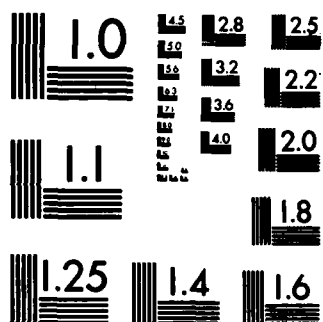


AD-A146 267 PERFORMANCE MEASUREMENT AND REPORTING (PMR) SYSTEM FOR 1/1
SHIPYARD FOREMEN... (U) NAVY PERSONNEL RESEARCH AND
DEVELOPMENT CENTER SAN DIEGO CA J A RIEDEL ET AL.
UNCLASSIFIED AUG 84 NPRDC-TR-84-55 F/G 5/1 NL

END

FILED

DTIC



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

AD-A146 267

**PERFORMANCE MEASUREMENT AND REPORTING (PMR) SYSTEM
FOR SHIPYARD FOREMEN: DEVELOPMENT AND DESIGN**

James A. Riedel
Kent S. Crawford
Darlene Morell
Robert Kanemaru

Reviewed by
Laurie Broedling

Approved by
R. Blanchard

Released by
J. W. Renard
Captain, U.S. Navy

DTIC
ELECTE
S **OCT 3 1984** **D**
B

Navy Personnel Research and Development Center
San Diego, California 92152

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release, distribution unlimited.	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE			
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NPRDC TR 84-55		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION Navy Personnel Research and Development Center	6b. OFFICE SYMBOL (If applicable) Code 72	7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State and ZIP Code) San Diego, California 92152		7b. ADDRESS (City, State and ZIP Code)	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Pearl Harbor Naval Shipyard	8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State and ZIP Code) Pearl Harbor, Hawaii 96860		10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO. N0031184	PROJECT NO. 4XF801
		TASK NO. WR 30000	WORK UNIT NO.
11. TITLE (Include Security Classification) PERFORMANCE MEASUREMENT SYSTEM FOR SHIPYARD FOREMEN: DEVELOPMENT AND DESIGN AND REPORTING (PMR)			
12. PERSONAL AUTHOR(S) James A. Riedel, Kent S. Crawford, Darlene Morell, and Robert Kanemaru			
13a. TYPE OF REPORT Technical Report	13b. TIME COVERED FROM Oct 1981 TO Jul 1984	14. DATE OF REPORT (Year, Month, Day) 1984 August	15. PAGE COUNT 68
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES			
FIELD 05	GROUP 01	SUB-GROUP	
18. ABSTRACT (Continue on reverse if necessary and identify by block number)			
This report describes the development, design, and implementation of an automated system for tracking the performance efficiency of foremen in a Navy shipyard. The system, which uses existing input, was developed to augment the performance measurement application of the shipyard management information system (MIS). It improves accuracy in measuring performance efficiency, provides a correction procedure for improper labor transactions, and allows for clear audit trails. It can be used in conjunction with a variety of productivity enhancement techniques, such as incentives, goal setting and performance feedback and appraisal. Direct benefits to the Production Department, Pearl Harbor Naval Shipyard, are discussed.			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL James A. Riedel		22b. TELEPHONE (Include Area Code) (619) 225-6955	22c. OFFICE SYMBOL Code 72

DD FORM 1473, 84 JAN

63 APR EDITION MAY BE USED UNTIL EXHAUSTED
ALL OTHER EDITIONS ARE OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

FOREWORD

The purpose of this research and development, which was supported under a task order from the Pearl Harbor Naval Shipyard (NAVSHIPYDPEARL), was to develop a performance measurement and reporting (PMR) system for use in conjunction with a group wage incentive system at NAVSHIPYDPEARL. The newly designed system can also be used with other productivity enhancement techniques appropriate for groups of production workers.

Appreciation is extended to staff members at NAVSHIPYDPEARL, especially the system analysts and programmers, who provided detailed information about the shipyard management information system, developed computer programs, and made valuable suggestions for the design of the new system.

J. W. RENARD
Captain, U.S. Navy
Commanding Officer

JAMES W. TWEEDDALE
Technical Director

Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
PER CALL JC	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

SUMMARY

Problem

To justify the payment of incentives to production workers in Shop 31 at the Pearl Harbor Naval Shipyard (NAVSHIPYDPEARL), an accurate and timely measure of group performance was needed. Current measures did not meet these requirements.

Purpose

The purpose of this effort was to design and implement a performance measurement and reporting (PMR) system to be used in conjunction with a group incentive system or any other productivity enhancement technique appropriate for groups of production workers at Navy shipyards.

Approach

The existing management information system (MIS) at NAVSHIPYDPEARL was reviewed to determine its adequacy in tracking and reporting work gang performance. During this review, attention was given to the characteristics of the performance measure, the performance standard, and the form, content, and timeliness of the feedback reports. Problems were found in some of these areas, and steps were taken to remedy them. The primary goal was to improve the accuracy of the performance measure while maintaining timely feedback.

Results and Conclusions

The new PMR system developed for tracking performance efficiency of foremen provides a more accurate and yet timely measure of performance efficiency than was previously available. Moreover, it uses existing MIS data, permits allowance and expenditure information in the database to be corrected, and provides clear audit trails for documentation, justification, and review. These improvements could have a positive impact on other shipyard functions such as cost accounting, production control, and planning. Three detailed time accounting reports, produced both weekly and every 4 weeks, show labor transactions by employee, foreman, and job order key operation. Four performance feedback reports, produced every 4 weeks, summarize performance efficiency information by foreman, work center, and shop.

Results from a trial implementation of the system in Shop 31 suggested that it could be successfully used to replace some elements of the PM application of the shipyard MIS. Supervisors reported the accuracy of performance feedback to be superior to that provided by the existing Performance Measurement (PM) application of the shipboard MIS but favored modifying the reports to provide less detail. Since the system was designed expressly for a Navy shipyard MIS, its use could be extended to other shops at NAVSHIPYDPEARL or other Navy shipyard production departments. Also, it can be used in conjunction with a number of motivational techniques for improving productivity (e.g., incentives, goal setting, or performance appraisal).

Recommendations

It is recommended that NAVSHIPYDPEARL:

1. Continue using the new PMR system in Shop 31 to evaluate foreman and shop performance efficiency.

2. Develop systematic and efficient procedures for correcting errors such as failure to enter allowances into the MIS or timecard entry errors. Timely correction of such errors should improve both the accounting of labor expenditures and the measurement of performance.

3. Develop reports that summarize information in graphic form for use by supervisors and managers.

4. Use the system to detect errors in the MIS database, such as rejected timecards. When possible, enforce accountability for such errors to the offending department.

5. Implement the system in other areas of the Production Department if this is cost-effective. Implementation costs to be considered include those associated with (a) tailoring the system to the requirements of the entire department and (b) integrating the system within the existing PM application of the shipyard MIS.

6. Complete documentation of the new system and make it available to other shipyards.

7. Determine the feasibility of using the system in other Navy shipyard production departments.

CONTENTS

	Page
INTRODUCTION	1
Problem	1
Background	1
Performance Measure Characteristics	2
Performance Standard	2
Feedback Timeliness	3
Content and Form of Feedback Reports	4
Purpose	4
APPROACH	5
Organizational Setting	5
Work Process and Measurement in Shop 31	5
JO KEYOP	6
Employee Time Card	8
Problem Areas in Existing PM Application	8
Performance Measure Characteristics	9
Performance Standard	10
Feedback Timeliness	10
Content and Form of Feedback Reports	11
RESULTS	11
System Overview	11
Time Accounting Reports	11
PM-L07A--Detail Time Accounting Report by Employee	13
PM-L08A--Detail Time Accounting Report by Foreman	13
PM-L09A--Detail Time Accounting Report by Job Order KEYOP	16
Performance Computation Reports ¹⁶	16
PM-L17A--Foreman Line Item Performance on Closed KEYOPs	16
PM-L18A--Line Item Allowance/Expenditure Detail List	18
PM-L18B--Shop Work Center Performance Over Last Three Periods	21
PM-L19A--Foreman Performance and Man-hour Savings Over Last Three Periods	21
Trial Implementation of the New PMR System	23
CONCLUSIONS	24
RECOMMENDATIONS	24
REFERENCES	27
APPENDIX--DETAILED DESCRIPTIONS OF PMR SYSTEM FEEDBACK REPORTS ..	A-0
DISTRIBUTION LIST	

LIST OF FIGURES

	Page
1. Sample KEYOP document	7
2. Sample time card	8
3. Sample page from PM-L07A report	14
4. Sample PM-L08A report	15
5. Sample PM-L09A report	17
6. Sample PM-L17A report	19
7. Sample PM-L18A report	20
8. Sample PM-L18B report	21
9. Sample PM-L19A report	22

INTRODUCTION

Problem

In recent years, the Department of the Navy has provided policy and guidance to encourage field activities to develop initiatives aimed at improving their productivity. Consistent with this direction, the Pearl Harbor Naval Shipyard (NAVSHIPYDPEARL), in collaboration with the Navy Personnel Research and Development Center (NAVPERS-RANDCEN), developed a group wage incentive system for use on a trial basis in its Inside Machine Shop, Shop 31. It was anticipated that this system, which would give financial rewards to production supervisors and workers for labor hour savings, would result in increased productivity. However, before financial rewards could be computed and justified, an accurate and timely measure of group performance was needed. Existing measures were not adequate.

Background

A measurement system that tracks performance on important organizational outcomes and provides diagnostic information that can be used to improve individual or group performance is a prerequisite of many productivity improvement techniques. Goal setting, team building, performance appraisal, and monetary incentives all rely, to some extent, on such a system. However, if workers perceive a performance measurement and reporting (PMR) system as being poorly designed, it may have a negative effect on the performance of organizational members (Cammann & Nadler, 1977; Lawler & Rhode, 1976). For example, in the presence of such a system, they may resort to game playing, where they manipulate measures to obtain the desired results, or actually sabotage the system. On the other hand, if employees perceive a system as being well designed, they may be encouraged to increase their level of performance by increasing production or improving the quality of their work. Cammann and Nadler (1977) give three reasons why a PMR system should affect performance positively.

1. The fact that management is measuring an area of performance indicates that management feels that that area is important. As a result, individuals whose performance is being measured may also begin to view it as important and direct their energy to activity within the area.
2. Managers often use PMR systems to evaluate and reward employee performance. Employees usually direct their energy into work activities that are evaluated and rewarded.
3. Organizational members can easily see changes in their performance when it is measured as a part of the formal PMR system. If they can see that their performance is improving, this can be a source of personal satisfaction.

Despite the substantial influence that PMR systems can have on the performance of organizational members, some managers continue to maintain ineffective or out-of-date systems. Organizational effectiveness may suffer when a PMR system produces erroneous information that is used as a basis for decision making or performance feedback. Also, the quality of work life may deteriorate, as organizational members realize that they are both partially controlled by and expending time and energy to support an ineffective system.

In designing an effective PMR system, Lawler and Rhode (1976) suggest that managers consider (1) the characteristics of the performance measure(s), (2) the performance standard, (3) the timeliness of feedback, and (4) the content and form of the feedback reports. These factors are discussed below.

Performance Measure Characteristics

A good performance measure should have the following characteristics:

1. It should be objective; that is, it should be quantitative, reflecting specific, countable, observable acts or events (Mohr, Shumate, & Magnusson, 1983). Since objective measures are unambiguous, they are more likely to produce positive reactions from individuals than are subjective measures, particularly when organizational trust is low (Porter, Lawler, & Hackman, 1975). When trust is low, employees may be uncertain about their superiors' intentions. Therefore, they may not believe that the subjective performance ratings are either accurate or fair. As a result, it is unlikely that they will try to improve their performance.

2. It should be complete; that is, it should cover all the major aspects of an employee's job. If it is not complete, employees may ignore those job aspects not covered (Baumler, 1971), thus undermining their overall effectiveness.

3. It should be sensitive; that is, it should be influenced by changes in employee performance but not by external events beyond the employee's control. If an employee whose performance is being measured feels that the measure is being influenced by external events, he or she will view it as capricious and is unlikely to try to improve performance on the measured outcome.

4. It should be accurate; that is, it should reflect individual or group performance precisely. It should represent not only changes in employee behavior, but also the magnitude of those changes. Research has shown that employees try harder to improve their performance when a performance measure is accurate than when it is inaccurate (Cammann, 1974), probably because, when people are working effectively, they derive personal satisfaction from seeing and having others see the results of their work efforts reflected in a performance measure.

5. Finally, it should be practical. A practical measure not only uses available performance data from existing sources, but is also cost-effective; that is, the expected benefits gained by collecting data for a performance measurement exceed the data collection costs. By using available performance data, the performance measure is apt to be familiar to users. Thus, it is more likely to be used for decision-making, assessment, or problem identification purposes than is a less familiar measure.

It is unlikely that a single performance measure will have, in all circumstances, all of these characteristics. The appropriateness of a particular measure will depend upon the organizational setting and the reasons why a manager is collecting the information. Managers need to judge the adequacy of a performance measure based on these factors, as well as its objectivity, completeness, sensitivity, accuracy, and practicality.

Performance Standard

A performance standard represents the amount of time it should take an employee to perform a given task or unit of work. The standard time may be based on a time and

motion study, historical records, or technical judgment. These standard setting methods usually consider such factors as employee skill level, work method, work pace, work accuracy, fatigue, and rest breaks. Established standards represent performance goals for employees. However, the success of applying a standard to improve employee performance depends not so much on how it is derived but, rather, on how well it is accepted by the work force.

An important factor related to worker acceptance of a standard is its difficulty. Research has shown that the difficulty level of a goal or standard has a direct effect on employee performance. For example, goal setting studies indicate that hard goals produce higher performance than do easy goals as long as workers accept the goals and feel that they can be achieved (Locke, Shaw, Saari, & Latham, 1981). If they feel the goal is too difficult, they will ignore it and their motivation to achieve the goal will be low.

Some investigators have proposed a somewhat different view concerning the appropriate difficulty level for a standard. For example, Shumate, Dockstader, and Nebeker (1981) argue that an incentive standard should be set, or adjusted, at the point where the top 20 to 30 percent of the work force is currently performing. The rationale for this guideline is based on the idea that success breeds success. In other words, top performers will be motivated to perform at even higher rates to receive important valued rewards, while the rest of the performers will have reason to believe that they, too, can receive rewards by increasing their performance (Peters & Waterman, 1982). These rewards may be either tangible (e.g., cash) or intangible (e.g., recognition).

