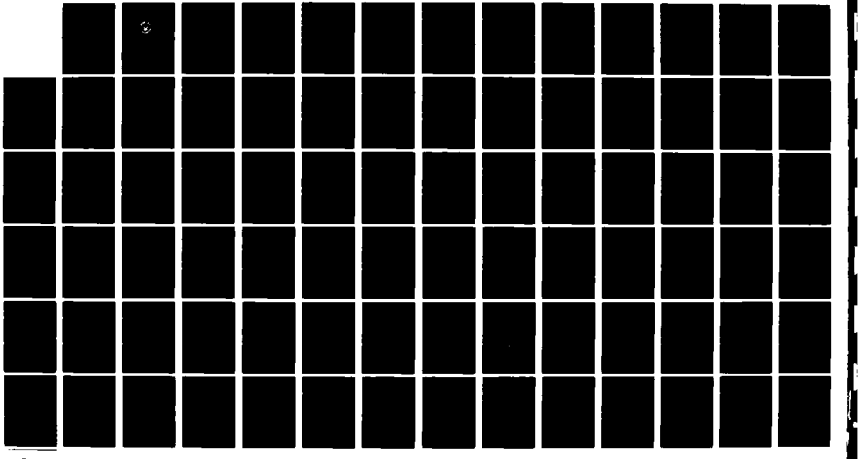
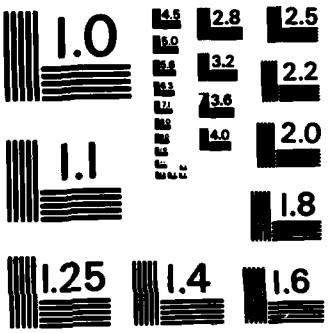
AD-A121 869 AN INVESTIGATION OF THE LOCAL MANAGEMENT SUMMARY CODE AS AN ASSIST TO PUBLIC WORKS MAINTENANCE MANAGEMENT(U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA K A JOHNSTON 1/1

UNCLASSIFIED JUN 82 F/G 13/2 NL



END

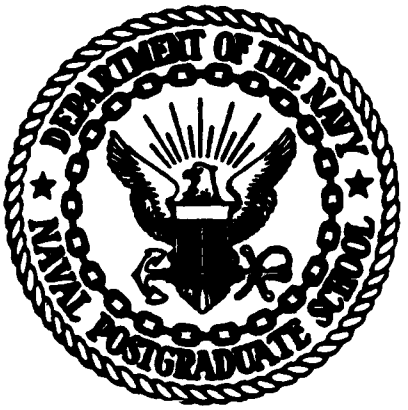
FILMED
DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

AD A121869

NAVAL POSTGRADUATE SCHOOL
Monterey, California



THESIS

AN INVESTIGATION OF THE LOCAL MANAGEMENT SUMMARY CODE AS AN ASSIST TO PUBLIC WORKS MAINTENANCE MANAGEMENT

BY

Keith A. Johnston

June 1982

Thesis Advisor: R. A. Bobulinski

Approved for public release; distribution unlimited

DTIC FILE COPY

82 11 30 074

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. A121869	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) AN INVESTIGATION OF THE LOCAL MANAGEMENT SUMMARY CODE AS AN ASSIST TO PUBLIC WORKS MAINTENANCE MANAGEMENT		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis June 1982
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Keith A. Johnston		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE June 1982
		13. NUMBER OF PAGES 81
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Naval Postgraduate School Monterey, California 93940		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Public Works, Public Works Department, Local Management Summary Code, Maintenance Management, Maintenance Control

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This thesis is an investigation into the use of the Local Management Summary Code (LMSC) contained within the Uniform Automated Data Processing System by Public Works Departments (PWD)s, as an assist in maintenance management. The difference between cost and maintenance management is discussed, and the need for maintenance management data gathering techniques is established. Current Naval Facilities Engineering Command

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE S/N 0102-014-6601

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Block 20 Cont'd:

(NAVFAC) management reports are detailed, as well as the pending Base Engineering Support Technical (BEST) system. A method of obtaining maintenance management data from existing comptroller reports is described. The efficacy of this LMSC supported system is evaluated through a questionnaire distributed to continential PWDs.

The survey results indicated beneficial maintenance management data support was gained by those activities aware of the LMSC applications for other than cost aggregation.

Approved for public release: distribution unlimited

An Investigation of the Local Management Summary Code as an Assist to Public Works Maintenance Management

by

Keith A. Johnston
Commander, Civil Engineer Corps, United States Navy
B.S., San Jose State University, 1967

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT
from the
NAVAL POSTGRADUATE SCHOOL
June 1982

Author _____

Approved by: _____
Thesis Advisor

_____
Second Reader

_____
Chairman, Department of Administrative Sciences

_____
Dean of Information and Policy Sciences

ABSTRACT

This thesis is an investigation into the use of the Local Management Summary Code (LMSC) contained within the Uniform Automated Data Processing System by Public Works Departments (PWD)s, as an assist in maintenance management. The difference between cost and maintenance management is discussed, and the need for maintenance management data gathering techniques is established. Current Naval Facilities Engineering Command (NAVFAC) management reports are detailed, as well as the pending Base Engineering Support Technical (BEST) system. A method of obtaining maintenance management data from existing comptroller reports is described. The efficacy of this LMSC supported system is evaluated through a questionnaire distributed to continental PWDs.

The survey results indicated beneficial maintenance management data support was gained by those activities aware of the LMSC applications for other than cost aggregation.

TABLE OF CONTENTS

I. INTRODUCTION 9
A. GENERAL 9
B. PROBLEM DEFINITION 12
C. OBJECTIVES 13
D. GENERAL APPROACH AND METHODOLOGY 13
E. THESIS CHAPTER SUMMARY 14
II. CURRENT AND PROPOSED MANAGEMENT INFORMATION SYSTEMS 16
A. CURRENT MANAGEMENT INFORMATION SYSTEMS 16
B. A PROPOSED MANAGEMENT INFORMATION SYSTEM . . . 19
C. THE JOB COST STATUS REPORT 22
D. THE LOCAL MANAGEMENT SUMMARY CODE 24
E. CONCLUSION 25
III. RESEARCH PROCEDURES 29
A. INTRODUCTION 29
B. SURVEY QUESTIONNAIRE 29
1. Methodology Employed 29
2. Measures Utilized 30
C. BASIS FOR SAMPLE SELECTION 33
D. SUMMARY 34
IV. RESEARCH FINDINGS 35
A. INTRODUCTION 35
B. SURVEY QUESTIONNAIRE FINDINGS 35
1. Degree of Questionnaire Response 36
2. Activity Background Analysis 37
3. Utilization of Uniform Automated Data Processing System (UADPS) 37
4. Identification of Authorization Accounting Activity (AAA) 38
5. PWO Awareness of the JCSR 39
6. Utilization of the JCSR 39

7. PWO Experiences With and Introduction to the LMSC 40
8. Usefulness of the LMSC in PW Maintenance Management Program 40
9. Previous Use of the LMSC 41
10. Assignment of LMC spaces 42
11. Principal User of LMC Sorted Data 42
12. Application of LMC Sorted Data 43
13. LMC Space Coding 43
14. Activity Accounting System 43
15. Use by PWO of Comptroller Generated Reports 44
16. Use by MCD of Comptroller Generated Reports for Maintenance Rather Than Cost Management. 45
17. Current MCD System of Maintenance Management Information Collection 45
18. PWO Consultation with PW Personnel 46

C. SUMMARY 46

V. CONCLUSIONS AND RECOMMENDATIONS 48

A. INTRODUCTION 48

B. ANALYSIS OF SURVEY FINDINGS 48

1. PW Organizational Background 49
2. Utilization of UADPS and Awareness of JCSR 49
3. PWD Utilization of the JCSR and LMSC . . . 49
4. PWD Utilization of Current NAVFAC Reports 51
5. Variety of Accounting Systems 51

C. SUMMARY OF CONCLUSIONS 52

D. RECOMMENDATIONS 53

APPENDIX A: TABULATED REPORT A 54

APPENDIX B: TABULATED REPORT B 55

APPENDIX C: BASE ENGINEERING SUPPORT, TECHNICAL (BEST) SYSTEM PLANNED MODULES 56

A. EMERGENCY/SERVICE (ES) 56
B. FAMILY HOUSING (FH) 56
C. TRANSPORTATION (TR) 56
D. UTILITIES (UT) 57
E. SHORE FACILITIES INSPECTION (SFI) 57
F. WORK PLANNING AND STATUS (WPS) 58
G. FACILITIES ENGINEERING JOB ESTIMATING (FEJE) . 58
H. WORK INPUT CONTROL (WIC) 58
I. MANAGEMENT ANALYSIS (MA) 59

APPENDIX D: JOB ORDER CARD FORMAT 60

APPENDIX E: JOB COST STATUS REPORT 61

APPENDIX F: NAVAL AIR STATION MOFFETT FIELD JOB ORDER HANDBOOK 63

A. SELECTED PAGES (9) 63
B. COMMENTS 72

APPENDIX G: QUESTIONNAIRE 73

LIST OF REFERENCES 80
INITIAL DISTRIBUTION LIST 81

LIST OF TABLES

I.	Shore Facilities Age	10
II.	Maintenance of Real Property Authorizations (MIllions $)	11
III.	Posting Key Codes	26
IV.	LMC 9A3B Sort Example	27
V.	Key to LMSC Questionnaire	31
VI.	Activity PWD Background Data	38
VII.	Activity Utilization of UADPS	38
VIII.	PWO Awareness of the JCSR	39
IX.	PWD Utilization of the JCSR	40
X.	PWO Experience with LMSC	41
XI.	Utility of LMSC in Maintenance Management Programs	41
XII.	Assignment of LMC Spaces	42
XIII.	Activity Accounting System	44
XIV.	PWO Use of Comptroller Generated Reports for Maintenance Management	45
XV.	MCD Use of Comptroller Generated Reports for Maintenance Management	46
XVI.	MCD Formal Maintenance Management System	47

I. INTRODUCTION

A. GENERAL

Public Works is the provision of facilities related services inclusive of construction, alteration, maintenance, and repair of buildings and structures, operation and maintenance of transportation systems and equipment, generation and distribution of utilities, and various other services [Ref. 1: p. 21]. These services are provided at the majority of United States Navy (USN) shore activities by a Public Works Department (PWD). The remainder of the shore activities receive similar services from Public Works Centers (PWC)s, a separate command supplying services to many other commands or by private contractors. The PWD is an integral part of the command and comes directly under the control of the commanding officer (CO).

The Department of the Navy (DON), Naval Facilities Engineering Command (NAVFAC) publication MO-321 entitled "Maintenance Management of Public Works and Public Utilities", contains methods and techniques to maintain and operate the USN physical plant. A comparison conducted by the author of the contents of this publication with books describing commercial maintenance management indicated that the means of work generation, classification, planning and estimating, and scheduling arise from a common pool of experience shared by civilian authors, as well as government managers. Another point of commonality is ageing facilities [Ref. 2,3].

The average age of the Navy shore establishment is 35 years and more than 70 percent is in excess of 26 years of age [Ref. 4]. Statistics reviewed by the author show that

efforts by the Chief of Naval Operations (CNO) Code OP-44, Deputy CNO Logistics (OP-44) to convince Congress of the need for additional maintenance and repair funds to properly maintain the physical plant have been successful. Maintenance and repair dollars have increased some 330 percent from 1970 to 1980. These conditions and the continued emphasis on greater efficiency and productivity have placed greater value on better management skills. The author contends that management must find more effective and efficient ways to accomplish the task of maintenance. For details of plant age, and maintenance and repair authorizations see Table I and Table II.

