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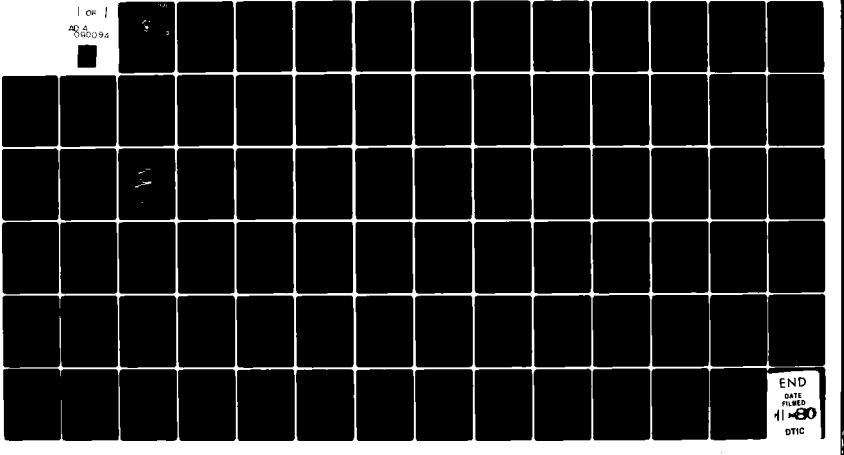

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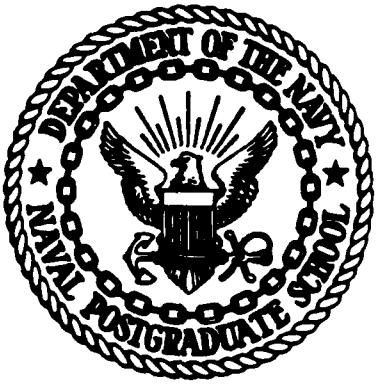

THESIS

BACKLOG OF MAINTENANCE AND REPAIR (BMAR): THE NAVY'S APPROACH TO FUNDING.

by

Janet Marie McAuley

June 1980

Thesis Advisor: R. A. Bobulinski

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Recent concern within Congress and the Department of Defense over the growing Backlog of Maintenance and Repair (BMAR) of military real property, has encouraged the search, within the armed services, for a more effective approach to reducing the BMAR level. Within the Navy, the problem was seen as a resource allocation problem, rather than a technical deficiency

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Backlog of Maintenance and Repair (BMAR): the Navy's Approach to Funding

by

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

Recent concern within Congress and the Department of Defense over the growing Backlog of Maintenance and Repair (BMAR) of military real property, has encouraged the search, within the armed services, for a more effective approach to reducing the BMAR level. Within the Navy, the problem was seen as a resource allocation problem, rather than a technical deficiency in maintenance procedures. The solution, therefore, has centered around the line officer, who controls the programming of funds rather than the facilities engineer.

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TABLE OF ACRONYMS

AIS	Annual Inspection Summary
BMAR	Backlog of Maintenance and Repair
BUDOCKS	Bureau of Yards and Docks
CMP	Continuous Maintenance Program
CNO	Chief of Naval Operations
CO	Commanding Officer
CPV	Current Plant Value
DOD	Department of Defense
GAO	General Accounting Office
IC	Investment Category
MRP	Maintenance of Real Property
NAVFACENGCOM	Naval Facilities Engineering Command
NIF	Navy Industrial Fund
NMAR	Nondeferable Maintenance and Repair
O&MN	Operations and Maintenance (Navy)
OPNAV	Office of the Chief of Naval Operations
OSD	Office of the Secretary of Defense
POM	Program Objectives Memorandum
PWC	Public Works Center
PWO	Public Works Officer
RMS	Resource Management System
RPMA	Real Property Maintenance Activities
SECDEF	Secretary of Defense

I. INTRODUCTION

A. DESCRIPTION OF PROBLEM

1. General

Since 1962, there has been increasing concern both within the Department of Defense (DOD) and the other government agencies over the general deterioration of government-owned real property. The prime indicator used to monitor the effectiveness of Maintenance of Real Property (MRP) efforts is the Backlog of Maintenance and Repair (BMAR), which is all of those items which have been identified as requiring MRP funding during a particular fiscal year but which remained on the maintenance list at the end of that fiscal year.

Over a period of years the official definition of BMAR has been repeatedly altered in an attempt to make the term more meaningful. The current operating definition of BMAR is:

> The end of fiscal year measurement of repair work remaining as a firm requirement of the installation work plans but which lack of resources prohibit accomplishment in the fiscal year.[1]

The problem noted by both Congressional and DOD observers was that the level and trend of the BMAR were unsatisfactory. Because Congress believed that a contributing factor to this problem was that funds which had been authorized for MRP were diverted to other operations within the military services, it enacted a statutory floor or bottom line spending level on

funds for MRP in the 1963 DOD Appropriations Act and subsequent appropriation acts.[2]

Despite increases in the maintenance floor over the past fifteen years, the BMAR has not only gone undiminished, but it has continued to grow. During the eight year period from 1965 to 1972, for example, the BMAR within DOD increased from $286 million to $677 million.[3] During these years the Navy BMAR increased from $136 million to $345 million.[4] With this adverse trend, and with Congressional attention focused on the backlog, the BMAR figure became suspect as a true indicator of the effectiveness of MRP efforts. "Over the years, managers and reviewers within DOD have discussed the credibility and validity of the backlog."[5] Doubts regarding the validity of claiming an MRP problem on the basis of an increasing BMAR were fueled by the observation that despite the military's apparent inability to maintain its current real property holdings as shown by the increasing BMAR, the services continued to request funds for the construction of additional facilities.[6] By inference, the military's physical plant was not being maintained in "satisfactory" condition.

The military services cited inflation as the primary cause of the BMAR growth. Yet, when the BMAR was converted to constant dollars, it still showed a growth pattern.[7] Further, it was established that the BMAR figure was conservative, representing a much smaller backlog than what actually existed.

Other reasons given for the growth of the BMAR were:

a. increased emphasis on identifying the backlog,

b. insufficient funding,

c. continued deterioration of previously identified deficiencies, and

d. redefinition of the term BMAR, so that it encompasses a broader scope.[8]

2. Funding for MRP

Within the Navy, funding for MRP is budgeted under the heading of Real Property Maintenance Activities (RPMA). RPMA includes four functional categories:

a. Maintenance and Repair -- including recurring maintenance of a routine nature and major repair projects

b. Minor Construction -- construction projects under $100,000

c. Operation of Utilities -- including procurement or production and distribution of utilities

d. Other Engineering Support -- including public works engineering and administration, custodial services. refuse collection and similar support services.

The first two items together constitute MRP. The Navy's BMAR consists of maintenance and repair projects that were not accomplished during a fiscal year due to a lack of funding in the Maintenance and Repair portion of MRP.

3. The Navy's Response to the BMAR

The Director, Shore Activities Planning and Programming Division of the Chief of Naval Operations (OP-44) is the office which is responsible for providing guidance in the area of real property maintenance in the Navy's programming and planning process. Starting from the 1974-1975 time frame, this office was involved in the restructuring the Navy's approach to meeting the MRP problem. The solution, as seen by OP-44, centered around the line decision maker, not the staff engineer.

The situation causing the BMAR growth and the deterioration of the Navy's physical plant was viewed by OP-44 as a resource allocation and timing problem. The dollars required to reduce the level of the backlog were being allocated to other purposes, notably acquisition of new property. The new approach utilized to deal with the situation was to try to convince the line decision makers controlling the allocation process that it would be in the best interests of the Navy if a greater share of the available resources was directed toward maintaining existing structures. What led the Navy, guided by OP-44, to this conclusion as well as an assessment of the resulting program's prospects for success, form the substance of this thesis.

B. OBJECTIVE

The objective of this thesis is to examine the new OP-44 program with regard to the original perceptions of the problem

and the subsequently developed objectives for MRP management in the Navy. It will also explore the long term potential for the success of the program in light of the dominance of the line manager in the decision and allocation process. In addition, the thesis will also study the new MRP program's impact to date on the area of base support.

C. METHODOLOGY

Research for this study was accomplished primarily by means of a literature search and personal interviews. Documents, such as Navy instructions, reports, and Congressional testimony on the Navy's MRP were obtained from OP-44. Additional background material was obtained from military journals and other periodicals, and from a bibliography prepared by the Defense Logistics Studies Information Exchange.

The primary source of background information consisted of a taped discussion and telephone conversations with Rear Admiral Robert F. Jortberg, Civil Engineer Corps, U.S. Navy (retired). Prior to his retirement, RADM Jortberg occupied the position of OP-44. He was instrumental in the Navy's decision to utilize its present approach to controlling BMAR. In order to gain insight into the perception of the problem and possible solutions from the viewpoint of professionals in the field, the author conducted interviews at a number of individual naval activities.

This information was then reviewed against the stated objectives of the MRP program and the perceptions of the field

professionals in order to assess the program's prospects for success or failure and to derive lessons learned.

D. THESIS ORGANIZATION

Chapter II will present a description of the programming process through which the Navy acquires and maintains its real property. It will discuss the historical circumstances which led to the Navy's concern over the condition of its real property. The mechanics of the Navy's approach to this problem will also be reviewed.

In Chapter III, the MRP program's objectives and the rationale guiding the Navy's present course of action in regard to BMAR will be presented along with noted strengths and weaknesses of the program to date. There will be an assessment of how well the approach is functioning at this time and the impact it is having on the area of base support.

Finally, Chapter IV will summarize the major points presented in the thesis and the apparent direction of future MRP management in the Navy.

E. ACKNOWLEDGEMENTS

The author is indebted to RADM Jortberg who provided a significant amount of background information as well as encouragement and patience in the writing of this thesis. The author also wishes to express gratitude to Commander P. Drennon, Civil Engineer Corps, U.S. Navy, of the current OP-44 staff, who provided instructions and other Navy documents used in the

research for this thesis. However, the text is solely the responsibility of the author and no other individual.

II. BACKGROUND

A. INTRODUCTION

In Chapter II, the factors underlying the Navy's approach to the Backlog of Maintenance and Repair (BMAR) problem will be examined. This will begin with a brief overview of the extent and composition of Navy property. A historical discussion follows which traces the flow of traditional Navy thought in the area of facilities management. Next, the structure through which the Navy acquires and maintains property will be described. The final section of the chapter will be a report of the key elements of the OP-44 program to alleviate the BMAR problem.

B. EXTENT OF PROPERTY

It is surprising to realize how extensive in scope and diverse in character are the facilities that the Navy uses and maintains. The Navy's physical plant (including land) as of September 1979 had an acquisition cost of approximately $14.5 billion and a conservatively estimated replacement cost of $69.7 billion.[9] At that time, the Navy was responsible for 3,779,789 acres of land[10] which is an area larger than the State of Connecticut.

