-37</u>	<u>102</u>

The workloads of the naval shipyards were also affected by the overhaul program changes. In 1972, 8 of the 10 shipyards had a net reduction of overhauls but some were affected more than others. The changes by shipyards are shown below.

	1972				
	<u>Original quantity</u>	<u>Deletions</u>	<u>Additions</u>	<u>Net change</u>	<u>Final</u>
Boston	13	4	3	- 1	12
Charleston	14	5	1	- 4	10
Hunters Point	9	7	3	- 4	5
Long Beach	23	6	2	- 4	19
Mare Island	4	1	-	- 1	3
Norfolk	11	3	2	- 1	10
Pearl Harbor	11	3	1	- 2	9
Philadelphia	10	6	-	- 6	4
Portsmouth	2	-	-	-	2
Puget Sound	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>1</u>
Navy repair activities:					
U.S. shipyards	98	35	12	-23	75
Pacific activities	<u>7</u>	<u>3</u>	<u>-</u>	<u>- 3</u>	<u>4</u>
	105 (76%)	38	12	-26	79 (77%)
Private shipyards	<u>34 (24%)</u>	<u>13</u>	<u>2</u>	<u>-11</u>	<u>23 (23%)</u>
Total	<u>139</u>	<u>51</u>	<u>14</u>	<u>-37</u>	<u>102</u>

The shipyard most affected, in terms of the original work planned, was Philadelphia. There, 6 of the 10 original overhauls were deleted. The work change at Philadelphia was compensated for by sending to the yard additional unscheduled repair work and some military assistance program work.

The effect of workload fluctuations can be seen in the schedule on page 14 showing ships transferred to the preceding year. Six ships were transferred in 1972 and three were transferred in 1973.

Changes in the 1973 program

Changes in the 1973 overhaul program as they affected the fleets, the individual shipyards, and the mix between Navy and private shipyards are shown below.

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	<u>Original quantity</u>	<u>Deletions</u>	<u>Additions</u>	<u>Net change</u>	<u>Quantity</u>
Atlantic Fleet	42	14	6	- 8	
Pacific Fleet	<u>53</u>	<u>10</u>	<u>7</u>	- <u>3</u>	
	<u>95</u>	<u>24</u>	<u>13</u>	- <u>11</u>	

The status of the work at the various Navy and private shipyards as of March 1973 follows.

	1973				
	<u>Original quantity</u>	<u>Deletions</u>	<u>Additions</u>	<u>Net change</u>	<u>Quantity</u>
Boston	7	1	-	- 1	
Charleston	9	5	1	- 4	
Hunters Point	3	1	1	-	
Long Beach	10	2	-	- 2	
Mare Island	3	-	-	-	
Norfolk	7	1	-	- 1	
Pearl Harbor	5	2	1	- 1	
Philadelphia	3	3	-	- 3	
Portsmouth	2	1	1	-	
Puget Sound	<u>3</u>	-	-	-	
Navy repair activities:					
U.S. shipyards	52	16	4	-12	
Pacific activities	<u>15</u>	<u>1</u>	-	- <u>1</u>	
Total	67(71%)	17	4	-13	
Private shipyards	<u>28(29%)</u>	<u>7</u>	<u>9</u>	<u>2</u>	
Total	<u>95</u>	<u>24</u>	<u>13</u>	- <u>11</u>	

Because of higher overhaul costs in 1972 and 1973 quantity of ships overdue for overhaul has increased. Twenty-one ships due for overhaul in 1972 had to be deferred because the Navy did not have enough funds, and the Navy's projection for the end of 1973 is 33 deferred ships with an estimated overhaul cost of \$233.4 million.

The changes in the 1972 and 1973 overhaul program were brought about primarily by increased repair costs in Navy shipyards. These increases were caused by (1) more labor man-days used for overhauls than originally estimated (2) a higher cost per man-day. These matters are discussed in the following chapters.

MAJOR ALTERATIONS

Major alterations, which are part of the Fleet Modernization Program (FMP), are made while ships are being overhauled and repaired. Because overhauls were deferred in 1972 and 1973, many alterations were not made as scheduled. However, even when ships were overhauled or repaired as planned, alterations were not made.

We looked at five ships scheduled to receive alterations in 1972. Of the 105 alterations that were originally programmed, only 77 were actually made, although 9 were added. Actual costs were \$8.9 million for the five ships instead of the original estimate of \$10.7 million.

<u>Hull number</u>	<u>Programed alterations</u>	<u>Estimated cost</u>	<u>Alterations</u>			<u>Actual cost</u>
			<u>Original</u>	<u>Additional</u>	<u>Total</u>	
DDG 4	26	\$ 3,300,700	18	2	20	\$1,135,394
DLG 6	27	4,739,900	18	-	18	4,382,224
DE 1044	28	1,628,500	23	-	23	1,945,498
DDG 35	3	139,400	1	5	6	362,978
DDG 10	<u>21</u>	<u>884,800</u>	<u>17</u>	<u>2</u>	<u>19</u>	<u>1,108,700</u>
	<u>105</u>	<u>\$10,693,300</u>	<u>77</u>	<u>9</u>	<u>86</u>	<u>\$8,934,794</u>

The Navy told us that (1) it has been making only about 75 percent of its programmed alterations each year and (2) this overprogramming gave the Navy greater flexibility because adjustments are always necessary.

We discussed specific alterations with alteration project representatives. We did not identify any alterations which had questionable validity or justification, or which seemed to be overly costly or more elaborate than necessary. These alterations used between 70 and 80 percent of the total alteration installation funds for 1972 and 1973.

Installation Dollars Appropriated

For Specific Programs in FMP

<u>Program</u>	<u>Fiscal year</u>	
	<u>1972</u>	<u>1973</u>
	(millions)	
Anti-Surface Missile Defense	\$ 20.1	\$ 21.5
Light Airborne Multi-Purpose System	12.5	12.6
Pollution Abatement	-	16.8
Habitability	4.2	4.7
Aviation Support	12.5	21.5
Air Identification Mark XII System	3.4	3.7
Submarine Safety	9.0	1.9
Submarine Silencing	10.5	5.7
Communications	15.5	19.5
Navy Distillate Fuel	3.0	7.9
Aqueous Film Forming Foam	-	9.5
Carrier Concept	-	3.8
Nuclear Alterations	42.4	35.7
Design and Planning	24.3	20.4
Ordnance Alterations	9.6	7.7
Consolidated Ships Allowance List	13.5	11.2
Anti-Submarine Warfare	<u>21.3</u>	<u>29.0</u>
Total	<u>\$201.8</u>	<u>\$233.1</u>

Generally these projects involved new weapons or defense systems or improvements to existing weapons systems requiring ship installations. Some of the programs concerned such matters as environment and improved shipboard living conditions.

The alteration program to improve habitability is related to the all-volunteer service and to the extensive fire damage aboard the carrier U.S.S. FORRESTAL in July 1972. The damage occurred because flammable furnishings had been used. Although criteria for inflammability and improved habitability had been established before the fire, they had not been enforced. Following the FORRESTAL fire, the Chief of Naval Operations directed the fleet commanders to review shipboard furnishings and develop a program for removing or replacing unauthorized material.

CHAPTER 3

INCREASED MAN-DAYS REQUIRED FOR OVERHAULS

Cost estimates used to prepare fiscal year 1972 and 1973 budget submissions for ship overhauls were developed from forecasts of the amount of work that ships would need when they entered overhaul in 1972 and 1973. The estimates were inaccurate because:

- The number of man-days required for overhaul work was generally understated.
- Some planned work was not included in the estimates.
- Labor and material costs were allocated arbitrarily.
- Prior overhaul costs, which were incomplete, were used to estimate future work.