TABLE I

Shore Facilities Age

DISTRIBUTION	PERCENTAGE
0 - 10 YRS	7
11 - 25	19
26 - 40	47
40 plus	27
Total	100%

Average Age 35 Years

The manager in the PWD, be he or she the Public Works Officer (PWO) or the Maintenance Control Director (MCD), in the author's opinion, must continually ask questions regarding the utilization of maintenance resources. They should ask questions like, "Where are the maintenance monies being spent?" "Can these expenditures be reduced?" "Are the expenditures justified in meeting the station mission and NAVFAC objectives?" "Can management be made more effective?"

TABLE II

Maintenance of Real Property Authorizations (MIllions $)

YEAR	AMOUNT
1970	160.8 (1)
1975	272.4
1980	530.2

(1) Includes Reserves which were listed separately after 1973

To make rational decisions on these issues, management literature indicates that the manager must receive timely, accurate, and relevant information on which to base analysis.

The accounting system within the United States defense establishment and the DON is oriented toward financial reporting since dollars are the common language of requirements and represent the official record. Under these systems, without special attention, the author believes that the maintenance manager may know how much is spent in general, but does not know specifically where the maintenance funds are being spent. A form of managerial accounting seems to be justified for establishing functional controls within the maintenance program. In the author's opinion, managerial accounting procedures could be valuable in providing data and information to serve as an input for arriving at decisions for the type of questions stated above.

While both the commercial sector and the DON have established systems for cost accounting for maintenance, only the commercial sector appears to have recognized the problems posed by the system for the maintenance manager. Anthony Corder writes,

> "Maintenance managers seldom have any say regarding the cost centres that they would like to have set up to enable them to classify the code costs and activities which are of particular concern to them. The conventional methods at present in use for collecting all costs to departmental heads or cost centres does not provide maintenance managers with sufficient information to analyze and control the maintenance function. Engineers are interested in the cost of maintaining actual items of plant and analyzing these costs by type of maintenance work involved" [Ref. 5: p. 21].

A survey of NAVFAC management publications by the author did not reveal any discussions addressing this problem.

The gathering and analysis of maintenance cost data could allow the identification of trends prior to a major expense. It could contribute to the most effective assignment of dollars, as well as personnel when the desired work outstrips available labor hours. Preventative maintenance programs could be effectively designed and modified after an analysis of historical costs are combined with experience and time proven levels of preventative maintenance.

At present the PWO has no automated method of obtaining costs for use in answering the questions posed above. A potential source of this information is the Job Cost Status Report (JCSR), an output of the Uniform Automated Data Processing System (UADPS).

B. PROBLEM DEFINITION

NAVFAC has provided the PWO with policies, objectives, and procedures by which the maintenance function is to be performed. This guidance serves as the foundation on which the local maintenance program is constructed.

Information performs a necessary role in the maintenance manager's environment. NAVFAC has recognized this requirement by establishing PW feeder reports, such as the Tab A and, Tab B which are generated by the Comptroller as an offshoot of other required accounting input. It is the

author's opinion that the present format of these reports is not conducive to maintenance management, but rather, is directed toward cost management.

This disparity was recognized during the development of the UADPS in 1965 according to Mr. Edward Bucher of the USN Fleet Material Support Office (FMSO), Mechanicsburg, Pennsylvania, who participated in the generation and implementation of UADPS [Ref. 6]. UADPS includes local option sorting systems identified as the local management sorting code (LMCS). This system allows managers the option of arranging data contained in standard comptroller reports in a form that can benefit them.

This thesis is concerned with the availability of information contained in the JCSR for use by PWO's. The author feels that maintenance management information is available and that a system exists for its cost effective organization and display.

C. OBJECTIVES

This thesis is specifically concerned with the maintenance management information needs of the PWO and the MCD. The thesis objectives are to describe a methodology to identify maintenance management information contained in the JCSR, and to evaluate the utility of the proposal through distribution of a questionnaire to prospective users in the field.

D. GENERAL APPROACH AND METHODOLOGY

The research conducted was directed towards developing a methodology to utilize the LMSC to consolidate cost data contained in the JCSR so as to increase its utility as a management tool. A literature search was conducted which

encompassed the Naval Postgraduate School, (NPS) Monterey, California, Library and the Defense Logistics Studies Information Exchange. Primary sources of information within the DON were (1) NAVFAC, (2) NAVFAC, Atlantic Field Division, and (3) FMSO. Personal interviews with knowledgable managers in PW maintenance, maintenance control, accounting and comptrollership at the NPS, as well as at other stations, contributed background, as perceived at the various levels of management and control. Current Department of Defense (DOD) and DON instructions were reviewed to assess the existing reporting systems.

Reviews of automated reports provided background on how effectively the reports were serving management. Visits to the Authorized Accounting Activity at the Naval Supply Center, Oakland (NSC) provided an insight into the procedures utilized to process activity inputs. Finally a field questionnaire allowed a potential user evaluation of the author's proposed input procedures and data displays. From this information and its analysis, conclusions were rendered and new applications recommended.

E. THESIS CHAPTER SUMMARY

Chapter I introduces the reader to the concept and requirements for maintenance management information. The objectives and research methodology of the study are also presented.

Chapter II discusses the various management information systems available for PWO use. It details the author's proposal for use of LMSC for information display within the JCSR. Additionally, the chapter details current NAVFAC development of the Base Engineering Support Technical (BEST) system.

Chapter III presents the development of a questionnaire interview form used to gather field responses to an author developed proposal for increased utilization of the LMSC.

Chapter IV comprises the analysis of the field responses.

In Chapter V the author draws conclusions from the analysis and makes recommedations for further development of automated maintenance management information.

II. CURRENT AND PROPOSED MANAGEMENT INFORMATION SYSTEMS

This chapter describes the management information reports currently used by Public Works Departments (PWD). Additionally it describes the Base Engineering Support, Technical (BEST) system of management information modules. BEST is currently undergoing development and evaluation by the Naval Facilities Engineering Command (NAVFAC). The program is directed towards providing PWD's with a method of utilizing the computer to provide more effective and efficient management of Public Works data.

A. CURRENT MANAGEMENT INFORMATION SYSTEMS

Currently automated reports received by PWD's and used for management purposes are generated by the comptroller organization, generally at the Authorization Accounting Activity (AAA). These reports are identified in volume 3 chapter 7 of the Navy Comptroller (NAVCOMPT) manual and are described in the MO-321, Maintenance Management of Public Works and Public Utilities.

The objectives of management systems include the following:

1. To provide managers at the responsibility center and subordinate levels a system which includes the monetary and qualitative information that will enable them to effectively and efficiently manage resources made available.

2. To furnish operating budget grantors and other levels of management up to and including the NAVCOMPT that degree of financial information necessary for effective coordination and control of resources.

3. To determine the cost of operation of an activity in terms of total resources consumed or applied [Ref. 7: Vol. 1, section III].

Volume 3, chapter 7 of the NAVCOMPT Manual, entitled Public Works Cost Accounting and Reporting System, contains the following general comment regarding the above listed objectives.

> "The instructions in this chapter incorporate procedures pertaining to the recording and reporting of costs and manhours for maintenance and operation of public works in order to assist management in the effective use of manpower, material, and equipment, and to establish necessary financial controls. The primary support office, bureau or systems command of each naval activity is responsible for the implementation of these procedures and for liaison within other offices, bureaus and system commands to assure proper coordination between affected departments of a field activity [Ref. 7: Vol. 3, p. 7-1].

The station level comptroller plays a support role in public works operations. The NAVCOMPT Manual, vol. 3, chapter 7 states, "The performance of all cost accounting functions are provided as a service to the Public Works Department by the Comptroller Department or Fiscal Office" [Ref. 7: Vol. 3, p. 7-12]. It further assigns the reporting responsibilities for several principal PWD reports to the Comptroller Department or Fiscal Office. The principal reports which are the comptroller's responsibility are:

1. Tabulated Report A. (Tab A.) Feeder report for the Maintenance and Utilities Labor Control Report (NAVFAC form 9-11014/29)
2. Tabulated Report B. (Tab B.) Completed Job Orders
3. Maintenance Cost Report
4. Utilities Cost Analysis Report (NAVCOMPT Form 2127) (UCAR)
5. Housing Cost Report
6. Transportation Cost Report (TCR)

As previously indicated, this thesis is concerned with Public Works facilities maintenance management and, as such, will limit discussion to the Public Works maintenance related reports. The applicable reports are 1 through 3 in the above list.

Tab A is the feeder report for the Maintenance and Utilities Labor Control Report [Ref. 7: Vol. 3, p. 7-93]. It is a monthly report and provides basic information on the expenditure of labor hours to the various labor class codes in each cost center. It is intended for local use only. Appendix A is a sample of the report.

Tab B is a two part report which provides final cost data on completed job orders. Part one includes both completed and cancelled job orders and is prepared weekly at the option of the Public Works Officer (PWO). Part two includes only completed job orders and is prepared monthly. It is designed to evaluate both planning and estimating and/or job execution by highlighting significant variances between estimates and actual costs for specific job orders. It is also used to highlight total job order variances which require specific follow-up action (variance report), and chronic variances attributable to a specific branch [Ref. 7: Vol. 3, p. 7-94]. The variance analysis serves as a benchmark from which to judge the quality of planning and estimating, and shop execution of the planned work. Appendix B is a sample of the report.

The Maintenance Cost Report is an annual report designed to obtain fiscal year cost data related to real property maintenance functions funded by appropriations other than 17-1804, Operation and Maintenance, Navy; 17-97-0700, Family Housing Management Account, Defense (Transfers to Navy) and those appropriations administered by the Commandant of the Marine Corps. The Maintenance Cost Report is prepared

annually when required by higher authority [Ref. 7: Vol. 3, p. 7-95]. Both the Maintenance and Utilities Labor Control Report and the Report on Variation on Completed Job Orders are local Public Works maintenance management reports.

B. A PROPOSED MANAGEMENT INFORMATION SYSTEM

In addition to the automated data support provided by the Comptroller, NAVFAC has sponsored an Automated Data Processing System (ADPS) entitled The Navy Facilities System (NFS). NAVFAC publication P-424 of October 1980 describes NFS as follows:

> "NAVFACENGCOM's comprehensive NFS is comprised of 15 interfacing Automated Information Systems (AIS). The NFS is concerned with the requirements, acquisition, and utilizations processes and their relationship to real property, utilities, and civil engineer support. The AIS are sponsored by NAVFACENGCOM program managers who provide the interaction necessary at Headquarters to operate the total system. Efficient operation of the NFS requires the support of top level management throughout the Command Headquarters and field [Ref. 8: p. iii].

One of these 15 interfacing AIS is the BEST system.

BEST is a data support system for use by PWDs and Public Works Lead Activities (PWLA's) who are responsible for real property maintenance accounting at approximately 65% of all naval shore activities.

The origin of what today is called the BEST system may be traced back to the late 50's and the introduction of the PWD management and inspection manuals MO-321 and MO-322. These manuals provided uniform guidance to the various PWDs in keeping with the NAVFAC mission of being the custodian of the United States Navy (USN) shore facilities. Management systems detailed in the manuals were of necessity manual in nature.

During the late 60's with the arrival of computers, NAVFAC developed the PWD Management Information System

(PWDMIS). This was an attempt to apply the newly developing capability of the computer to the clerical record keeping of the MO-321 management programs. Two packages were developed; one dealing with emergency service (EIS) and a second with shore facilities inspection (SFI). The PWD at Indian Head, Maryland was selected as the test site. After an evaluation of several years the packages eventually saw limited use at some 60 activities and are still in use at approximately 20 activities.

According to Mr. D. Snyder the system was successful from a technological standpoint. However, operationally they were a failure [Ref. 9]. First there was the use of batch processing which restricted the flexibility and responsiveness of the programs. Second was the relative priority enjoyed by the PWD input. The computer systems used were either remote from the base or owned by the comptroller and PWD input was generally very low in the queue.