The Naval Facilities Engineering Command (NAVFACENGCOM), as the Navy's facilities specialist, maintains individual property record cards which describe each structure or facil-

ity that the Navy owns. NAVFACENGCOM publishes a number of consolidations and summaries of the information contained in the property record cards (collectively referred to as the "Navy Facilities Assets Data Base"), one of which is the "Inventory of Military Real Property, Navy" (NAVFAC P-77). This large, annually updated document features a breakdown of Navy property by various factors such as geographical area and major claimant.

The Navy's physical plant included some 170,517 separate land items[11] which are classified into 110 different groupings, called category codes. Appendix A gives a listing of the category codes and descriptions that the Navy uses in the management of its real property. These category codes include items that would normally be associated with a Navy such as its waterfront facilities (piers, seawalls, and small craft berths, to name a few) airfields, sewage plants, computer centers, research and development facilities, training facilities, and ammunition depots, as well as less expected ones such as museums and memorials, and railroads. The sheet volume and variety of the Navy's physical plant is part of the problem in maintaining such a system of facilities. For example, the Navy owns, and consequently it must maintain, a total of 1,148 miles of railroad track[12] which is enough to stretch from Los Angeles to Seattle.

C. HISTORICAL DISCUSSION

1. Prior to 1974

In the early 1950s the then Bureau of Yards and Docks (BUDOCKS), NAVFACENGCOM's predecessor, initiated a program to apply many principles of industrial engineering to Navy maintenance problems. The program was designed to bring about more productive use of available resources. These efforts first began with respect to the maintenance of automotive equipment. The program was successful and the principles were applied in the area of Maintenance of Real Property (MRP). The overall program was called the Navy's Controlled Maintenance Program (CMP).[13]

Prior to the initiation of CMP, there was no Navy-wide, comprehensive set of procedures to govern the activities of individual shore activity Commanding Officers (CO), and Public Works Officers (PWO). The CMP recognized that significant improvements in productivity could be achieved if standard maintenance procedures based on sound industrial principles were applied on a Navy-wide basis.

The CMP involved three main elements. The first element of the CMP was a continuous inspection program.[14] The results of this program are summarized in a report called the Annual Inspection Summary (AIS), which is produced annually.

The purpose of the continuous inspection program is to provide a systematic routine procedure for identifying existing deficiencies rather than depend on these being noticed on

a haphazard basis. An important feature of the continuous inspection program was the determination, using engineering principles, of appropriate frequencies for inspections so that those facilities which were subject to fairly rapid deterioration would be inspected more frequently than those which were less sensitive to the elements and less subject to rapid wear. This helped to ensure that the best use was made of the limited number of skilled inspectors available.

The second feature of the program involved the estimation of the cost and workload involved to correct deficiencies identified through the continuous inspection program. Deficiencies identified by the inspections, when written up in the form of job orders, constituted a work backlog for each of the Public Works shops at individual activities. The overall program involved a shops scheduling function to assure that each of the shops could be properly loaded.[15]

The third element of this program was a comparison of the actual costs in man hours and materials to the original estimates. This injected discipline into the program and provided an opportunity to evaluate the productivity of the force.[16]

The focus of virtually everything that was done under the CPM was on productivity at the shop level in order to obtain the greatest possible value for the money spent. It is important in defending budgets to have supportive programs which the Navy can point to in order to show that it is

attempting to get the best possible return on its investment. The CMP was such a program. While the focus was appropriate, this was not the sole problem in facilities maintenance. There was another significant area which was essentially ignored from the middle 1950s until the middle 1970s.

The basic problem came to be seen by the OP-44 analysts not as whether the resources were being used productively, but rather, whether there was enough money available to maintain the total plant that the Navy owned. The problem was one of resource allocation rather than activity level engineering or production efforts. Within OP-44, it was felt that it was not a problem which could be ultimately corrected by the activity PWOs or by NAVFACENGCOM. The solution would require the concerted effort of the line management command structure of the Navy, through Major Claimants and activity COs in line management.[17] Given the size of the physical plant that the Navy owned, it should take a certain minimum amount of money to operate and maintain the plant. Without at least that minimum level of maintenance funding, facilities would deteriorate, and sooner or later, this would adversely impact on mission readiness. By the mid-seventies it was becoming obvious that this was in fact happening.

2. Deterioration of the Physical Plant

With Congressional attention focused on statistics showing a rising BMAR, the poor condition of real property was becoming painfully obvious. Extreme, but actual, examples

include the following:

> During 1975 more money was spent to repair foreign object damage to jet engines at Naval Air Station Miramar than was needed to overlay the spalling runway, the source of these foreign objects.[18]

It was noted that there was enough money available to repair the engines, but not enough to fund the overlay.[19] A further example is the following:

> In July 1974 Pacific Fleet ships could not be refueled at Point Molate in San Francisco Bay as the fuel pier was so badly deteriorated that it was unsafe to bring ships alongside. Refueling was accomplished by barge. The design to repair the pier had been finished with a price tag of $3.5 million. ... The (fiscal year) 76 budget of the Navy Material Command then being submitted included a total of $2.6 million for all major repair projects ... for the entire command.[20]

3. From 1974

In 1974 there was general recognition among the Navy's senior leaders that the condition of too many Navy facilities was poor; almost all categories of facilities were affected including runways, parking aprons, waterfront activities at naval stations and shipyards, support facilities, and warehousing.[21] In real dollar terms, from 1966 to 1974, there had been a reduction in maintenance dollars. Figure 1 shows BMAR as a percentage of the current plant value (CPV) during the period 1966-1983. Figure 2 shows the extent of the backlog compared with constant fiscal year 1980 dollars.

Contributing to the difficulty of the situation was the fact that the maintenance program was not the only area

O&MN MRP FUNDING
AS A PERCENTAGE OF CURRENT PLANT VALUE [23]

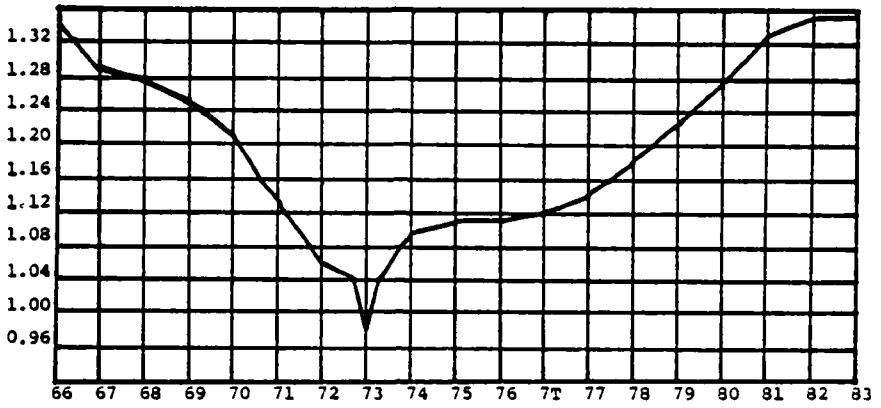

Figure 1.

GRAPHIC CONSTANT FISCAL YEAR 1980 DOLLARS
COMPARISON OF EXPENDITURES AND BACKLOG OF MAINTENANCE
AND REPAIR - FISCAL YEARS 1965-1978[24]

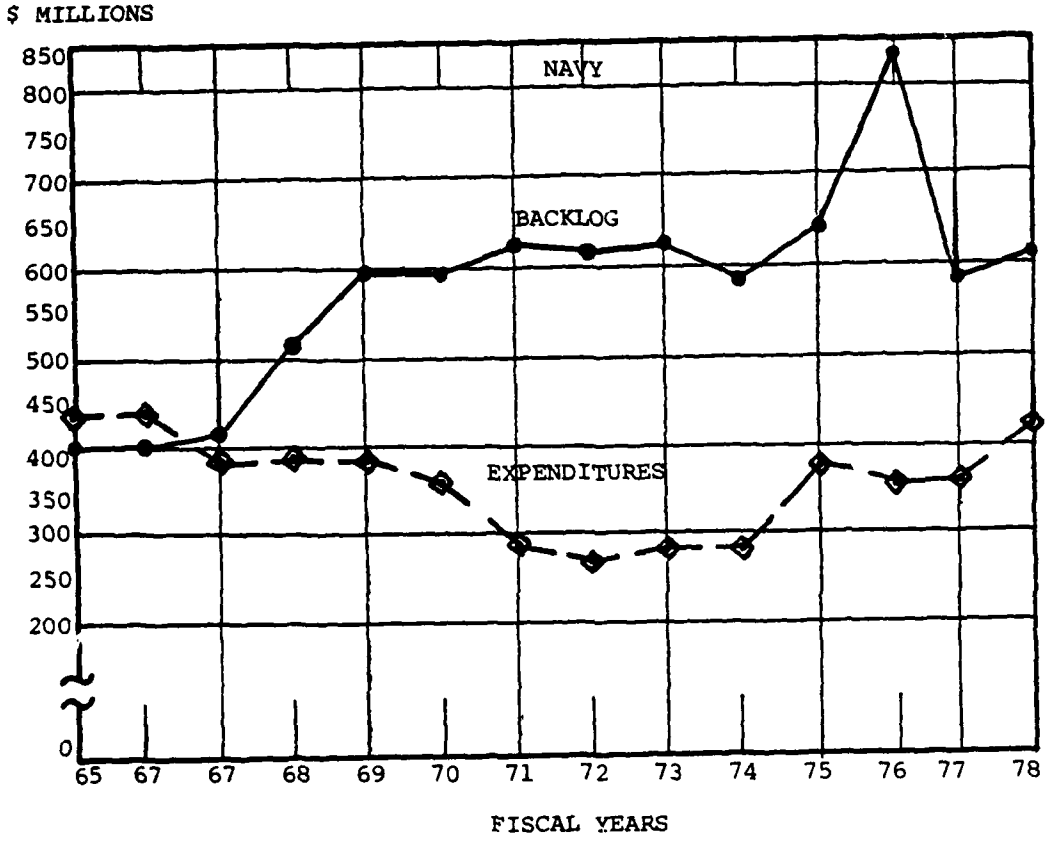

Figure 2

to suffer from decreased funding. These were the years when the country was engaged in the Vietnam conflict. Funds for many programs were being preempted to the war effort. While it was true that the Navy enjoyed an increased budget during these years, the additional funds were used to purchase ammunition, petroleum products, and other wartime materials.[22]

In the case of MRP, the question was raised that, "If the Navy had been a leader in the application of industrial engineering techniques, how could it allow such a dramatic reduction in the maintenance effort to occur?" The answer was that while the Navy was careful to develop the most productive methods of using its maintenance resources, it failed to allocate enough of those resources to MRP in the first place. Adequate funds were not budgeted, regardless of well justified arguments protesting the need for more maintenance dollars.[25]

4. The Navy's Tradition of Bureaus

While the Vietnam conflict drained resources, the MRP effort was affected by another problem, one involving the Navy's organizational traditions. The Navy's Civil Engineer Corps officers were regarded as the Navy's facilities managers. The perception of the bulk of the line officers was that MRP was solely an engineer's responsibility; that BUDOCKS (and later NAVFACENGCOM) would take care of things in time; and that this was an area in which a line manager need not be concerned.[26] Some of the roots of this attitude go back to the 1962-1963 time frame when BUDOCKS was given single executive responsibil-

ity for maintenance management in order to correct problems caused by the Navy's having gone too long a period without a strong maintenance program.