We compared the original cost estimates for 28 ships in the 1972 overhaul program with the cost of overhaul at 5 shipyards. In some instances work on these overhauls continued into 1973. Cost estimates totaled \$167.7 million, and actual costs or the latest cost estimates were \$216.3 million. Costs increased \$48.6 million, or about 30 percent. The following information developed at two shipyards gives the reasons for the cost increases.

INCREASED OVERHAUL COSTS AT NAVY SHIPYARDS

Costs of overhauling 10 ships at the Charleston Naval Shipyard exceeded the original estimates by almost \$16.9 million. Originally, the Navy estimated the cost at \$56.9 million. However, the fixed price was almost \$73.8 million. As of February 1973, overhaul of two of these ships--the U.S.S. ROOSEVELT (SSBN-600) and the U.S.S. POLLACK (SSN-603)--was not complete and the fixed price on these ships could change. The following table compares the original estimates with the fixed prices.

BEST DOCUMENT AVAILABLE

Hull number	Ship	Original cost estimate	Fixed price	Increase
DD 844	U.S.S. PERRY	\$ 2,098,000	\$ 2,782,000	\$ 684,000
DD 866	U.S.S. CONE	2,112,000	2,326,000	214,000
DDG 10	U.S.S. SAMPSON	2,848,000	3,479,000	631,000
DE 1044	U.S.S. BRUMBY	1,389,000	2,529,000	1,140,000
DER 329	U.S.S. KRETCHMER	1,437,000	1,462,000	25,000
SS 416	U.S.S. TIRU	2,994,000	3,505,000	511,000
SS 426	U.S.S. RUSK	2,977,000	^a 2,996,000	^a 19,000
SS 490	U.S.S. VOLADOR	2,977,000	^a 3,514,000	^a 537,000
SSBN 600	U.S.S. THEODORE ROOSEVELT	23,353,000	29,403,000	6,050,000
SSN 603	U.S.S. POLLACK	14,721,000	21,760,000	7,039,000
Total		<u>\$56,906,000</u>	<u>\$73,756,000</u>	<u>\$16,850,000</u>

^aActual shipyard costs were used. (See schedule below.)

The \$16.8 million increase in overhaul cost was caused by (1) more man-days used than were estimated, (2) labor rates higher than those included in original estimates, and (3) differences between the amount of material originally estimated and actually used during overhauls. The following table shows the overhaul cost increases for each ship by each of these causes.

Ship	Increased or decreased (-) man-days (note a)	Higher man-day rates (note b)	Increased or decreased (-) material	Total increase in price over original estimate
U.S.S. PERRY	\$ 408,404	\$ 149,099	\$ 126,350	\$ 683,853
U.S.S. CONE	-206,276	437,138	-16,767	214,095
U.S.S. SAMPSON	203,365	360,750	67,160	631,275
U.S.S. BRUMBY	722,609	344,612	72,319	1,139,540
U.S.S. KRETCHMER	-33,846	195,675	-137,220	24,609
U.S.S. TIRU	398,381	358,348	-245,263	511,466
U.S.S. TUSK (note c)	213,995	15,230	-210,672	18,553
U.S.S. VOLADOR (note c)	608,111	71,075	-141,584	537,602
U.S.S. THEODORE ROOSEVELT	3,385,197	4,209,011	-1,545,441	6,048,767
U.S.S. POLLACK	<u>5,177,598</u>	<u>2,623,209</u>	<u>-761,472</u>	<u>7,039,335</u>
	<u>\$10,877,538</u>	<u>\$8,764,147</u>	<u>-\$2,792,590</u>	<u>\$16,849,095</u>

^aThe fixed price over the original estimate multiplied by the fixed-price labor rate.

^bMan-days in the original estimate multiplied by the increase in the labor rate from the original estimate to the fixed price.

^cComputations for these ships were based on actual labor and material costs and actual man-days because a breakdown of fixed-price costs and fixed-price man-days was not available.

The original material estimates for 7 of the 10 ships shown on the preceding page were overstated, partly because a greater part of the total overhaul cost estimate was allocated to materials than was warranted. The Navy estimated that material costs were about 20 percent of the total overhaul costs.

Since submarines accounted for most of the cost increase, we discussed the estimates with a representative of the Commander, Submarine Force, Atlantic. He said materials represent only about 10 percent of the total overhaul cost of submarines. Therefore, when the total estimated overhaul cost was broken down between man-day costs and material costs, the estimate for material costs was overstated and the estimate for man-day costs was understated.

The situation at the Norfolk Shipyard was essentially the same. Overhaul costs for eight ships were about \$15.2 million higher primarily because of increased man-days and an actual man-day rate that was higher than the rate included in the original overhaul cost estimate. This is illustrated below.

<u>Hull number</u>	<u>Ship</u>	<u>Increased man-days</u>	<u>Higher man-day rates</u>	<u>Increased or decreased (-) material</u>	<u>Total increase in price over original estimate</u>
CVA 59	U.S.S. FORRESTAL	\$ 318,313	\$ 517,234	\$ 300,724	\$ 1,136,271
CVA 62	U.S.S. INDEPENDENCE	925,952	1,623,966	857,093	3,407,011
DLG 26	U.S.S. BELKNAP	50,327	445,672	-14,632	481,367
DD 715	U.S.S. WOOD	402,224	259,128	6,772	668,124
DD 873	U.S.S. HAWKINS	170,363	120,763	-72,941	218,185
DDG 4	U.S.S. LAWRENCE	1,515,871	97,006	196,471	1,809,348
DDG 35	U.S.S. MITCHER	1,288,848	151,393	22,202	1,462,443
SSN 578	U.S.S. SKATE	<u>4,788,358</u>	<u>2,124,533</u>	<u>-907,053</u>	<u>6,005,838</u>
Total		<u>\$9,460,256</u>	<u>\$5,339,695</u>	<u>\$ 388,636</u>	<u>\$15,188,587</u>

The greater number of man-days used in overhaul was caused by a combination of factors. Actual overhauls included work that was not included in the original estimates; labor and material costs were allocated arbitrarily, and incomplete prior overhauls were used as a cost base. These factors are discussed in the sections that follow. The reasons for the increased man-day rates are discussed in chapter 4.

WORK NOT INCLUDED IN ORIGINAL ESTIMATE

The U.S.S. SKATE overhaul is scheduled to be completed in June 1973. The current fixed price, excluding major alterations, is about \$6 million more than the estimate presented to the Congress. There has been an increase of 47,084 man-days and a reduction in material cost of \$999,013. Approximately \$4.8 million of the total cost increase was caused by use of more man-days than were originally estimated.

The original estimate for the SKATE's fiscal year 1972 overhaul was based on costs for its fiscal year 1967 overhaul. During the 1967 overhaul, about \$6 million was spent on a special program to improve submarine safety (sub-safe). The work consisted primarily of inspecting and repairing or replacing all sea systems. The Naval Ship Systems Command funded the sub-safe work.

Many of the items replaced or repaired during the fiscal year 1967 sub-safe work were repaired during the fiscal year 1972 overhaul. The SSN Material Officer, Submarine Forces, Atlantic (SUBLANT), estimated that it cost about \$697,000 to repair sub-safe items in fiscal year 1972. This work require about 6,198 man-days and materials cost about \$113,532. Examples of sub-safe major repairs in fiscal year 1972 are show below.

<u>Description</u>	<u>Man-days</u>	<u>Material cost</u>	<u>Total cost</u>
Main seawater pump	229	\$ 3,600	\$ 28,071
Auxiliary seawater pump	551	9,932	68,016
Hull and backup valves	<u>3,184</u>	<u>60,000</u>	<u>350,715</u>
Total	<u>3,964</u>	<u>\$73,532</u>	<u>\$446,802</u>

The original estimate for the SKATE's fiscal year 1972 overhaul was based on repairs that SUBLANT paid for in 1967. Therefore, costs for repairs of sub-safe items in fiscal year 1972 were not included in the original estimate.