In the summer of 1979 using the PWDMIS program as a base and with a recognition of the trend away from mainframe computers to small on-line interactive terminals, the NAVFAC Program Manager for Public Works (09B) developed the concept of modular programs to support PWD management with small interactive computers. This system was subsequently named BEST. NAVFAC's objective for BEST is described in P-424 as follows:

> "The objective of the BEST system should be to provide management tools for specific, technical, base engineering support functions in a PWD. However, PWD's differ in size, functions and organization; for example, not all PWD's have family housing, utilities, transportation or the same maintenance capabilities. Since there is therefore, no Navy-wide, standard PWD, this precludes developing a Navy-wide, integrated PWD Automated Information System for all the functions performed in a PWD.
>
> The targets for improving management tools are the single base engineering technical functions within a PWD that do have Navy-wide procedures, that is, emergency/service work, management

> analysis, and so forth. This is where productivity and cost-effectiveness can be improved by making better use of information with automated support [Ref. 8: p. J-2].

The BEST system was to consist of ten modules developed in two stages. The first series of modules would include EIS, SFE, Work Input Control (WIC) and Facilities Engineering Job Estimating (FEJE). The second series would include Family Housing (FH), Utilities (UT), Transportation (TR), Work Planning and Status (WPS), Preventative Maintenance Inspection (PMI), and Management Analysis (MA). Appendix C describes the objectives and function of each module, as of October 1980. Subsequent to the initial proposals the WPS, PMI, and MA module objectives were incorporated into the remaining modules. Testing of the BEST modules began in February 1982 with a field evaluation of the FEJE module at the Navy Construction Battalion Center, Port Hueneme, California, PWD. Implementation of the BEST system is scheduled to begin in FY-84 and continue through FY-87.

Information to construct the various modules will be input by public works personnel during the course of their normal duties. Because of the relatively recent start of the initial evaluation period, final details of the specific input procedures for the individual modules were not available.

Of particular interest to this thesis is the formerly proposed MA module. The module was to contain, "reports that provided management with a complete analysis of work force utilization, completed work and long range planning for unfunded deficiencies" [Ref. 10: p. iii]. It was to consist of a group of after-the-fact reports detailing the accomplishment of jobs and use of in-house forces. One input data source was to have been the actual hours and dollars recorded as spent by the activity financial system.

That report is the Job Cost Status Report (JCSR) which is described in the next section.

In 1978 the decision was made by the BEST developers to delete the MA module. Phone conversations with individuals involved in the development at that time revealed that the decision to delete the module was based upon the opinion that the first two objectives of the module, analysis of work force utilization and completed work, could be incorporated into other modules [Ref. 9]. Information for long range planning would presumably be locally generated by the PWO or MCD from utilized modules or other local sources. It is the author's opinion that the JCSR is a highly useful source of this type of information.

C. THE JOB COST STATUS REPORT

An additional report available to activities whose Authorization Accounting Activity (AAA) utilizes the UADPS is the JCSR. The JCSR is a listing of all job order numbers generated by a specific activity. The job order number serves as a vehicle to collect the accrued costs, both labor and material, for a specific project, work order, process or task. The NAVCOMPT Manual allows each activity to establish its own job order numbering system. It states,

> "A Navy-wide plan of numbering job orders is not prescribed because of the variation of requirements in the various naval activities. However, activities using job orders will establish a uniform job order numbering system within the activity. The control over the assignment of job order numbers will be centralized to preclude the assignment of duplicate numbers. Generally, all that is required fiscally is a number that will distinguish a job order from all other job orders at the activity and provide an index to the job order itself or to the master card that contains all of the detailed accounting classifications [Ref. 7: Vol 3, p. 5-5].

While the job order number is left up to the individual activity, submission of job orders to the AAA must adhere to

a detailed format. In the case of the Naval Postgraduate School (NPS) the AAA is the Naval Supply Center, Oakland (NSC). Appendix D is the standard form, called the job order card (JOC) required by NSC for job order establishment from all activities for whom financial services are provided. NSC Instruction 7000.1 series provides detailed instructions for the completion of the JOC. One JOC is submitted to the AAA for each job order created.

Upon receipt by the AAA, data from the JOC is key punched into the Uniform Automated Data Processing System (UADPS).

The UADPS consists of a series of inter-related computer programs which have become the standard for Department of the Navy (DON) supply and financial management at Stock Points. The system is used to process supply transactions and to maintain stock records. A major section of UADPS contains financial files which are broken down into six applications. The application which produces the JCSR as one of its outputs is application G, entitled cost, allotment and appropriation accounting. The UADPS Executive Handbook describes application G as follows:

> 1. In accordance with the Navy policy of centralizing accounting, whenever possible, the UADPS stock points have been designated to perform cost, allotment, and appropriation accounting for funds granted to other activities, as well as funds granted to the processing stock points. Application G is designed to perform the required cost, allotment, appropriation accounting for these funds.
>
> 2. In this application, allotment records which reflect the status of each separate allotment are developed, i.e., funds authorized, committments, obligations, expenditures and remaining balance available. Various cost records that disclose how, when and where the money was spent, i.e., civilian labor for packing stock issues, are also prepared. Periodically, a wide assortment of cost and allotment reports are prepared for local management and external reporting to higher authority. These reports include the Resources Management System (RMS) and Research, Development, Test and Evaluation (R,D. T&E) type reports as well as normal allotment accounting type reports prescribed in the Navy Comptroller Manual.

3. The current design of Application G satisfies all of the accounting and reporting by maintaining files and preparing reports, with a few exceptions. These exceptions have not been included in the system design because no universal need exists or it is more economical or practical to perform the function manually or sufficient time has not been available to incorporate the requirements. For example, Utilities Cost Analysis Report (NAVCOMPT Form 2127) and Maintenance Cost Report are not a part of this application. To enable the stock points to perform the functions not included in UADPS, output transaction tapes are provided for use as input to locally developed operations [Ref. 11: p. 6-G00-1].

Specifically operation G04, entitled maintain job cost file generates the JCSR. A copy of the report form is shown in Appendix E. This extract from the NPS JCSR shows a LMC of 7340. The last line of appendix E, page 2 lists the totals for the sort of the LMC to the LMSC-1, posting key 2 (73XX) level.

Each PWD utilization of funds which is separately identified by a job order number will be listed in this report. The job order numbers are listed internal to the report under index categories known as local management codes (LMC). This index is the key to an expanded utilization of the report by PWD maintenance personnel.

D. THE LOCAL MANAGEMENT SUMMARY CODE

The LMSC is a sorting capability that was built-in to UADPS during its initial development. It allows the collection of job order numbers into desired catagories. The LMSC consists of a four space entry of any combination of numbers or letters entered in spaces 50 to 53 of the JOC.

After initial submission the combination of LMC and job order number cannot be changed. However the same LMC may be entered along with any number of job order numbers. There are a maximum of 36 to the fourth combinations (10 numbers plus 26 letters by four spaces) which may be assigned by the

local activity. The second portion of this sorting system is the posting key.

The posting key consists of a number or a letter which when entered in space 71 of the JOC allows activity determination of the level of detail required in the JCSR. Table III is a listing of the posting key codes, the applicable appropriations, the level of LMSC provided, and the position of the sort. Table IV is a specific example for LMC 9A3B of the level of sort provided for all posting codes. The appropriate posting code is selected depending on the level of sophistication of the LMSC system. An expanded description of the LMSC may be found in Navy Supply Publication 420 [Ref. 12: p. XV,A4-4].

Although the JCSR is of most immediate use to public works, a series of reports are sorted using the same LMSC. These include the Transaction Ledger, Document Control File Report, NC 2030 Interim Fund Resources Status Report, Local NC 2168 Report, and the Obligation Fund Status Report. As these reports are utilized primarily by the comptroller, it may be seen that all possible LMCs are not available to the PWD. Coordination between the comptroller and public works is necessary to establish a workable system.

Discussions with Mr. E. Bucher revealed that the LMSC system was not developed with any specific activity application in mind. It is "local" in that each activity may develop an application(s) to suit its particular need. Mr. E. Bucher commented that one common application in his experience was the sorting of financial information at the commanding officer, department and division level.

E. CONCLUSION

During preliminary research for this thesis, the author contacted several PWDs and interviewed the PWO regarding

TABLE III

Posting Key Codes

POSTING KEY	APPN	LEVELS OF LMSCs	LMSC
1	any	1	First pos of LMC = LMSC-1
2	any	1	First 2 pos of LMC = LMSC-1
3	any	1	First 3 pos of LMC = LMSC-1
4	any	1	All 4 pos of LMC = LMSC-1
A	OB	2	First pos of LMC = LMSC-1 All 4 pos of LMC = LMSC-2
D	OB	2	First 2 pos of LMC = LMSC-1 All 4 pos of LMC = LMSC-2
T	OB	2	First 3 pos of LMC = LMSC-1 All 4 pos of LMC = LMSC-2
M	O&M OB	4	First pos of LMC = LMSC-1 First 2 pos of LMC = LMSC-2 First 3 pos of LMC = LMSC-3 First 4 pos of LMC = LMSC-4

OB= operating budget
APPN= appropriation

their awareness and utilization of the LMSC. The awareness and utilization by PWO's ranged from no prior knowledge to a high level of useage. One PWD which has made extensive use of the LMSC capability is the Naval Air Station (NAS) Moffett Field, California. Their job order handbook, a portion of which is contained in Appendix F, combines a sequence of job order numbers and LMCs, as previously discussed.

Mr. Paul Crawford, the MCD at NAS Moffett Field, was instrumental in development of the LMSC system in the PWD.

TABLE IV

LMC 9A3B Sort Example

POSTING KEY	LEVEL of LMSCs	LMSC	
1	1	9	(LMSC-1)
2	1	9A	(LMSC-1)
3	1	9A3	(LMSC-1)
4	1	9A3B	(LMSC-1)
A	2	9	(LMSC-1)
		9A3B	(LMSC-2)
D	2	9A	(LMSC-1)
		9A3B	(LMSC-2)
T	2	9A3	(LMSC-1)
		9A3B	(LMSC-2)
M	4	9	(LMSC-1)
		9A	(LMSC-2)
		9A3	(LMSC-3)
		9A3B	(LMSC-4)

He wanted to develop a method of determining total maintenance expenses for various categories of buildings and utility systems. During discussions with the base comptroller, Captain John Cuddy, SC, USN Mr. Crawford was advised of the existence of the LMSC. Working together they developed the job order handbook currently in use by Public Works. Their system allows the collection of service, standing, specific, and contract expenditures for selected groups of buildings or utility systems. Mr. Crawford has used the summarized financial information for maintenance management decisions regarding expenditure trends, creation of historical cost records, and justification of special projects. A major advantage cited was that, once established, the information was gathered essentially cost free. As the records are historical in nature, no regular schedule need be established for their retrieval.

An additional point which should be recognized is the necessity for coordination between the PWD and the comptroller. The UDAPS is essentially the province of the comptroller and any extension of usage of the system by PW must be carefully thought out and clearly presented. The first step in such utilization is an awareness and understanding of the system. In order to access the level of awareness and utilization of the LMSC for PW maintenance management, the author prepared a questionnaire which was submitted to all PWD's in the continential United States. Chapter III describes the development of that questionnaire.

III. RESEARCH PROCEDURES

A. INTRODUCTION

This chapter is directed towards the research methodology employed in support of the central research objective discussed in Chapter I. Specifically, this chapter provides a comprehensive overview of the methodology used to determine the awareness and the utilization on the part of the Public works Officer (PWO) and maintenance control staff of the Local Management Summary Code (LMSC). Presented in this chapter is an author developed questionnaire survey used to gather data relative to the extent and nature of this awareness. Specific conclusions with recommendations concerning the revelance of the data to both existing and future Public Works Department (PWD) maintenance management practices will be detailed in the final chapter.

B. SURVEY QUESTIONNAIRE

The following discussion of the questionnaire focuses on three interrelated survey and data collection issues: the methodology employed, the measures utilized, and the basis for sample selection. Aspects of these issues, which the author feels are important for the reader's understanding of the analytical procedures, are described below.