NAVFACENGCOM single executive responsibility for MRP prevailed for two or three years until terminated when the entire Department of Defense was placed under the Resource Management System (RMS) by the Office of the Secretary of Defense (OSD) comptroller, Dr. Robert N. Anthony. The RMS system was based on the premise that resources should flow along lines of responsibility, that is, along command lines. The concept of single executive responsibility was inconsistent with RMS.

Single executive responsibility was slowly phased out of the Navy but its influence lingered. Senior officers still harbored the idea that direct control of the MRP, and by inference, responsibility for the deterioration of the physical plant, belonged entirely to the civil engineers and NAVFACENGCOM. The tradition of bureaus (BUDOCKS, the Bureau of Medicine, and the like), with its concentration of single area expertise was, and still is, particularly strong in the Navy. The line manager did not worry about the BMAR problem because it was considered a BUDOCKS problem; unfortunately, BUDOCKS did not have the means to singlehandedly correct it.

To understand how such a situation could have developed and the structure within which a solution to the problem would

have to be developed requires an explanation of the Navy's process for obtaining and allocating resources.

D. THE PRESENT PROGRAMMING PROCESS

1. Consolidated Guidance

The programming process is the fundamental resource allocation process in the Navy. The product of this process, the budget is an interpretation of basic or fundamental policy decisions into operating plans which are then expressed in terms of resources. Figure 3 illustrates the basic structure of the planning, programming and budgeting process. Each year the Secretary of Defense (SECDEF) translates the thinking of the President and the National Security Council into a comprehensive document called the Consolidated Guidance.[27] This incorporates strategic thinking, basic policies and judgements, and basic financial and fiscal guidance into a single document.

The Consolidated Guidance is then promulgated by SECDEF to the service secretaries. It provides them with long-range direction about the roles and missions of the services, the force structure that is likely to exist, and the ways in which the services are to support one another. The bottom line is that the Consolidated Guidance says how much manpower the armed services can have and how many dollars will be available for each of the five years in the programming period.

2. Within the Navy

The decision making process in the Navy is formally expressed through the vehicle of the Program Objectives

PLANNING PROGRAMMING BUDGETING[28]

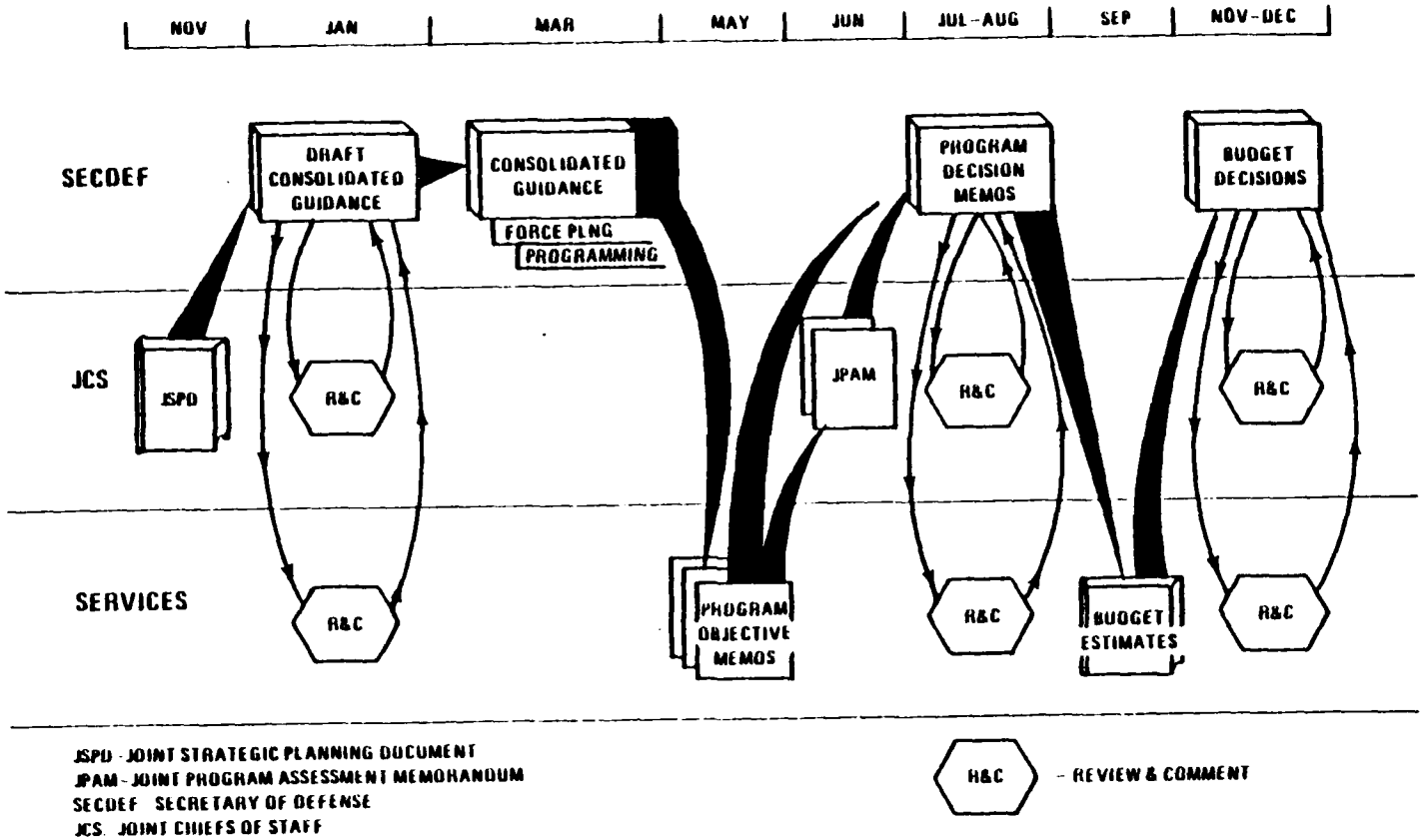

Figure 3.

Memorandum (POM). The POM, which is submitted by the Navy to SECDEF each spring, summarizes how the Navy plans to respond to, or accommodate the guidance given; that is, how it plans to use the resources that were identified in the Consolidated Guidance as being available. There is then a period of time in which the Navy is given the opportunity to make choices as to how the resources will be allocated over the following five year period. The Navy can decide how much of the total money available it wishes to allocate to various functional areas, such as the procurement of new aircraft, the maintenance of existing aircraft, research and development, and military pay. Within the Operations and Maintenance--Navy (O&MN) appropriations, the Navy can make a choice as to how many dollars will be allocated to the MRP. Once this programming decision is made, it is incorporated into budget documentation. The congressional floor on MRP spending is then fixed as a percentage, currently 90 percent, of this budget figure.

It is important to note that within the Navy the total amount of funding which is being allocated is a fixed, finite amount of money. The available dollars have to be allocated to all of the activities in the Navy in some rational way in order to obtain the best compromise among all requirements. If the Navy decides that it wants to put more money into MRP, it must take that money away from somewhere else. Navy managers have to consider from which programs dollars can be diverted to address needed requirements in other programs.

In practice, this whole process is biased by its very nature in favor of the procurement of new things: ships, aircraft, weapons, and facilities.[29] It is biased in favor of new procurement because it is relatively easy to identify the benefits which will result from a new acquisition and the risks associated without proceeding with the new acquisition. It seems to be more difficult to specifically and clearly identify the effects associated with changes in funding for almost any O&MN programs, of which MRP is only one. This is particularly true for MRP because there is no sharply defined boundary separating a particular facility's "satisfactory" condition from an "unsatisfactory" one. The judgment is ultimately subjective and the criteria for making it often inherently imprecise and variable.

It was in this atmosphere that OP-44 approached the problem of insufficient MRP funding.

E. THE OP-44 PROGRAM

1. General

The program developed by OP-44 is structured around the task of breaking the total BMAR figure down into functional area figures, each of which can be individually dealt with by Major Claimants. The Major Claimants provide command assessments of the potential for adverse impact of MRP deficiencies on the Navy readiness in each applicable functional area. Integral to the program is the concept of a fixed cost of ownership of real property.

2. Cost of Ownership

The key device used by OP-44 to translate the poor condition of Navy facilities into a realization that additional MRP funding was required was the concept of the cost of ownership. Cost of ownership is:

> ... the minimum funding necessary to offset routine maintenance requirements of active facilities. Funding below this level results in consumption of plant assets and accumulation of nondeferable maintenance backlog.[30]

Basically the argument used was that when the Navy decides to acquire some property, it is also making an implicit decision to commit funds for maintaining it. This means that the Navy is investing not only the capital required to buy or construct the property, but is also making a commitment to spend future resources to at least maintain it at some minimum acceptable level.[31]

> Productivity isn't enough. Line people involved in resource allocation must recognize an obligation to commit sufficient resources to maintain their assets. Expressing it in terms of cost of ownership, line decision makers must realize that when they decide to acquire and own real property, they must commit adequate resources to maintain this property at or above that minimum.[32]

A useful example would be the purchase of a home or automobile, both major investments for the average family. The purchase price and financing are not the sum total of costs which are expended on these items. Owners expect to incur additional maintenance costs during the normal life of

these assets. This theme was then applied to the Navy's real property.

> ... a related and extremely powerful concept that helps support the decisions for funds in MRP and also helps explain the enormous inertia that must be overcome before BMAR can be reduced is the concept of the 'fixed cost of ownership.' Simply, if you own something you need, then you have a responsibility to properly maintain it. ... the fixed cost of ownership, or necessary funding level, must contain not only the minimum funds, but enough additional funds to effect a reduction in BMAR over a planned objective period of say 10 years.[33]

The line of reasoning utilized by OP-44 was that it is not prudent to build new facilities if the Navy cannot afford to maintain the ones it already owns. As an example, it was incongruous that funds for new hospitals were being programmed at a time when there were major MRP problems in existing hospitals, including recently built ones.[34]

3. The Process

In breaking the total BMAR figure down into more manageable functional area groupings, OP-44 made use of an existing structure for investment categories (IC), which are groupings of similar facilities with related contributions to Navy missions.[35] The eighteen ICs are listed below:

IC NO.	DESCRIPTION
01	Aviation Operational Facilities
02	Communications Operational Facilities
03	Waterfront Operational Facilities
04	Other Operational Facilities
05	Training Facilities

06	Aviation Maintenance and Production Facilities
07	Shipyard Maintenance and Production Facilities
08	Other Maintenance and Production Facilities
09	Research, Development, Test and Evaluation Facilities
10	Petroleum, Oil and Lubricants Supply and Storage Facilities
11	Ammunition Supply and Storage Facilities
12	Other Supply and Storage Facilities
13	Medical Facilities
14	Administrative Facilities
15	Troop Housing and Messing Facilities
16	Other Personnel Support Facilities
17	Utilities
18	Real Estate and Grounc Structures[36]

The mechanics of the OP-44 program involve the following:

a. a continuous inspection program at each shore activity in the Navy. In addition to reliance on the existing inspection programs at the individual activities, steps were taken to strengthen them. It was noted that

> We are funding a complete inspection effort by (Public Works Centers) PWC's, who have developed an ADP assisted management system to help them do a thorough job. At the same time, our initiatives in developing specialized inspection techniques will be realized and should be implemented during this next year.[37]

b. a determination and validation through the line chain of command of the nondeferable portion of the total deficiencies identified by the inspection;

c. a narrative assessment of the condition of the facilities;

d. a review by a board consisting of an OP-44 representative and representatives of the Navy's major claimants;

e. the development of program objectives for a five year strategy to reduce the Navy's BMAR.[38]

Figure 4 illustrates the basic steps of this process.