To summarize, the difficulty level of the performance standard will, in large part, determine how it is accepted by the work force. Workers are more likely to improve their performance when they accept performance standards and value the rewards associated with performing above standard. No universal rule exists for determining a standard's difficulty level; rather, such determination depends on a number of situational factors (e.g., management's goals) and the level of current organizational performance.

Feedback Timeliness

The frequency and rapidity with which information is reported by the PMR system affects not only whether or not the information will be used for decision-making but also the degree to which the feedback will influence the work performance of those being measured. Feedback provides employees the cues needed to determine whether (1) their performance is proceeding well or poorly, and (2) they need to take corrective action. Since employees generally desire feedback on how well they are doing, it also serves an important motivating function (Nadler, 1977). To maximize its motivating and cueing functions, performance feedback should be provided frequently and as soon as possible after the performance being measured. Delaying feedback reduces the association between performance and the feedback information, which, in turn, reduces its usefulness as a cueing device and its value as a motivator.

Despite the general rule that performance feedback should be provided quickly and frequently, it may be reported too frequently. On any job, an individual needs a certain amount of time to complete a unit of work that can be measured. The time cycle required to complete a unit of work is called the "time span of discretion" (TSD) (Jaques, 1961). When the time period required to complete a unit exceeds the time period used to measure the performance on that unit, the performance measure accuracy is reduced, since it does not reflect the complete cycle of job performance.

Jobs within an organization vary as to their TSD. For some jobs, the TSD may be hours; for others, it may be weeks or more. As one might expect, the TSD is generally longer for the top levels of the organizational hierarchy than it is for the lower levels. Given that jobs vary in terms of TSD, the appropriate frequency of performance feedback for organization members will differ as a function of their job. Individuals with jobs having a long TSD should receive feedback less frequently than those with jobs having a short TSD. This consideration serves to balance the need for quick feedback.

Content and Form of Feedback Reports

Both the content and the form of the reports produced by the PMR system influence how the information will be used. PMR data may be used to evaluate employees' performance, predict organizational trends, assess current practices, or reward performance. To contribute effectively to each of these, the system should provide accurate, relevant, and up-to-date information in a form that is understandable to the individual or individuals who need it.

In large, complex organizations, managers can often be overwhelmed by the amount of data produced by the MIS. Unrestricted information results in information overload; that is, the amount of information input is greater than that which the organization or its decision makers can adequately handle (Rosen & Schneck, 1967). Individuals respond to information overload in a variety of ways (Miller, 1960). The most damaging way, from an organizational standpoint, is that they may process information incorrectly or not at all. To avoid overload, information should be filtered so that managers at each level receive only needed information. Lower level managers and staff personnel often need detailed information for audit, analysis, and evaluation purposes. To reduce overload for higher levels of management, however, such details can be eliminated by extracting and summarizing information.

In terms of form, information from PMR systems is sometimes presented in a way that makes it difficult to understand and, hence, less likely to be used. It is important that the form, language, and symbols used on reports be familiar and understandable to the people in the organization. For clarity, only a limited amount of information should be presented on each report. Moreover, information should be in a form that permits managers to use the feedback for its intended purposes. For example, information in graphic form may be appropriate for identifying organizational trends over time, whereas numbers in a table may be more appropriate for auditing. Finally, all information on the reports should be clearly and meaningfully labeled (Hartman, Matthes, & Proeme, 1968).

In summary, the PMR system must get the right information in an understandable form to the people who need it. When work activities are progressing effectively, this information can be used as a basis for rewarding performance. When work activities are not progressing well, it can be used to identify problems and impediments to productivity that can then be corrected through changes in training policy, procedures, or work practices. If the information from the system is not accurate or timely, its utility as a decision-making tool is diminished. Managers, therefore, face the constant challenge of ensuring a high level of quality in the information produced by the PMR system.

Purpose

The purpose of this effort was to develop a PMR system to be used in conjunction with productivity enhancement techniques appropriate for groups of production workers at Navy shipyards. Specifically, the system was developed for use with a group incentive

program that financially rewards production supervisors and workers for labor hour savings. It was designed to (1) ensure an accurate and timely measure of foreman work gang efficiency, (2) provide data for problem solving and evaluation, (3) provide clear audit trails for documentation, justification, and review, (4) use existing MIS input data, and (5) be a compatible part of the existing MIS. During system development, consideration was given to features that characterize effective PMR systems, as described above.

APPROACH

Organizational Setting

NAVSHIPYDPEARL's primary function is to perform authorized work in connection with the construction, conversion, overhaul, repair, and dry-docking of ships and craft. The shipyard employs over 6900 civil service workers.

The shipyard's Inside Machine Shop, Shop 31, with approximately 485 employees and 23 first-level supervisors, is one of 18 shops in the shipyard's Production Department. It performs the shipyard's inside machine work, including light and heavy machine work, hydraulic repairs, and associated testing on marine equipment. Shop 31 was selected as the test site for the following reasons:

1. It is a lead shop within the Production Department, giving it a central role in the performance of the shipyard.
2. Its consistently low performance vis-a-vis the allowed hours issued by the Planning Department suggests that its performance efficiency can be improved.
3. Its employees can influence performance efficiency through increased effort or improved work strategies.

To understand how the new system was developed for use at NAVSHIPYDPEARL, it is necessary to know something about how shop work is accomplished as well as the existing management information system (MIS). The following section describes Shop 31's organization, work processing, and accounting practices.

Work Process and Measurement in Shop 31

Shop 31 is organized into 17 work centers, groups of employees who do a particular kind of work. For example, work center A1 repairs high pressure valves, B3 performs grinding, and H repairs hydraulic equipment. Each work center has approximately 20 employees with a foreman who is responsible for the work center's production. Work is performed in three shifts: day, swing, and graveyard. The shop receives work requirements from the Planning Department on a job order (JO) key operation (KEYOP) document that provides a detailed description of the work to be performed, along with man-hour allowance and schedule information. When shop planners receive the JO KEYOP document, they compile references with technical work specifications and route the document to the appropriate general foreman. After the general foremen have reviewed the document for completeness and accuracy, they route it to the foremen who actually organize the job and assign the work to the floor mechanics for accomplishment.

Since the shop's production work requires the coordinated efforts of a work gang (individuals reporting to the same foreman), the shipyard's existing Performance Measurement (PM) application tracks and reports performance at the work gang level, rather than the individual level. Performance information (allowed hours, expended hours, and a performance efficiency index) is provided to shipyard management via the PM application of the MIS. Performance efficiency is represented by a performance factor (PF), which is determined by dividing the number of man-hours allowed by the planning and estimator (P&E) analysts to complete production work by the number of man-hours actually expended:

$$PF = \frac{\text{man-hours allowed}}{\text{man-hours expended}}$$

When the PF is greater than 1.0, the work took less time than that allowed, indicating efficient performance. When the PF is less than 1.0, the work took more time than that allowed, indicating waste in the production process. The PF computation is based on data obtained from the JO KEYOP document and employee time cards.

JO KEYOP

The JO KEYOP document (Figure 1) is the basic planning and scheduling document describing work to be performed by the Production Department in compliance with customer order requirements as noted in the Customer Order Acceptance Record (COAR). The KEYOP is a detailed work package that combines man-hour allowances, man-hour expenditures, and schedule data information. KEYOP documents describe the work to be accomplished either by a single trade or several trades working in close cooperation. Each KEYOP document has a number of line items, work elements to be accomplished by a shop work center. Each line item has assigned man-hour allowances that are determined by P&E analysts based on engineered standards (E), uniform methods and standards (U), estimated standards (A), or nonstandard manhour allowances (O). The top half of the KEYOP document includes the name of the ship or project on which the work is to be performed (e.g., USS CIMARRON, field 1), a 10-digit JO identification number (field 4), a 3-digit KEYOP number (field 5), a job title (field 6), the production shop/work center having primary responsibility for completion of the KEYOP (field 7), and the total number of man-hours allowed to complete the KEYOP (field 14). The bottom half provides line item information, including the shop and work center responsible for completing the line item (SHOP WC), the number of man-hours allowed to complete the work (MHR ALLOW), the standard code by which allowances are determined (SC), and the start (START) and completion (COMP) date for each line item.

Foremen initiate work on KEYOP line items and continue to charge labor hours to the line items until work is completed. When work is completed on all KEYOP line items, the KEYOP is closed to further labor charges by either automatic or direct closure.¹

1. Automatic closures are executed by the MIS, which automatically codes a KEYOP as complete when the scheduled completion date is met. When a completion is coded, a counter is activated that automatically closes the work to charges after a

¹Although work is normally reported as complete at the KEYOP level, completions can also occur for an entire JO or COAR.

JOB ORDER KEY OPERATION		DATE: 1/18/82		PAGE 1 OF 2	
ROUTING: 236P 214-16 (2) 377 27222		INITIAL & DATE: 1/18/82			
SHIP/ORDER: 1600-010-0000/02 (110-70)		TYPE/ORDER NO.: 10-177		SERIAL NO.: 256A11	
JOB TITLE: CIRC/CIA IN SYS (RPR CHK VALTS)		LEAD SHOP: 96		SUBJECT CODE: 237	
PLANNER: KENNEDY		PER TO: 474 2860		PER SUPV: 07273	
☐ DOCK WORK		☐ PUMP CONTROL		☐ LEVEL 1	
☐ CONTROLLING		☐ 2 Y INTEGRITY		☐ SAN	
☐ SUBSAFE		☐ RIFOUT		☐ REENTRY	
☐ NUCLEAR		☐ RABSON		☐ NON-TARGET	
REMARKS:					
CHANGE NUMBER: R5582		REV OPEN NO.: 280		REV SHOP NO.: 31	
REV OPERATION TITLE: RPR CHK VLS		FINAL: 7		REPORT DATE: 2/18/82	
SHIP WC: 31A3		MFR ALLEN: 160		AFT P.P. 00	
31B1		40		00	
31C5		40		00	
26A		8		00	
11A		4		00	
71A		12		00	
75A		4		00	
STANDARD NO. 0005-0094/906					
0071-017A					
SHIP'S INSTRUCTIONS: 1. 1/18/82					
SHIP'S OFFICER: 244.2		WORK COMPLETED INDICATOR OF SUPP.: 207.3		WORK SATISFACTORY SIGN. OF SHIP'S REP.:	
ADD'L. DATA: 244.2		MFR-2: 236P		207.3	
ADD'L. DATA:					

Figure 1. Sample KEYOP document.

period of "N" days. The N-day concept permits Production Department personnel to report work completed while still being able to submit additional charges. These charges may include late time cards or work performed after the scheduled completion due to nonavailability of material. The N-day period for the shipyard is 20 days.

2. Direct closures are handled through shop planners, shop superintendents, or Planning Department personnel who enter a "manual close" code in a KEYOP amendment transaction. With direct closures, there is no N-day period. Thus, the MIS will reject any charges submitted after the amendment. Rejects enter an unallocated cost account that, if uncorrected, enter a shop overhead account for unresolved labor charges. Although these charges may reflect expended hours on direct work, they cannot be properly accounted for and will not be counted as expended hours in computing a foreman's PF.

Employee Time Card

Foremen complete time cards (Figure 2) daily for each of their employees. The time card contains information on labor charges to direct and overhead work, overtime, sick leave, and annual leave. The foremen indicate labor charges to direct work by entering a 5-digit charge number in the "Job Order and KEYOP or Charge No. Only" column of the time card rather than the 10-digit JO KEYOP number. This simplifies the time card entry process for foremen.

NOTE: COMPLETE REVERSE SIDE OF ATTENDANCE CARD.
I ELABOR COMPENSATORY TIME.

ATTENDANCE AND ABSENCE CERTIFIED CORRECT. I DID NOT SUPPLY OR PERFORM ANY OVERTIME WORK OTHER THAN AS REPORTED ON THE TIME CARD. * TEXTING OF HOURS FOR COMPENSATORY TIME AND ADMINISTRATIVE LEAVE ONLY.

EMPLOYEE'S SIGNATURE _____

SUPERVISOR'S SIGNATURE _____

NAVY TIME CARD PM-208A-100-000

Figure 2. Sample time card.

The PM application of the shipyard MIS has two key reports for evaluating the labor efficiency within the production shops.

1. The PM-208A report (Leadingman Performance on Completed Work) which is issued weekly, shows a PF for work based on engineered standards, nonengineered standards, and total man-hours allowed to complete work for each shop foreman.

2. The PM-302A (Shop Work Center Performance) is also issued weekly and is similar to the PM-208A report except that it shows a PF for each shop work center by each type of standard for which man-hour allowances are based (i.e., engineered standards, uniform methods and standards, estimated standards, and nonstandard methods). The major difference between the two reports is the level for which a PF is calculated.

Problem Areas in Existing PM Application

The existing PM application at NAVSHIPYDPEARL was reviewed to determine whether it was adequate for tracking and reporting work gang performance. Deficiencies discovered are discussed below in terms of the four measurement factors discussed in the background section.

Performance Measure Characteristics

Although the PF reported by the existing system has some good characteristics, its accuracy could be improved. The reasons for its inaccuracy are discussed below.

Proration of Labor Charges. In the existing system, labor charges of all foremen who share responsibility for completing work on the same KEYOP line item are included in the total labor hours expended by the foreman who charged the majority of hours on that line item. This practice results in a PF that inaccurately reflects work gang performance for each of the foremen. In the new PMR system, this problem was corrected by (1) tracking the hours charged by different foremen to a given KEYOP line item and (2) based on the proportion of the total expended hours charged by various foremen, prorating the number of hours allowed for that line item among them. For example, suppose that Planning had allocated 500 hours for a KEYOP line item and one foreman had charged 300 hours (75% of total expended hours) to that line item and a second foreman had charged 100 hours (25% of total), for a total of 400 expended hours. In this case, the first foreman would be credited for 375 allocated hours (75% of 500); and the second foreman, for 125 hours (25% of 500). Both would have a PF of 1.25. Thus, both foremen have a stake for performing well (or in other cases, poorly) on the line item. Using the prorated total of allowed hours in calculating each foreman's PF improves the accuracy of the measure.