Furthermore, the Navy's original estimate for the fiscal year 1972 overhaul did not include any costs for unique repairs and/or minor alterations. Shipyard officials, however identified about \$2.6 million charged for unique repairs and minor alterations. The work required about 19,579 man-days

and \$252,177 for material. The SUBLANT official who prepared the original estimate stated that in June 1970, when the estimate was prepared, he was not aware of any unique repairs or minor alterations for the fiscal year 1972 overhaul. He stated that, because the SKATE was about 15 years old, he doubted that any unique repairs or minor alterations would be made. The official stated that generally it is very difficult to identify unique repairs and minor alterations up to 2 years before an overhaul.

ARBITRARY ALLOCATION OF LABOR
AND MATERIAL COSTS

SUBLANT's estimate for the fiscal year 1972 overhaul of the SKATE was determined by dividing the fiscal year 1967 overhaul cost into 80 percent for labor and 20 percent for material. The SUBLANT Assistant for Budget and Fiscal Matters stated that this is not a realistic allocation and that a more accurate allocation is 90 percent for labor and 10 percent for materials. He stated that the 80-20 allocation understated man-days required by about \$342,000, overstated material costs by about \$45,980, and understated total cost.

The SUBLANT Assistant for Budget and Fiscal Matters stated estimates for fiscal year 1974 overhauls use actual man-days and material costs for ships used in the cost base (baseline ships).

INCOMPLETE PRIOR OVERHAULS
USED AS A COST BASE

In developing its overhaul cost estimates the Atlantic Fleet included some ships in the cost base that had not previously been overhauled completely. Because the Navy made no adjustments to compensate for the incomplete overhauls, the cost estimates were understated.

For example, the estimates on 15 destroyers were understated by almost \$3 million because 4 of the 5 baseline ships had previously received incomplete overhauls.

Destroyer maintenance officials informed us that the baseline year used (1970) was an austere year, represented by absolute minimum overhauls. A fleet maintenance official told us that, previously, adjustments to baseline ships not

completely overhauled had not been considered in preparing estimates. He stated that this practice could have had a significant impact on 1972 estimates and that, for the 1972 overhaul, consideration would be given to adjusting costs for incomplete overhauls.

A similar situation existed in the Pacific Fleet regarding the overhaul of the submarine tender PROTEUS (AS 19). The Navy requested \$1.8 million in its 1972 overhaul program request for the PROTEUS. The actual cost was \$10 million, an increase of \$8.2 million or 456 percent. The cause of most of this increase was that actual man-days exceeded estimated man-days by more than 425 percent. In this case, the Navy knew that its original estimate was far too low.

The PROTEUS was overhauled last in 1968 when the crew provided most of the labor. Sometime after 1968, the Commander, Submarine Forces, Pacific (COMSUBPAC), noted that PROTEUS' condition was extremely poor and attributed this to the substandard quality of the 1968 overhaul. Despite this, the Commander in Chief, Pacific Fleet (CINCPACFLT), prepared the fiscal year 1972 estimate based upon performing another self-overhaul. The total cost was estimated at \$1.8 million and this was the amount in the final fiscal year 1972 program which CINCPACFLT sent to Washington in January 1971.

We found documentation, dated 1 month later, which showed that COMSUBPAC, CINCPACFLT, and the Chief of Naval Operations had agreed on three alternative plans. In March 1971 one of these alternatives was selected. The estimated overhaul cost of this alternative overhaul plan was \$10 million.

CHAPTER 4

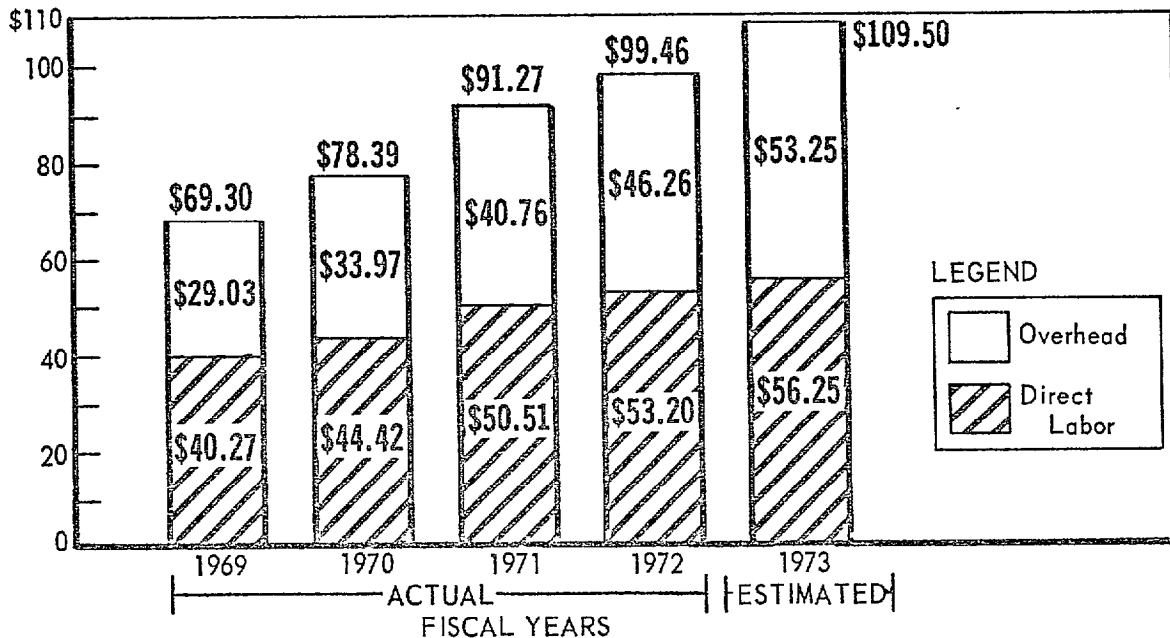
INCREASED COST PER MAN-DAY

AT NAVY SHIPYARDS

Ship overhaul costs were higher in 1972 and 1973 than the Navy anticipated. As shown in chapter 3, this was caused in part by overhauls requiring more man-days than estimated. In addition, the man-day rates charged by the shipyards were higher than expected. The higher rates caused overhaul costs to increase beyond available funds and ships had to be deleted from the overhaul programs.

Shipyard man-day costs are computed by dividing the total direct labor costs and overhead costs by the number of direct labor man-days worked. The cost per man-day increased from \$69 in fiscal year 1969 to \$109 in fiscal year 1973, as follows.

MAN-DAY COSTS
ALL NAVAL SHIPYARDS
FISCAL YEARS 1969-1973
RELATIONSHIP OF OVERHEAD TO DIRECT LABOR



Most of the increase--about \$28 a man-day--is attributable to wage and salary increases for direct and indirect employees. The remainder--about \$12 a man-day--is attributable to increased overhead costs.

Overhead costs per man-day increased by about 83 percent while direct labor costs increased by about 40 percent. This could be due at least in part to underuse of the yards. Employment in the Navy shipyards dropped from about 90,000 in 1969 to an estimated 67,000 at the end of 1973.

WAGE AND SALARY INCREASES

Wage and salary increases had a varying impact at shipyards because of different pay scales for different geographical locations and different labor skill mixes, depending on the shipyards' missions. At most yards pay raises were the primary factor increasing man-day costs.

From 1969 to 1972 at the Pearl Harbor Shipyard, man-day costs increased about \$29. Direct labor costs increased \$16.40 a man-day, as a result of wage and salary increases as shown below.