1. Methodology Employed

A survey was conducted through a mailed questionnaire (Appendix G) sent to all PWO's at continental United States Naval activities which had PWDs. Activities which had PWDs numbered 68 excluding the two PWDs used as a

control group for preliminary questionnaire testing. In addition to background data on the PWD, the questionnaire was designed to gather data concerning the use of a comptroller generated report, the Job Cost Status Report (JCSR), and the attendant (LMSC) in the department's maintenance management program. The specific development of the Local Management Code (LMC) and attendant interaction of the PWD with the comptroller is also explored. The questionnaire was also structured in a manner to permit gathering of data related to current procedures utilized by the activity Maintenance Control Director (MCD) should the activity not utilize the JCSR.

Table V summarizes the characteristics or attributes of the PWD being measured by each question of the questionnaire.

2. Measures Utilized

Questions numbered 1 through 6 measured activity PW organizational background information. Data such as budget levels and personnel in the maintenance control division was requested to allow comparision of activity size with the level of maintenance management development. Due to their straight forward objective approach, this author feels that the responses to these questions were not biased.

Question 7 was formulated to determine the accounting system utilized by the activity. Although the intent is to make the UADPS the "uniform" accounting system within the Navy, not all activities are currently using the system.

Question 8 identified the Authorization Accounting Activity (AAA) utilized by the activity. Identification of the AAA allowed the author to examine the policy of the AAA regarding expanded usage of the LMSC and the potential

TABLE V

Key to LMSC Questionnaire

CHARACTERISTIC/ATTITUDE	QUESTION NUMBER
Current PWD budget	1
Current M-1 and R-1 budget	2
Total PWD personnel ceiling	3
Total maintenance control personnel	4
Total maintenance and utilities personnel	5
Activity replacement cost	6
Axtivity utilization of UADPS	7
Activity AAA	8
PWO awareness of JCSR	9
PW utilization of the JCSR	10
PWO experience with LMSC	11
PWO discovery of LMSC	12
Utility of LMSC in maintenance management	13
Previous use by PWO of LMSC	14
LMSC spaces assigned by comptroller	15
Use of numbers and/or letters in LMSC	16
PWD consultation in LMSC space assignment	17
LMSC spaces used by PWD	18
Principal user of LMC sorted data	19
Application of LMC sorted data	20
Code assignment of LMC spaces	21
Activity accounting system	22
PWO utilization of comptroller generated reports	23
Reports used by PWO	24
MCD utilization of comptroller generated reports	25
Reports used by MCD	26
MCD maintenance information collection system	27
Sources of MCD information system	28
PWO personal knowledge of activity maintenance management systems	29

impact of the increased administrative and data processing load.

Question 9 was posed to determine personal knowledge of an accounting system report vital to the study. As the LMSC is contained within the JCSR, knowledge of the report was necessary to respond to the remainder of the questionnaire which dealt with LMC usage. Should the respondant indicate no knowledge, a note requested that he or she turn to the section dealing with utilization of other techniques for maintenance management data gathering.

Question 10 was formulated to measure PWD utilization of the JCSR compared to other public works (PW) and comptroller generated formal reports without reference to the LMSC. This question and question 13 used an anchored response scale, as research has shown that, "the reliability of scales with verbal anchors and verbal response alternatives is superior to that of purely numerical scales" [Ref. 13: p. VII-P,1]. The use of anchors tends to reduce the introduction of bias from different interpretations of the scale by the respondents.

Question number 11 was intended to indicate the PWO's awareness of the LMC within the JCSR.

Question number 12 looked at the manner in which the PWO became aware of the LMSC. Additionally, the question was intended to provide an indication of the level of awareness of the LMSC within the PWD. As discussed in chapter II, a description of the LMSC was not located in any publication which in the opinion of the author, a PWO would be aware. Questions 12, 19, 20, 21, 24, 26, and 28 all contained lists from which the respondent was requested to select the appropriate items. Included in each question was the response "Other" and the request that other items be specifically identified.

Question 13 allowed an evaluation of the usefulness of the LMC by the activity PWO.

Question 14's intent was to determine whether or not the PWO had used the LMC at a former duty station. Affirmative responses would then be compared against current utilization at the same activity to obtain a measure of continuity for the method.

Questions 15 through 18 measured the utilization of the LMC by the activity comptroller and the level of interdepartmental coordination between the comptroller and the PWD in assigning the LMC spaces.

Questions 19 and 20 dealt with identifing the users of the LMC sorted data and the end application.

Question 21 allowed the activity PWO to identify the various catagories of information desired through use of the LMSC in the JCSR.

Question 22 was intended to identify the accounting system utilized by the activity should it be other than UADPS.

Questions 25 and 26 requested an evaluation by the PWO of the Maintenance Control Director's (MCD) utilization of the same reports for maintenance management.

Questions 27 and 28 were formulated to identify existing systems utilized by the MCD to gather maintenance management information.

The final question, number 29, was intended to indicate the PWO's familiarity with the various PW divisions use of comptroller generated reports.

C. BASIS FOR SAMPLE SELECTION

The survey questionnaire was sent to all PWD's within the continental United States. A mailing list containing all PWD's was obtained from the Naval Facilities Engineering Command. Overseas activities were excluded due to the time limitations of the research.

Based upon the experience of Oppenheim in working with questionnaires, the author expected a return rate of 40 to 60% [Ref. 14: p. 34].

In order to achieve or possibly exceed this percentage, the author contacted each PWO by phone, advised of the research questionnaire and requested his or her participation. Any discussion of the topic was carefully omitted so as to avoid the introduction of bias in the responses. Anonymous replies were solicited and respondents were told

that all information provided by them would be considered confidential. Surveyed PWO's were provided the opportunity to indicate to the researcher, their desire to be sent a summary of the survey results.

The proposed questionnaire was reviewed by the author for acceptance and conformance to established survey techniques. Also Naval Postgraduate School (NPS) Civil Engineer Corps officer students familiar with PWD orperations were requested to review and comment on the questions. Additionally, the questionnaire was tested at the NPS PWD and the Naval Air Station Moffett Field PWD as the survey control group. As a result of their recommendations, many constructive changes were made to the questionnaire.

D. SUMMARY

In this chapter the author has attempted to outline for the reader the research methodology employed and the basis for its use in support of the study's objectives. Specifically, this chapter has provided an overview of the methodology used to determine the level of awareness and utilization by the PWO of the LMSC in the maintenance management operations. The author provided a review of the questionnaire, along with an explanation of the design, use, and possible statistical shortcomings.

The following chapter discusses the analysis of the data obtained through the questionnaire. Answers provided by the returned questionnaire will be presented, discussed, compared and analyzed.

IV. RESEARCH FINDINGS

A. INTRODUCTION

The purpose of this chapter is to present an analysis of the data gathered by the questionnaire discussed in the previous chapter. Data provided by the questionnaire will be tabulated, analyzed, and discussed. Potential problems pertaining to use of the Local Management Summary Code (LMSC) are identified; however, conclusions and recommendations regarding these aspects will be deferred to the final chapter.

The emphasis of this chapter is limited to an analysis of the compiled data. There has been a conscious effort by the author to minimize inference statements pertaining to the findings. For simplicity of understanding and conciseness of presentation, the author has chosen to detail the research findings through the use of descriptive summaries and tables.

B. SURVEY QUESTIONNAIRE FINDINGS

A review of the author's questionnaire findings, along with an analysis of the related data, is keyed to the following general considerations:

1. Degree of Questionnaire Response
2. Activity Background Analysis
3. Utilization of the Uniform Automated Data Processing System (UADPS)
4. Identification of the Authorization Accounting Activity (AAA)
5. Public Works Officer (PWO) knowledge of the Job Cost Status Report (JCSR)

6. Utilization of the JCSR by the PWO and Public Works Department (PWD) personnel
7. PWO experience with and introduction to the Local Management Summary Code
8. Utility of LMSC in PWD maintenance management program
9. Previous usage of the LMSC by PWO at other PWDs
10. Assignment of LMSC space
11. Principal user of Local Management Code (LMC) sorted data
12. Application of LMC sorted data
13. Code assignment of the LMC spaces
14. Activity Accounting System
15. PWO use of comptroller generated reports
16. MCD use of comptroller generated reports
17. Maintenance Control Director (MCD) maintenance management information collection system
18. PWO consultation with PWD personnel

With the exception of the "Degree of Questionnaire Response", the above considerations have been keyed directly to these general areas of questionnaire inquiry which were identified in the previous chapter dealing with the research methodology.

1. Degree of Questionnaire Response

The questionnaire was mailed to all continental United States PWD's, with the exception of two used for preliminary validation of the survey, for a total of 68 mailings. Prospective respondents were requested to return the questionnaire within seven days of its receipt via a pre-addressed envelope. The author received a total of 46 replies. Two unanswered questionnaires were returned. One claimed the nature of the activity operation precluded

answering, and the second activity stated it was funded under the Navy Industrial Fund (NIF) and thus had no input. It should be noted that the activity has a PWD and could have responded to the section of the questionnaire dealing with maintenance management planning and the MCD's management program. These two questionnaires were considered non-responsive. The 44 valid responses resulted in a net survey response rate of 65 percent.

2. Activity Background Analysis

The findings related to the general size of the activity public works department (PWD) both from a fiscal and personnel standpoint. Table VI presents the data gathered by questions one through six. Included are the largest and smallest values given, as well as the mean and standard deviation. The table rows are related to the question asked as follows:

1. What is the PWD budget for this fiscal year?
2. What is the total M-1 (Maintenance) and R-1 (Repair) budget for this fiscal year?
3. What is the total PWD personnel ceiling?
4. What is the maintenance control division personnel ceiling?
5. What is the maintenance and utilities division personnel ceiling?
6. What is the activity replacement cost in current dollars?

3. Utilization of Uniform Automated Data Processing System (UADPS)

Question number seven asked whether or not the activity utilized UADPS. Fifty one percent (N=26) of the survey respondents indicated that they did not utilize the

TABLE VI

Activity PWD Background Data

Question No.	High Value	Low Value	Mean	Standard Deviation
1- ($million)	64	.79	14.6	13.46
2- ($million)	18	.19	.4	4.01
3- (person)	777	17	236	196
4- (person)	70	0	17	15
5- (person)	376	11	141	103
6- ($million)	1,516	1.5	470.4	403

UADPS. Forty-three percent (N=22) indicated that they did and six percent (N=3) did not respond to the question. Table VII summarizes the results.

TABLE VII

Activity Utilization of UADPS

	Frequency of Response	Percent of Total
Use	22	43
Do Not Use	26	51
No Response	3	6
Total	51	100 %

4. Identification of Authorization Accounting Activity (AAA)

Question eight asked for the activity AAA. Ten percent (N=5) of the respondents did not make a response.

The remaining respondents identified 33 separate AAAs. Of those, 20 performed this function for themselves. The largest number of activities served by the same AAA was seven. That AAA was the Naval Education and Training Financial Information and Processing Center, Pensacola, Florida.

5. PWO Awareness of the JCSR

In question nine PWOs were asked if they knew of the JCSR. Thirty nine percent (N=20) replied that they were aware of the JCSR. Fifty nine percent (N=30) replied that they did not know of the JCSR. One individual did not respond to the question. Table VIII summarizes the results.

TABLE VIII

PWO Awareness of the JCSR

	Frequency of Response	Percent of Total
Aware	20	39
Not Aware	30	59
No Response	1	2
Total	51	100 %

6. Utilization of the JCSR

Question ten measured the utilization of the JCSR by the PWO and various divisions in the PWD compared to other comptroller generated formal reports. The anchored scale form of evaluation was used to provide a common basis for response. Table IX lists the responses by percentage at

each level, as well as the weighted mean value for each individual or group included in the response.