4. Nondeferable Maintenance and Repair Backlog (NMAR)

Initially the OP-44 program to reduce the Navy's BMAR involved the reporting of the Nondeferable Maintenance and Repair Backlog (NMAR) as of 30 March each year, plus a projection of the NMAR to the end of the fiscal year. By definition,

> NMAR backlog for a given fiscal year is the estimated dollars value of maintenance and repair deficiencies of a nondeferable nature ... for which corrective action is not formally authorized at the end of the fiscal year (September 30).[39]

Nondeferability is bound by several parameters, chief among them is loss of mission. Other criteria include cost avoidance with regard to inflationary cost growth; life or death safety; quality of life (refering to habitability of unaccompanied personnel housing and work areas); and threat of catastrophic environmental damage, such as major oil spills.[40]

MRP FUNDING IN THE NAVY

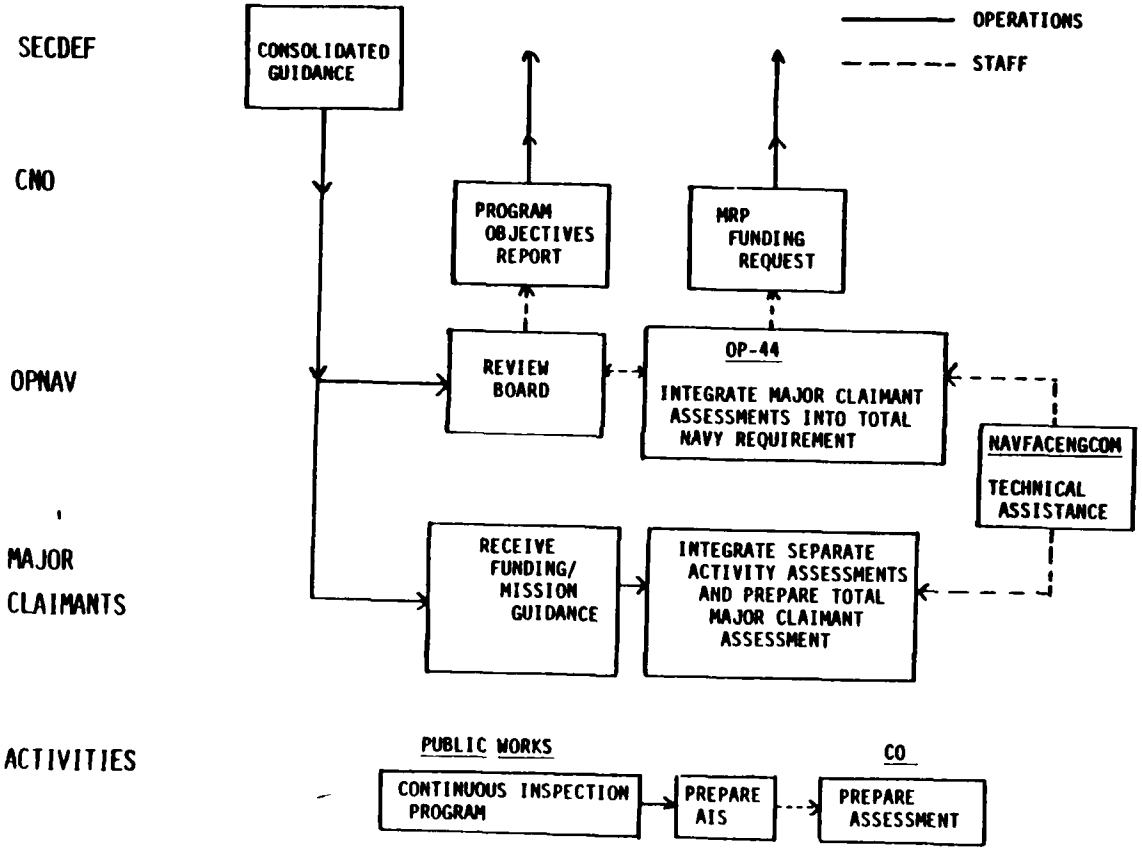

Figure 4.

In developing the present solution to the BMAR problem, OP-44 sought to develop a totally credible backlog figure to present to Navy line managers and to Congress.[41] The search for a manageable BMAR figure led OP-44 to identify that portion of work which could not be deferred beyond the current program year without serious consequences, generally stated in terms of mission degradation.

> Failure to fund the minimum cost of ownership over a prolonged period of time has caused the nondeferable maintenance and repair backlog to reach such a magnitude that it is affecting the Navy's ability to perform its mission.[42]

As it turned out, the process of estimating the NMAR and projecting it to the end of the fiscal year was later determined to be unwieldy. As a result, the program as currently implemented does not use this procedure. NMAR is now reported as of 30 September, eliminating the requirement for six-month projections, and thus improving accuracy. The NMAR inputs are received and totaled from each Major Claimant. To the degree that these are no changes due to validation at the OPNAV level, then the total NMAR equals the BMAR, which is reported to OSD and to Congress.

5. Funds Migration

Towards the end of each fiscal year, funds appropriated for that year but which will not be utilized as originally planned, become available to the Navy as year-end residual funds. These funds can usually be reprogrammed to meet requirements in other areas. MRP is an ideal area to absorb such funds since

fairly large amounts can be quickly obligated.

The Navy is careful to include in its MRP funding requests an estimate of these funds which are expected to migrate from other program areas and be used for MRP. The table below illustrates how funds migration, indicated here as a program adjustment, is used in calculating the end-of-year backlog figure.

CONG/PRES BUDGET SUBMISSION O&M, NAVY

BACKLOG OF MAINTENANCE AND REPAIR (BMAR) OF REAL PROPERTY[43]
($000)

		1979	1980	1981
A.	BACKLOG - BEGINNING OF YEAR	536,000	563,000	587,000
B.	REQUIREMENTS:			
	(Recurring Maintenance & Repair)	261,671	282,483	290,436
	(Major Repair Projects)	154,263	191,796	234,329
	(Backlog Deterioration)	16,080	16,890	17,610
C.	TOTAL REQUIREMENTS (A + B)	968,014	1,054,169	1,129,375
D.	PROGRAM ADJUSTMENTS:			
	(Direct Program Funding)	375,241	442,169	572,375
	(Funds Migration from Other Program Areas)	29,773	25,000	25,000
E.	BACKLOG - END OF YEAR (C - D)	563,000	587,000	532,000
F.	PERCENT BMAR CHANGE ((E - A) - A)	+ 5.0%	+ 4.1%	- 10.3%

F. SUMMARY

In this chapter, the background of the Navy's BMAR program has been discussed with special attention focused on historical factors and the programming process. The principles of the Navy's present program, as these have developed, were outlined.

Chapter III will explore the rationale governing the Navy's decision to adopt that particular program and an assessment made of potential long range effectiveness in regard to meeting the BMAR program's objectives.

III. DISCUSSION AND ANALYSIS

A. INTRODUCTION

In Chapter I the Backlog of Maintenance and Repair (BMAR) problem was defined. The purpose and methodology of this thesis were outlined. Chapter II presented an overall description of Navy real property and a discussion of the historical events contributing to the development of the Navy's BMAR. The proposed solution to the BMAR problem, as implemented by OP-44, was then outlined. Now, in Chapter III, the rationale underlying the OP-44 solution and the major elements of the solution will be examined in detail. Special attention will be paid to Navy organizational constraints and the effect they had in shaping the particular solution to the BMAR developed by OP-44. The strengths and weaknesses of the OP-44 program will be itemized and the factors affecting the long term prospects for success of the program will be reviewed.

B. THE REASONS BEHIND THE NAVY'S APPROACH

1. BMAR as a Measure of the Problem

a. Significance of the BMAR Statistic

The only tool or indicator which was available to the decision makers in looking at the area of Maintenance of Real Property (MRP) was the figure for the total BMAR. The BMAR was generally defined in dollars; that is, the estimated funding required to correct deficiencies. Alternatively, the

BMAR was sometimes cited as a percentage of the current plant value (CPV) of real property. However, clear understanding of the limits of each of the aforementioned statistics was missing.

From time to time, some number, such as 10%, was cited as the appropriate percentage of CPV that the BMAR should properly be. However, there was no objective basis on which to justify any such figure.[44] With regard to the BMAR stated as a funding requirement, it had been noted (most importantly, by Congress) that the level of BMAR continued to rise, despite increasing maintenance appropriations. To state that there was a backlog, which is all that the BMAR figure actually did, was in and of itself meaningless. A legitimate question both among Navy decision makers and within Congress would have been, "To what purpose was continued increases in maintenance dollars when they apparently, as measured by the BMAR figure, had no effect?" What was needed was a basis on which to decide whether a particular level of BMAR was either acceptable or was too high.[45] This could not be determined from the BMAR figure itself. Navy, Department of Defense (DOD), and Congressional decision makers needed to know what level of backlog could actually be tolerated by the Navy at any given time.

The answer to that question was demanded by senior decision makers for the simple reason that they operated in a world of limited resources, where less than perfect solutions to problems had to be made to work. The Navy, they knew, would always have a backlog. The critical decision they had

to make was to decide what portion of the limited resources they had at their disposal should be allocated to the BMAR problem at the expense of other pressing needs. Since the total BMAR statistic could not give the answer to that question, it was of no significance to them. Not unexpectedly, they were inclined to give the whole BMAR question short consideration and concentrate instead on attacking problems which could be understood and at least partially alleviated.

b. Large Extent of Total BMAR

The shore facilities of the Navy are so diverse, geographically and functionally, that to address them as a single entity and to speak in terms of the total backlog was not effective. Such an approach masked the differing impacts that various elements of the backlog had on the Navy's mission readiness. The BMAR so stated was not relevant to the Navy's decision makers because it was not presented in terms which were meaningful to them as operationally oriented leaders.[46] This was particularly true in light of the fact that an increase in MRP funding would probably have necessitated a decrease in funding in some other area of Navy operations. The program that OP-44 developed was an attempt to provide an understanding of the significance of the BMAR and a method of relating that significance to the operational concerns of the senior decision makers. A later instruction on the program aptly noted that:

> While a single assessment of condition for the whole naval shore establishment would be so broad as to be meaningless, a breakdown into facilities with related contribution to missions can be prepared ...[47]

2. OP-44 Program Concepts

a. General Approach

After examining the situation, OP-44 concluded that the "BMAR problem" was not caused by either an actual shortage of potential funding for MRP purposes or by deficiencies in the technical abilities of activity level Public Works personnel. First, Congress had never shown any unwillingness to fund MRP actions so long as they remained convinced that there was a legitimate problem. The objection was more that whatever the true funding requirement for maintaining real property was, it did not necessarily increase automatically simply because the BMAR increased.