<u>Fiscal year</u>	<u>Cost per direct labor man-day</u>	<u>Increase</u>	<u>Reasons for increase</u>
1969	\$43.68		
1970	48.24	\$ 4.56	Ungraded raise of July 13, 1969 Graded raise of July 13, 1969 Graded raise of December 28, 1969
1971	54.88	6.64	Ungraded raise of July 26, 1970 Graded raise of January 10, 1971
1972	60.08	5.20	Ungraded raise of July 25, 1971 Graded raise of January 9, 1971
Total		<u>\$16.40</u>	

BEST DOCUMENT AVAILABLE

Pay raises of indirect employees also increased overhead costs almost \$6 a man-day, or about 17 percent. Annual overhead costs increased from \$21.1 million in fiscal year 1969 to \$28.3 in fiscal year 1972. About one-half of the increase was caused by pay raises.

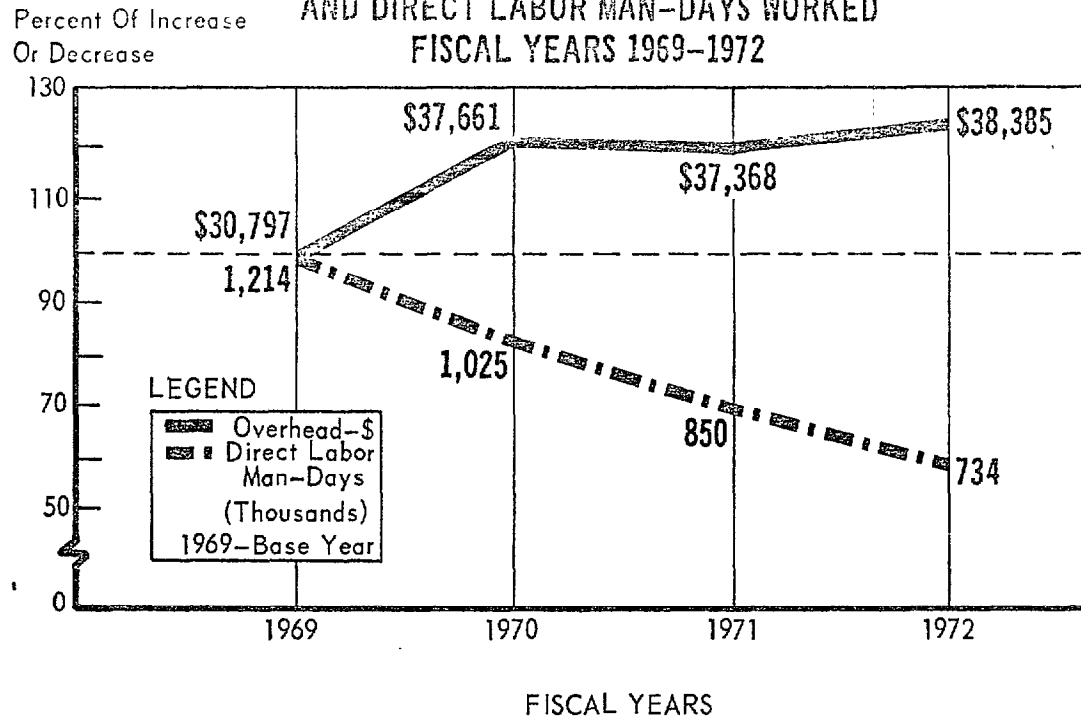
In contrast, the impact of pay raises at the Portsmouth shipyard was not as significant, primarily because of a substantial reduction in direct labor-hours. Direct labor-hours in 1972 were only about 60 percent of the direct labor-hours in 1969.

The man-day cost at Portsmouth increased from \$67 in 1969 to \$104 in 1972, a difference of \$37, or 55 percent. Pay raises during this period increased the man-day cost almost \$15 as shown below.

<u>Date of raise</u>	<u>Amount of raise</u>		<u>Approximate impact on man-day rate</u>
	<u>Ungraded</u>	<u>Graded</u>	
7-13-69		9.1%	\$ 1.04
12-28-69	\$0.22 an hour		3.28
12-28-69		6.0	.88
11-29-70	.26 an hour		3.76
1-10-71		5.96	1.12
1- 9-72		5.5	1.12
2- 6-72	.24 an hour		<u>3.68</u>
Total			<u>\$14.88</u>

At Portsmouth the remaining \$22 of the man-day cost increase was attributable to overhead costs which increased by 25 percent and direct labor man-days which decreased by 40 percent as shown on the following graph.

PORTSMOUTH NAVAL SHIPYARD
 RELATIONSHIP BETWEEN OVERHEAD COSTS
 AND DIRECT LABOR MAN-DAYS WORKED
 FISCAL YEARS 1969-1972



Since the overhead portion of the man-day cost is based on direct labor, overhead is allocated to a smaller base, therefore represents a higher proportion of the man-day cost in 1972.

OVERHEAD COSTS

Overhead expense is made up of both productive and general expenses. Productive expenses (those charged to productive shops) include costs for supervising graded and ungraded personnel, safety and training programs, tools and equipment maintenance, and fuel. General expenses (those charged to the general cost centers providing overhead support to the productive shops) include costs for administration, industrial relations, medical support, central tool rooms, and planning and estimating.

Overhead increased because indirect employees also received pay raises as discussed in the preceding section. But overhead increased for other reasons also.

Mare Island Shipyard

At the Mare Island Shipyard, the overhead rate increased about \$26 a man-day from \$31 per direct labor man-day in the first quarter of 1969 to \$57 per direct labor man-day in the last quarter of 1972.

Twelve percent (\$3 a man-day) of the overhead cost growth occurred while Mare Island was combined with the Hunters Point Shipyard. Because these shipyards did not maintain separate productive and general expense rates, we could not isolate where cost growth occurred.

The separation of the two shipyards on February 1, 1970, caused the overhead rate to increase 41 percent (\$11 a man-day) of the total overhead cost growth during the period.

The remaining 47-percent increase (\$12 a man-day) in the overhead rate occurred between the third quarter of fiscal year 1970 and the fourth quarter of fiscal year 1972. Most of this increase was due to pay raises, but a substantial portion was due to an increase in shipyard general expense. The costs of resource conservation, cost reduction, and equal employment opportunity programs are charged to this expense. These programs have expanded in recent years.

Such services as police and fire protection, as well as many public works programs which previously were charged to direct labor, are now treated as overhead and are accumulated in the shipyard general expense center account. Overhead costs also increased because the Mare Island Shipyard's mission changed from construction and conversion of ships to submarine overhaul and repair services.