PF Based on Closed vs. Completed KEYOPs. In the current system, the PF is based on KEYOPs that have reached their scheduled completion date rather than on the actual closing date. This practice may result in an overestimation of foremen performance, since labor charges made after the completion date are not included in PF computations. To remedy this problem, the new PMR system does not include a KEYOP in the calculation of foremen PFs until it has closed. A PF based only on closed KEYOPs is more accurate since it includes a greater portion of the total hours expended to perform the job.

Labor Charges Against KEYOPs After First Closure. All labor charges to a KEYOP must be accounted for if the PF is to reflect performance on that KEYOP accurately. If a PF calculation is made for a KEYOP and then additional hours are charged, the PF is incorrect. For example, if a PF is computed before a final accounting of expended hours because labor transactions are charged to a closed KEYOP without being rejected by the MIS, the late charges would not be reflected in the PF.

One way to increase accuracy in measuring performance would be to delay the computation of the PF for a period of time long enough after the KEYOP closure to capture all late charges, even though this approach would result in considerable delay between work completion and feedback regarding the work gang's efficiency. To balance the need for an accurate performance measure with the need for timely feedback, a 12-week performance period and a 4-week reporting period were included in the new system. This means that a PF is calculated every 4 weeks based on all KEYOPs that have closed in the previous 12 weeks. Therefore, the PF is a running average of performance efficiency and captures most, if not all, of the late charges against closed KEYOPs. This improves the accuracy of the PF while maintaining timely performance feedback.

Variability in Planning Estimates. Since the precision of planning estimates varies across KEYOPs, some KEYOPs have man-hour allowances that are easy to meet, while others have man-hour allowances that are difficult, or impossible, to meet. The existing system uses a 4-week performance period, making the PF particularly sensitive to variations in the precision of man-hour estimates. The shorter the performance period,

the more likely that the PF reflects good (bad) standards as much as it does good (bad) performance. This is because, with shorter performance periods, PFs are based on fewer line items; thus, the influence of each individual line item on the PF is increased. Given this situation, it was necessary to specify a performance period that was long enough so that a work gang's performance could be assessed on a mix of "easy" and "hard" KEYOPs. Including a 12-week performance period in the new system increases the accuracy of the performance measure, since longer periods are more likely to cancel the effects of both over- and underestimates of real required man-hours.

Variability in KEYOP Size. KEYOPs vary in length ranging from a few days to several months. As a result, a foreman and his work gang may have a large number of small KEYOP closures during one period and a small number of large closures in another period. In a short performance period when only one or two jobs close, the PF will be heavily weighted by performance on only a few jobs, resulting in wide fluctuations in a foreman's PF. Given that work gangs may perform well on some jobs and poorly on others, a short performance period may lead to a very high PF in one period and a low PF in the next. Since a PF based on a longer performance period includes more jobs, the impact of large performance variations on the PF is reduced. By extending the performance period to 12 weeks, the PF is made more stable and possibly more accurate.

Performance Standard

The PF is obtained by dividing allowed hours (AH) by expended hours (EH). A PF of 1.0 reflects standard performance, whereas a PF above or below 1.0 corresponds to above or below standard performance, respectively. A PF below 1.0 may be due to low performance, conservative allowances, or a combination of both. Regardless of the reason, if a PF is consistently less than 1.0 and management wants performance to improve, it may be appropriate to adjust the standard or goal to bring it into a range where it is seen as achievable by the measured employees. This is true whether or not the AH is based on a time and motion study or on other methods, such as historical analysis. The standard can be adjusted by boosting or reducing the PF by some percentage in one of two ways. First, the actual allowances issued by the P&Es in the Planning Department could be adjusted by some percentage that would bring the standard to the desired level. For example, P&E could increase or decrease allowances on each KEYOP line item. However, this approach is time consuming, costly, and affects other functions using planning allowances such as production scheduling. A less intrusive and less costly approach is to adjust, automatically, the allowances or expenditures with the PMR system. With this approach, the standard's difficulty can be adjusted to encourage performance improvement without affecting planning, production control, or cost accounting functions. The new system is designed to permit this latter capability.

Historically, Shop 31 has performed about 11 percent below standard. Following the guideline that the performance standard be set or adjusted to a point where the top 20-30 percent of the work force is currently performing, the new system automatically adjusts the EH by a correction factor of .90. This brings the standard into a range seen by employees as attainable and thereby worth striving for.

Feedback Timeliness

A 12-week performance period was included in the system design to reduce the impact of late charges, imprecise allowances, and KEYOP size on the accuracy of PFs. If feedback were to be delayed to the end of the 12-week performance period, however, it would be neither fast nor frequent. To ensure timely feedback, the PFs, based on the

previous 12 weeks, are reported every 4 weeks. The combination of the 12-week performance and the 4-week reporting period balances the need to provide both timely and accurate feedback.

Content and Form of Feedback Reports

The feedback reports from the existing system do not provide the detailed information necessary to audit the accuracy of the allowance and expenditure data used to calculate PFs. Errors or irregularities in these data will reduce the accuracy of the PF. Improperly written JOs, failures in entering JO information into the MIS data base, and errors in establishing or closing JOs all may reduce the accuracy of allowance data. The improper coding of time cards by shop supervisors, whether accidental or intentional, will negatively affect the proper accounting of expenditures.

The reports produced by the new system provide information in sufficient detail to permit the auditing for accuracy of both allowance and expenditure data. For example, if an allowance shown on a JO KEYOP does not match the allowance shown in the MIS for that KEYOP, the discrepancy is reported. The time accounting reports produced by the new system show labor charges against direct and overhead work by shop employee, foreman, and JO number. These reports, issued weekly, are given in such detail that incorrect foreman codes, work centers, and rejected charges can be detected and corrected. The new system also produces summary performance information in a form suitable for management review. Reports for first-level supervisors provide feedback on work gang performance. Also, performance reports, in various formats, were developed for upper level shop and production managers having a direct interest in the production efficiency of Shop 31.

RESULTS

System Overview

Table 1 lists the programs that comprise the new PMR system. The system provides a more accurate yet timely measure of performance efficiency than did the previous system. Moreover, it uses existing MIS input data, permits corrections to be made to the data base, and provides clear audit trails for documentation, justification, and review.

The inputs used in the new system consist primarily of JO and time card data. Allowance and schedule data are obtained from the JO brief, the basic planning and scheduling document for work to be performed by the Production Department. Expenditure information is obtained from employee time cards. Although both of these inputs are abstracted from various applications of the shipyard MIS, they are obtained primarily from the financial and production control applications. After processing JO and time card data, the PMR system produces seven feedback reports: three detailed time accounting reports that are produced both weekly and every 4 weeks, and four performance computation reports that are produced every 4 weeks.

Time Accounting Reports

The three time accounting reports--PM-L07A, PM-L08A, and PM-L09A--list all shop time card transactions to open JO KEYOPs (i.e., those on which work is currently in

Table 1
Programs of the New PMR System

Program No.	Title
PM-L00	List and punch foreman data
PM-L01	Card-in, sort, generate foreman table
PM-L02	Extract, match, and reformat
PM-L03	Sort-list roster and generate foreman file
PM-L04	Sort and generate foreman, code cross-reference report
PM-L05	Weekly extract and reformat
PM-L06	Sort shop/badge number; extract foreman records
PM-L07 ^a	Sort/generate detail employee
PM-L08 ^a	Sort/generate detail foreman
PM-L09 ^a	Sort/generate detail job order
PM-L10	Profile extract
PM-L11	Consolidate and compute work center performance
PM-L12	Sort/generate line item performance by shop
PM-L13	Sort/generate work center performance by shop
PM-L14	Generate debit-credit corrections
PM-L15	Sort/merge to profile sequence
PM-L16	Consolidate and compute foreman's percent of responsibility
PM-L17 ^b	Compute foreman performance
PM-L18 ^b	Sort/generate shop/work center performance
PM-L19 ^b	Sort and consolidate foreman performance

^aThe three time accounting reports are generated by these programs.

^bThe four performance computation reports are generated from these programs.

progress). They all show labor hour charges to direct and overhead work but present the information differently:

1. PM-L07A, Detail Time Accounting Report by Employee, lists all transactions for a particular employee and can be used to determine (a) if an employee's labor is being properly charged, (b) what jobs the employee worked on, and (c) how many foremen the employee worked for during the reporting period.

2. PM-L08A, Detail Time Accounting Report by Foreman, shows labor charges against direct and overhead authorized by a particular foreman, and can be used to determine (a) to what JO KEYOPs a foreman charged employees during the reporting period, (b) which employees worked for the foreman, and (c) which transactions authorized by the foreman were rejected and why.

3. PM-L09A, Detail Time Accounting Report by Job Order KEYOP, lists all labor transactions for each KEYOP line item, and can be used to determine (a) how many labor hours were charged against a particular JO KEYOP line item, (b) which foremen were responsible for labor expenditures to a particular KEYOP line item, and (c) which employees worked on the line item.

The time accounting reports are described more fully below.

PM-L07A--Detail Time Accounting Report by Employee

The PM-L07A report issued weekly lists all time card charges against direct and overhead work during the previous week for each shop employee. The summary PM-L07A report issued every 4 weeks shows cumulative-to-date time card charges against direct and overhead work, as well as corrections made during the previous 4 weeks. As shown in Figure 3, the PM-L07A report comprises two parts. Part 1 provides (1) the dates covered by the report (both Gregorian and Julian), (2) a line showing employee work status, shop, badge number, name, and pay grade, and (3) the employee's time card entries listed by foreman and work date. The number of labor hours charged to each foreman is totalled (indicated on the form by a double asterisk). The sample report in Figure 3 shows that employee Sentino has 4 hours charged to foreman code 00 and 93 hours charged to foreman code 11. Foreman code 00 is an unassigned code. The notation "W.C." appears in the comments column, indicating that the employee's work center was not properly coded on the time card. Time card entry errors such as incorrect or missing foreman codes can be easily detected using the PM-L07A report.

Part 2 lists data excluded from performance computations, including charges to sick leave, charges to annual leave, loan status, rejected time card charges, and the reason for their rejection. The last line of the report shows the employee's total labor hours from Parts 1 and 2, excluding overtime and rejected hours (indicated by a triple asterisk), and the total hours from Part 2, excluding overtime and rejected hours (indicated by a double asterisk). The appendix provides a detailed description of the PM-L07A report.

PM-L08A--Detail Time Accounting Report by Foreman

The PM-L08A report issued weekly lists all time card charges against direct and overhead work authorized by a particular foreman during the previous week. The summary PM-L08A report issued every 4 weeks lists cumulative-to-date time card charges against direct and overhead work, as well as the corrections made during the previous 4 weeks.

As shown in Figure 4, Part 1 of the PM-L08A report provides (1) the dates covered by the report (both Gregorian and Julian), (2) a line showing the foreman's work status, shop, supervisor code, badge number, name, pay grade, shift, and primary work center, (3) time card entries for a given foreman listed by JO and KEYOP number, and (4) time card entries for a given foreman charged to overhead (indicated by JO numbers beginning with the digit 9). The number of labor charges authorized by a foreman to each JO KEYOP number are totalled (indicated by a double asterisk). For example, Figure 4 shows that

DETAIL TIME ACCOUNTING REPORT BY FOREMAN

PHLOBA		REPORT DATE 63196		COVERING JUN 16 JUL 15		63189 63196 JUL		ISSUE DATE 18 JUL 83	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18		20 24341 NAKAMA		MILES		HOURS		DATA DATE 15 JUL 83	
COMMENTS SUPV JOB ORDER		KEY W.C. REC. BADGE		HOL. DATE		HOL. DATE		FAYOBA HOLL SHIP	
CODE		-OP		SEQ # NO.		MINRS.		TYPE NAME	
SHOP SUPV. CODE		AND BADGE #		MILES		HOURS		FAYOBA HOLL SHIP	
1-31		20 14284 26211 820 A1 00005 24192		4.0		63189		AO WILLAHETTE P8	
*****		14284 26211 820 A1 ** TOTAL **		4.0		63196			
*****		20 14284 55556 621 A1 00006 30936		6.0		63189		AO WILLAHETTE P8	
*****		14284 55556 621 A1 ** TOTAL **		6.0		63196			
*****		20 16130 01903 392 A1 02864 32567		2.0		63196		SSN PINTADO RO	
*****		20 16130 01903 392 A1 02865 34471		4.0		63196		SSN PINTADO RO	
*****		16130 01903 392 A1 ** TOTAL **		6.0		63196			
*****		20 16130 08704 586 A1 00971 32768		3.0		63179		SSN PINTADO RO	
*****		16130 08704 586 A1 ** TOTAL **		3.0		63196			
*****		20 9931 110900 001 A1 01911 27008		1.0		63186		YOSHIDA 63186	
*****		20 9931 110900 001 A1 01912 30921		1.0		63186		HAMAMOTO 63186	
*****		20 9931 110900 001 A1 01913 30936		1.0		63186		WEATHERS 63186	
*****		20 9931 110900 001 A1 01914 31217		1.0		63186		FUJIWARA 63186	
*****		20 9931 110900 001 A1 01915 31362		1.0		63186		AKIYAMA 63186	
*****		20 9931 110900 001 A1 02803 31098		1.0		63194		TAKATA 63195	
*****		9931 110900 001 A1 ** TOTAL **		6.0		63196			

Figure 4. Sample PM-L08A report.

Foreman Nakama has 4 hours charged to number 14284 26211 620, 6 hours charged to number 14284 55556 621, etc.

Part 2 lists data excluded from performance computations; these data represent rejected time card charges along with the reason for rejection. For example, reject code "I" indicates that labor charges were made against an invalid JO number; and reject code "S," that the shop entered on the time card was not authorized to charge to the KEYOP. In addition to verifying foreman labor charges to JO KEYOPs, this report can be used to identify the reasons why time card charges are rejected. A detailed description of the PM-L08A report appears in the appendix.