TABLE IX

PWD Utilization of the JCSR

Individual/ Group	No.	<--- Response Scale ---> Often 5	4	3	2	Rarely 1	Mean Value
PWO	20	5	10	10	5	70	1.75
PWD Financial Personnel	20	60	10	25	0	5	4.20
MCD	20	5	15	20	20	40	2.25
Maintenance Control Personnel	19	5	11	16	11	57	1.85

7. PWO Experiences With and Introduction to the LMSC

Questions 11 and 12 measured PWO experience with the LMSC and how they became aware of the existence of the sorting system. Sixty eight percent (N=13) of the 19 respondents had experience with the LMSC. Table X summarizes the manner in which the PWO became aware of the LMSC. Three did not respond to question 12.

8. Usefulness of the LMSC in PW Maintenance Management Program

Response to the question of the usefulness of the LMSC in PW maintenance management programs was made on an anchored response scale ranging from 5 (very useful) to 1 (not useful). Table XI is a display of the input to the question by the 13 respondents.

TABLE X

PWO Experience with LMSC

LMSC experience: YES 13/68% NO 6/32%

Method of Discovery:

A. Advised by PWD personnel 6
B. Advised by comptroller personnel .. 2
C. Self-discovered 3
D. Other 2

"Other" responses included:
1. Activity automated data processing supervisor
2. Other Civil Engineer Corps officers

TABLE XI

Utility of LMSC in Maintenance Management Programs

No.	<------ Response Scale -----> Very useful 5	4	3	2	Not Useful 1
13	62%	0%	8%	8%	23%

Mean Value: 3.9

9. Previous Use of the LMSC

There were three positive responses to this question addressing previous use of the LMSC at other PWDs. Two PWOs indicated previous experience at other PWDs and one commented on the similarity of the LMSC with an Air Force system dealing with cost and real property functions. Both of the previous PWDs identified were currently utilizing the LMSC system and rated it highly useful.

10. Assignment of LMC spaces

Questions 15 through 18 dealt with the assignment of LMC spaces. Question 15 requested the number of spaces assigned by the comptroller and question 18 inquired as to the number of spaces used by the PWD. Table XII summarizes the responses to these questions. Question 16 determined the depth of sorting detail by asking whether both numbers and letters were used in the LMC spaces. Thirty eight percent (N=5) of the 13 respondents indicated that both numbers and letters were used. Question 17 inquired into the coordination between the comptroller and PW in the assigment of LMC spaces to the PWD. Eighty five percent (N=11) of the 13 replies indicated that the PWD was consulted by the comptroller during the assignment of LMC spaces.

TABLE XII

Assignment of LMC Spaces

Question 15: Spaces assigned by comptroller

1- 1/8% 2- 3/24% 3- 2/15% 4- 7/54%

MEAN= 3.15

Question 16: LMC Spaces used by PW

1- 2/15% 2- 5/38% 3- 1/8% 4- 5/38%

MEAN= 2.69

11. Principal User of LMC Sorted Data

Question 19 was aimed at determining the principal user of the LMC sorted data within the PWD. Ninety-two percent (N=12) of the 13 replies indicated that the primary

user was the financial and budgeting division. A single response identified the Maintenance Control Director as the primary user.

12. Application of LMC Sorted Data

Question 20 listed several potential applications of LMC sorted JCSR data. Responses were as follows:

1. Special Project justification ... 0
2. System cost trend analysis 8
3. Senior level inquiries 2
4. PWO analysis 9
5. Other 2

Both other responses mentioned MCD analysis.

13. LMC Space Coding

Question 21 provided four potential areas which could be represented by a LMC entry. A fifth line allowed space for other uses. Responses were as follows:

1. Investment category 1
2. Building groups 1
3. Category codes 1
4. Cost codes 3
5. Other 8

Responses for other included cost centers for divisions, reimbursable accounts, subcost centers, and organizational segments.

14. Activity Accounting System

Question 22 requested the identification of the activity accounting system. Thirteen different responses were provided. Several mentioned cost accounting (double entry) and accrual accounting based on the Navy Comptroller Manual. Others mentioned various forms of the Integrated

Disbursing and Accounting (IDA) system. A consolidation of the responses is detailed in Table XIII. Activities which listed the Resource Management System (RMS) or NIF (N=24) did not indicate the specific system of accounting used. Activities under RMS use either UADPS, IDA or locally developed systems to meet accounting requirements. The same holds true for NIF funded activities. The number of those 24 activities utilizing UADPS was not determined other than by responses to other questions.

TABLE XIII

Activity Accounting System

System	Utilizing Activities
UADPS	9
Naval Ordnance Management Information System	2
NAVSEA Management Information System	1
Naval Facilities Engineering Command Management Information System	3
Integrated Disbursing and Accouting System	4
Committment Management Information System	1
Navy Industrial Fund	14
Resource Management System	10

15. Use by PWO of Comptroller Generated Reports

Question 23 and 24 asked the PWO to identify those reports produced by the comptroller which were utilized for maintenance management. Seventy-six (N=39) percent of the PWOs indicated that they did not use any of the comptroller

reports for maintenance management. Those who answered yes, 24 percent (N=12), used the reports summarized in Table XIV.

TABLE XIV

PWO Use of Comptroller Generated Reports for Maintenance Management

Report	Frequency	%
Tab A	8	9
Tab B	8	9
JCSR	2	2
OTHER	4	4
Do not use	39	76
Total	61	100%

Other responses included local project management systems (2), Utilities Cost Analysis Report (1), and labor control summary (2).

16. Use by MCD of Comptroller Generated Reports for Maintenance Rather Than Cost Management.

Questions 25 and 26 asked for usage and identification of comptroller generated reports used by the MCD for maintenance rather than cost management. Sixty-eight (N=28) of the PWOs indicated that the MCD did not use any of the reports. Positive responses are summarized in Table XV.

17. Current MCD System of Maintenance Management Information Collection

Seventy-three (N=37) percent of the PWOs indicated that the activity MCD had a formal system to collect maintenance information. Sources utilized are shown in Table XVI.

TABLE XV

MCD Use of Comptroller Generated Reports for Maintenance Management

Use Reports 17/33%		Do Not use 34/67%
Report	Frequency	%
Tab A	10	29
Tab B	12	34
JCSR	6	17
OTHER	7	20
Total	35	100%

Some of the 17 respondents used more than 1 report

Other responses included closed job order numbers, Utility Cost Analysis Report, local customer work order listing, uniform management report.

18. PWO Consultation with PW Personnel

Question 29 was intended to determine the depth of personal knowledge of the PWO regarding the details of the activity maintenance management program. Eighty-six (N=36) percent indicated that they consulted with PWD personnel during answering of the questionnaire.

C. SUMMARY

This chapter has presented the findings of the author developed questionnaire. The emphasis was limited to an analysis of the compiled data without inferences. In the next chapter the author draws conclusions and makes recommendations based upon the findings provided by the questionnaire and the background research.

TABLE XVI

MCD Formal Maintenance Management System

Formal System 37/73% No Formal System 14/27%

Report	Frequency
Specific/Standing Job Orders	34
Previous Experience	14
Comptroller Reports	7
OTHER	15

Other responses included the following:

1. Facility Inspection 5
2. Local management information system . 6
3. Memorandum records 2
4. Annual Inspection Summary 1
5. Service chits 1
6. Automated DEIS system 1

Some of the respondents used more than 1 report.

V. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The purpose of this thesis, as previously stated in the introduction, was to describe a methodology to identify maintenance management information contained in the Job Cost Status Report (JCSR), and to evaluate the utility of this method through distribution of a questionnaire to prospective users in the field. Chapter I provided background information to establish the need for maintenance management information. Chapter II reviewed the standard Naval Facilities Engineering Command (NAVFAC) reports available to Public Works Departments (PWD)s. Additionally it contained a description of the Base Engineering Support Technical (BEST) system, a NAVFAC developed public works (PW) management assistance program. Finally, the chapter contained an explanation of the Local Management Summary Code (LMSC) and its application to the JCSR. Chapter III presented the questionnaire used to evaluate PWDs use of the LMSC and to obtain information on alternate methods of maintenance management information gathering. Chapter IV summarized the input from the survey questionnaire. Conclusions and recommendations were not discussed up to this point in the research paper and will be discussed in this chapter.

B. ANALYSIS OF SURVEY FINDINGS

The author will now draw certain inferences regarding issues and problems raised by the research findings. The conclusions have been presented in a format which follows the general areas noted in the Measures Utilized section of Chapter III.

1. PW Organizational Background

In general, the wide range of values of PW personnel and budgets highlights the need for a flexible management system with the ability to expand with the volume of operations. Manual methods of information gathering and analysis workable at smaller activities are simply overcome by their own momentum at higher volumes of data input. NAVFAC's BEST system is a response to this situation. However, the criteria for selection of candidates for the BEST system is based upon projected volume of data and a four year payback period. All activities will not receive all modules due to financial limitations. The LMSC within the Uniform Automated Data Processing System (UADPS) provides a technique for gathering maintenance information as an input to either current BEST modules or to supplement locally developed systems.

2. Utilization of UADPS and Awareness of JCSR

The LMSC technique is contained in the cost, allotment and appropriation accounting section, section G, of the UADPS. Forty-three percent of the activities polled indicated the activity came under the UADPS accounting system. Thirty-nine percent of the respondents were aware of the JCSR. Thus the LMSC sorting technique is available to approximately forty percent or 20 PWD activities in the continental United States. This figure assumes a negative response from all activities which did not return a questionnaire.

3. PWD Utilization of the JCSR and LMSC

Questionnaire responses indicated a preponderance of usage of the JCSR and LMSC by PW financial personnel. Both Public Works Officers (PWO)s and Maintenance Control

Directors (MSD)s evidenced rare usage of the report. A majority of the PWOs indicated their discovery of the LMSC was as a result of advice from PWD, comptroller, or data processing personnel. Since the questionnaire indicated a high level of usage of the JCSR by financial personnel it is assumed that advice to PWOs with regard to the LMSC was directed to its application in cost collection and display, rather than maintenance management information gathering. This is supported by the majority of replies to the question of LMC space coding which indicated codes served the financial identification function of cost center, reinbursable account, and subcost centers. Additionally, only 54 percent of the activities with UADPS accounting indicated full utilization of the LMSC, that is, four Local Management Code (LMC) spaces assigned. Spaces used by PW were split at 40 percent each for two and four spaces. However, responses to questions addressing the utility of the LMSC in maintenance management programs indicated a much higher level of usefulness. The mean value was 3.9 on a scale of 5.

The LMC sorted data was used by PWOs and MCDs for system cost trend analysis. Cost trend analysis was one of the objectives of the maintenance module in the BEST system. Conversations with personnel involved in the BEST system development indicated that schema to gather cost trend information was not transferred to other modules, as had the other objectives of the since deleted maintenance module.

It is the author's conclusion that increased application of the LMSC to maintenance management data gathering is being restricted by a lack of awareness on the part of PWOs as to the potential of the technique. This is not unexpected since the majority of advice regarding the system came from financial personnel. Additionally, a search by the author revealed only one written description of the

system, reference 12. The publication is quite large and would not normally be found in a PWD. Full maintenance management benefit from the sorting technique requires an awareness of the capability of the system and the investment of extra time during initial implementation.

4. PWD Utilization of Current NAVFAC Reports

Fully two-thirds of the PWOs and MCDs indicated that they did not make use of current NAVFAC reports for maintenance management. As discussed in chapter II, the format of these reports preclude their effective application. However, three fourths of the respondents had established some form of local maintenance management system. Input information support mentioned with the highest frequency was specific and standing job orders, followed by the other catagory which included memorandum records, service chits, and facility inspections. Three of these data inputs, specific and standing job orders, and service chits, are recorded in present reports. The manual extraction and reformatting of the information becomes an administrative burden which may well overcome the anticipated benefits, especially after the procedure becomes another of the routine tasks.

5. Variety of Accounting Systems

The number of accounting systems in use precludes any universal guidance regarding the structuring of cost data to maximize its potential to aid PWOs and MCDs in maintenance management. Conversations with various personnel involved in developing a universal accounting system disclosed that the Navy Comptroller (NAVCOMPT) is presently developing a system tentativly entitled Integrated Disbursing and Accounting Financial Management System (IDA

FMS) which will be implemented in FY-84. This system will eventually replace the accounting functions performed by UADPS. According to Mr. Doug Savin, Code 6221 at NAVCOMPT, the new system currently has no sorting capability similar to the LMSC found in UADPS. He indicated, however, that such a function would be considered if recommended by reviewing agencies.