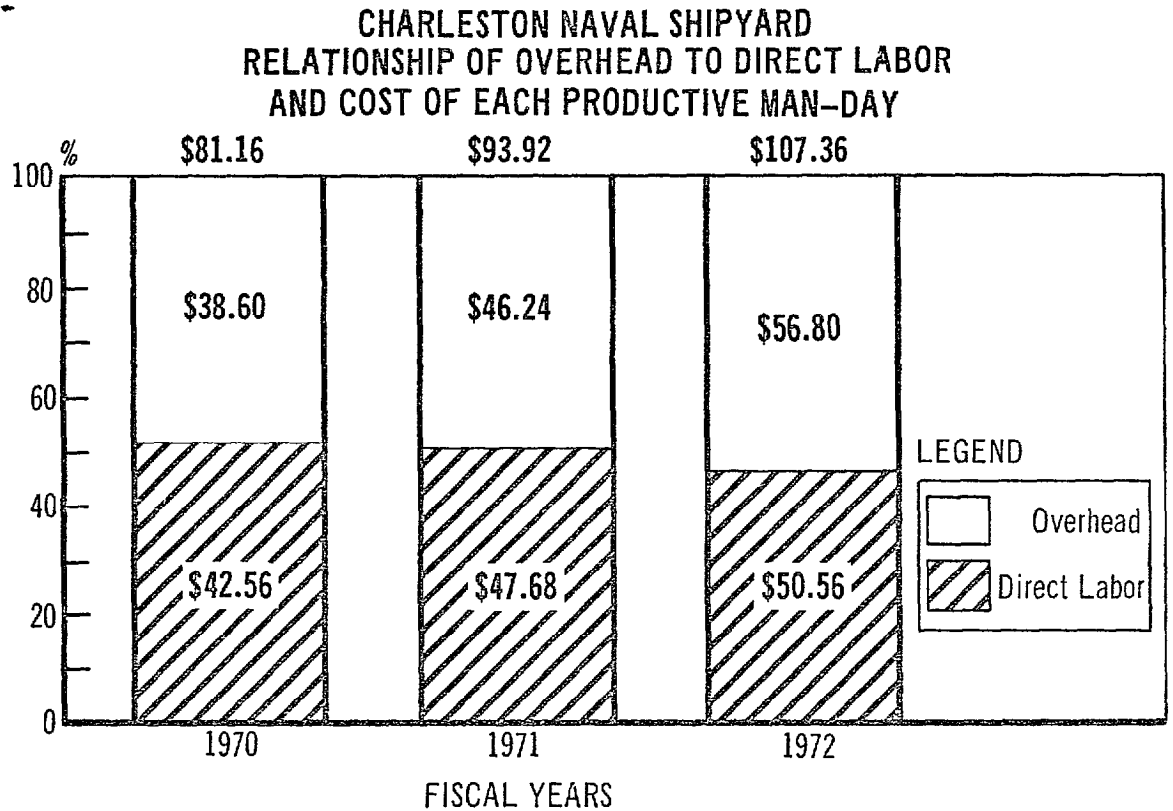
Norfolk Shipyard

At the Norfolk Shipyard, total man-day costs increased \$25, from \$67 a man-day in 1969 to \$92 a man-day at the end of 1972. Overhead was responsible for about \$16 of this increase. Most of the increase was caused by the pay raises for indirect employees' and other employees' charging their time to overhead functions. Increased overhead was attributable in part to the maintenance needed at the shipyard's old facilities. Also there had been a decrease in direct reimbursements for work done by overhead personnel for

activities not part of the shipyard (such as printing payroll checks for others). These reimbursements reduce overhead expense and thus affect the overhead rate.

Charleston Shipyard

The repair man-day cost for all shipyards shows that overhead is increasing at a faster rate than direct labor costs. At some yards overhead is more than half of the man-day cost. This is illustrated by the following information developed at the Charleston Shipyard.



The \$18.20 overhead increase was caused by a reduction of 200,000 man-days of direct labor, the base on which overhead is prorated, and by a \$7.9 million increase in overhead expenses. Overhead increased from 48 percent of total man-day costs in 1970 to 53 percent in 1972.

Shipyard officials told us that direct labor man-days decreased from about 1,050,000 in 1970 to 850,000 in 1972 because of a reduction in shipyard workload. Because overhead costs do not vary proportionately as direct labor

changes, the decrease in man-days caused ships overhauled in 1972 to absorb more overhead for each man-day than ships overhauled in 1970.

The total overhead expense increased by \$7.9 million during the 1970-72 period primarily because of pay raises to indirect employees equal to those received by direct employees, an increase in the number of indirect labor hours due primarily to the increase in nuclear work, and increased facility maintenance and repair cost.

Shipyard officials told us that nuclear submarine work gradually increased while work on conventional vessels decreased. This change has caused the shipyard to expend more man-hours in training for and supervising nuclear work. For example, between 1970 and 1971, the shipyard hired 25 engineers-technicians and 15 quality assurance monitors because of the increase in nuclear work. Also, in 1972 the shipyard hired 45 nuclear inspectors. All these employees required extensive training, sometimes as much as 6 months, before they became productive direct employees. All costs of training, including salaries paid during training, were charged to overhead accounts.

Facility maintenance and repair costs increased because of a major upgrading of maintenance needed to meet the exacting standards for overhauling. A major facility upgrading program was required to provide a capability to overhaul two or more nuclear vessels simultaneously.

Pearl Harbor Shipyard

A reduction in force, restrictions on hiring, and a limitation on overtime and holiday time have limited the size of the Pearl Harbor work force available to perform scheduled overhauls and repairs. As a result:

1. Ships scheduled for work at Pearl Harbor have been deferred or rescheduled to other shipyards.
2. Overhead charges to customers increased significantly as direct labor decreased, and overhead costs were spread over fewer direct labor man-days.

Direct labor man-days dropped about 2 percent during the 3 years ended June 30, 1972. As shown below, the large part of this decrease resulted from the 6-percent limit on overtime and holiday work which was imposed during year 1972.

	<u>1969</u>	<u>1972</u>	<u>Decrease</u>	
			<u>Man-days</u>	<u>Per</u>
Regular man-days	500,032	476,584	23,448	
Overtime and holiday man-days	<u>110,260</u>	<u>76,482</u>	<u>33,778</u>	
Total	<u>610,292</u>	<u>553,066</u>	<u>57,226</u>	

The effect of the direct labor reductions increased to shipyard customers by about \$2.7 million during fiscal year 1972. Although direct labor was reduced, the shipyard was unable to make corresponding reductions in the number of overhead personnel and other overhead costs.¹ Shipyard officials told us that, even though the direct labor workload has decreased, overhead functions are at a minimum and further reductions would seriously affect shipyard operations. Therefore, overhead functions which remained at approximately the same levels during this 3-year period spread over 57,000 fewer direct man-days during fiscal year 1972. This, in turn, increased the shipyard's fixed costs to its Navy customers by \$2.7 million.

¹Some decrease in overhead did occur during this period. Overhead man-days actually were decreased 1 percent from fiscal year 1969 to fiscal year 1972.

CHAPTER 5COST-ESTIMATING PROCEDURES

The procedures used by the Navy to compute cost estimates for ship overhauls and repairs have changed significantly in the last four budgets--fiscal years 1971 through 1974. The basic philosophy, however, was the same. For each budget year, cost estimates were derived from data modified to reflect known changes in labor and material costs and changes in overhaul locations. Following is a discussion of the methods used to estimate ship overhaul and repair costs.

FISCAL YEAR 1972

In recognition of the weaknesses in the approach used in the fiscal year 1971 ship overhaul budget preparation, the Navy decided to change its estimating procedures for the fiscal year 1972 budget. Under the revised procedures, type commanders were instructed to use actual fiscal year 1969 costs as the basis for estimating fiscal year 1972 costs. Fiscal year 1969 was selected as a base year because maintenance funds in that year were considered to have been sufficient to allow an adequate number of overhauls.¹

The type commander selected the appropriate fiscal year 1969 overhaul costs for each similar ship class and made two adjustments to compute a baseline cost. First, the costs of minor alterations and unique repairs were subtracted. Second, the adjusted overhaul cost at a particular Navy or private shipyard location was converted to an average cost based on the average fiscal year 1969 man-day cost for Navy or private shipyards. The purpose of these adjustments was to put the separate overhauls at different locations on a common base.

Finally, the adjusted figures for each ship were simply totaled and then averaged to determine the ship class baseline cost.

¹In those cases where ships of a similar class were not overhauled in 1969, overhaul costs from the closest available year were selected and the man-day costs were adjusted to show actual 1969 costs.

The fleets, using the baseline cost computed by type commanders, developed the projected cost of each fiscal year 1972 ship overhaul. The estimated costs of planned minor alterations and unique repairs were added to the baseline cost, forming an adjusted baseline cost. This figure was divided into estimated labor and material costs, assuming 80 percent for labor and 20 percent for materials.