PM-L09A--Detail Time Accounting Report by Job Order KEYOP

The PM-L09A report, issued every 4 weeks, lists time card charges against a particular JO and KEYOP, either direct or overhead, made during the previous 4 weeks. It can be used to identify the foreman responsible for labor expenditures to a KEYOP line item. Figure 5, which provides a sample page from this report, shows that entries are listed by JO, KEYOP, and work center (line item), in that order. Within each work center, entries are listed by foreman code and work date sequence. Following the entries for each work center, a summary line, indicated by asterisks, denotes the total labor charges to the KEYOP line item. For example, supervisor 21 (field 8) in work center C3 (field 4) charged a total of 8 hours to KEYOP 622 (field 3), and supervisor 27 in work center D charged a total of 14 hours to that JO KEYOP. The report also lists the work date and the employees charged. For example, of the 14 hours supervisor 27 charged to KEYOP 622 on 28 June 1983, 7 were worked by Tavares and 7 by Tarr. The appendix provides a detailed description of the PM-L09A report.

Performance Computation Reports

The performance computation reports--PM-L17A, PM-L18A, PM-L18B, and PM-L19A--summarize allowance, expenditure, and PF information on closed JO KEYOPS by foreman, work center, and shop.

1. The PM-L17A report shows foreman line item performance on closed work and is used to determine how much a foreman contributed to line item performance when more than one foreman charges to a line item.
2. The PM-L18A report shows work center performance on individual line items from closed KEYOPs and is used to identify the line items that have an impact on work center performance.
3. The PM-L18B report provides a summary of each work center's overall performance for all line items and is used to review overall work center performance.
4. The PM-L19A summarizes each foreman's performance efficiency and provides detailed information for identifying the specific KEYOP line items affecting the work gang's efficiency. It is used to track foreman performance efficiency on production work.

PM-L17A--Foreman Line Item Performance on Closed KEYOPs

The PM-L17A report, organized by ship, JO/KEYOP, shop, work center, and foreman, is issued every 4 weeks to show foreman line item performance on KEYOPs that have closed in the previous 12 weeks. The dates covered by the report are shown under the

report title. Figure 6, which provides a sample page from the PM-L17A report, shows that information for different KEYOPs is separated by a horizontal dashed line. The first line under each dashed line contains performance data for an entire JO KEYOP, followed by performance data for each line item and each foreman working on that line item. At both the KEYOP and line item levels, man-hour allowance and expenditure data are taken from PROFILE, a file in the Production Control (PC) application of the shipyard MIS. Allowance data represent the number of hours issued by the Planning Department to complete a KEYOP line item (field 14); and expenditure data, the number of hours worked by the Production Department (field 16). A PF is computed by dividing the allowance data by the expenditure data for the entire KEYOP (e.g., $192/264 = .727$ in field 18) and each line item (work center) of the KEYOP (e.g., $32/32 = 1.00$ in field 25). The balance (allowance minus expenditures) (field 17) represents saved labor hours when the PF is greater than 1.0 and lost labor hours when the PF is less than 1.0.

Man-hour allowances for each foreman (field 28) are computer-generated because the Planning Department issues allowances for line items, not foremen. Allowance hours for a line item are automatically divided among the foremen who charge to that item, based on a foreman's percent responsibility. For example, as shown in Figure 6, Foremen Nakama and Mizusawa expended a total of 32 hours on KEYOP line item 620. Foreman Nakama expended 24 hours (75% responsibility) and Foreman Mizusawa expended 8 hours (25% responsibility). The foreman's share of a line item allowance is computed by multiplying the number of hours allowed for that line item by each foreman's percent responsibility. This procedure results in a foreman allowance for each line item to which the foreman expended time, regardless of the number of foremen charging to the line item.

Expenditures for foremen (field 30) are computer-generated in the same manner as foreman allowances. There may be a discrepancy between the foreman's actual expended hours and the computer-generated expenditure. For example, Figure 6 shows that Foreman Kimokeo has 52.0 actual expended hours (field 29) and 51.9 computer-generated hours (field 30). These and similar discrepancies are caused by (1) transferred labor charges that affect total line item data in PROFILE but not the actual foreman data in the PMR system's foreman history file, and (2) rounding errors that may occur when multiplying percent responsibility with line item allowance and expenditure. With the computer-generated expenditure, however, transferred labor charges are reflected in the calculation of foreman performance indices, which ensures that these indices are accurate and consistent with line item data. The appendix provides a detailed description of the PM-L17A report.

PM-L18A--Line Item Allowance/Expenditure Detail List

The PM-L18A report, organized by shop, work center, JO/KEYOP number, and foreman code, is issued every 4 weeks to show work center performance on line items of KEYOPs that have closed during the previous 12-week period as well as the performance of each foreman charging to the line item. The dates covered by the report are shown under the report title. This report can be used to identify the KEYOP line items having an impact on a work center's performance as well as the foreman, or foremen, responsible for labor expenditures to these line items. Figure 7, which provides a page from a PM-L18A report, shows that work center A2 (field 3) has a PF of 1.086 (field 20) for work completed on JO KEYOP number 30130 50202 520 (fields 4 and 5). Two foremen charged a total of 22 hours to this job (field 16). Foreman 36 charged 8 hours (about 36% responsibility--field 17); and foreman 41, 14 hours (about 64%). The number of man-hours saved was 1.9 (field 19), which is shared by the two based on their percent responsibility.

FOREMAN - LINE ITEM PERFORMANCE ON CLOSED KEY OPS														ISSUE DATE 16 JUL 83		PAGE			
BY SHIP, JO/KG, SHOP, WC AND FOREMAN														DATA DATE 15 JUL 83					
APR 23 TO JUL 15																			
JO ORDER #	KEY OP	CC	CLOSE DTE	KEYSVC CHG.	ISSUED ON	PH-ALLO.	ISSUED	EXPEND-	BALANCE	PERCENT	PERF								
JO TITLE	KG TITLE	SHIP NAME	NO.	JO/KG AUTH	IN M.I.S.	VARIANCE	ITURES	ALW - EXP	RESPON.	AL/EXP									
SC KE#																			
30102 241K1	5903	2K5	83-04-286	K8782	00	9	10	12	13	14	15	16	17	18	19				
IF MODS RTNRS 2	4HF MOD XMT	JASON 7	8	9	10	12	13	14	15	16	17	18	19	20	21				
LINE-ITEM (EU SHOP, SD & SD NO.)														32.022		32.023		024 = W.C. = 1.900	
FOREMAN EXPENDITURE DATA HIGUCHI 26 STEP 2127														24.028 (8.0 (8.0)		24.030		031 (.750) 32	
FOREMAN EXPENDITURE DATA MIZUSAWA CARL 38														8.0 (8.0)		8.0		0 (.250)	
30102 583K1	620	2K	83-05-13	K56D	H	99	PFAI	0010	1194.0	3415.0	2941.0	1747.0	405						
LINE-ITEM (EU SHOP, SD & SD NO.)														16.0		32.0		16.0 = W.C. = .500	
FOREMAN EXPENDITURE DATA NAKAMA MILE 20														12.0 (24.0)		24.0		12.0 = (.750)	
FOREMAN EXPENDITURE DATA MIZUSAWA CARL 38														4.0 (8.0)		8.0		4.0 = (.250)	
LINE-ITEM (EU SHOP, SD & SD NO.)														40.0		16.0		24.0 = W.C. = 2.500	
FOREMAN EXPENDITURE DATA KUNIMITSU NORI 22														20.0 (8.0)		8.0		12.0 (.500)	
FOREMAN EXPENDITURE DATA MAU PHIL 28														8.0 (8.0)		8.0		0 (.500)	
FOREMAN EXPENDITURE DATA MAESHIRO MELV 43														8.0 (8.0)		8.0		0 (.500)	
LINE-ITEM (EU SHOP, SD & SD NO.)														32.0		.0		32.0 = W.C. = .000	
LINE-ITEM (EU SHOP, SD & SD NO.)														8.0		.0		8.0 = W.C. = .000	
LINE-ITEM (EU SHOP, SD & SD NO.)														104.0		71.0		33.0 = W.C. = 1.464	
FOREMAN EXPENDITURE DATA KIROKO HARR 25														75.1 (52.0)		51.9		24.2 (.732)	
FOREMAN EXPENDITURE DATA BARRETT CHAR 41														17.5 (12.0)		11.9		5.6 (.169)	
FOREMAN EXPENDITURE DATA CHANG EDWA 42														10.2 (7.0)		7.0		3.2 (.099)	
LINE-ITEM (EU SHOP, SD & SD NO.)														125.0		55.0		72.0 = W.C. = 2.265	
LINE-ITEM (EU SHOP, SD & SD NO.)														192.0		423.5		231.5 = W.C. = .453	
LINE-ITEM (EU SHOP, SD & SD NO.)														.0		100.0		100.0 = W.C. = .000	
LINE-ITEM (EU SHOP, SD & SD NO.)														.0		6.0		6.0 = W.C. = .000	
LINE-ITEM (EU SHOP, SD & SD NO.)														128.0		755.8		627.8 = W.C. = .169	
LINE-ITEM (EU SHOP, SD & SD NO.)														.0		91.0		91.0 = W.C. = .000	
LINE-ITEM (EU SHOP, SD & SD NO.)														.0		8.0		8.0 = W.C. = .000	

PH-L18A										LINE-ITEM ALLOWANCE/EXPENDITURE DETAIL LIST										ISSUE DATE 16 JUL 83										DATA DATE 15 JUL 83									
BY SHOP, W.C., JR/KG AND FOREMAN CODE										(PERIOD COVERING APR 23 TO JUL 16)																													
GRP. SH WC JOB ORDER * KEY KEYS										CLOSING PER- PEID S TY HULL FORE-										MNRH. ACTUAL PCT. ADJUSTED MNHRS PERF																			
SHP. OP										DATE 100 D PE TYPE MAN ALUD. EXPEND. RESPON EXPEND. SAVED AL/EXP																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20																				
930	31	A2	30130	50202	520	568	MOD	CHW	(P	83-04-29	(3)	6CK1	G	RO	SSN	O	SUM	23.9	22.0	1.9	1.088																		
																		36	8.7	8.0	0.354	8.0																	
																		41	15.2	14.0	0.636	13.9																	
930	31	A2	30130	51804	921	31C2	343GMFBODY	83-05-27	(2)	9HY1	G	RO	SSN	O	SUM	32.0	48.0			16.0	0.667																		
																		41	12.8	16.0	0.400	19.2																	
																		42	6.4	8.0	0.200	9.6																	
																		47	12.8	16.0	0.400	19.2																	
930	31	A2	30130	54002	340	56E	MOD	AIR	PP	83-06-02	(2)	6JK1	G	RO	SSN	O	SUM	6.8	106.8	100.0	0.064																		
																		20	.5	8.0	0.074	7.9																	
																		22	1.1	16.0	0.148	15.9																	
																		36	6.2	84.0	0.778	84.0																	
930	31	A2	30130	54002	937	31C2	340CMFADPT	83-04-29	(3)	2VH1	A	RO	SSN	O	SUM	4.0	.0			4.0	0.000																		
																		00	4.0	.0	1.000	.0																	
930	31	A2	30130	56402	345	38A	INSTL	COMP	83-06-10	(2)	2HH1	G	RO	SSN	O	SUM	10.0	8.0			2.0	1.250																	
																		47	10.0	8.0	1.000	8.0																	
930	31	A2	30130	56402	347	56E	PPG	MODS	83-06-17	(2)	6CPT	G	RO	SSN	O	SUM	23.7	23.7			.0	1.000																	
																		36	23.7	23.7	1.000	23.7																	
930	31	A2	16258	22115	420	31A3	RPR	SFTY	V	83-05-06	(3)	7CG1	RO	FF	O	SUM	.0	.4			.4	0.000																	
																		22	.0	.4	1.000	.4																	
930	31	A2	16258	22117	522	41B	INSP	BLR	(	83-07-08	(1)	5CC1	G	RO	FF	O	SUM	.0	4.0			4.0	0.000																
																		46	.0	4.0	1.000	4.0																	

Figure 7. Sample PM-L18A report.

That is, foreman 36 received 0.7 saved hours (36%) whereas foreman 41 received 1.3 saved hours (64%). The appendix provides a detailed description of the PM-L18A report.

PM-L18B--Shop Work Center Performance Over Last Three Periods

The PM-L18B report, organized by shop, work center, and foreman code, is issued every 4 weeks to summarize work center (line item) performance on all KEYOPs that have closed during the past three 4-week periods. The dates covered by these three periods are shown under the report title. Work center performance, reported in terms of allowances, expenditures, saved hours, and PFs, is shown, by foreman, for each of the three 4-week periods. Total figures show performance for each work center and shop. This report can be used to review work center performance and identify foremen who contributed to this performance. Figure 8, which provides a page from the PM-L18B report, shows work center A3 (field 3) performance for the period from 23 April to 15 July. The appendix provides a detailed description of the PM-L18B report.