C. SUMMARY OF CONCLUSIONS

Chapter V has provided a discussion of the findings and conclusions drawn by the author from the research effort. A summarized list of the conclusions is as follows:

1. The LMSC within the UADPS provides an existing technique for gathering maintenance management information, as an input to either current BEST modules, or to supplement locally developed systems.
2. The LMSC sorting technique is available to approximately forty percent or 20 PWD activities in the continential United States.
3. Both PWOs and MCDs evidence rare usage of the JCSR for gathering maintenance management information.
4. Response to the questions addressing the utility of the LMSC in maintenance management programs indicated a high level of usefulness. The mean value was 3.9 on a scale of 5.
5. Increased application of the LMSC is being restricted by a lack of awareness on the part of the PWOs as to the potential of the technique.
6. Fully two-thirds of the PWOs and MCDs indicated that they did not make use of current NAVFAC reports for maintenance management. However, three-fourths of the respondents had established some form of local maintenance management system.

7. The number of accounting systems in use precludes any universal guidance regarding the structuring of cost data to maximize its potential to aid PWOs and MCDs in maintenance management.
8. The proposed IDA FMS accounting system has no sorting capability similar to the LMSC found in UADPS.

D. RECOMMENDATIONS

In view of the research findings discussed earlier in this thesis work, as well as the author's conclusions drawn from the analyzed data, the following recommendations are provided:

1. NAVFAC increase the awareness of Civil Engineer Corps Officers of information sorting systems available in current Navy accounting systems, to assist in the economic operation of maintenance management systems, through NAVFAC publication MO-321, reference 1, and by instruction at the Civil Engineer Corps Officers School, Port Hueneme, Ca.
2. NAVFAC endorse the inclusion of a LMSC type system in the proposed IDA FMS.

APPENDIX A

TABULATED REPORT A

The Tabulated Report A, feeder report for the Labor Control Report is provided by the AAA on microfiche or computer size paper. The report contains data arrayed as follows:

COLUMN NUMBER	HEADING
1	Work Center
2	Labor Class Code
3	Actual Labor Hours- Month
4	Actual Labor Hours- Fiscal Year-to-Date

ROWS	HEADING
As required	Labor class codes contained within listed work centers
As required	Labor class codes contained within a PWD Branch
As required	Labor class codes contained within a PWD Division (Maintenance, Utilities)

APPENDIX B

TABULATED REPORT B

The Tabulated Report B, Completed Job Orders is provided by the AAA on microfiche or computer size paper. The report contains data arrayed as follows:

COLUMN NUMBER	HEADING
1	Trade, Branch or Work Center
2	Job Order Number
3	Estimated Hours
4	Actual Hours
5	Estimated Labor Hours
6	Actual Labor Cost
7	Estimated Material Cost
8	Actual Material Cost
9	Estimated Total Cost
10	Actual Total Cost
11	Variation Total Cost

ROWS	HEADING
One each	The specific trade, branch or work center
One each	Summary of trade branch
One each	Summary of division, maintenance or utilities

APPENDIX C

BASE ENGINEERING SUPPORT, TECHNICAL (BEST) SYSTEM PLANNED MODULES

A. EMERGENCY/SERVICE (ES)

The objectives of the Emergency/Service module are to provide a way to manage emergency/service work, and to identify the magnitude of emergency/service work in terms of the manpower requirements, the craft or work performed, and the response time required to provide emergency/service support. The module identifies equipment and/or facilities which require excessive amounts of emergency/service support, as well as emergency service items awaiting material. The modular design provides perfcrmance evaluation compared with EPS, and specific response criteria.

B. FAMILY HOUSING (FH)

The Family housing module enables the housing manager to effectively manage the assignment and utilization of Government-owned family housing, minimizing change-of-occupancy downtime and enhancing the quality of service to applicants. It also allows establishment of an automated referral data base which significantly improves service to referral customers. Furnishings program management capability is also provided at overseas locations.

C. TRANSPORTATION (TR)

The Transportation module is designed to provide the manager with the tools that are necessary to effectively

manage the transportation operation in an efficient, economical and responsible manner. It obtains cost and man-hour information for internal and external reporting.

The Transportation module consists of two submodules:

1. The Operations submodule provided vehicle utilization data, operator man-hour usage by work area, and related, indirect effort, compared to direct, productive effort.
2. The Maintenance submodule furnishes a comparison of actual man-hours with the standard hours which were estimated for equipment repair, targeted costs actual costs, and productive labor with the indirect labor which was expended.

D. UTILITIES (UT)

The Utilities module is designed to provide the manager with the tools necessary to effectively manage the utility plants and systems at an activity. The three submodules are as follows:

1. The Data submodule provides information on performance and the conditions of the utility system.
2. The Target submodule provides information on the effectiveness of service utilization and operation efficiency.
3. The Allocations submodule provides information on the extent to which a particular utility service has been used by various consumers.

E. SHORE FACILITIES INSPECTION (SFI)

The SFI module consists of the following submodules:

1. The Control Inspection (CI) submodule schedules inspections, maintains historical data, and produces

reports of buildings and structures. CI will improve the productivity of inspections, help avoid major facilities repair, and reduce clerical effort.

2. The objectives of the Preventive Maintenance Inspecion (PMI) submodule are the provision of low-cost, periodic maintenance consisting of examination, lubrication, minor adjustment, and minor repair of dynamic equipment, so that the equipment may be operated at peak efficiency; and the initiation of appropriate, corrective action to maintain the dynamic equipment at the required levels of maintenance.

F. WORK PLANNING AND STATUS (WPS)

The Work Planning and Status module is designed to track the status of Job Orders (with the exception of E/S work) from inception to completion. It will be able to identify the status of any job, upon request, or to identify a backlog of work by area.

G. FACILITIES ENGINEERING JOB ESTIMATING (FEJE)

The function of this module is to generate estimates of labor hours, labor costs, equipment hours, and equipment costs. The module relies upon a Cost Estimating Guide, Unit Price Standard, Engineered Performance Standards, and locally generated standards recorded in FEJE program external systems tables, that is, labor rates, equipment rates, nomograph data, and material costs.

H. WORK INPUT CONTROL (WIC)

The Work Input Control module is designed to identify, on a periodic basis, deficiencies in all facilities and equipment, and to initiate appropriate corrective action to

maintain these facilities and equipment at the required levels of maintenance, to provide a system for controlling Public Works Department real property maintenance activities from inception to completion, and to provide scheduling support and information on manpower availability, planned overhead and productive work, and total workload requirements necessary to control and accomplish essential maintenance and repair jobs within a current fiscal year. This system will incorporate the Work Planning and Status System as a submodule.

I. MANAGEMENT ANALYSIS (MA)

The Management Analysis module covers the output and use of after-the-fact reports on completed jobs and/or work force utilization.

JOB ORDER CARD FORMAT

ACTIVITY NAME

DOC IDENT	ACTIVITY	FY	JOB ORDER	TC	AAA IND	FUND ADM OR AAA	APPROPRIATION	SUB-HEAD	BUDG PROJ	ALLOT	SUB ALLOT RECD	SUB ALLOT ISSUED
1-3	6-10	11	12-16	*17	18	19-23	24-30	31-34	35-36	37-39	40	41

SEG	BCC		LOCAL MANAGEMENT CODE	CHARGEABLE ACTIVITY	FUNC CAT	FUNC. ACCT. NO. SUB/FUNC CAT	FUNC. ACCT. NO. COST ACCOUNT	LBR ACCL CODE	FINANCE BUREAU	JOB COST KEY	RE-IMB CAT	JOB COST CONTROL	POST KEY	
42-45	46	47	50-53	54-58	59	60	61-64	65	66-67	68	69	70	71	

JOB DESCRIPTION

CARD NUMBER 2

DOC IDENT	ACTIVITY JOB ORDER	TC	CMP/TMP	CUST CODE	SHOP CONT EQUIP CODE	BUDGET LINE NUMBER	UTIL CODE	SITE CODE	HOUSING CODE	HOUSING GFOQ	CREDIT ACCL JOB ORDER
1-3	6-16	*17	18	19-20	21-24	25-29	30-31	32	34	35-37	38-42
	SAME AS ABOVE										

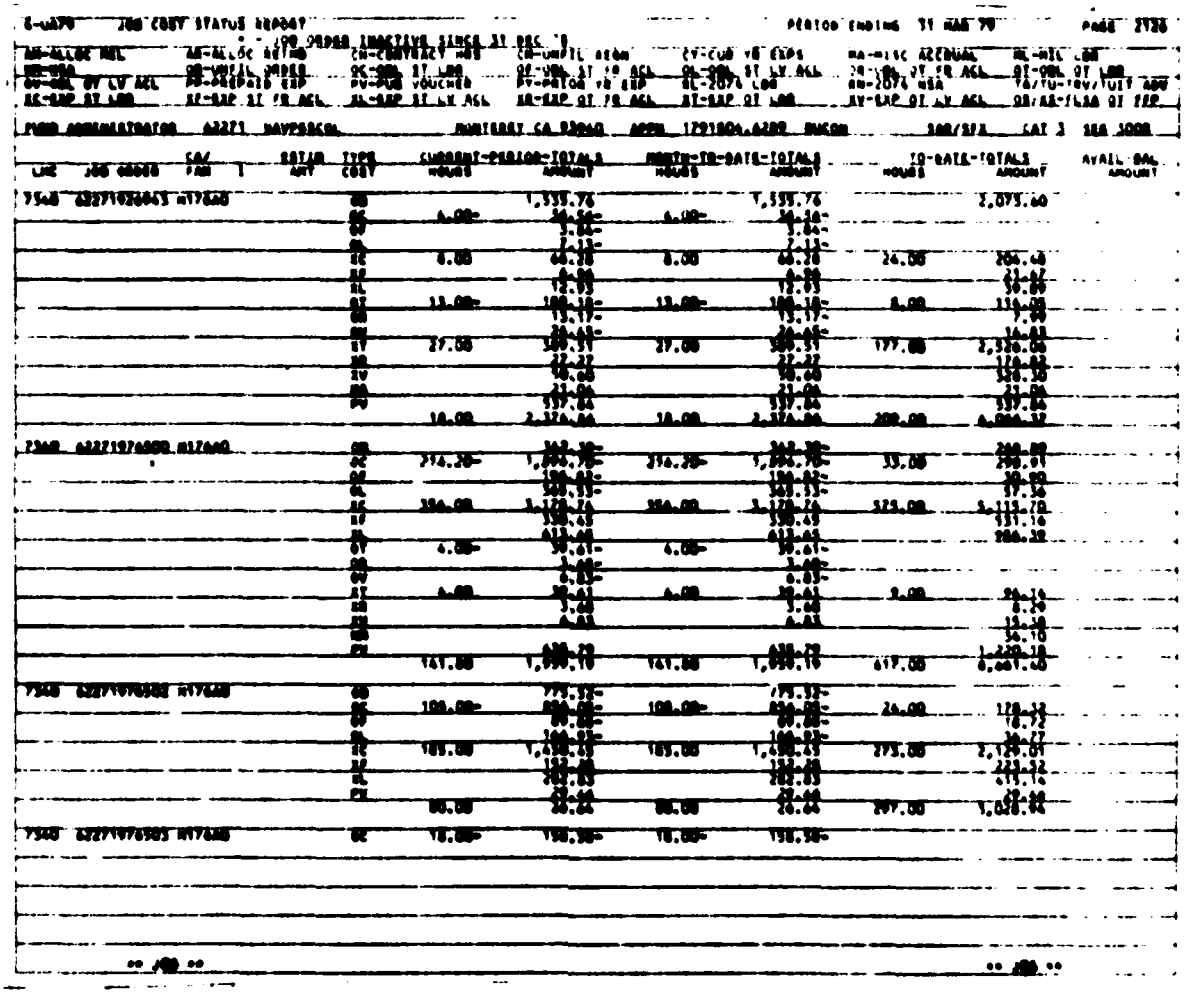
END USE JOB ORDER NO.	TASK ASSIGNMENT NUMBER (54-64) OR R&D PE, PROJ, TASK & TYPE			2025 KEY	BUDGET PROJECT SUFFIX	DISP LINE NO.	STORES CODE	NON NAVY KEY	POL EXP ELEM.	PLANT PROPERTY ACCTG. ACTY
43-53	54-55	56-59	60-62	63 64	65	66-68	69	70	71	72	73-77