Secondly, the Controlled Maintenance Program (CMP) was, by all indications, doing what it was intended to do, namely, ensure that the activity level personnel actually responsible for accomplishing maintenance work were as technically proficient and productive as possible.

Accordingly, OP-44 set about developing a program with a different emphasis, one which would attack the BMAR problem by attaining two new goals:

(1) preserve adequate MRP funding levels by restoring credibility to the Navy's data which supported requests to Congress for MRP funds; and

(2) ensure that an adequate portion of the resources made available by SECDEF were allocated by senior decision makers to the maintenance of real property.

The key to obtaining these goals and thus solving the basic problem was the development of a procedure which would permit the Navy to completely fund those MRP items which could not be deferred without mission capability degradation. This was pursued through the concept of the "fixed cost of ownership."

With respect to Congress, it was OP-44's intent to present a BMAR target figure which was totally credible, rather than base the Navy's funding requests on a broader, but less defensible base.

b. Investment Categories (IC)

The first step in the solution was determined to be the breakdown of shore facilities into classifications. The vehicle used was an already existing system called "Investment Categories (IC)". These had been used for some time to categorize the Navy's physical plant investment when programming military construction. The same classifications, with relatively minor changes, were applied to the area of MRP.

The breakdown of the investment category functional areas corresponds closely with the interest of the decision makers in OPNAV. (Figure 5) The Deputy Chief of Naval Operations for Aviation Warfare (OP-05), for example, would be particularly concerned with investment category 01, aviation

OPNAV ORGANIZATION CHART[48]

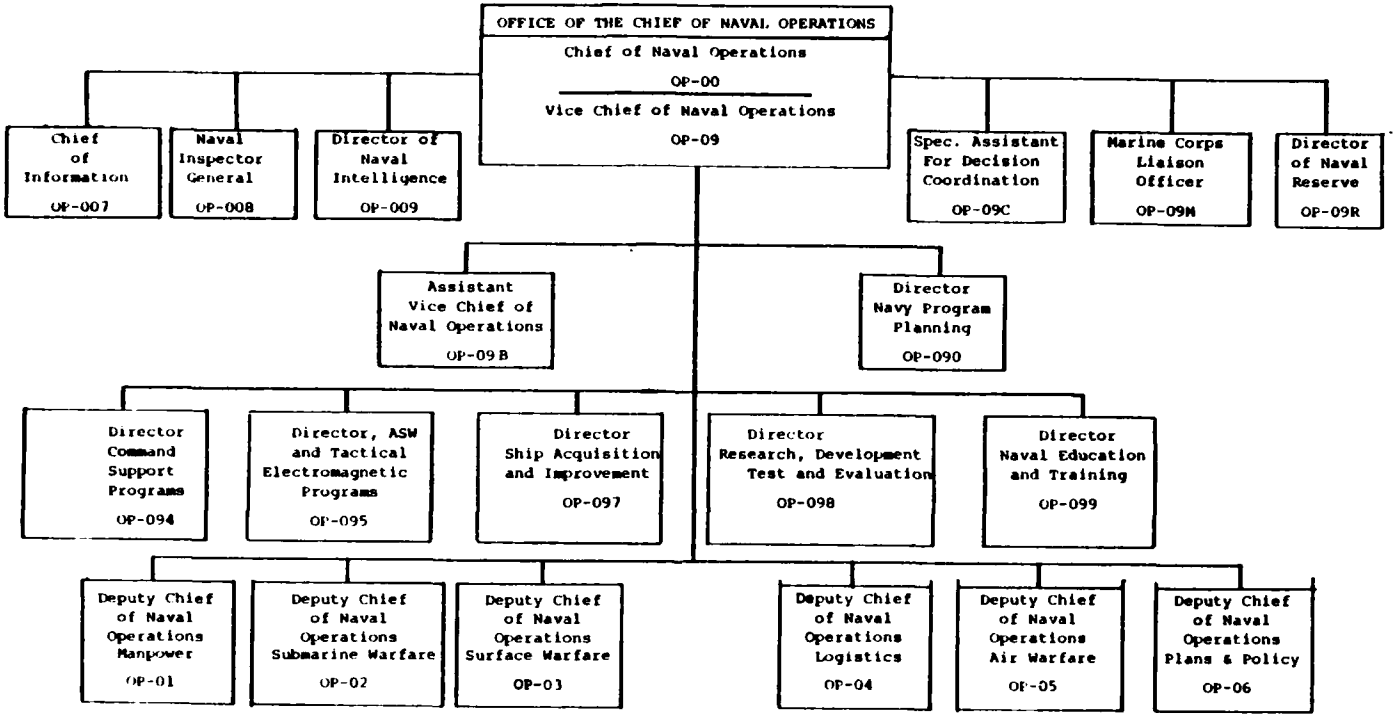

Figure 5.

operational facilities. Senior decision makers in the operational chain and, particularly, the supporting staffs have quite specialized interests and concerns. They are responsible for components of the total problem. Their focus is on those factors of the total problem which pertain to their area of cognizance. In the Navy's organizational structure they have neither the resources nor the charter to develop more than a passing concern with problems outside their own areas.

By breaking the total set of naval shore facilities down into investment categories, OP-44 bypassed the amorphous nature of shore facilities as a whole and identified facilities in such a way that the senior decision makers had only to relate to facilities problems in their area of cognizance.

Having developed this approach through the use of ICs, the question remaining was the mechanics of communicating to the decision makers some meaningful information about the facilities. The technique chosen was to create and to maintain an "operational impact profile" for each IC. The purpose was to bring together in document form for each IC all the facts which could be generated concerning the effect that the maintenance backlog was having on operational readiness.

The operational impact profiles include for each IC the following information:

(1) total inventory in that category;

(2) the CPV and the percentage of the Navy's total CPV:

(3) BMAR for each category and percentage of the total;

(4) trend of expenditures over time;

(5) relationship between funding and BMAR;

(6) age distribution, showing which portion of the plant was very young or very old;

(7) what funding was already committed in the POM.[49]

c. Assessment and Planning

From these facts, a judgment was developed by the OP-44 staff, concerning the condition of the property in each IC. Given the funding previously committed in the POM and the potential for the condition of the facility in each category to have an adverse impact on Navy readiness, the degree of impact was assessed over the period of the POM.

This process constitutes an attempt to <u>interpret</u> the BMAR, to establish its significance to the Navy and to the functional areas of the mission, rather than to merely state a statistic. Formerly funds had been programmed merely to MRP. Now they were to be programmed, at least in general terms, to MRP by IC.

Having developed the profile, the next step was to determine what level of funding each IC needed. Each of these determination was put into the form of a five-year program objective. The total resources required for each of the eighteen ICs were then summed up. This provided the total resources required for the Navy as a whole for the five-year

period.[50] Appendix B gives a typical sample of the results of this process, the program objectives for fiscal year 1981.

The information developed during this process was then considered by the decision makers during the development of the POM. It was in a form that enabled them to weigh arguments that it was necessary to put more money into this category or that one. In discussing the condition of runways, for example, one could discuss the implication of not putting more money into their repair.

> The argument was presented this way: if you go to war, you will be increasing the tempo of your flight operations: you will be flying heavier aircraft with heavier loadings. The runways and parking aprons which are in bad condition now, are going to get worse. It will be necessary to pull them out of service at the time when you need them the most.[51]

The telling point was made that the Navy would never allow the flight decks of its carriers to deteriorate to the same extent as some of the runways ashore.[52] This type of contingency argument was repeated for other categories, such as waterfront facilities, medical facilities, and others. In the Navy structure, phrasing the problem in this manner was critical to its consideration by specialists in their own areas of cognizance.

d. Involvement of the Major Claimant

The implemented program requires that the activity Commanding Officer (CO) prepare an assessment report to accompany the already required routine preparation and submission of the Annual Inspection Summary (AIS). The assessment report

is to reflect the CO's judgment of the condition of the real property at the activity level. Claimants are then to evaluate these reports and make their own assessments of the condition of their property by IC and submit them to OP-44 who integrates them into a Navy-wide assessment.

The key role played by the Major Claimants is due to the fact that they are the level closest to the operating forces which has the breadth of view to make an assessment that is not too parochial in outlook. Assessments prepared at lower levels can consider specific segments of the operational readiness picture in greater detail because these levels are closer to the day-to-day efforts of the operating forces. Lower echelons are thus likely to be aware of the existence of an operational limitation imposed by a facilities deficiency sooner than higher levels and to have a more detailed appreciation of exactly what the extent of the limitation is. They are, however, restricted in the scope of their concerns and thus unable to evaluate the relative serousness of different deficiencies. Similarly, echelons above the Major Claimant level are likely to have easy access to the current information concerning overall funding situations and mission requirements that is needed to properly assign priorities to competing programs. However, their distance from the actual operating elements makes it difficult for them to remain current concerning the existence and effects of specific facility deficiencies.

Major Claimants are situated at a level that best avoids either extreme. They are close enough to the operating forces to have a good appreciation of the actual problems faced by those forces at any given moment. At the same time, they are also close enough to the senior decision making levels to be able to place specific facility deficiencies in proper perspective. Conscientious, careful efforts by Major Claimants are thus particularly critical to the proper functioning of the OP-44 program.

Note that the procedures implemented under the OP-44 program involve much more than simply a flow of technical information from the Public Works Officer (PWO) to the Major Claimant's staff facilities specialists. This was intended to be a flow of command judgment, however influenced it might be by the PWO. This change from the previous procedure, whereby the AIS proceeded from the activity directly to the Naval Facilities Engineering Command (NAVFACENGCOM) with only a courtesy copy to the Major Claimant, is integral to the Navy's current approach to the BMAR problem.

C. OPINIONS FROM THE FIELD

1. General

Although the OP-44 program requires very little change in the mechanics of "business as usual" at the activity level, the ultimate test of the program's success will be measured in terms of its positive or negative effect on the individual

activity's real property holdings. In order to obtain a perception of how the program is being received to this point, interviews were conducted with field personnel. Those interviewed were members of either Public Works Departments or Staff Civil Engineer offices at six California naval activities, representing four Major Claimants: a Public Works Center, a Supply Center, two air stations, a shipyard, and a weapons station.

Appendix C presents a list of the questions to the interviewees at each activity. No statistical inferences were drawn from these information gathering interviews. Although this thesis does not draw statistical inferences on the BMAR figures at each location, questions 1 and 2 served to orient the author to the particular circumstances at each command. Not all of the questions were answered at all of the activities.

There tended to be a difference in orientation between Navy Industrial Fund (NIF) activities and those funded primarily through O&MN. Repair projects at NIF activities are funded from the general overhead. They have to compete for funding only with other projects at the particular NIF activity. The effects of OP-44's program would thus tend to have less of an impact at NIF activities than at activities that do not have the option of funding repairs out of earnings generated by the repaired facilities.