To bring these fiscal year 1969 costs up to current price levels, three adjustments were made. First, the estimated material cost was increased by 2.6 percent to account for fiscal year 1970 material price increases, and this adjusted cost was then increased another 4 percent to reflect fiscal year 1971 material price increases. Second, the labor portion was adjusted by an economic-location factor showing the difference between the most recent actual man-day rate at the designated shipyard and the average fiscal year 1969 man-day rate for all Atlantic or Pacific area shipyards. Third, the adjusted labor portion was further adjusted by an industrial cost factor, provided by the Chief of Naval Operations, showing the anticipated efficiency of the shipyard based on its projected workload, status of major equipment, and other factors.

Following is an example of this budget methodology, using the U.S.S. TANG (SS 563), a Pacific Fleet ship.

	Labor (80%)	Materials (20%)	Total
Baseline cost			\$3,797,753
Plus minor alterations and repairs			<u>203,193</u>
Adjusted baseline cost	\$3,200,757	\$800,189	<u>\$4,000,946</u>
Plus material price escalation for fiscal year 1970 at 2.6%		<u>20,805</u>	
Subtotal		820,994	
Fiscal year 1971 at 4%		<u>32,840</u>	\$ 853,834
Plus economic/location factor (1.304) (note a)	<u>973,038</u>		
Subtotal	4,173,795		
Plus industrial cost factor (0.95)	<u>-208,689</u>		<u>3,965,106</u>
Project fiscal year 1972 cost	<u>\$3,965,106</u>	<u>\$853,834</u>	<u>\$4,818,940</u>

^aFiscal year 1969 Pearl Harbor man-day rate of \$95 divided by average rate of \$72.87 for all Pacific shipyards.

The projected fiscal year 1972 cost of overhauling the U.S.S. TANG does not agree with the total cost estimate of \$4,583,000 included in the fiscal year 1972 budget because after the computation there was an overall budget reduction that was prorated to all Pacific Fleet ships.

FISCAL YEAR 1973

With one exception, the budget methodology used to prepare the fiscal year 1973 ship overhaul budget was similar to that used for the fiscal year 1972 budget. The exception was the inclusion of a labor disruption factor for fiscal years 1972 (4 percent) and 1973 (2 percent). This factor was added to compensate for inefficiencies in shipyard operations due to large cutbacks in personnel and workloads. The Chief of Naval Operation assigned the factors.

FISCAL YEAR 1974

For the fiscal year 1974 budget, the basis for estimating overhaul costs was changed to actual man-days and actual material costs shown on departure reports for prior years' overhauls. Actual material costs for baseline ships overhauled in fiscal year 1972 were used as estimates for fiscal year 1974 overhauls. When ships overhauled in years other than fiscal year 1972 were used as baseline ships, an adjustment was made to reflect fiscal year 1972 material prices. For example, the actual material cost for a baseline ship overhauled in fiscal year 1971 was increased by 5 percent to reflect fiscal year 1972 material prices.

To estimate labor costs, the number of actual man-days used from earlier overhaul departure reports was multiplied by an estimate of the man-day rate at the shipyard where the fiscal year 1974 overhaul was scheduled. An example of an Atlantic Fleet ship scheduled for overhaul in 1974 is shown in appendix II.

OVERHAUL INTERVAL AND DURATION
AND THE RELATIONSHIP TO REPAIR

The Navy has established specific overhaul intervals and durations for different types of ships to plan overhaul schedules. Aircraft carriers, for example, are brought in for overhaul every 4 years and overhaul normally lasts 9 months. The Navy schedule below shows the 1970 duration-cycle criteria used by the Navy in planning the 1972, 1973, and 1974 overhaul programs.

COPY

SHIP OVERHAUL DURATION/OPERATING CYCLES

<u>TYPES</u>	<u>1962</u>	<u>1967</u>	<u>1970</u>
CVA	4/32 (4/28)*	6/35	9/48
DD/DE	3/33 (3/24)*	3/37	3.5/37
DLG	3/33 (3/24)*	4/37	4/37
SSN (OH ONLY)	6/30	6/40	13/40
SSN (OH & RECORE)	6/30	6/40	16/40
SSBN	8/32	8/32	13/60
LKA/LPA/LSD	2/24 (2/34)*	3/33	4/40
LST	2/21	3/37	4/44
AD/AS	2/33	3/48	3/48
AE	2.5/24	3/37	4/48
AO	3/24	3/37	4/48
AR	3/33	3/48	3.5/48
ASR	3/30	3/37	3/37
ATF	2/20 (2.5/24)*	2/30	3/37

* () INDICATES DIFFERENT CYCLE FOR CINCPAC SHIPS

4/32 = four month long overhaul every 32 months.

As the schedule shows, the criteria have changed over the years. Generally ships are brought in for overhaul less frequently, but the overhaul lasts longer. Navy representatives told us that through these changes they had attempted to bring about the best combination of cycle and duration.

Overhaul changes have been made in conjunction with changes in the frequency and duration of interim repairs. Short interim repair periods, normally called restricted, technical, and selected restricted availabilities, are used to repair items to maintain ships in an operational status. These repair intervals are capable of restoring ships to an acceptable level of serviceability, but only overhauls can restore ships to a high level of reliability. Navy representatives said they attempted to weigh the cost of overhaul and repair against the factor of reliability and operational needs to achieve the most cost-effective balance.

UNANTICIPATED REPAIRS

In planning overhaul and repair programs, the Navy uses long-range overhaul schedules, past experience, and estimates. But some events that affect the cost of these programs cannot be anticipated.

For example, in July 1972 the aircraft carrier FORRESTAL (CVA-59) was damaged by fire. The fire occurred while the ship was in Norfolk shortly after having been overhauled. Its deployment was delayed while repairs were completed at a cost of \$2.8 million.

In October 1972 the cruiser NEWPORT NEWS (CA 148) had an explosion aboard while operating in Southeast Asia. This explosion extensively damaged one of its main gun turrets. Temporary repairs were made at the Ship Repair Facility in Subic Bay, the Philippines, at a cost of \$173,000. Permanent repairs will necessitate replacing the gun turret using one from an inactive cruiser at a total cost of about \$3.8 million. The Navy has not made a final decision on permanent repairs because the NEWPORT NEWS is scheduled for inactivation in 1975.

These unforeseen additional costs must be funded from the Operations and Maintenance appropriation or by transfer from other appropriations. In 1972 the Navy funded repairs

of this type by deleting overhauls and transferring funds from the overhaul program to the repair program in the Operations and Maintenance appropriation. This explains, in part, why total overhaul funds have decreased while total repairs funds have increased.

CHAPTER 6

CONCLUSIONS AND MATTERS FOR CONSIDERATION BY THE COMMITTEE

Because of high costs in Navy shipyards in 1972 and 1973, the backlog of ship overhauls has increased. Although the Navy anticipated 1 ship overdue for overhaul by the end of fiscal year 1972, the year ended with 21 ships overdue. The Navy projects that this will increase to 33 ships by the end of fiscal year 1973.

This undoubtedly will affect the plans for ship overhauls in 1974 and future years. Furthermore, the full impact of the Vietnam operation on overhaul costs may not have been totally realized or provided for in the 1974 overhaul program.

The Navy has revised its procedures for estimating the work needed when ships are overhauled. Overhaul estimates are now based on prior actual man-days and material costs. This should provide a more accurate projection of what future overhauls will cost. These procedures were used to prepare the 1974 overhaul programs. Estimating the cost of ship overhauls is not a precise matter. Many uncertainties cannot be known until a ship arrives for overhaul and inspection and repair actually begin. Also, there are outside influences. The amount of use the ship and the ship systems have had since the last overhaul and the amount of work in the shipyards affect the overhaul cost. For these reasons the Navy needs to continually evaluate its estimating procedures to look for opportunities to further improve them.