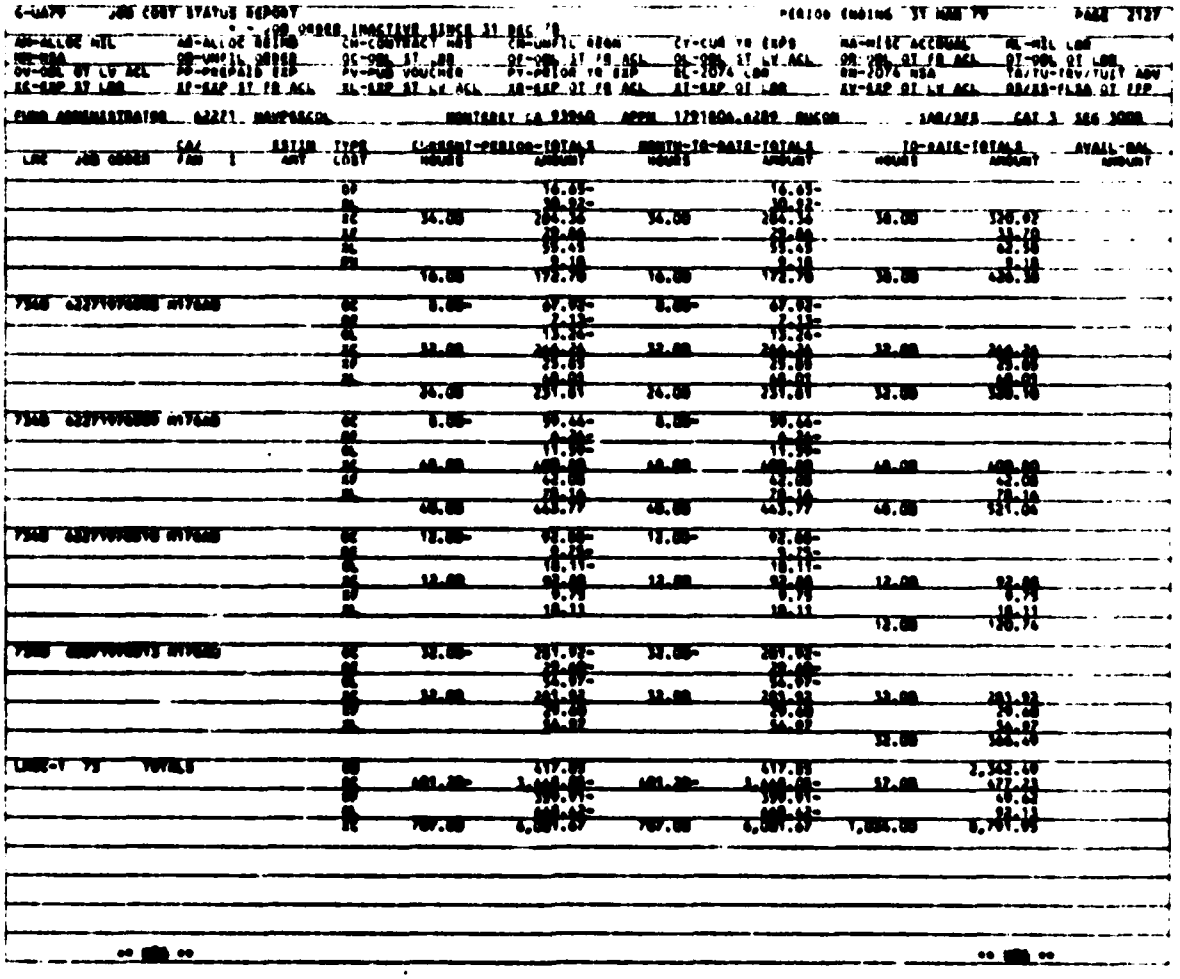
*T/C CARD NO. 1
1 - Establish
3 - Update
5 - Delete "0" Fields

T/C CARD NO. 2
2 - Establish/update
6 - Delete "0" Fields

APPENDIX E

JOB COST STATUS REPORT





APPENDIX F

NAVAL AIR STATION MOFFETT FIELD JOB ORDER HANDBOOK

A. SELECTED PAGES (9)

Public Works Department - Maintenance of Real Property

LMC	ORGANIZATION TITLE
U---	Maintenance of Building
U---	Maintenance of Waterfront
U---	Maintenance of Other facilities
U---	Maintenance of Utility Plants
U---	Maintenance of Utility Distribution Systems
U---	General Maintenance Costs
U---	Minor Construction-Capitalized/Noncapitalized
USFH	Self Help
USRF	Maintenance of Surfaced Areas
UGRD	Maintenance of Grounds
UOTH	Other Structural Maintenance
UPLT	Utility Plants Maintenance
UDST	Utility Distribution Systems Maintenance
UGEN	General Maintenance Costs
UPEB	Pre-Expended Bin for Public Works Shops
UOVH	Maintenance Overhead
USTU	Transportation Operations - Groups S, T and U
UACC	Leave Accleration Credits
----	Reference Lists A thru U

SPECIFIC JOB ORDER FORMAT

General. Specific job order numbers contain the same number of characters as standing job orders published in the job order handbook (6 characters consisting of a fiscal year plus 5 unique characters). A system has been established to provide for the identification of building numbers in areas where costs are significant and should be tracked in detail. In other areas of public works activity a specific job order scheme has been adopted to link the specific job order to the standing job order which describes the same type work. Additionally within the Specific Format a sequence code has been established to identify how many job orders have been initiated by category (Operations or MRP) and by source of funds (Direct or Reimbursable). The following detail explains the coding for the 5 characters following FY.

Public Works (Operations). Specific job orders relating to Public Works Operations (Cost Center or Local Management Code beginning with 'S') will utilize the same three characters following fiscal year as the standing job order for that type of function. The last two characters will identify the job order as being in the operations area, its sequential number and the source of funds. Example: PTABS is the standing job order number for Maintenance and Repair of Refrigeration and Water Cooling Equipment over 5 Tons.

If it were necessary to issue a standing job order it is desirable for the job cost report to collect all standing and specifics relating to this area together - therefore, the PTA is repeated in the specific. The sequence number is necessary to identify which standing job order the transaction refers to in the PTA series. Using a sequence code that combines 12 letters of the alphabet and the numbers 1-9 each area of interest may have up to 108 unique specific job orders. To distinguish between direct and reimbursable fund sources the position of the letter number combination can be referenced - letter first means direct funds - number first means reimbursable funds. The sequence will be assigned in either case in ascending order as follows:

Direct	Reimbursable
PTAA1	PTA1A
PTAA2	PTA2A
.	.
.	.
.	.
PTAA9	PTA9A
PTAB1	PTA1B
.	.
.	.
.	.
PTAB9	PTA9B
PTAC1	PTA1C
etc.	etc.

Notice that only the letters A-L not including 'I' are used for Public Works Operations. This also will provide a job cost report which collects all maintenance and repair of refrigeration together and lists in order the direct and reimbursable job in use.

Public Works (Maintenance of Real Property). Specific job orders relating to MRP (Cost Center, or Local Management Code beginning with 'U') follow a pattern similar to that established for Public Works Operations. The only difference occurs in those specific costs that are to be collected by particular building - for which case the first three characters will be a building number from one of the lists in the job order handbook.

In those cases where building number is not significant the first three letters of the MRP standing job order number will be used in a manner similar to the procedure described under Operations. To distinguish the MRP area a separate sequence code has been established using the letters M-Z except for 'O'. The concept of letter first for Direct and letter last for Reimbursable also applies to MRP.

Example of Specifics for Bldg 12

Direct	Reimbursable
012M1	0121M
012M2	0122M
.	.
.	.
.	.
012M9	0129M
012N1	0121N
etc.	etc.

Example of a non-building related to a standing job order:

MAEBU is the standing job order for sidewalks and pavements.

Direct	Reimbursable
MAEM1	MAE1M
MAEM2	MAE2M
.	.
.	.
.	.
MAEM9	MAE9M
MAEN1	MAE1N
etc.	etc.

Assigning of Building/Structure Job Orders

The selection of a structure number from the list indicated as the missing elements of the job order number will insure that job cost reports identify structure costs. Job order numbers reflecting structures will automatically group changes within Local Management Codes on management reports that reflect the same building or structure numbers.

Example:

Bldg #	JON	LMC
12	012TB	U012
148	148TB	U148

PUBLIC WORKS - MRP

UIC	LOCAL MGMT CODE	APPROPRIATION AND SUBHEAD	BUDGET CL CD	CMP/TMP CODE	JOB COST KEY		POST KEY
00296	U---	17-1804. 702E	FA	3	M		A
JOB SERIAL NUMBER	DESCRIPTION		FUNC/SF COST ACCT	PW/FLT REPORT	EQUIP CODE	UTIL CM/T	MSC CD
	MAINTENANCE OF BUILDINGS						
---TB	Training - Building in which applied academic and general instruction is given or military training accomplished. (Cat. Code 171) (NIC 05) List "F" Applies. Work Unit: Thousand square feet of floor area in training buildings.		M17110	71100			(R
---MP	Maintenance and Production Buildings Includes the maintenance of buildings and shops used in the maintenance, repair, production, testing, storage and/or assembly of ordnance and components, combat and noncombat vehicular equipment, weapons, ammunition, explosives and toxics, electronic and communications equipment and other miscellaneous such as material handling equipment and production of processed items such as asphalt, concrete, rock and lumber. (Cat. Codes 212-10, 212-20,212-30, 212-77, 214-10, 214-20, 214-30, 214-40, 214-51, 214-53, 215, 216, 217-10, 217-30, 217-77, 218, 219, 222, 224, 225, 226, 227, 228, 229-40, 229-50, 229-60, 229-77 and 229-80) (NIC 08) List "G" Applies. Work Unit: Thousand square feet of floor area in maintenance and production buildings.		M17120	71200			(R

PUBLIC WORKS - MRP

JOB SERIAL NUMBER	DESCRIPTION	PROJECT COST REPORT				
00296	U--- 17-1804. 702F	BUDGET EX CD FA	CONSTRUCTION GROUP 3	JOB COST REV ::		POST REV A
	MAINTENANCE OF BUILDINGS (CONTINUED)					
--- ED	Dental - Buildings designated as dental clinics or out-patient dental services. (Cat Codes 510, 520, 530, 540 and 550) (NIC 13)(Building 546 Only) Work Unit: Thousand square feet of floor area in dental facilities.	M17150	71500			(R
--- MC	Medical - Buildings designated as hospitals, infirmaries, or used for medical related work, or out-patient dispensary service. (Cat Codes 510, 520, 530, 540 and 550) (NIC 13) (Building 546 Only) Work Unit: Thousand square feet of floor area in medical facilities.	M17150	71500			(R
--- AD	Administration - Buildings housing administrative functions such as office, professional and technical activities. Excludes bulk storage of administrative records. (Cat Code 610) (NIC 14) List "J" Applies. Work Unit: Thousand square feet of floor area in administration buildings.	M17160	71600			(R
--- BK	Bachelor EM Barracks - Housing for bachelor enlisted personnel and comparable civilians both male and female. Barracks; dormitories; disciplinary and detention barracks; and facilities with or without mess and galley facilities; (except clubs and club messing) and latrines. (Cat Code 721)(NIC 15) List "K" Applies. Work Unit: Thousand square feet of floor area.	M17170	717B0			(R

PUBLIC WORKS DEPARTMENT - OPERATIONS

LMC	ORGANIZATION TITLE
SPWO	Public Works Operations - Inclusive of NAF Activities
SFON	Telephone - Inclusive of NAF Activities
SUTL	Utility Operations - Inclusive of NAF Activities
SSUP	Miscellaneous Operations Support
SSUS	Suspense Account
STRA	Training
SLVE	Civilian Leave
SACC	Leave Acceleration Credits
SCRT	Allocated Cost Credits
SYAR	Military Duty and Absence, and Military Cost Variances
SKID	Student Aids

NOTE: ACQUISITION OF MINOR PROPERTY (UNIT COST LESS THAN $3,000) FOR STORAGE AND PRESERVATION OPERATIONS, FURNISHINGS AND OPERATING EQUIPMENT NOT CHARGEABLE TO PUBLIC WORKS FUNCTIONS WILL BE COSTED TO FUNCTIONAL SUBFUNCTIONAL CATEGORY AND COST ACCOUNTS P19110/P192A0. SEE LMC SSUP. EXCLUDES OFFICE FURNITURE AND LABOR SAVING DEVICES, SEE NASMFINST 5210.2D.