Generally speaking, there was little consensus among the personnel interviewed as to the effect that the OP-44

program was expected to have in the long term at their activities. Some pointed to recent increases in the MRP budget but they did not share similar views concerning the long term continuation of this funding. A summary of the major points of discussion follows.

2. Inspections

Every individual interviewed emphasized the importance of the initial inspection procedure. Some mentioned the decision by OP-44 to provide mission management funds for inspections directly rather than have NAVFACENGCOM fund the inspections. This was discussed in a favorable light. While those interviewed acknowledged that budget increases for inspection purposes were helpful the advantage gained by increases were seen to be offset by either constant or decreasing civilian manpower ceiling points. Without inspectors, the adequacy of the inspection procedures would be in jeopardy.

Offsetting this was one interviewee's opinion that there are never enough inspectors, even in the best of times. The individual relates it to the general problem of insufficient resources with regard to any problem. However, the introduction of procedures into the inspection cycle utilizing specialized equipment such as infrared scanners and supporting computer programs may lessen the impact of fewer inspectors.

Personnel attached to activities serviced by a PWC expressed concern that inspectors from PWC were not sufficiently familiar with the buildings under their cognizance thereby

affecting PWC's ability to provide an accurate AIS. It is noted that customer activities must still validate reports submitted by the PWC.

The concern for the validity of the PWC inspections touches another area other than purely technical. Although PWC conducts the AIS and estimates the cost of the repair project, the funding for the project comes from the customer activity's Major Claimant. Some interviewees felt that this division of responsibility reduces the incentive for PWC to keep the costs down. One individual recommended that total ownership and management responsibility be transferred to facilities engineers to eliminate this problem. This would essentially constitute a return to the single executive responsibility concept.

3. Workload

Some personnel felt that the new OP-44 program would cause an initial increase in workload, but would eventually result in long term savings, both in time and dollars. Others felt that there would be no net increase in workload. The Maintenance Control Divisions of Public Works Departments are the level which would be most directly affected at the local activity by the changes imposed by the new program. Interestingly, there was an unexpectedly positive response to the program from the Maintenance Control supervisors interviewed. This included one interviewee who definitely felt that there would be an increase in work in his division. This enthusiastic

response was made by the civilian working managers at a level close to actual operations.

Because of pressure during recent years to reduce the number of civilian ceiling points, an increasing percentage of total workload is being performed through contractors. The increase in contracts in itself was seen to cause additional work for facilities managers in overseeing the quality of work. Relating the problem to this issue, increased MRP funding meant more contracts to manage.

4. Funding

In general NIF activities tend to be in better financial shape than O&MN funded activities because MRP of production facilities can be charged to the customer in the form of higher overhead rates. What has tended to nullify this advantage in the past has been the pressure to keep the rates down.

Interviewees mentioned special funding packages received during the last fiscal year which constituted a substantial increase in the level of their BMAR funding. The BMAR funding addition received for the current fiscal year was less than for last year. Still, the total level of MRP funding was greater than it had been in the past. Many felt that this was due to presently increased visibility of the BMAR problem and that, while grateful for the windfall, they believed the visibility and thus the additional funding would soon fade.

5. Summary

Many of the comments of the interviewees were found to be remarkably polar with regard to their attitudes and perceptions of the OP-44 program. This fact was considered in the development of the following section which discusses the program's effectiveness.

D. ASSESSMENT OF PROGRAM'S EFFECTIVENESS

1. General

The growing BMAR problem was determined by OP-44 to be caused by an insufficient provision of adequate maintenance funding at the beginning of the programming cycle. The solution developed was designed to improve the condition of the Navy's physical plant by programming in more maintenance dollars during this fundamental programming process of the POM. In doing so, it impacts on several levels of decision making: the activity, the Major Claimant, OPNAV, DOD and Congress. The program is also intended to provide a more objective and systematic way of assigning priorities to maintenance requirements.

2. Program Impact at Each Level

a. Activity

At the activity level, the program focuses increased attention on the part of the CO to the problem of maintaining the facilities at some acceptable level. Little has been added to the mechanics of the continuous inspection program

except the assessment by the CO of the condition of the real property at that facility.

b. Major Claimant

The major emphasis, however, and the level that the program is targeted at, is the Major Claimant. This is the point about which maintenance funding pivots. It is the Major Claimant input which provides the basis for the POM. It is the Major Claimant who must be convinced of the necessity of adequate maintenance funding in order to maintain the state of readiness that the mission requires. Without that belief or convinction, as the past has shown, Major Claimants have no incentive to even consider facilities maintenance a serious matter for their concern. The cost of ownership concept tied a familiar idea to the broad perspective of real property acquisition and upkeep. In doing this, and in providing an objectively supported justification for increased maintenance attention, the program was intended to lend greater credibility to the whole claim for an adequate level of maintenance spending.

The Major Claimant is the pivot point around which this program is structured. It is the Claimant's assessment of the condition of real property which ultimately provides the basis for the POM. In order for the program to be effective, it is necessary to convince the Major Claimant of the seriousness of the maintenance backlog and the Claimant's role in correcting the situation. The reference to the cost of

ownership concept can go far in putting the elements of the problem in perspective.

c. OPNAV/CNO/DOD

The OP-44 program provides to the very highest level of decision making of CNO's staff and DOD, a framework within which senior leaders can organize and evaluate available information and apply it to the problem of MRP. Without this structure, it was difficult to focus attention to even critical problem areas.

d. Congress

Presumably the OP-44 program would have a similar impact at the Congressional level as well, and for much the same reasons. The General Accounting Office (GAO) in its August 31, 1979 report to Congress was, in effect, a vote of 'no confidence' aimed primarily at the military's requests not only for increased maintenance funding, but also for acquisition dollars. GAO challenged the need for new acquisitions in the light of the services' apparent inability to maintain the property already on inventory. The direction of the Navy's solution indicates that OP-44 concurred with the Comptroller General that the basic problem was primarily one internal to the military services; that it did not make much sense to continue to request new purchases when even recently constructed facilities had severe maintenance discrepancies.

The program can have the effect of improving the credibility with the Congress over the amount of maintenance

funding requested. On the one hand, the new system can be used to claim the attention of the Major Claimants and the senior management within the Navy in order to convince them to allocate a greater share of the Navy's appropriations to maintenance. On the other hand, the program can also be used with comparable effectiveness outside the Navy to support claims to Congress that larger appropriations are needed. At this point the program is geared to answer the same question from both senior Navy managers and the Congress: of what significance is the BMAR? The program answers in terms of the effect on mission readiness. In doing so, it emphasizes those items which are more critical and which can be deferred to a later funding period.

e. Not Addressed in the OP-44 Program

The solution proposed by OP-44 is geared toward the programming process, a specific aspect of the maintenance problem. It is that element of the problem which was identified by OP-44 as having the major impact from the OP-44 perspective. What this specific program does <u>not</u> claim to do is concentrate either on improved technical aspects of maintenance control or on construction criteria for the purpose of building in maintenance-free characteristics into the design.

3. <u>Strengths and Weaknesses</u>

a. Organizational Factors

The mechanical element of the program developed by OP-44 to address the maintenance funding shortfall is an

expansion of the existing continuous inspection procedure. Already existing information was collected and presented as investment category profiles. The direction of the AIS reports was changed with the emphasis being concentrated on the managers who control the funds, rather than on the engineers. However, with all of the changes in orientation it is important to note that the mechanics of the maintenance identification and reporting procedure stay fundamentally the same. There is no additional action required at the activity level other than the CO's assessment statement. This is considered to be an inherently positive aspect of the solution. While a major educational effort was launched to reorient the thinking of both line manager and engineer, the program is devoid of any basic changes in the collection or presentation of data. Therefore, the program was able to make use of a familiar set of operating procedures without disrupting the routine flow of practices at the activity level.

b. Reliability

There remains the question of accuracy of the data collected. While inspection techniques are being updated and improved, this was not the primary focus of the OP-44 program. All of the personnel interviewed at the individual activities saw the inspection process as the remaining weak link in the plan to reduce the BMAR. However, if minimum standards are met, the goals of the program can be achieved.

With such a large BMAR still in sight, a great amount of fine-tuning of the identification process is not really needed. Assuming a basic competence in the activity Public Works or engineering staff, the OP-44 program is not dependent on any more rigid a set of technical standards than that which already exists. If a more exacting accuracy were required, the program might be in danger of collapsing under its own weight. The effort required would be too much work without a substantial training process. It is expected, however, that as the BMAR shrinks to a more acceptable level, that increasingly accurate identification procedures will be more in demand. At that point, retaining a claim on scarce funds can be expected to become more difficult, and greater accuracy might be required to justify continued earmarking of maintenance dollars.

While interest in the BMAR has been high in recent POMs, it can be expected to take a back seat in future programming proceedings, particularly as the BMAR approaches acceptable goals. As interest wanes, there is a danger of slipping back into habitual thought patterns. There is the risk that the condition of the Navy's real property can again enter a deterioration process eliminating the gains made in the last few years.

There is another potential problem, centered at the activity level, which could negate the purpose of the CO's appraisal to the major claimant of the condition of real property

at that activity. There is a particularly strong unwillingness on the part of Navy managers to draw attention to shortfalls in their organizations. Recent publicity has been successful in explaining the purpose of the assessment procedure. However, there remains the danger, particularly as the BMAR subsides, that future CO's will resort to a traditional attitude of making do with insufficient resources in order to avoid highlighting deficiencies at their activities. This is a temptation which senior managers must resist if the condition of real property is to be maintained at a suitable level. One thing that will help counter this inclination is rigorous scrutiny at the Major Claimant and OP-44 level of the assessment statments as compared to the information contained in the AIS.

IV. SUMMARY AND CONCLUSIONS

A. INTRODUCTION

Chapter I introduced the problem of the Backlog of Maintenance and Repair (BMAR) and described the course of this thesis. Chapter I presented an overview of the Navy's response to BMAR and the history behind its development. Chapter III reviewed the salient features of the Navy's Maintenance of Real Property (MRP) program with regard to its prospects for future success. This final chapter will reiterate the major points brought out in the thesis and present the author's conclusions and recommendations.

B. SUMMARY

BMAR has undergone a number of redefinitions since 1962 in an attempt to make its meaning more significant to the decision makers, both within Congress and the military services. The current operating definition is that BMAR is:

> The end of fiscal year measurement and repair work remaining as a firm requirement of the installation work plans but which lack of resources prohibit accomplishment in the fiscal year.[53]

Numerous reasons have been offered by the services for the dramatic increase in the BMAR in the recent past, among them inflation, continued deterioration of facilities requiring maintenance, better inspection procedures, and increased attention focused on the BMAR problem, and redefinition of the term BMAR.

Despite Congresional willingness to increase MRP funding and pressure to hold the BMAR to a zero-growth level, the BMAR has continued to grow. In light of the services' willingness to request funding for new construction when serious maintenance problems were still apparent, the BMAR became suspect as an accurate indicator of a genuine need for maintenance funding.