PM-L18B SHOP WORK CENTER (WC) PERFORMANCE OVER LAST THREE PERIODS																
BY SHOP, W.C. AND FOREMAN CODE (PERIOD COVERING APR 23 TO JUL 15)																
ISSUE DATE 18 JUL 83 DATA DATE 15 JUL 83																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
GRP	SH	WC	FORE	A	D	J	U	S	T	E	D	PERF	AL	EXP	SAVED	PF
SHF	OP	MAN	ALWD	EXPEND	AL/EXP	SAVED	ALWD	EXPEND	PERF	ALWD	EXPEND	PERF	ALWD	EXPEND	PERF	PF
930	31	A3	88	969.8	867.0	1.119	102.8	482.7	422.8	1.141	282.2	282.2	1.114	194.8	181.8	1.071
930	31	A3	00	357.0	99.8	3.577	257.2	48.0	3.9	9.999	181.0	8.0	9.999	128.0	87.9	1.456
930	31	A3	12	16.3	15.6	1.045	.7	16.3	15.6	1.045	.0	.0	.0	.0	.0	.0
930	31	A3	20	23.8	24.0	.992	-.2	.0	.0	.0	7.8	8.0	.975	18.0	18.0	1.000
930	31	A3	21	8.0	8.0	.750	0.0	8.0	8.0	.750	.0	.0	.0	.0	.0	.0
930	31	A3	22	9705.4	9560.2	1.018	145.2	2307.6	2167.3	1.065	3842.8	3641.3	1.000	3755.0	3751.6	1.001
930	31	A3	24	1.0	1.9	.526	-.9	.0	.0	.0	.0	.0	.0	1.0	1.9	.526
930	31	A3	27	15.2	15.8	.962	-.6	.0	.0	.0	15.2	15.8	.962	.0	.0	.0
930	31	A3	28	81.8	87.7	.910	5.9	13.9	18.0	.889	28.3	27.8	.943	21.4	23.8	.899
930	31	A3	30	13.0	17.0	.765	4.0	.0	.0	.0	8.8	8.0	.644	7.2	8.0	.900
930	31	A3	32	83.3	93.8	.889	10.5	58.3	70.0	.847	18.3	15.8	1.032	7.7	8.0	.963
930	31	A3	34	87.4	91.3	.957	3.9	27.0	27.8	.978	18.9	23.9	.833	40.5	39.8	1.018
930	31	A3	36	22.0	19.4	1.134	2.6	18.6	15.8	1.219	3.1	3.8	.785	.0	.0	.0
930	31	A3	38	139.4	148.6	.938	9.2	68.6	78.9	.869	35.0	31.2	1.101	35.8	37.9	.945
930	31	A3	41	1192.4	1171.0	1.018	21.4	475.2	455.3	1.044	426.9	415.5	1.027	290.3	300.2	.987
930	31	A3	42	1078.0	1078.2	1.000	.2	388.3	359.3	1.081	243.0	238.5	1.013	346.7	360.4	.911
930	31	A3	43	.0	8.0	.0	8.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
930	31	A3	44	59.2	63.4	.934	4.2	24.5	23.8	1.029	27.8	31.8	.870	7.2	8.0	.900
930	31	A3	45	4.3	7.9	.544	3.6	.0	.0	.0	.0	.0	.0	4.3	7.9	.544
930	31	A3	46	20.0	8.0	2.500	12.0	.0	.0	.0	.0	.0	.0	20.0	8.0	2.500
930	31	A3	47	51.3	71.0	.723	19.7	.0	.0	.0	8.8	8.0	.844	45.5	82.0	.734
930	31	A3	48	18.2	21.8	.835	3.6	18.2	21.8	.835	.0	.0	.0	.0	.0	.0
930	31	A3	53	.0	124.0	.0	124.0	.0	.0	.0	.0	18.0	.0	.0	108.0	.0
930	31	A3	88	98.0	240.8	.399	142.8	10.0	10.0	1.000	88.0	92.8	.732	18.0	137.8	.131
930	31	A3	82	138.0	152.0	.895	14.0	.0	.0	.0	104.0	112.0	.928	32.0	40.0	.800
930	31	A3	SUM	14156.6	13976.2	1.013	180.4	3964.5	3695.9	1.073	5220.6	5063.1	1.031	4971.5	5217.2	.953

Figure 8. Sample PM-L18B report.

PM-L19A--Foreman Performance and Man-hour Savings Over Last Three Periods

This report, which shows foreman work gang performance on line items of KEYOPs that have closed during the last three 4-week periods, can be used to track foreman performance efficiency on production work. The dates covered by the report are shown under the report title. A line showing foreman shop, code, and name precedes the list of line item performance data. The following information is shown for each closed KEYOP line item, regardless of work center, to which the foreman's work gang charged hours: the foreman's PF (field 5), allowances (field 10), expenditures (field 11), and saved hours

(allowed minus expended hours) (field 6) (see Figure 9). For a foreman, line item entries are listed by availability number (positions 3-5 of the JO number), SWLIN (positions 6-10 of the JO number), and KEYOP. Summary performance information for each of three 4-week periods, as well as the full 12 weeks, is shown following the entries for separate line items. Figure 9 shows that Foreman 25, Mr. Kimokeo, had a total of 8154.2 allowed hours and 8724.2 expended hours for the 12-week performance period, for a three-period average PF of .934.

PM-L19A		FOREMAN PERFORMANCE AND MNHR SAVINGS OVER LAST THREE PERIODS										ISSUE DATE 16 JUL 83				
		BY SHOP, FOREMAN, JO ORDER AND KEY OP										DATA DATE 15 JUL 83				
		FACTORED BY SS 090022 0900 PERIODS COVERING APR 23 TO JUL 15														
JOB ORDER	KEY	SHOP	KEYS	PERF	SAVED	PEID	KEY-OP	CLOSING	DATA	ADJUSTED	MNHR	LINE-ITEM	PERFORMANCE	S	TY-	MULL
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
830 31 25																
22102 24331 420	25	31B1	31B1	913	1.0	7WH1	83-06-02 (2)	PERIOD 2	10.5	11.5	750 0	621.4	.014	A	RO	AR
30102 589K1 620	25	31H	58D	1 629	28.4	PFA1	83-05-13 (3)	PERIOD 3	76.1	46.7	103 9	63.7	.732	O	RO	AR
30102 589K1 695	25	31H	38H	1 111	4	7FT1	83-05-27 (2)	PERIOD 2	4.0	3.6	8 0	7.2	.500	O	RO	AR
30102 589K1 695	25	31X	38H	1 111	1.6	7FT1	83-05-27 (2)	PERIOD 2	16.0	14.4	16 0	14.4	1.000	O	RO	AR
39106 08702 657	25	31X	30X	1 111	.8	2DD1	83-05-09 (2)	PERIOD 2	8 0	7.2	8 0	7.2	1.000	O	RO	SSN
39106 08702 754	25	31X	30X	1 111	1.6	2DD1	83-04-28 (3)	PERIOD 3	16 0	14.4	16 0	14.4	1.000	O	RO	SSN
39106 51801 627	25	31C2	38H	.317	4.3	1GN1	83-05-05 (3)	PERIOD 3	2.0	6.3	86 9	273 9	.023	A	RO	SSN
39106 55201 720	25	31H	38H	1 111	1.2	2WJ1	83-06-17 (2)	PERIOD 2	12.0	10.8	12 0	10.8	1.000	O	RO	SSN
39106 70801 690	25	31H	38E	.000	7.2	2CC1	83-05-05 (3)	PERIOD 3	.0	7.2	.0	7.2	1.000	O	RO	SSN
39106 70804 420	25	31C1	31C1	1 071	.5	2WS1	83-06-10 (2)	PERIOD 2	7.5	7.0	750 0	700 0	.010	A	RO	SSN
16130 20401 348	25	31H	38A	.986	.3	2HM1	83-05-08 (3)	PERIOD 3	22.2	22.5	39 9	40.4	.556	O	RO	SSN
16130 20701 344	25	31H	38A1	.987	.7	20M1	83-04-29 (3)	PERIOD 3	56.8	57.8	79 8	80 8	.711	O	RO	SSN
16130 23801 391	25	31A1	58E	1.027	.1	6AH1	83-05-13 (3)	PERIOD 3	3.7	3.8	17 5	17 0	.211	O	RO	SSN
16130 41801 420	25	31H	38F	.810	20.5	2K01	83-07-08 (1)	CURRENT	87.5	108 0	140 0	172 8	.625	O	RO	SSN
16130 42401 420	25	31H	38F	.800	11.3	2NH1	83-05-08 (3)	PERIOD 3	46.1	57 0	87 8	122 2	.471	O	RO	SSN
16130 44101 421	25	31A2	31H	1 159	4.6	2ML1	83-05-08 (3)	PERIOD 3	33.4	28.8	47 9	41 3	.686	O	RO	SSN
16130 44101 421	25	31C5	31H	1 111	3.2	2ML1	83-05-08 (3)	PERIOD 3	32.0	28.8	119 8	107 8	.267	O	RO	SSN
16130 44101 421	25	31H	31H	.950	24.4	2ML1	83-05-08 (3)	PERIOD 3	464.2	468.6	585 8	627 2	.779	O	RO	SSN
16130 44201 420	25	31H	38F	.718	24.9	2NH1	83-05-08 (3)	PERIOD 3	83.0	87.8	97 9	136 7	.643	O	RO	SSN
16130 51802 422	25	31C5	31B1	1 134	2.9	2RL1	83-05-06 (3)	PERIOD 3	24.4	21.5	143 5	126 4	.170	O	RO	SSN
16130 51802 422	25	31H	31B1	.698	27.1	2RL1	83-05-06 (3)	PERIOD 3	62.9	80.0	123 8	177 1	.508	O	RO	SSN
16130 51802 928	25	31B1	31B1	.422	4.1	2HM1	83-06-10 (2)	PERIOD 2	3 0	7.1	78 9	186 8	.038	O	RO	SSN
16959 51312 422	25	31H	51B	.000	7.2	3RO1	83-03-13 (3)	PERIOD 3	.0	7.2	.0	7.2	1.000	O	RO	DDG
16959 51314 424	25	31H	51B	.000	18 0	3RO1	83-03-04 (3)	PERIOD 3	.0	18.0	.0	18 0	1.000	O	RO	DDG
16959 53441 620	25	31H	58D	.000	7.2	PNS1	83-06-17 (2)	PERIOD 2	.0	7.2	.0	7.2	1.000	O	RO	DDG
16959 55121 722	25	31H	58D	.000	7.2	P001	83-07-08 (1)	CURRENT	.0	7.2	.0	7.2	1.000	O	RO	DDG
16959 58111 420	25	31H	31H	1 122	32.7	7WH1	83-05-06 (3)	PERIOD 3	300.7	268 0	419 9	374 3	.716	O	RO	DDG
16959 56111 425	25	31C5	31H	1 215	23 6	7WH1	83-05-06 (3)	PERIOD 3	133 0	109 4	200 0	164 5	.665	A	RO	DDG
16959 56111 425	25	31H	31H	1 156	94 8	7WH1	83-05-05 (3)	PERIOD 3	698 8	604 0	779 9	674 1	.896	A	RO	DDG
22959 24315 220	25	31B1	31B1	1 113	1.8	7WH1	83-02-25 (3)	PERIOD 3	15 7	14 1	5233 3	4700 0	.003	A	RO	DDG
22959 51315 420	25	31H	51B	.000	3 6	3RO1	83-05-20 (3)	PERIOD 3	.0	3 6	.0	3 6	1.000	O	RO	DDG
930 31 25					18	19			20	21						
KIMOKEO					933	216.2			3047 4	3263 6						
3 PERIOD AVERAGE					934	190.0 ***			8154 2	8724 2 ***						
COMBINED SUMMARY																

Figure 9. Sample PM-L19A report.

The computer program used to produce the PM-L19A report has a designator that can be used to adjust, by some percentage, the line item expenditure data. Such an adjustment automatically increases or decreases, by some percentage, the actual expenditures, that will, in turn, affect the summary performance indices for foremen. For applications where no adjustment is needed, the designator will be set at 100 percent. However, in situations where it may be desirable to make an adjustment (e.g., when the report is to be used as a basis for an incentive or goal-setting system), the standard or goal difficulty can be adjusted by setting the designator higher or lower than 100 percent. When the designator value is not equal to 100 percent, the value will be shown under the report title. The appendix provides a detailed description of the PM-L19A report.

Trial Implementation of the New PMR System

The new PMR system was implemented as part of the experimental trial of the group incentive system in Shop 31. Prior to distributing feedback reports from the new system, general foremen and foremen attended training sessions. During these sessions, the rationale for the new system was explained, and an overview of the system was given, along with a detailed description of each feedback report. Also, in an effort to highlight the anticipated benefits of the new reports to the shop and to the shipyard, the existing PM and new PMR reports were compared and contrasted and the intended uses of the new reports explained.

After a trial implementation period of 6 months, some of Shop 31's supervisors were interviewed to obtain their opinions of the new system. These supervisors reported that the PF reported by the new system is more accurate and, therefore, superior to that reported by the existing system. The use of a 12-week running average of performance was also considered to be an improvement over the existing system. Although supervisors viewed the new PF as being more accurate than the PF previously available, they expressed concern over a number of factors, beyond their control, that affect the PF. One such factor was the occasional failure by Planning Department personnel to enter allowances into the MIS. Supervisors felt it was unfair to be evaluated on a PF influenced by such extraneous factors. Also, foremen pointed out the variability in the accuracy of the work standards across KEYOPs—a problem area addressed by a recent report from the General Accounting Office (General Accounting Office, 1984). Another negative reaction to the system concerned the new feedback reports. Supervisors reported that most of the feedback reports were too detailed to be used effectively and noted that, unless they are modified to make them more readable, some supervisors would prefer not to receive them.

Although supervisors had mixed reactions to the PMR reports, they were used to the benefit of the entire shop, as well as to individual foremen, during the 6-month trial period. Use of the reports, coupled with training, has resulted in Shop 31 supervisors, as well as some personnel in other shops, adhering more closely to the proper procedures for filling out time cards. This, in turn, has led to improved accuracy of labor accounting, particularly in loaned or borrowed employee situations. Improvements in labor accounting should have a positive impact on other shipyard functions such as cost accounting, production control, and planning. Also, information in the feedback reports has enabled the Production Department staff to review the accuracy of other sources of information in the shipyard MIS data base. For example, more attention has been paid to correcting labor rejects, which, if uncorrected, are charged to overhead. It appears that the aggressive correction of labor rejects by Shop 31 personnel has forestalled the increases in these overhead costs experienced in a comparison production shop at NAVSHIPYDPEARL. Also, in a number of instances, allowances authorized by the P&E on the JO document

have not been properly entered into the MIS. Such errors not only negatively affect shop performance as reported by the new system but also distort the performance feedback provided by other MIS applications. Using the reports to detect such errors has resulted in a constructive dialogue between the Production and Planning Departments to pursue ways to resolve the problem.

Finally, the increased emphasis on performance efficiency resulting from the trial of the new PMR system has encouraged Shop 31 foremen to attend to various factors that influence their performance. Foremen have been actively working to loan out excess employees when their workloads have fallen rather than charging them to direct work, thereby improving their PFs. In addition, supervisors have shown an increased concern with the accuracy and completeness of the JO documents received from the Planning Department.

CONCLUSIONS

1. The newly developed PMR system was successfully implemented on a trial basis in Shop 31 at NAVSHIPYDPEARL and is being used to replace some elements of the PM Application of the shipyard MIS.

2. The system has improved the accuracy of both allowance and expenditure information in the MIS data base. This improvement could have a positive impact on other shipyard functions such as cost accounting, production control, and planning.

3. Supervisors reported that the accuracy of performance feedback was superior to that provided by the existing PM Application but favored modifying the reports to provide less detail.

4. The system could be extended to other shops at NAVSHIPYDPEARL or other Navy shipyard production department since it was designed expressly for a Navy shipyard MIS.