TRAINING/TRAVEL:

1. TUITION COSTS AND TIME SPENT IN FORMAL CLASSROOM TRAINING WILL BE COSTED TO THE APPROPRIATE FUNCTIONAL SUBFUNCTIONAL CATEGORY AND COST ACCOUNT, SEE LMC STRA.

2. TRAVEL AND PER DIEM COSTS WILL BE COSTED TO THE COST ACCOUNT FOR WHICH THE TRAVEL IS PERFORMED.

PUBLIC WORKS - TRANSPORTATION DIVISION

LMC	ORGANIZATION TITLE
BT50	Transportation - Maintenance
BT51	Transportation - Maintenance Groups S, T and U
BT52	Transportation - Operations
BT53	Transportation - Operations Groups S T and U
BT90	Suspense Account
BT91	Training
BT92	Civilian Leave
BT93	Leave Acceleration Credits
BT95	Allocated Cost Credits
BT96	Military Duty and Absence, and Military Cost Variances

NOTE: TRAINING/TRAVEL:

1. TUITION COSTS AND TIME SPENT IN FORMAL CALSSROOM TRAINING WILL BE COSTED TO THE APPROPRIATE FUNCTIONAL, SUBFUNCTIONAL CATEGORY AND COST ACCOUNT, SEE LMC BT91.

2. TRAVEL AND PER DIEM COSTS WILL BE COSTED TO THE COST ACOCUNT FOR WHICH THE TRAVEL IS PERFORMED.

PUBLIC WORKS - FAMILY HOUSING

LMC	ORGANIZATION TITLE
JA10	Operations (Budget Project 10)
JA20	Referral Office (Budget Project 10)
JA30	Furniture/Furnishings and Equipment (Budget Project 10)
JA40	Maintenance (Budget Project 20)
JA--	Major Repairs

NOTE: 1. SEE LMC BS92 FOR LEAVE JOB ORDER SERIALS.

2. CREDIT LEAVE ACCELERATION TO LMC BS93.

3. JOB ORDER SERIAL NUMBERS JA700 THROUGH JA890 RESERVED FOR ASSIGNMENT BY PUBLIC WORKS UNDER THE MAINTENANCE CONTROL PROGRAM.

B. COMMENTS

The previous nine pages presented the general layout of the Naval Air Station Moffett Field Job Order Handbook. Page U-1 shows a LMC U___ which is completed by entering the appropriate building number. Additionally posting key A is designated. Thus, expenses are summarized by each building and by the total category U (Maintenance). A similar format is applied to PW areas of operations, transportation, and family housing. The entire job order handbook contains over 110 pages.

Mr. Paul Crawford, NAS Moffett Field Maintenance Control Director, has offered to provide details of the procedures used to generate the comprehensive blending of LMC and job order number codes. He may be contacted at commercial telephone 415-462-5241 or autovon 966-5241.

APPENDIX G

QUESTIONNAIRE

Administrative Science Curriculum
Naval Postgraduate School
Monterey, California 93940

22 March 1982

Commanding Officer (Public Works Department)

Salutation

As a student at the Naval Postgraduate School, I have selected the utilization of the Local Management Code in the Job Cost Status Report by the Public Works Department as a thesis research topic. My research addresses the level of awareness and utilization of this built-in sorting system, as an aid to maintenance management rather than cost management. I would appreciate your assistance in completing the enclosed questionnaire.

The questionnaire is designed to be completed in approximately fifteen minutes, as most of the questions require Yes/No or brief fill-in answers. Space is provided at the end of the questionnaire, however, for any comments you might wish to make concerning the nature of the questions or the topic in general. If you find it necessary to consult with other PWD personnel while answering questions regarding the Local Management Code please check the appropriate box in question 29.

All information provided by respondents will be treated in a strictly confidential manner. Your assistance in insuring that the questionnaire is returned within seven days of its receipt will be greatly appreciated.

If you or members of your staff desire to receive a summary of the survey results, please check the appropriate box on the last page of the questionnaire. Thank you for your assistance in this research effort.

Sincerely,

K. A. JOHNSTON
CDR, CEC, USN

____ 1. What is the Public Works (PWD) budget for this fiscal year?

____ 2. What is the total M-1 and R-1 budget for this fiscal year?

____ 3. What is the total PWD personnel ceiling?

____ 4. What is the maintenance control division personnel ceiling?

____ 5. What is the maintenance and utilities division personel ceiling?

____ 6. What is the activity replacement cost in current dollars?

Y__N__ 7. Does your activity utilize the Uniform Automated Data Processing System (UADPS)?

8. Who is your Authorization Accounting Activity (AAA)?

Y__N__ 9. Do you know of the Job Cost Status Report (JCSR)? (If you answered No to question 9 please go to question 22)

10. How often do each of the following personnel use the JCSR compared to other public works and comptroller generated formal reports?

OFTEN				RARELY	Please select a value from the left for each response
5	4	3	2	1	
___	___	___	___	___	A. Yourself
___	___	___	___	___	B. PWD financial personnel
___	___	___	___	___	C. Maintenance Control Director
___	___	___	___	___	D. Maintenance control personnel

Y__N__ 11. Have you had any experience in public works with the Local Management Code (LMC), as it is applied to the JCSR? (If you answered No to question 11 please go to question 22)

12. How did you become aware of the sorting capability of the LMC?

____ A. Advised by PWD personnel
____ B. Advised by comptroller personnel
____ C. Self discovered
____ D. Other (please specify) _____

13. Is the LMC a useful adjunct to your maintenance management program?
Circle one: Very useful Not useful
5 4 3 2 1

Y__N__ 14. Have you used the LMC sorting technique at any other PWD? If yes, please identify the activity

_____

15. How many of the four available LMC spaces are assigned by the comptroller? (Please check the number of spaces used)

____1
____2
____3
____4

Y__N__ 16. Are both numbers and letters used in the LMC spaces?

Y__N__ 17. Was the PWD consulted in this assignment?

18. How many of the LMC spaces are used by the PWD? (Please check the number of spaces used)

____1
____2
____3
____4

19. Who is the principal user of the LMC sorted data?

____ A. PWO
____ B. APWO
____ C. MCD
____ D. Engineering
____ E. Financial
____ F. Other (Please specify) _____

20. To what application do you put the LMC sorted data?

____ A. Special Project justification
____ B. System cost trend analysis
____ C. Senior level inquiries
____ D. PWO analysis
____ E. Other (Please specify) _____

21. What do the LMC spaces represent in the JCSR printout?

____ A. Investment category
____ B. Building groups
____ C. Category codes
____ D. Cost codes
____ E. Other (Please specify) _____

22. What accounting system is utilized by your activity?

_____

Y__N__ 23. Do you, as the PWO, use any comptroller generated report for maintenance management rather than cost management?

24. If so, please indicate the report(s) used

____ Tab A
____ Tab B
____ JCSR
____ Other (Please specify) _____

Y__N__ 25. Does the MCD make use of any comptroller generated report for maintenance rather than cost management?

26. If so, please indicate the report(s) used

____ A. Tab A
____ B. Tab B
____ C. JCSR
____ D. Other (Please specify) _____

Y__N__ 27. Does the MCD have a system to formally collect information on specific areas of maintenance on ongoing basis?

28. From what sources are the maintenance information gathered?

____ A. From specific and standing job orders

____ B. Based on previous experience

____ C. From comptroller reports (Please specify)

_____

____ D. Other (Please specify) _____

Y__N__ 29. Did you find it necessary to consult PWD personnel while answering this questionnaire?

Additional comments on your use of the LMC, as desired, are welcomed:

_____

_____

_____

_____

_____

Thank you for your assistance in completing this questionaire. If you wish to receive a copy of the summarized results please fill in your address below.

_____

_____

_____

LIST OF REFERENCES

1. NAVFAC MO-321, Maintenance Management of Public Works and Public Utilities, Department of the Navy Naval Facilities Engineering Command, 1975

2. Nebough, E. T., Effective Maintenance Management, McGraw-Hill, 1967

3. Bullock, J. H., Maintenance Planning and Control, National Association of Accountants, 1979

4. Telephone conversation with Mr. R. D. Dutton, Code 1003, Naval Facilities Engineering Command, Alexandria, Virginia

5. Corder, A. S., Maintenance Manangement Techniques McGraw-Hill, 1976

6. Various telephone conversations with Mr. E. Bucher, Code 973, Fleet Material Support Office, Mechanicsburg, Pennsylvania

7. NAVSO P-1000, Navy Comptroller Manual, Vol. 3, Comptroller of the Navy, 1981

8. NAVFAC P-424, Navy Facilities System (NFS), Department of the Navy Naval Facilities Engineering Command, 1980

9. Various telephone conversations with Mr. Don Snyder, Code 1001, Naval Facilities Engineering Command, Alexandria, Virginia

10. NAVFAC P-428, Public Works Department Management System (Draft), Department of the Navy Naval Facilities Engineering Command, August 1971

11. UADPS-SP Executive Handbook, Department of the Navy Navy Fleet Material Support Office, January 1980

12. NAVSUP P-420, UADPS Support Procedures, Naval Supply Systems Command, 1961

13. Dyer, R. F., and others Questionnaire Construction Manual Army Project Number 2Q763711A775, July 1976

14. Oppenheim, A. N., Questionnaire Design and Attitude Measurement, Basic Books Inc., 1966

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, Virginia 22314	2
2.	Defense Logistics Studies Information Exchange U.S. Army Logistics Management Center Fort Lee, Virginia 23801	1
3.	Library, Code 0142 Naval Postgraduate School Monterey, California 93940	2
4.	Department Chairman, Code 54 Department of Administrative Science Naval Postgraduate School Monterey, California 93940	1
5.	CDR Robert A. Bobulinski, SC, USN, Code 54Bb Department of Administrative Science Naval Postgraduate School Monterey, California 93940	3
6.	Profressor Shu, S. Liao, Code 54Lc Department of Administrative Science Naval Postgraduate School Monterey, California 93940	1
7.	CDR Keith A. Johnston, CEC, USN OICC SOWESTPAC Manila, RP APO San Francisco 96528	2
8.	Commander Naval Facilities Engineering Command Code 1001 200 Stovall Street Alexandria, Virginia 22332	3
9.	Professor Kenneth J. Euske, Code 54Ee Department of Administrative Science Naval Postrgaduate School Monterey, California 93940	1
10.	LCDR William Talutis, CEC, USN, Code 54Tu Department of Administrative Science Naval Postgraduate School Monterey, California 93940	3
11.	Commanding Officer Naval School Civil Engineer Corps Officers Port Hueneme, California 93043	1