In the past, responsibility for the upkeep of Navy real property has either implicitly or explicitly been considered the purview of the Navy's Civil Engineer community, represented organizationally first by the Bureau of Yards and Docks (BUDOCKS) and later by Naval Facilities Engineering Command (NAVFACENGCOM). A favorable productivity rate had failed to correct the backlog problem. In fact, the over-reliance on productivity may have tended to mask the true problem. The reliance by line managers on the engineer to solve the property MRP problem ignored the essential fact that engineers were not in control of the funding process.

While much attention was put into budget preparation each year in an attempt to support MRP funding, these efforts were largely futile. Concentration on the budget overlooked the earlier programming process, during which the major funds allocation decisions were made. OP-44 sought to correct this by approaching the problem of insufficient MRP funding during the initial allocation process.

Additionally, OP-44 developed an approach to the BMAR problem which shifted emphasis of property maintenance from

the engineer to the line manager. In doing this, OP-44 intended to bring to the decision maker and to Congress a means of relating the BMAR in some significant way, to the Navy's mission. The primary vehicle for conveying this was the concept of fixed cost of ownership.

The cost of ownership principle established that the decision to acquire property implied a future cost of maintaining that property. To avoid doing so could be to allow the property to deteriorate more quickly than its normal physical life would indicate. Such deterioration would seriously impact the Navy's mission readiness. This was then translated to the needs of each decision maker through the use of investment categories (IC), which are groupings of similar facilities with related contributions to the Navy's mission. Profiles were developed for each. IC profiles were a collection of factual data about the real property in each category. Each profile included as well an assessment of the condition of the property. The total package was designed to give substance to the BMAR figure and to relate the significance of the BMAR to the mission areas of the line decision maker. The ultimate purpose was to convince those in control of the programming process of the need for additional MRP funding.

With regard to the procedure employed by OP-44 to handle the BMAR problem, little has changed on the surface. The annual inspection program is conducted very much as before. What has been added is an assessment, by the Commanding

Officer or Major Claimant, of the condition of the real property within their respective area of responsibility. The order of submission of the Annual Inspection Summary (AIS) has been altered to reflect a new emphasis on the line manager in this process. Major Claimants are now the primary addressees of the AIS, with subsequent reporting responsibilities. By including the Major Claimant in the process, at an earlier point in time, OP-44 has brought the BMAR problem closer to the funding source, and increased the likelihood that it will receive adequate attention from the decision makers in the programming process.

One of the major strengths of the Navy's current program to reduce the BMAR is the incorporation of an already widely used and understood inspection and reporting system. The use of familiar procedures lessened the disruptive impact of change on the organization. This is particularly critical at the working level where the importance of strategic policy is not always appreciated.

The critical level of decision making in this new process is the Major Claimant funding. Since funds are controlled at this level, compliance at subordinate levels can be effected through the budget. On the other hand, the major claimants provide the primary input for funding justification at higher decision making levels.

C. CONCLUSIONS

Real property is currently enjoying the benefit of increased attention from the highest levels of Navy management. However, the question which remains is how consistent will funding be in future years, at a time when the MRP is a less competitive program.

The OP-44 program has added significance and credibility to a BMAR number which, in the past, has been treated as little more than a curious statistic. The program has accomplished this by focusing its emphasis on the line manager, particularly at the Major Claimant level. It further defines the nature of the problem in meaningful terms which that line manager can readily understand, specifically mission readiness. However, it is noted that as the BMAR figure approaches a more acceptable level, interest in the problem is likely to fade. This could potentially introduce a return of apathy into the maintenance outlook. Can the Navy's program accommodate that aspect of the problem?

The OP-44 program has already established a firm foothold within the Navy by making extensive use of familiar organizational apparatus. By doing this, it has bypassed the problem of bureaucratic inertia which threatens many potentially significant programs both within government agencies and in the private sector. If it continues to become a routine facet of reporting and programming within the Navy, the chances of its long term success will be enhanced.

D. RECOMMENDATION

1. Current Situation

At present, all indication from people interviewed at various levels points toward success of the program and a long-term beneficial effect on the condition of Navy real property. However, analysis of the Navy's MRP program was limited to very recent changes and their immediate effect on the organization. The more valuable test of the program's strength and success can only be seen in the future. It is therefore recommended that a similar study be conducted in a few years to determine its extended effect on Navy real property.

2. Further Analysis

To a large extent, the potential benefits of the OP-44 program depend on the ability to convey to senior decision makers within the Navy a sense of urgency regarding the importance of maintenance. It is further recommended, therefore, that in order to help reinforce such a sense of urgency, continuing research be conducted into ways of relating the failure to perform maintenance to loss of operational readiness.

APPENDIX A

KEY CODES AND ABBREVIATIONS CATEGORIES [54]

CATEGORY CODE NO.	CATEGORY ABBREVIATION	DESCRIPTION
111	RUNWAY	Airfield Pavements - Runways
112	TAXIWAY	Airfield Pavements - Taxiways
113	APRON	Airfield Pavements - Aprons
116	OTHER AFLD PVMT	Airfield Pavements - Other
121	FUEL DISP/ACFT	Airfield Dispensing
122	FUEL DISP/MARIN	Marine Dispensing
123	FUEL DISP/LAND	Land Vehicle Dispensing
124	OPER FUEL STOR	Operating Fuel Storage
125	FUEL/POL LINES	POL Pipelines
126	FUEL DISP/OTR	Liquid Fueling and Dispensing - Other
131	COMMS BUILDINGS	Communications-Buildings
132	COMM/OTHER	Communications - Other than Buildings
133	NAVTR AID/BLDG	Navigation and Traffic Aids - Bldgs (Non-Ship Related)
134	NAVTR AID/OTHER	Navigation and Traffic Aids - Other than Buildings (Non-Ship Related)
135	COMMS LINES	Communication and Control Lines
136	AFLD PVMT LTING	Airfield Pavement Lighting
137	SHIP NAV&TR-BLDG	Ship Navigation and Traffic Aids - Buildings
138	SHIP NAV&TR-OTH	Ship Navigation and Traffic Aids - Other
141	LD OP/BLDG	Land Operational - Buildings (Non-Ship Related)
142	LD OP/HELIUM	Land Operational - Helium Plants and Storage
143	SHIP&OTH OP BLDG	Ship and Other Operational - Buildings
148	SHIP OPRTNL FAC	Ship and Other Operational Facilities - Other than Buildings
149	LD OP/OTHER	Land Operational - Facilities Other than Buildings
151	WTRFR OP/PIERS	Waterfront Operational - Piers
152	WTRFR OP/WHARFS	Waterfront Operational - Wharfs
153	WTRFR OP/CARGO	Waterfront Operational - Cargo Handling Facilities
154	WTRFR OP/SEAWAL	Waterfront Operational - Sea Walls, Bulkheads, Quay Walls
155	SMALL CRFT BRTH	Small Craft Berthing

159	WTRFR OP/OTHER	Waterfront Operational - Other
161	HARBOR PROT FAC	Harbor Protection Facilities
162	COAST PROT FAC	Coastal Prctection Facilities
163	HARBR CST/MOORG	Harbor and Coastal - Moorings
164	HARBR CST/MARIN	Harbor and Coastal - Marine Improvements
165	HARBR CST/DREDG	Harbor and Coastal - Dredging
169	HARBR CST/OTHER	Other Harbor and Coastal Facilities
171	TRAINING/BLDGS	Training Buildings
179	TRAINING/OTHER	Training Facilities - Other than Buildings
211	MNT/AIRCRAFT	Maintenance - Aircraft, Spares
212	MNT/GUIDED MIS	Maintenance - Guided Missiles
213	MNT/SHIPS	Maintenance - Ships, Spares
214	MNT/TANK AUTHV	Maintenance - Tank, Automotive
215	MNT/WEAPONS	Maintenance - Weapons, Spares
216	MNT/AMMUNITION	Maintenance - Ammunition, Explosives, Toxics
217	MNT/ELECNX/COMS	Maintenance - Electronics and Communication Equipment
218	MNT/MISC/PROC	Maintenance - Facilities for Miscellaneous Procured Items and Equipment
219	MNT/INS REP OPN	Maintenance - Installation, Repair and Operation
221	PROD/AIRCRAFT	Production - Aircraft
222	PROD/GUIDED MIS	Production - Guided Missiles
223	PROD/SHIPS	Production - Ships, Spares
224	PROD/TANK AUTMV	Production - Tank - Automotive
225	PROD/WEAPONS	Production - Weapons, Spares
226	PROD/AMMUNITION	Production - Ammunition, Explosives, Toxics
227	PROD/ELECNX/COMS	Production - Electronics and Communications Equipment
228	PROD/MISC/PROC	Production - Facilities for Miscellaneous Procured Items and Equipment
229	PROD/MNT REP OP	Production - DOD Maintenance, Repair and Operation of Installations
310	R D TEST BLDGS	Research and Development and Test Buildings
390	R D TEST OTHER	Research and Development and Test - Other than Buildings
411	LIQ FUEL STOR	Liquid Fuel Storage - Bulk
412	LIQ STOR OTWF&P	Liquid Storage Other than Water, Fuel and Propellants
421	AMMO STOR/DEPOT	Ammunition Storage - Depot and Installation

423	AMMO STOR/LIQPR	Ammunition Storage - Liquid Propellant
424	WPN/REL BAT STR	Weapon-Related Battery Storage
425	OPEN AMMO STOR	Open Ammunition Storage
431	COLD STOR/DEPOT	Cold Storage - Depot and In-Transit
441	COV STOR/DEPOT	Storage - Covered - Depot and Installation
451	OPEN STOR/DEPOT	Storage - Open - Depot and Installation
510	HOSPITAL BLDGS	Hospital Buildings
530	LABS & CLINICS	Laboratories and Clinics
540	DENTAL CLINICS	Dental Clinics
550	DISPENSARIES	Dispensaries
610	ADMINISTR BLDGS	Administrative Buildings
620	ADM FACIL/UNDGR	Administrative Facilites - Underground
690	ADM FACIL/OTHER	Administrative Facilities - Other
711	FAM HSG/DWELLG	Family Housing - Dwellings
712	FAM HSG/TRAILER	Family Housing - Substandard Trailers
713	FAM HSG/TR SITE	Family Housing - Trailer Sites
714	FAM HSG/DET FAC	Family Housing - Detached Facilities
721	TRHSG/EM/W MESS	Troop Housing - EM Barracks w/Mess
722	BCH HSG/MESS FAC	Bachelor Housing - Mess Facilities
723	TRHSG/DET FAC	Troop Housing - Detached Facilities
724	TRHSG/BOQ	Troop Housing - Bachelor Officers Quarters
725	TRHSG/EMERGENCY	Troop Housing - Emergency
730	PER SUPP/SVC	Community Facilities - Personnel Support and Service
740	COMMUNITY/INTER	Community Facilities - Exchange, Morale and Recreation Buildings - Interior
750	COMMUNITY/EXTER	Community Facilities - Morale and Recreation Facilities - Exterior
760	MUSEUM/MEMORIAL	Museums and Memorials
811	ELECTRIC/SOURCE	Electricity - Source
812	ELEC/DSTR TMSN	Electricity - Distribution and Transmission Lines
813	ELEC/SUBSTA/SW	Electric Power - Substations and Switching Stations
821	HEAT/STM/SOURCE	Heat, Steam - Source
822	HEAT/STM/TMSN	Heat, Steam - Transmission
823	HEAT/GAS/SOURCE	Heat, Gas - Source
824	HEAT/GAS/TMSN	Heat, Gas - Transmission
826	REFRIG/AIR COND	Refrigeration - Air Conditioning