5. The system can be used in conjunction with a number of motivational techniques for improving productivity, such as incentives, goal setting, or performance appraisal.

RECOMMENDATIONS

It is recommended that NAVSHIPYDPEARL:

1. Continue using the new PMR system in Shop 31 to evaluate foreman and shop performance efficiency.

2. Develop systematic and efficient procedures for correcting errors such as failure to enter allowances into the MIS or time card entry errors. Timely correction of such errors should improve both the accounting of labor expenditures and the measurement of performance.

3. Develop reports that summarize information in graphic form for use by supervisors and managers.

4. Use the system to detect errors in the MIS data base, such as rejected time cards. When possible, accountability for such errors should be enforced to the offending department.

5. Implement the system in other areas of the Production Department if this is cost-effective. Implementation costs to consider include those associated with (a) tailoring the new system to the requirements of the entire Production Department and (b) integrating the new PMR system within the existing PM Application.

6. Complete documentation of the newly developed PMR system and make it available to other shipyards.

7. Determine the feasibility of using the system in other Navy shipyard production departments.

REFERENCES

- Baumler, J. V. Defined criteria of performance in organizational control. Administrative Science Quarterly, 1971, 16, 340-349.
- Cammann, C. Can accounting systems produce change? In Lawler, E. E. & Rhode, J. G. Information and control in organizations. Pacific Palisades, CA: Goodyear Publishing Co., 1976.
- Cammann, C. & Nadler, D. A. Making effective use of control systems. In Hackman, J. R., Lawler, E. E., & Porter, L. W. (Eds.), Perspective on behavior in organizations. New York: McGraw-Hill, 1977.
- General Accounting Office. (April 1984). Navy can improve management of shipyard labor resources through better work measurement practices (GAO/NSAID-84-96). Washington, DC.
- Hartman, W., Mather, H., & Proeme, A. Management information systems. New York: McGraw-Hill, 1968.
- Jaques, E. Equitable payment. New York: Wiley, 1961.
- Lawler, E. E. & Rhode, J. G. Information and control in organizations. Pacific Palisades, CA: Goodyear Publishing Co., 1976.
- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. Goal setting and task performance: 1969-1981. Psychological Bulletin, 1981, 90, 125-152.
- Mohr, D. A., Shumate, E. C., & Magnusson, P. A. Individual performance measurement and reporting in a Navy industrial organization (NPRDC Tech. Rep. 83-35). San Diego: Navy Personnel Research and Development Center, September 1983. (AD-A133 481)
- Miller, J. G. Information input overload and psychopathology. American Journal of Psychiatry. 1960, 116, 695-704.
- Nadler, D. A. Feedback and organization development: Using data-based methods. Reading, MA: Addison-Wesley Publishing Co., 1977.
- Peters, T. J. & Waterman, R. H. In search of excellence. New York: Harber & Row, 1982.
- Porter, L. W., Lawler, E. E., & Hackman, J. R. Behavior in organizations. New York: McGraw-Hill, 1975.
- Rosen, L. S. & Schneck, R. W. Some behavioral consequences of accounting measurement system. Cost and Management, 1967, 41, 6-16.
- Shumate, E. C. Dockstader, S. L., & Nebeker, D. M. Performance contingent monetary rewards for individual productivity: Principles and applications (NPRDC Tech. Note 81-14). San Diego: Navy Personnel Research and Development Center, May 1981.

APPENDIX

DETAILED DESCRIPTIONS OF PMR SYSTEM FEEDBACK REPORTS

	Page
1. L07A--Detail Time Accounting Report by Employee	A-1
2. L08A--Detail Time Accounting Report by Foreman	A-5
3. L09A--Detail Time Accounting Report by Job Order KEYOP	A-9
4. L17A--Foreman Line Item Performance on closed KEYOPS	A-13
5. L18A--Line Item Allowance/Expenditure Detail List	A-19
6. L18B--Shop Work Center Performance over Last Three Periods	A-22
7. L19A--Foreman Performance and Man-hour Savings Over Last Three Periods	A-27

REPORT NUMBER: PM-L07A

REPORT TITLE: DETAIL TIME ACCOUNTING REPORT BY EMPLOYEE

PURPOSE: Enables verification of employee time card entries

The PM-L07A report issued weekly lists all time card charges against direct and overhead work made during the previous week for a particular employee. Time card entry errors such as incorrect or missing foreman codes can be easily detected using the PM-L07A report. The summary PM-L07A report issued every 4 weeks lists cumulative-to-date time card charges against direct and overhead work, as well as corrections made during the previous 4 weeks. As shown in Figure A-1, the report comprises two parts. Part 1 provides (1) the dates covered by the report, both Gregorian and Julian, (2) a line showing employee work status, shop, badge number, name, and pay grade, and (3) the employee's time card entries listed by foreman and work date. The number of labor hours charged to each foreman is totaled (indicated by a double asterisk). Part 2 lists data excluded from the performance computation, including charges to sick and annual leave, the number of hours an employee has been loaned to another shop, and rejected time card charges with the reason for their rejection. The last line of the report shows the employee's total labor hours from Parts 1 and 2, excluding overtime (indicated by a triple asterisk), and the total hours from Part 2, excluding time card charges (indicated by a double asterisk).

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	COMMENTS	In Part 1, an employee's work status and shop number are printed. The single digit indicates employee status, e.g., 1 = supervisor 2 = nonsupervisor 9 = temporary The double-digit number designates the employee's shop. In Part 2, if the employee is on loan to another shop, the word "loaned" is printed. For leave transactions, the type of leave is shown: annual, sick, or other. This field also shows the reject status code for the time card charge; e.g., KK = Charge against a KEYOP that has been automatically closed. KC = Charge against a KEYOP that has been closed by the customer. KM = Charge against a KEYOP that is closed to all but material charges. I = 10-digit job order number is invalid. S = Shop is not authorized to charge to the KEYOP.

<u>Field</u>	<u>Title</u>	<u>Description</u>
2	FA104A FP126A	Five-digit number indicating the date the charge entered the Financial Application of the Shipyard MIS. The first two digits show the year while the last three digits show the Julian work date.
3	REC.SEQ#	Record Sequence Number is reserved for future use in making time card charge corrections.
4	SUPV CODE	Two-digit code identifying each foreman.
5	WORK DATE	Five-digit number indicating the work date on which the charge was made. The first two digits show the year while the last three digits show the Julian work date.
6	SHIFT	The shift on which the time was charged: 1 = day shift 2 = second shift 3 = third shift
7	HULL TYPE	Typically, this code shows the type of vessel on which the work was performed; may also indicate that other types of work were done; e.g., - SS = Diesel submarine - SSN = Nuclear submarine - SSBN = Ballistic missile submarine Other codes denote surface vessels or other types of work.
8	SHIP NAME	Typically shows the name of the vessel on which the work is being performed.
9	AVAIL TYPE	Two-digit code showing the type of availability; e.g., - RA = Restricted availability - TA = Technical availability - RO = Regular overhaul - PS = Post-shakedown availability - MS = Miscellaneous
10	JOB ORDER	Ten-digit job order number shown on the KEYOP document or the 10-digit number indicating the overhead account charged.

<u>Field</u>	<u>Title</u>	<u>Description</u>
11	KEYOP	Three-digit KEYOP number shown on the KEYOP document.
12	W.C.	Work Center responsible for the KEYOP line item.
13	BB SHOP	Shop from which the employee was borrowed.
14	TRAN CODE	Three-digit Transaction Code showing the type of time card charge; e.g., 055 = Timecard charge submitted on the work date. 050 = Timecard charge submitted after the work date. 040/041 = Payroll adjustment to correct time card charge.
15	WK CD	One-digit work code taken from the time card; e.g., 1 = overtime work 2 = holiday work 3 = compensatory work 4 = straight time Sunday work
16	MAN-HRS	The employee's total man-hours accounted for by that charge.
17	EMPLOYEE NAME	Last name of the employee for whom the time was charged.
18	OT/HOL	Overtime or holiday hours charged. This field shows those hours listed in field 16 (MAN-HRS) that were overtime or holiday hours.
19	LV HRS	Leave hours charged. This field shows those hours listed in field 16 (MAN-HRS) that were leave hours.

PM-L07A

DETAIL TIME ACCOUNTING REPORT BY EMPLOYEE

REPORT DATE 83196

COVERING JUN 18 JUL 15

83169 83196 JUL

ISSUE DATE 16 JUL 83

DATA DATE 15 JUL 83

COMMENTS

FA104A REC. SUPV WORK SH- HULL SHIP

FP126A SEQ. CODE DATE 1FT TYPE NAME

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

2-31 23400 SENTINO

JOHN

W010

V.C.		83171	00	83171	2	DDG	GOLDSBORO	RO	16269	31421	420	055	4.0	SENTINO
FOREMAN 00		CODE												TOTAL
83172		01552	11	83172	2	DDG	GOLDSBORO	RO	16269	48274	420	H	055	8.0 SENTINO
83174		03295	11	83174	2	DDG	OVERHEAD	RO	9190	149504	520	H	050	8.0 SENTINO
83175		00108	11	83174	2	DDG	GOLDSBORO	RO	16269	51313	222	H	050	7.0 SENTINO
83175		00106	11	83175	2	DDG	GOLDSBORO	RO	16269	48274	420	H	055	7.0 SENTINO
83179		01103	11	83178	2	DDG	GOLDSBORO	RO	16269	40274	420	H	050	8.0 SENTINO
83181		02595	11	83181	2	DDG	GOLDSBORO	RO	16269	48274	420	H	055	8.0 SENTINO
83186		00826	11	83186	2	DDG	GOLDSBORO	RO	16269	48274	420	H	055	8.0 SENTINO
83189		02743	11	83187	2	SS	BARREL	RO	16395	30701	228	H	050	8.0 SENTINO
83188		02744	11	83188	2	SS	BARREL	RO	16395	30701	228	H	055	8.0 SENTINO
83192		00214	11	83189	2	SS	BARREL	RO	16395	30701	228	H	050	8.0 SENTINO
83192		00178	11	83192	2	DDG	GOLDSBORO	RO	16269	72121	426	H	055	4.0 SENTINO
83192		00368	11	83192	2	DDG	B STODDERT	RA	26559	31401	520	H	055	4.0 SENTINO
83195		01743	11	83195	2	DDG	GOLDSBORO	RO	16269	72121	426	H	055	4.0 SENTINO
FOREMAN 11		CODE												TOTAL
ANNUAL		83175	11	83174	2	LEAVE			9025	101002		H	050	1.0 SENTINO
ANNUAL		83175	11	83175	2	LEAVE			9025	101002		H	055	1.0 SENTINO
ANNUAL		83180	11	83180	2	LEAVE			9025	101002		H	055	1.0 SENTINO
SICK		83182	11	83182	2	LEAVE			9025	201002		H	055	8.0 SENTINO
OTHER		83186	11	83185	2	LEAVE			9025	200002		H	055	8.0 SENTINO
SICK		83193	11	83193	2	LEAVE			9025	201002		H	055	8.0 SENTINO
SICK		83195	11	83194	2	LEAVE			9025	201002		H	055	8.0 SENTINO
ANNUAL		83195	11	83195	2	LEAVE			9025	201002		H	055	1.0 SENTINO
LOANED		83174	11	83168	2	DDG	JO STRAUSS	RO	16395	48168	422	H	51	055
LOANED		83178	11	83167	2	DDG	JO STRAUSS	RO	16395	48168	422	H	51	050
LOANED		83186	11	83171	2	DDG	GOLDSBORO	RO	30269	514K1	442	H	51	055
LOANED		83183	11	83179	2	DDG	GOLDSBORO	RO	30269	514K2	634	H	51	050
1 - REJECT		83171	11	83171	2	DDG	GOLDSBORO	RO	30269	514K1	442	H	51	055
3 - REJECT		83178	11	83171	2	DDG	GOLDSBORO	RO	30269	514K2	634	H	51	055
3 - REJECT		83180	11	83179	2	DDG	GOLDSBORO	RO	30269	514K2	634	H	51	050
EMPLOYEE MHR TOTAL		= 168.0 ***												TOTAL
														71.0 **
														43.0

Figure A-1. Detail time accounting report by employee.

REPORT NUMBER: PM-L08A

REPORT TITLE: DETAIL TIME ACCOUNTING REPORT BY FOREMAN

PURPOSE: Enables verification of foreman labor charges to Job Order KEYOPs. Can also be used to determine what problems are causing time card charges to be rejected.

The PM-L08A report issued weekly lists all time card charges against direct and overhead work authorized by a particular foreman during the previous week. This report can be used to review the accuracy of the week's time card charges since incorrect foreman codes, work centers, and rejected charges are highlighted. The summary PM-L08A report issued every 4 weeks lists cumulative-to-date time card charges against direct and overhead work, as well as the corrections made during the previous 4 weeks. As shown in Figure A-2, Part 1 of the report provides (1) the dates covered (both Gregorian and Julian), (2) a line showing the foreman's work status, shop, supervisor code, badge number, name, pay grade, shift, and primary work center, (3) time card entries listed by foreman code, job order, and KEYOP number order, and (4) time card entries charged to overhead (indicated by job order numbers beginning with the digit 9). The number of labor charges authorized by a foreman to each job order and KEYOP are totalled (indicated by a double asterisk). Part 2 lists data excluded from performance computation; that is, rejected time card charges along with the reason for their rejection. In addition to verifying foreman labor charges to job order KEYOPs, this report can be used to determine the reasons for time card rejections.

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	COMMENTS	In Part 1, an employee's work status and shop number are printed. The single digit indicates employee status; e.g., 1 = supervisor 2 = nonsupervisor 3 = temporary The double-digit number designates the employee's shop. If field 5 is blank, then W.C. is printed. "Borrowed" is printed if the employee is borrowed from another shop. a row of asterisks indicates a KEYOP summary line. Part 2, data excluded from performance computations, shows the reject status code for that time card charge; e.g., KK = Charge against a KEYOP that has been automatically closed. KC = Charge against a KEYOP that has been closed by the customer. KM = Charge against a KEYOP that is closed to all but material charges. I = 10-digit job order number is invalid. S = Shop is not authorized to charge to the KEYOP.