The growing costs for overhauls in 1972 and 1973 led to numerous overhaul schedule changes and transfers of funds. Funds earmarked originally for overhaul were used for repairs. Ships were given interim repairs to carry them over to their next overhaul dates. This could have an impact on the overall readiness of these ships. The numerous changes undoubtedly increased the cost of the overhaul program, which is geared to long-range planning.

The Navy continues to be faced with high costs for repair work in its shipyards. Additional pay raises, as well as increased material costs, can be expected in the future.

The most significant cost influence is the low use of the Navy shipyards in terms of their capacity. If shipyard capacity is expressed as a function of shipyard employment levels, the 10 existing shipyards are operating at about 75 percent of their 1969 levels. Since overhead costs have not dropped proportionately to the use, the overhead cost per unit of production has increased.

The Navy has several options to control costs.

- Close selected shipyards and increase use of the remaining yards.
- Emphasize improving the efficiency and cost effectiveness of the naval shipyards.
- Reduce fleet size by inactivating older ships with less reliability and high maintenance costs.

The recent announcements of closures of two shipyards should help this situation. Although we did not specifically include the effect of these closures in our review, ship overhaul and repair workloads at those yards can eventually be redistributed to increase the use of other shipyards.

MATTERS FOR CONSIDERATION BY THE COMMITTEE

The Committee may wish to discuss with Navy officials:

- The effect of shipyard closures on ship overhaul and repair costs and when this effect will be noticeable.
- The revised planning procedure the Navy has used in estimating overhaul and repair costs for fiscal year 1974.
- Plans the Navy may have for further reducing the size of the fleets to help control overhaul costs.
- The Navy's estimates of costs per man-day for repairs in 1974 and future years.
- The impact of the deferred maintenance on the 1974 overhaul program and the readiness of the fleets.

CHAPTER 7

SCOPE OF REVIEW

We made our review in response to a request from the Chairman, Committee on Appropriations, House of Representatives. The request was contained in the Committee Report on the Defense Appropriation Bill, 1973 (Report 92-1389), September 11, 1972.

Primarily we reviewed the planning, development, and execution of the Navy's ship overhaul and repair programs in 1972 and 1973. We examined accounting and administrative records, analyzed budgetary information, reviewed audit reports and applicable regulations and directives, and interviewed key Navy representatives responsible for the programs. In addition, we made limited inspections of ships being overhauled and repaired at the five shipyards reviewed. We analyzed the changes from fiscal years 1972 and 1973 congressional submissions to the actual expenditures. As agreed, we did not request written comments from the Navy. However, we discussed the findings and conclusions in this report with Navy representatives and included their comments where pertinent.

We made our review at the following activities and locations.

Chief of Naval Operations
Washington, D.C.

Naval Ship Systems Command
Washington, D.C.

Headquarters, Atlantic Fleet
Norfolk, Virginia

Commander, Cruiser/Destroyer Forces, Atlantic
Newport, Rhode Island

Commander, Naval Air Forces, Atlantic
Commander, Submarine Forces, Atlantic
Commander, Service Forces, Atlantic
Commander, Amphibious Forces, Atlantic
Norfolk, Virginia

Headquarters, Pacific Fleet
Honolulu, Hawaii

Commander, Naval Air Forces, Pacific
Commander, Submarine Forces, Pacific
Honolulu, Hawaii

Commander, Cruiser-Destroyer Forces, Pacific
Commander, Service Forces, Pacific
Commander, Amphibious Forces, Pacific
San Diego, California

Naval Shipyard, Portsmouth, New Hampshire

Naval Shipyard, Norfolk, Virginia

Naval Shipyard, Charleston, South Carolina

Naval Shipyard, Mare Island, California

Naval Shipyard, Pearl Harbor, Hawaii

BEST DOCUMENT AVAILABLE

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List of Combatant Ship Classifications

1. Warships

Aircraft Carriers:	
Attack Aircraft Carrier	CVA
Attack Aircraft Carrier (nuclear propulsion)	CVAN
ASW Aircraft Carrier	CVS
Surface Combatants:	
Battleship	BB
Heavy Cruiser	CA
Guided Missile Cruiser	CG
Guided Missile Cruiser (nuclear propulsion)	CGN
Light Cruiser	CL
Guided Missile Light Cruiser	CLG
Destroyer	DD
Guided Missile Destroyer	DDG
Frigate	DL
Guided Missile Frigate	DLG
Guided Missile Frigate (nuclear propulsion)	DLGN
Ocean Escorts:	
Escort Ship	DE
Guided Missile Escort Ship	DEG
Radar Picket Escort Ship	DER
Command Ship	CC
Submarines:	
Submarine	SS
Submarine (nuclear propulsion)	SSN
Fleet Ballistic Missile Submarine (nuclear propulsion)	SSBN
Guided Missile Submarine	SSG
Patrol Ships:	
Patrol Escort	PCE
Patrol Rescue Escort	PCER
Patrol Gunboat	PG

2. Amphibious Warfare Ships

Amphibious Command Ship	LCC
Inshore Fire Support Ship	LFR
Amphibious Fire Support Ship	LFS
Amphibious Assault Ship (general purpose)	LHA
Amphibious Cargo Ship	LKA
Amphibious Transport	LPA
Amphibious Transport Dock	LPD
Amphibious Assault Ship	LPH
Amphibious Transport (small)	LPR
Amphibious Transport Submarine	LPSS
Dock Landing Ship	LSD
Tank Landing Ship	LST

3. Mine Warfare Ships

Mine Countermeasures Ship	MCS
Minesweeper, Coastal (non-magnetic)	MSC
Minesweeper, Fleet (steel hull)	MSF
Minesweeper, Ocean (non-magnetic)	MSO

Enclosure (1)

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List of Combatant Craft Classifications

1. **Patrol Craft**
 - Patrol Craft (hydrofoil)..... PCH
 - Patrol Gunboat (hydrofoil)..... PGH
 - Fast Patrol Craft..... PTF
2. **Landing Craft**
 - Landing Craft, Assault..... LCA
 - Landing Craft, Mechanized..... LCM
 - Landing Craft, Personnel, Large..... LCPL
 - Landing Craft, Personnel, Ramped..... LCPR
 - Landing Craft, Utility..... LCU
 - Landing Craft, Vehicle, Personnel..... LCVF
 - Amphibious Warming Tug..... LWT
3. **Mine Countermeasures Craft**
 - Minesweeping Boat..... MSB
 - Minesweeper, Drone..... ~~MDS~~ MDS-1057
 - Minesweeper, Inshore..... MSI
 - Minesweeping Launch..... MSL
 - Minesweeper, River (Converted LCM-6)..... MSM
 - Minesweeper, Patrol..... MSR
 - Minesweeper, Special (Device)..... MSS
4. **Riverine Warfare Craft**
 - Assault Support Patrol Boat..... ASPB
 - Armored Troop Carrier..... ATC
 - Command and Control Boat..... CCB
 - Monitor..... MON
 - River Patrol Boat..... PBR
 - Patrol Craft, Inshore..... PCF
 - Quiet Fast Boat..... QFB
 - Riverine Utility Craft..... RUC
 - Strike Assault Boat..... STAB
5. **SEAL Support Craft**
 - Landing Craft Swimmer Reconnaissance..... LCSR
 - Light SEAL Support Craft..... LSSC
 - Medium SEAL Support Craft..... MSSC
 - Swimmer Delivery Vehicle..... SDV
6. **Mobile Inshore Underseas Warfare (MIUW) Craft**
 - MIUW Attack Craft..... MAC

Enclosure (2)

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List of Auxiliary Ship Classifications