827	CHIL WTR/AC/TMSN	Chilled Water - Air Conditioning Transmission and Distribution
831	SEWAGE/TRMT DSP	Sewage and Industrial Waste - Treatment
832	SEWAGE/COLLECT	Sewage and Industrial Waste - Collection
833	WASTE/REF GARB	Refuse and Garbage
841	POTABLE WATER	Potable Water - Supply, Treatment and Storage
842	WATER/DISTRIBTN	Potable Water - Distribution System
843	FIRE PROT WATER	Water/Fire Protection
844	WTR SPLY/STR NP	Water - Supply - Storage Non-potable Water
845	WTR/NPOT/DISTR	Water Distribution System - Nonpotable
851	ROADS	Roads
852	WALKS PARKING	Sidewalks and Other Pavement
860	RAILROADS	Railroads
871	GROUND/DRAINAGE	Ground Drainage
872	GROUND/FENCING	Grounds Fencing, Walls and Guard Towers
880	ALARM SYSTEMS	Fire and Other Alarm Systems
890	UTIL/MISC	Miscellaneous Utilities
911	LAND/HELD/MILIT	Land Purchase, Condemnation, Donation or Transfer
912	LAND/PUB DOMAIN	Public Domain Withdrawal
913	LAND/TEMP USE	Temporary Use License or Permit
914	PUBLIC LAND T/P	Public Land - Possessions
921	LAND/EASEMENTS	Easement
922	LAND/INLEASE	In-Lease
923	LAND/FOREIGN	Foreign Rights

APPENDIX B

FY 82-86 Maintenance and Repair
of Real Property Program Objectives

IC 01 Aviation Operational Facilities:

O&M,N - Major emphasis on maintenance and repair of airfield pavements is essential. The Navy must strive for full runway availability during mobilization, maximum feasible flight safety conditions, and substantial freedom from pavement induced foreign object damage. Actions must be initiated which minimize the potential for structural damage to aircraft, and hazards to personnel or equipment during operations at wartime tempo. Resource planning and execution efforts should allow for a major reduction in BMAR during the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1986.

NIF - Airfield pavement deficiencies at RDT&E facilities are outstripping the capacity of the individual activities to accrue NIF funds to initiate repairs. Major emphasis should be placed in this category to prevent mission impact on major aircraft and systems tests program.

IC 02 Communications Operational Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - No special emphasis is required.

IC 03 Waterfront Operational Facilities:

O&M,N - Major emphasis on maintenance and repair of waterfront facilities is essential. The obvious importance of these facilities to Naval readiness mandates a continuous effort to improve their condition. Harbor dredging and the proper maintenance of piers, pilings, fender systems and fleet moorings must be accomplished as necessary to avoid curtailment of mission critical operations. Resource planning and execution efforts should allow for a major reduction in BMAR during the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1986.

NIF - Serious deficiencies in this category will impact available berthing for industrial use and ammunition loading at shipyards and weapons stations. The problems are particularly sensitive at weapons stations with underutilized capacity. Special emphasis should be placed in this category to prevent deficiencies from deteriorating to a level which will make repairs from accrual impossible.

IC 04 Other Operational Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - No special emphasis is required.

IC 05 Training Facilities:

O&M,N - The maintenance and repair of training facilities should receive special emphasis. Facility conditions must be improved in order to ensure the presence of a proper academic atmosphere, and to avoid adversely affecting student-instructor relationships. Resource planning and execution efforts should allow for a modest rate of BMAR reduction during and beyond the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1988.

NIF - No special emphasis is required.

IC 06 Aviation Maintenance and Production Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - Special emphasis should be placed in this area to assure constant availability of aircraft maintenance. NARFs, especially, should be able to provide uninterrupted maintenance service under wartime tempo. Current conditions would hamper this service.

IC 07 Shipyard Maintenance and Production Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - Serious deficiencies in shipyard maintenance and production facilities exist. Special emphasis is required to prevent the backlog from deteriorating to a level which will make plant repairs from the accrual process prohibitively expensive for customers to support.

IC 08 Other Maintenance and Production Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - Significant backlog exists due to age of facilities and previous deferral of maintenance. Problem is most prevalent at PWCs and some ordnance facilities. Level of backlog has impact on the ability of activities to perform assigned mission. Special emphasis should be placed to reduce backlog to a manageable level.

IC 09 RDT&E Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - No special emphasis is required.

IC 10 POL Supply and Storage Facilities:

O&M,N - The maintenance and repair of POL Supply/Storage facilities should receive special emphasis. Concentrated efforts should be directed to improve the condition of these facilities in order to avoid interruption of ship and aircraft fueling operations, and to avoid fuel oil spills. Increased inspection efforts are required to determine the actual deterioration present in POL facilities. Resource planning and execution efforts should allow for a modest rate of BMAR reduction during and beyond the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1988.

NIF - Increased inspection is required to determine the true nature of plant condition. These facilities are unique and require specialized inspection techniques to determine true extent of problems. Hidden deficiencies could be detrimental to any effort to increase tempo of operations to mobilization levels.

IC 11 Ammunition Supply and Storage Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - No special emphasis is required.

IC 12 Other Supply and Storage:

O&M,N - The maintenance and repair of other Supply/Storage facilities should receive special emphasis. Resource planning and execution efforts should allow for a modest rate of BMAR reduction during and beyond the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1988.

NIF - No special emphasis is required.

IC 13 Medical Training:

O&M,N - The maintenance and repair of medical facilities should receive special emphasis. Additional attention should be given to routine maintenance in order to prevent accelerated facility deterioration. Resource planning and execution efforts should allow for a modest rate of BMAR reduction during and beyond the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1988.

NIF - No special emphasis is required.

IC 14 Administrative Facilities:

O&M,N - No special emphasis is required. Resource planning and execution efforts should allow for BMAR containment (no growth) during the FYDP period.

NIF - No special emphasis is required.

IC 15 Troop Housing and Messing Facilities:

O&M,N - Major emphasis on maintenance and repair of troop housing and messing facilities is essential. Efforts must be directed to the improvement of all deteriorated living quarters and messing facilities in support of the Navy's major commitment to high quality of life issues. Resource planning and execution efforts should allow for a major reduction in BMAR during the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1986.

NIF - No special emphasis is required.

IC 16 Other Personnel Support Facilities:

O&M,N - The maintenance and repair of other Personnel Support Facilities should receive special emphasis. Actions should be initiated which improve the condition of morale, welfare, recreation, and religious education facilities. Resource planning and execution efforts should allow for a modest rate of BMAR reduction during and beyond the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1988.

NIF - Severe problems exist in all areas of utilities at all NIF locations which have potential for serious mission impact. The problem is so severe that the backlog total for NIF activities in this IC is the highest of all ICs for all fund sources. Problems are due to age, climatic deterioration, over usage, and past failure to accrue sufficient resources. Many systems are so deteriorated that complete replacements through the MCOM funding route are the only possible solution. Major emphasis should be placed in this category to prevent serious mission degradation throughout the NIF establishment.

IC 17 Utilities:

O&M,N - Major emphasis on maintenance and repair of utility systems is essential. Major initiatives must be implemented which improve the condition and efficiency of utility systems in direct support of fleet units, maintenance-production facilities, and communication stations. Resource planning and execution efforts should allow for a major reduction in BMAR during the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1986.

NIF - Severe problems exist in all areas of utilities at all NIF locations which have potential for serious mission impact. The problem is so severe that the backlog total for NIF activities in this IC is the highest of all ICs for all fund sources. Problems are due to age, climatic deterioration, over usage, and past failure to accrue sufficient resources. Many systems are so deteriorated that complete replactments through the MCON funding foute are the only possible solution. Major emphasis should be placed in this category to prevent serious mission degradation throughout the NIF establishment.

IC 18 Real Estate and Ground Structures:

O&M,N - The maintenance and repair of Real Estate and Ground Structures should receive special emphasis. Particular attention should be directed towards deteriorated roads and railroad tracks. Recource planning and execution efforts should allow for a modest rate of BMAR reduction during and beyond the FYDP period in order to achieve the minimum shop backlog of nondeferable work which is commensurate with efficient production scheduling by FY 1988.

NIF - Increased emphasis is required to reduce the sharply growing backlog in this IC. Of particular concern are railroad and crane trackage which, in the present deteriorated state, adversely affects mobilization readiness. Recent severe winters have caused accelerated road deterioration which increases vehicle damage and repair costs. Security fencing at ordnance stations also badly needs repair. Prevention of weapons theft by terrorist groups requires security fence integrity.

APPENDIX C

Questionnaire

Discussion Items

1. Description of activity. What particular problems does this activity face which might be affecting its MRP backlog?

2. History of backlog of the activity.

Questions

3. How accurate do you feel is your BMAR data?
   If not confident of accuracy, why not?

4. Do you note any recent improvement in the BMAR?
   If so, what are the causes?

5. What are your impressions of the new OP-44 program?
   Will it mean more or less work for you?
   Will it be worth the effort?

6. Has there been any time lag or other problems in implementing the program?

7. Comments

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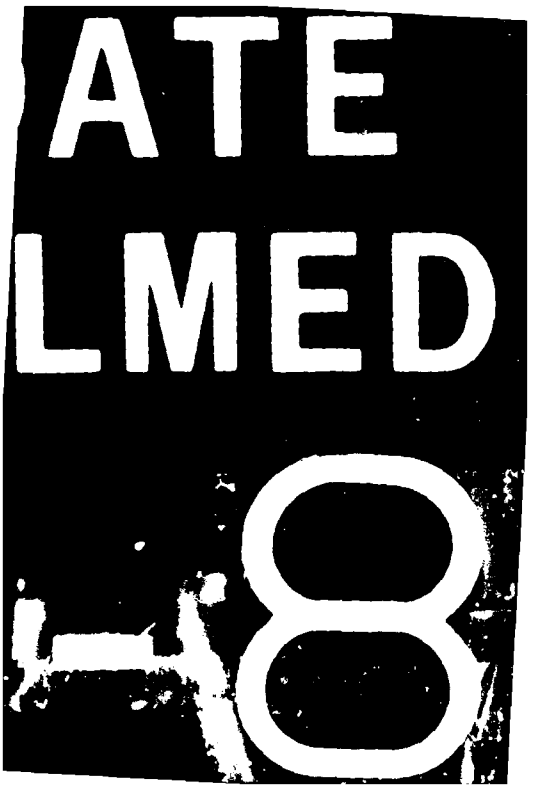
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