<u>Field</u>	<u>Title</u>	<u>Description</u>
2	SUPV CODE	Two-digit code identifying each foreman.
3	JOB ORDER	Ten-digit job order number shown on the KEYOP document or the 10-digit number indicating the overhead account charged.
4	KEYOP	Three-digit KEYOP number shown on the KEYOP document.
5	W.C.	Work Center responsible for the KEYOP line item.
6	REC. SEQ #	Record Sequence Number is reserved for future use in making time card charge corrections.
7	BADGE NO.	Badge Number of the employee for whom the time was charged.
8	TOT. MANHRS.	The employee's total man-hours accounted for by that charge.
9	OT. HOL.	Overtime or holiday hours charged. This field shows those hours listed in field 8 (TOT. MANHRS.) that were overtime or holiday hours.
10	WORK DATE	Five-digit number indicating the work date for which the charge was made. The first two digits show the year while the last three digits show the Julian work date.
11	SHIFT	The shift for which the time was charged: 1 = day shift 2 = second shift 3 = third shift
12	EMPLOYEE NAME	Last name of the employee for whom the time was charged.
13	BB SHOP	Shop from which the employee was borrowed.
14	TRAN/WK. CODE	The first three-digits are the Transaction Code showing the type of time card charge; e.g., 055 = Time card charge submitted on the work date. 050 = Time card charge submitted after the work date.

<u>Field</u>	<u>Title</u>	<u>Description</u>
		040/041 = Payroll adjustment to correct time card charge.
		This code is followed by a one-digit code taken from the time card; e.g.,
		blank = straight time
		1 = overtime work
		2 = holiday work
		3 = compensatory work
		4 = straight time Sunday work
15	FA104A FA126A	Five-digit number indicating the date the charge entered the Financial Application of the shipyard MIS. The first two digits show the year while the last three digits show the Julian work date. If this date is later than the work date (field 10), it means either the time card was turned in late or the charge is a correction to a reject shown in Part 2 of this report.
16	HULL TYPE	Typically, this code shows the type of vessel on which the work was performed; may also indicate that other types of work were done; e.g.,
		SS = Diesel submarine
		SSN = Nuclear submarine
		SSBN = Ballistic missile submarine
		Other codes denote surface vessels or other types of work.
17	SHIP NAME	Typically shows the name of the vessel on which the work is being performed.
18	AVAIL TYPE	Two-digit code showing the type of availability; e.g.,
		RA = Restricted availability
		TA = Technical availability
		RO = Regular overhaul
		PS = Post-shakedown availability
		MS = Miscellaneous

DETAIL TIME ACCOUNTING REPORT BY FOREMAN

PHLOBA
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
 COMMENTS SUPV JOB ORDER REV V.C. REC. BADGE TOT. WORK SH- EMPLOYEE BB TRAX/TK. PAYDIA HULL SHIP AVAIL
 CODE -OP SEQ # NO. MNHRS. HOL. DATE IFT NAME SHOP CODE FPI26A TYPE NAME TYPE
 REPORT DATE 83196 COVERING JUN 18 JUL 15 83189 83196 JUL 13 14 15 16 17 18
 ISSUE DATE 18 JUL 83
 DATA DATE 13 JUL 83

SHOP 1-31	SUPV. CODE AND BADGE #	NAKAMA	MILES	SH- TFT=1	W.C. #	PRIMARY
20	14284 26211	620 A1 00005 24192	4.0	83189	HERNLY	055 83189 AO WILLAMETTE P8
*****	14284 26211	820 A1 ** TOTAL **	4.0	83196		
20	14284 55556	621 A1 00006 30938	6.0	83189	WEATHERS	055 83189 AO WILLAMETTE P8
*****	14284 55556	821 A1 ** TOTAL **	6.0	83196		
20	16130 01903	392 A1 02064 32587	2.0	83196	FE BENITO	055 83196 SSN PINTADO RO
20	16130 01903	392 A1 02865 34471	4.0	83196	SAVAI	055 83196 SSN PINTADO RO
*****	16130 01903	392 A1 ** TOTAL **	6.0	83196		
20	16130 08704	586 A1 00971 32768	3.0	83179	SARAE	055 83179 SSN PINTADO RO
*****	16130 08704	586 A1 ** TOTAL **	3.0	83190		

20	9931	110900	001	A1	01911	27008	1.0	83186	YOSHIDA	055	83186		
20	9931	110900	001	A1	01912	30921	1.0	83186	HAMAHOTO	055	83186		
20	9931	110900	001	A1	01913	30938	1.0	83186	VEATHERS	055	83186		
20	9931	110900	001	A1	01914	31217	1.0	83186	FUJIWARA	055	83186		
20	9931	110900	001	A1	01915	31362	1.0	83186	AKIOMA	055	83186		
20	9931	110900	001	A1	02803	31098	1.0	83194	TAKATA	055	83195		
*****	9931	110900	001	A1	00001	30921	6.0	83196					

PART 2 - DATA THAT FOLLOWS ARE EXCLUDED FROM PERFORMANCE COMPUTATION

1 - REJECT	20	M8188		A1	00001	30921	6.0	83189	HAMAHOTO	055	83189		
1 - REJECT	20	R9066		A1	01394	31578	6.0	83194	OSHIRO	055	83195		
1 - REJECT	20	1491		A1	02751	28925	6.0	83174	FARIAS	055	83174		
KK-REJECT	20	1613050501	324	A1	00028	34795	4.0	83178	KAAA	055	83178	SSN	PINTADO RO
S - REJECT	20	1613050501	324	A1	01757	34795	4.0	83178	KAAA	055	83180	SSN	PINTADO RO
KK-REJECT	20	1613053201	690	A1	00707	32884	6.0	83186	OKA	055	83186	SSN	PINTADO RO
KK-REJECT	20	1613053801	341	A1	03341	25009	4.0	83182	TERUYA	055	83182	SSN	PINTADO RO
KK-REJECT	20	1639556101	390	A1	01011	34795	6.0	83183	KAAA	055	83183	SS	BARDEL RO
KK-REJECT	20	1639556101	390	A1	01012	34810	6.0	83183	HERNANDEZ	055	83183	SS	BARDEL RO
CS-REJECT	20	2654352901	520	A1	02765	37783	6.0	83181	CHANG	055	83181	ATS	BEAUFORT RA
KK-REJECT	20	3013040402	931	A1	02797	28251	6.0	83181	LEE	055	83181	SSN	PINTADO RO
KK-REJECT	20	30289531K1	220	A1	00545	30938	4.0	83178	WEATHERS	055	83178	DDG	GOLDSBORO RO
KK-REJECT	20	30289531K1	220	A1	00546	31217	7.0	83178	FUJIWARA	055	83178	DDG	GOLDSBORO RO

Figure A-2. Detail time accounting report by foreman.

REPORT NUMBER: PM-L09A

REPORT TITLE: DETAIL TIME ACCOUNTING REPORT BY JOB ORDER KEY-
OP

PURPOSE: Enables verification of time card charges on open KEYOP line items.

The PM-L09A report issued every 4 weeks lists all time card charges against a particular job order and KEYOP, either direct or overhead, made during the previous 4 weeks. Figure A-3 shows that entries are listed by job order, KEYOP, and work center (line item) order. Within each work center, entries are listed by foreman code and work date sequence. Following the entries for each work center, a summary line (indicated by asterisks) denotes the total labor charges to that KEYOP line item. In the case of some overhead charges, the summary line is entered for an entire job order number. Charges to overhead are listed following direct charge entries. The PM-L09A report can be used to identify the foreman responsible for labor expenditures to a KEYOP line item. The expenditure records also contain work data and employee name.

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	SHOP	Shop to which the work was charged. A row of asterisks in this field indicates a job order summary line.
2	JOB ORDER	Ten-digit job order number shown on the KEYOP document or the 10-digit number indicating the overhead account charged.
3	KEYOP	Three-digit KEYOP number shown on the KEYOP document.
4	W.C.	Work Center responsible for the KEYOP line item.
5	HULL	Typically, this code shows the type of vessel on which the work was performed; may also indicate that other types of work were done; e.g., - SS = Diesel submarine - SSN = Nuclear submarine - SSBN = Ballistic missile submarine Other codes denote surface vessels or other types of work.
6	SHIP NAME	Typically shows the name of the vessel on which the work was being performed.
7	AVAIL TYPE	Two-digit code showing the type of availability; e.g.,

<u>Field</u>	<u>Title</u>	<u>Description</u>
		RA = Restricted availability TA = Technical availability RO = Regular overhaul PS = Post-shakedown availability MS = Miscellaneous
8	SUPV CODE	Two-digit code identifying each foreman.
9	BB SHOP	Shop from which the employee was borrowed.
10	WORK DATE	Both the Julian and the Gregorian calendar date for which the work was charged.
11	BADGE NO.	Badge number of the employee for whom the time was charged.
12	TOT MNHRS	The employee's total man-hours accounted for by that charge.
13	O.T. HOL.	Overtime or holiday hours charged.
14	SHIFT	The shift for which the time was charged: 1 = day shift 2 = second shift 3 = third shift
15	EMPLOYEE NAME	Last name of the employee for whom the time was charged.
16	TRAN/WK CODE	The first three-digits are the transaction code showing the type of time card charge; e.g., 055 = Time card charge submitted on the work date. 050 = Time card charge submitted after the work date. 040/041 = Payroll adjustment to correct time card charge. This code is followed by a one-digit code taken from the time card; e.g., blank = straight time 1 = overtime work 2 = holiday work 3 = compensatory work 4 = straight time Sunday work

<u>Field</u>	<u>Title</u>	<u>Description</u>
17	FA104A FP126A	Five-digit number indicating the date the charge entered the Financial Application of the shipyard MIS. The first two digits show the year while the last three digits show the Julian work date.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SHOP	JOB ORDER	KEY	W.C.	HULL	SHIP	AVAIL	SUPV	DB	WORK DATE	BADGE NO.	MINHRS.	MOL.	IFT	EMPLOYEE NAME	TRAN/WK CODE	FA104A FP126A
-OP					NAME	TYPE	CODE	SHOP								
31	14284	25511	622	C3	AO	WILLAMETTE	PS	21	83180 83-06-29	32345	8.0	.0	.0	MARUYAMA	055	83180
----	14284	25511	622	C3	----	----	----	----	----- TOTAL	-----	8.0	.0	.0	----	----	----
31	14284	25511	622	D	AO	WILLAMETTE	PS	27	83179 83-06-28	22403	7.0	.0	.0	TAVARES	055	83179
31	14284	25511	622	D	AO	WILLAMETTE	PS	27	83179 83-06-28	29308	7.0	.0	.0	TARR	055	83179
----	14284	25511	622	D	----	----	----	----	----- TOTAL	-----	14.0	.0	.0	----	----	----
31	14284	26211	620	A1	AO	WILLAMETTE	PS	20	83189 83-07-08	24192	4.0	.0	.0	HERNLY	055	83189
----	14284	26211	620	A1	----	----	----	----	----- TOTAL	-----	4.0	.0	.0	----	----	----
31	14284	34111	520	AO	WILLAMETTE	PS	44	83172 83-06-21	33613	3.0	.0	.0	2 LEE	050	83173	
----	14284	34111	520	----	----	----	----	----	----- TOTAL	-----	3.0	.0	.0	----	----	----
31	14284	34111	520	C4	AO	WILLAMETTE	PS	30	83172 83-06-21	25203	6.0	.0	.0	2 YAMANE	050	83173
----	14284	34111	520	C4	----	----	----	----	----- TOTAL	-----	6.0	.0	.0	----	----	----
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83175 83-06-24	25973	8.0	.0	.0	SILETTI	055	83175
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83175 83-06-24	28597	8.0	.0	.0	TAKAI	055	83175
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83175 83-06-24	28928	8.0	.0	.0	NECOTA	055	83175
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83175 83-06-24	35142	8.0	.0	.0	POAI	055	83175
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83175 83-06-24	36407	8.0	.0	.0	CHUN	055	83175
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83175 83-06-24	37268	8.0	.0	.0	TAGAWA	055	83175
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83178 83-06-27	25973	8.0	.0	.0	SILETTI	055	83178
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83178 83-06-27	32069	6.0	.0	.0	LOOITOS	055	83178
31	14284	53412	620	A3	AO	WILLAMETTE	PS	22	83178 83-06-27	36407	8.0	.0	.0	CHUN	055	83178
----	14284	53412	620	A3	----	----	----	----	----- TOTAL	-----	70.0	.0	.0	----	----	----
31	14284	55556	621	A1	AO	WILLAMETTE	PS	20	83189 83-07-08	30936	6.0	.0	.0	WEATHERS	055	83189
----	14284	55556	621	A1	----	----	----	----	----- TOTAL	-----	6.0	.0	.0	----	----	----
31	14284	55556	622	A3	AO	WILLAMETTE	PS	22	83194 83-07-13	20233	8.0	.0	.0	TOMCSAWA	055	83195
31	14284	55556	622	A3	AO	WILLAMETTE	PS	22	83194 83-07-13	28597	8.0	.0	.0	TAKAI	055	83195
31	14284	55556	622	A3	AO	WILLAMETTE	PS	22	83194 83-07-13	37268	8.0	.0	.0	TAGAWA	055	83195
----	14284	55556	622	A3	----	----	----	----	----- TOTAL	-----	24.0	.0	.0	----	----	----
31	14284	57121	620	C2	AO	WILLAMETTE	PS	30	83172 83-06-21	20424	4.0	.0	.0	2 OKUI	055	83172
31	14284	57121	620	C2	AO	WILLAMETTE	PS	44	83172 83-06-21	33289	8.0	.0	.0	2 NISHIMURA	050	83173
----	14284	57121	620	C2	----	----	----	----	----- TOTAL	-----	12.0	.0	.0	----	----	----
31	14284	57121	620	H	AO	WILLAMETTE	PS	85	83195 83-07-14	34456	8.0	.0	.0	CHING	055	83195

Figure A-3. Detail time accounting report by job order KEYOP.

REPORT NUMBER: PM-L17A

REPORT TITLE: FOREMAN--LINE ITEM PERFORMANCE ON CLOSED KEY-OPS

PURPOSE: Enables identification of foreman contribution to line item performance.