1. Auxiliary Ships

Destroyer Tender.....	AD
Degaussing Ship.....	ADG
Ammunition Ship.....	AE
Store Ship.....	AF
Combat Store Ship.....	AFS
Miscellaneous.....	AG
Escort Research Ship.....	AGDE
Hydrofoil Research Ship.....	AGEH
Environmental Research Ship.....	AGER
Miscellaneous Command Ship.....	AGF
Missile Range Instrumentation Ship.....	AGM
Major Communications Relay Ship.....	AGMR
Oceanographic Research Ship.....	AGOR
Patrol Craft Tender.....	AGP
Radar Picket Ship.....	AGR
Surveying Ship.....	AGS
Auxiliary Submarine.....	AGSS
Technical Research Ship.....	AGTR
Hospital Ship.....	AH
Cargo Ship.....	AK
Cargo Ship, Dock.....	AKD
Light Cargo Ship.....	AKL
Stores Issue Ship.....	AKS
Cargo Ship and Aircraft Ferry.....	AKV
Vehicle Cargo Ship.....	AKR
Net Laying Ship.....	ANL
Oiler.....	AO
Fast Combat Support Ship.....	AOE
Gasoline Tanker.....	AOG
Replenishment Oiler.....	AOR
Transport.....	AP
Self-propelled Barracks Ship.....	APB
Repair Ship.....	AR
Battle Damage Repair Ship.....	ARB
Cable Repairing Ship.....	ARC
Internal Combustion Engine Repair Ship.....	ARG
Landing Craft Repair Ship.....	ARL
Salvage Ship.....	ARS
Salvage Lifting Ship.....	ARSD
Salvage Craft Tender.....	ARST
Aircraft Repair Ship (aircraft).....	ARVA
Aircraft Repair Ship (engine).....	ARVE
Aircraft Repair Ship (helicopter).....	ARVH
Submarine Tender.....	AS
Submarine Rescue Ship.....	ASR
Auxiliary Ocean Tug.....	ATA
Fleet Ocean Tug.....	ATF
Salvage Tug and Rescue Ship.....	ATS
Auxiliary Training Submarine.....	ATSS
Seaplane Tender.....	AV
Guided Missile Ship.....	AVM
Aviation Supply Ship.....	AVS
Auxiliary Aircraft Transport.....	AVT
Distilling Ship.....	AW
Training Aircraft Carrier.....	CVT
Fast Deployment Logistics Ship.....	FDL

Enclosure (3)

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List of Service Craft Classifications

1. Service Craft

Large Auxiliary Floating Dry Dock (non-self-propelled)	AFDB
Small Auxiliary Floating Dry Dock (non-self-propelled)	AFDL
Medium Auxiliary Floating Dry Dock (non-self-propelled)	AFDM
Barracks Craft (non-self-propelled)	APL
Auxiliary Repair Dry Dock (non-self-propelled)	ARD
Medium Auxiliary Repair Dry Dock (non-self-propelled)	ARDM
Deep Submergence Rescue Vehicle	DSRV
Deep Submergence Vehicle	DSV
Unclassified Miscellaneous	IX
Submersible Research Vehicle (nuclear propulsion)	NR
Target and Training Submarine (self-propelled)	SST
Submersible Craft (self-propelled)	X
Miscellaneous Auxiliary (self-propelled)	YAG
Open Lighter (non-self-propelled)	YC
Car Float (non-self-propelled)	YCF
Aircraft Transportation Lighter (non-self-propelled)	YCV
Floating Crane (non-self-propelled)	YD
Diving Tender (non-self-propelled)	YDT
Covered Lighter (self-propelled)	YF
Ferryboat or Launch (self-propelled)	YFB
Yard Floating Dry Dock (non-self-propelled)	YFD
Covered Lighter (non-self-propelled)	YFN
Large Covered Lighter (non-self-propelled)	YFNB
Dry Dock Companion Craft (non-self-propelled)	YFND
Lighter (special purpose) (non-self-propelled)	YFNX
Floating Power Barge (non-self-propelled)	YFP
Refrigerated Covered Lighter (self-propelled)	YFR
Refrigerated Covered Lighter (non-self-propelled)	YFRN
Covered Lighter (range-tender) (self-propelled)	YFRT
Harbor Utility Craft (self-propelled)	YFU
Garbage Lighter (self-propelled)	YG
Garbage Lighter (non-self-propelled)	YGN
Salvage Lift Craft, Heavy (non-self-propelled)	YHLC
Dredge (self-propelled)	YM
Salvage Lift Craft, Medium (non-self-propelled)	YMLC
Salvage Lift Craft, Light (self-propelled)	YLLC
Gate Craft (non-self-propelled)	YNG
Fuel Oil Barge (self-propelled)	YO
Gasoline Barge (self-propelled)	YOG
Gasoline Barge (non-self-propelled)	YOGN
Fuel Oil Barge (non-self-propelled)	YON
Oil Storage Barge (non-self-propelled)	YOS
Patrol Craft (self-propelled)	YP
Floating Pile Driver (non-self-propelled)	YPD
Floating Workshop (non-self-propelled)	YR
Repair and Berthing Barge (non-self-propelled)	YRB
Repair, Berthing and Messing Barge (non-self-propelled)	YRBM
Floating Dry Dock Workshop (hull) (non-self-propelled)	YRDH
Floating Dry Dock Workshop (machine) (non-self-propelled)	YRDM
Radiological Repair Barge (non-self-propelled)	YRR
Salvage Craft Tender (non-self-propelled)	YRST
Seaplane Wrecking Derrick (self-propelled)	YSD
Sludge Removal Barge (non-self-propelled)	YSR
Large Harbor Tug (self-propelled)	YTB
Small Harbor Tug (self-propelled)	YTL

Enclosure (4)

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Medium Harbor Tug (self-propelled).....	YTM
Water Barge (self-propelled).....	YW
Water Distilling Barge (non-self-propelled).....	YWDN
Water Barge (non-self-propelled).....	YWN

Enclosure (4)

APPENDIX II

DESCRIPTION OF ESTIMATING METHOD
(fiscal year 1974)

Ship scheduled for fiscal year 1974

DDGS (C. V. RICKLITS)

Ship class

DDG2

Scheduled fiscal year

fiscal year 1974

Baseline year

fiscal year 1974

Baseline Ship Formulation

	<u>A</u>		<u>B</u>		<u>C</u>	
1. Baseline ships-- Representative base- line year overhauls	DDG 3		DDG 17		DDG 23	
2. Fiscal year/overhaul location	71/NORVA		71/NORVA		71/NORVA	
	<u>Man-days</u>	<u>Material</u>	<u>Man-days</u>	<u>Material</u>	<u>Man-days</u>	<u>Material</u>
3. Return costs from de- parture reports	27,847	\$511K	29,169	\$422K	28,932	\$634K
4. Less unique repair and "D" Alts	-200	\$ -7K	-	-	-710	\$ -1K
5. Habitability	-	-	-	-	-1,420	\$ -3K
6. Adjusted baseline ships	27,647	\$504K	29,169	\$422K	26,802	\$630K
			<u>Man-days</u>	<u>Material</u>		
7. Average for baseline year			27,873	\$518K		
8. Add "D" Alts			+360	\$ +8K		
9. Unique repairs			+2,640	\$+67K		
10. Add habitability			<u>+1,600</u>	<u>\$+40K</u>		
11. Adjusted baseline			32,473	\$633K		
12. Overhaul location			NORVA			
13. Industrial cost factor man-day effect (note a)			1.0			
14. Total man-days (11 x 13)			32,473			
15. Material escalation (note a)				1.05		
16. Total material (11 x 15)				\$665K		
17. Shipyard man-day rate (note a)			\$104.28			
18. Labor cost			\$3,386K			
19. Total cost			<u>\$4,051K</u>			

a Factors provided by NAVSHIPS.

Type commanders are required to develop and submit Individual Ship Data/Calculation Sheets similar to that above for each regularly scheduled ship overhaul. Basic data concerning costs, adjustments, and factors relating to each ship is taken from the data sheets and is included in the budget submissions.