The PM-L17A report, organized by ship, job order/KEYOP, shop, work center, and foreman, is issued every 4 weeks to show foreman line item performance on KEYOPs that have closed in the previous 12 weeks. The dates covered by the report are shown under the report title. As shown in Figure A-4, information for different KEYOPs is separated by a horizontal dashed line. The first line under each dashed line contains performance data for an entire KEYOP, followed by performance data for each line item and each foreman working on that line item. At both the KEYOP and line item levels, man-hour allowance and expenditure data are taken from PROFILE, a file in the Production Control (PC) application of the shipyard MIS. Allowance data represent the number of hours issued by the Planning Department to complete a line item (field 14); and expenditure data, the number of hours worked by the Production Department (field 16). A performance factor (PF) (i.e., allowance divided by expenditures) is listed for the entire KEYOP and each line item (work center) of the KEYOP. The balance (allowance minus expenditures) represents saved labor hours when the PF is greater than 1.0 and lost labor hours when the PF is less than 1.0.

Man-hour allowances for each foreman are computer-generated (field 28) because the Planning Department issues allowances for line items, not foremen. The hours of the line item allowance are automatically divided among the foremen who charge to that item, based on a foreman's percent responsibility, the proportion of a foreman's actual expenditures on a line item to the total actual expenditures of all foremen charging to the line item. The foreman's share of the line item allowance is computed by multiplying the number of hours allowed for that line item by each foreman's percent responsibility. This procedure results in a foreman allowance for each line item to which the foreman expended time, regardless of the number of foremen charging to the line item.

Expenditures for foremen are computer-generated in the same manner as foreman allowances. There may be a discrepancy between the foreman's actual expended hours and the computer-generated expenditure. Such a discrepancy is due to (1) transferred labor charges that affect total line item data in PROFILE but not the actual foreman data in the PMR system's foreman history file, and (2) rounding errors that may occur when multiplying percent responsibility with line item allowance and expenditure. With the computer-generated expenditure, however, transferred labor charges are reflected in the calculation of foreman performance indices which ensures that these indices are accurate and consistent with line item data. The actual foreman expended hours and the computer generated foreman expenditures are shown in fields 29 and 30 respectively.

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	JOB ORDER #	Ten-digit job order number shown on the KEYOP document.
2	JO TITLE	Title of job order shown on the KEYOP document.

<u>Field</u>	<u>Title</u>	<u>Description</u>
3	KEYOP	Three-digit KEYOP number shown on the KEYOP document.
4	KO TITLE	Title of the KEYOP shown on the KEYOP document.
5	CC	Work status/closure code for a KEYOP; e.g., OC = Customer order closed to all charges. OJ = Job order closed to all charges. 1K = KEYOP closed by shop. 2K = KEYOP closed by date (automatically). 3K = KEYOP closed by Planning Department. 3X = KEYOP cancelled.
6	CLOSE DATE	The date on which the KEYOP was closed (YY-MM-DD).
7	SHIP NAME	The name of the vessel on which the work was performed.
8	KEYSWC	The shop work center having primary responsibility for the completion of the KEYOP.
9	CHG NO	The KEYOP change number assigned by the Planning Department and shown on the KEYOP document. The alphanumeric character corresponds to the number of KEYOP revisions. For example: A = change 1; B = change 2; and so on.
10	SC	A code shown on the KEYOP document that identifies the scheduler who assigned the scheduled start and completion dates to the KEYOP.
11	ISSUED ON JO/KO AUTH	Total man-hours, shown on the KEYOP document, allowed by P&E to accomplish the KEYOP.
12	PEID	The code that identifies the planner and estimator (P&E) who wrote the particular KEYOP.
13	KE#	Four-digit number on the KEYOP document that identifies the key event to which the KEYOP is tied.

<u>Field</u>	<u>Title</u>	<u>Description</u>
14	MH-ALLOW IN MIS	Total man-hours, as shown in MIS, allowed by P&E to accomplish the KEYOP.
15	ISSUED VARIANCE	Equals the man-hours allowed in MIS (field 14) minus man-hours issued on JO/KO authorization (field 11). There should be no variance unless the P&E authorizes a "Loaned by" transaction by the Production Department. There will be variance when the original KEYOP or KEYOP revisions are not properly process and entered into the MIS data base. A variance will negatively affect the accuracy of performance measure in PM reports L17A to L19A.
16	EXPENDITURES	The total man-hours expended on the KEYOP.
17	BALANCE ALW-EXP	The difference between man-hours in MIS (field 14) and expenditures (field 16).
18	PERF AL/EXP	KEYOP performance factor that equals allowed hours by P&E (field 14) divided by man-hours expended (field 16).
19	EU SHOP	End use shop is the shop work center responsible for the line item.
20	SD	A one-letter standard designator showing the method used by P&E to calculate the man-hour allowance; e.g., E = Engineered A = Estimated O = Nonstandard U = Uniform method and standard
21	SD NO	Eight-digit standard number assigned by the P&E and shown on the KEYOP document.
22	MH-ALLOW IN MIS	Total man-hours, as shown in MIS, allowed by P&E to accomplish the line item.
23	EXPENDITURES	Total man-hours expended on the line item.
24	BALANCE ALW-EXP	The difference between man-hours allowed in MIS for the line item (field 22) and the total line item expenditures (field 23).
25	PERF AL/EXP	Line item (work center) performance factor that equals line item allowed hours (field 22)

<u>Field</u>	<u>Title</u>	<u>Description</u>
26	FOREMAN NAME	Name of each foreman responsible for work on the line item.
27	FOREMAN CODE	Two-digit code identifying each foreman.
28	MH-ALLOW IN MIS	Foreman man-hour allowance. For individual foremen, this number represents the work gang's share of the man-hours allowed by the P&E to accomplish the line item as shown in field 22. When only one foreman charges to a line item, all man-hours allowed for the line item go to that foreman's work gang. When two or more foremen charge to a line item, the total man-hours allowed for that line item are prorated among the foremen in proportion to the man-hours each foreman's respective work gang expended on the line item. Each foreman's prorated share of the line item allowance is obtained by multiplying the foreman's percent responsibility (field 32) and the line item allowance in MIS (field 22).
29	ACTUAL	Actual line item expenditures of each foreman responsible for work on the line item. These expenditures are maintained in the foreman history file of the shipyard MIS.
30	EXPENDITURES	For an individual foreman, this number represents the work gang's share of the total man-hour expenditures on the line item. It is obtained by multiplying percent responsibility (field 32) and the total expenditures of all foremen who charged to that line item (field 23). See text of this appendix for a discussion of circumstances when a foreman's actual expenditures (field 29) and expenditures (field 30) may differ.
31	BALANCE ALW-EXP	The difference between foreman man-hour allowances (field 28) and foreman expenditures (field 30).
32	PERCENT RESP	Percent responsibility shows how much of the work on a line item was done by a work gang. It is the proportion of the total actual man-hours expended on the line item that was charged by this work gang.

$$\text{Percent Responsibility} = \frac{\text{Actual man-hours expended by this work gang}}{\text{Total actual man-hours expended on the line item}}$$

- Notes.
1. Fields 1-18 contain information at the KEYOP level.
 2. Fields 19-25 contain information at the line item level.
 3. Fields 26-32 contain information at the foreman level.

FOREMAN - LINE ITEM PERFORMANCE ON CLOSED KEY OPS														ISSUE DATE 16 JUL 83		PAGE	
BY SHIP, JO/KO, SHOP, WC AND FOREMAN														DATA DATE 15 JUL 83			
JO ORDER #	KEY OP	CC	CLOSE DTE	KEYSUC	CHG.	ISSUED ON	MR-ALLOW.	EXPEND-	BALANCE	PERCENT							
JO TITLE	KO TITLE	SHIP NAME	NO.	JO/KO	AUTH	IN M.I.S.	VARIANCE	ITURES	ALW - EXP	RESPON.	AL/EXP						

30102 241KT 1	6903	2K3	83-04-296	K8782	8	31C3	0	32.022	192.0	32.0	15	72.0	17	024	W.C. = 1.000		
4MF MOD XMT	JASON 7	8	10	12	13	14	15	16	17	17	17	72.0	18	031	(.750)32		

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA HIGUCHI 26 STEP 2127 24.028 (24.0) 129 24.030																	
FOREMAN EXPENDITURE DATA MIZUSAWA CARL 38 8.0 (8.0) 8.0 8.0																	

30102 588KT	620	2K	83-05-13	K560	H	99	PFAI 0010	3416.0	1747.0	1747.0	1747.0	1747.0	1747.0	031	(.750)32		
C/A CRANES IMP HYDRA	INSTL PPG	JASON	8	10	12	13	14	15	16	17	17	72.0	18	031	(.750)32		

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA NAKAMA MILE 20 12.0 (24.0) 24.0																	
FOREMAN EXPENDITURE DATA MIZUSAWA CARL 38 4.0 (8.0) 8.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA KUNIMITSU NORI 22 20.0 (8.0) 8.0																	
FOREMAN EXPENDITURE DATA 20.0 (8.0) 8.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA MAU PHIL 28 8.0 (8.0) 8.0																	
FOREMAN EXPENDITURE DATA MAESHITO MELV 43 8.0 (8.0) 8.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 32.0 (32.0) 32.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 8.0 (8.0) 8.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA KIMOKO HARR 25 76.1 (52.0) 51.9																	
FOREMAN EXPENDITURE DATA BARRETT CHAR 41 17.5 (12.0) 11.9																	
FOREMAN EXPENDITURE DATA CHANG EDWA 42 10.2 (7.0) 7.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 128.0 (128.0) 128.0																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 56A1 U 0056-001 192.0 423.5 231.5- W.C. = .453																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 56A2 U 0056-001 100.0 100.0 100.0- W.C. = .000																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 56B U 0056-001 8.0 8.0 8.0- W.C. = .000																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 56D U 0056-001 128.0 755.8 627.8- W.C. = .169																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 56H U 0056-001 91.0 91.0 91.0- W.C. = .000																	

LINE-ITEM (EU SHOP, SD & SD NO.)																	
FOREMAN EXPENDITURE DATA 56Z8 U 0056-001 8.0 8.0 8.0- W.C. = .000																	

Figure A-4. Foreman--Line item performance on closed KEYOPS.

REPORT NUMBER: PM-L18A

REPORT TITLE: LINE ITEM ALLOWANCE/EXPENDITURE DETAIL LIST

PURPOSE: Enables identification of the KEYOP line items having an impact on work center performance and the foremen responsible for labor expenditures on these line-items.

The PM-L18A report (Figure A-5), organized by shop, work center, job order/KEYOP number, and foreman code, is issued every 4 weeks to show work center performance on line items of KEYOPs that have closed during the previous 12-week period. Also shown on the PM-L18A report is the performance of each of the foremen charging to the line item. The dates covered by the report are shown under the report title. This report can be used to identify the KEYOP line items having an impact on work center performance as well as the foreman, or foremen, responsible for labor expenditures to these line items.

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	GRP SHOP	The production shop group to which the shop responsible for the line item belongs; e.g., 920 = Structural shop group 930 = Mechanical shop group 950 = Electrical/electronics shop group 970 = Service shop group
2	SHOP	The shop to which the work was charged.
3	W.C.	The work center to which the work was charged.
4	JOB ORDER NO	Ten-digit job order number shown on the KEYOP document.
5	KEYOP	Three-digit KEYOP number shown on the KEYOP document.
6	KEYS-WC	The shop work center having primary responsibility for the completion of the KEYOP.
7	TITLE	The KEYOP title shown on the KEYOP document.
8	CLOSING DATE	Date on which the KEYOP was closed (YY-MM-DD).
9	PERIOD	The 4-week period (within the 12-weeks covered by the report) in which the KEYOP closed: (1) Current = Most recent 4 weeks. (2) Period 2 = 4 weeks previous to current. (3) Period 3 = 4 weeks prior to period 2.

<u>Field</u>	<u>Title</u>	<u>Description</u>
10	PEID	The code that identifies the P&E who wrote the particular KEYOP.
11	SD	A one-letter standard designator showing the method used by the P&E to calculate the man-hour allowances; e.g., E = Engineered A = Estimated O = Nonstandard U = Uniform method and standard
12	TYPE	A two-letter availability type code; e.g., RA = Restricted availability TA = Technical availability RO = Regular overhaul PS = Post-shakedown availability
13	HULL TYPE	Typically, this code shows the type of vessel on which the work was performed; may also indicate that other types of work were done; e.g., SS = Diesel submarine SSN = Nuclear submarine SSBN = Ballistic missile submarine Other codes denote surface vessels or other types of work.
14	FOREMAN	Two-digit code identifying each foreman. For the entire line item, the word SUM appears in this field since the data on this line include all foremen who charged to the line item.

PH-118A										LINE-ITEM ALLOWANCE/EXPENDITURE DETAIL LIST										ISSUE DATE 16 JUL 83										DATA DATE 15 JUL 83									
										BY SHOP, W.C., JOYKO AND FOREMAN CODE																													
										(PERIOD COVERING APR 23 TO JUL 15)																													
GRP.	SH	VC	JOB	ORDER	* KEY	KEYS	CLOSING	PER-	PEID	S	TY	HULL	FORE-	MNHR.	ACTUAL	PCT.	ADJUSTED	MNHR	PERF																				
SH.	OP				-OP	-WC	DATE	TOO				PE	TYPE	HAN	ALVD.	EXPEND.	RESPON	EXPEND.	SAVED																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20																				
930	31	A2	30130	50202	520	568	MOD CHW (P	83-04-29	(3)	6CK1	O	RO	SSN	O	SUM	23.9	22.0		1.9	1.088																			
															36	8.7	8.0	0.364	8.0																				
															41	15.2	14.0	0.636	13.9																				
930	31	A2	30130	51804	921	31C2	3438HFBDY	83-05-27	(2)	9HY1	O	RO	SSN	O	SUM	32.0	48.0		16.0	0.687																			
															41	12.8	16.0	0.400	19.2																				
															42	6.4	8.0	0.200	9.6																				
															47	12.8	16.0	0.400	19.2																				
930	31	A2	30130	54002	340	56E	MOD AIR PP	83-06-02	(2)	6JK1	O	RO	SSN	O	SUM	6.8	106.8		100.0	0.064																			
															20	.5	8.0	0.074	7.9																				
															22	1.1	16.0	0.148	15.9																				
															36	6.2	84.0	0.778	84.0																				
930	31	A2	30130	54002	937	31C2	340CHFADPT	83-04-29	(3)	2VH1	A	RO	SSN	O	SUM	4.0	.0		4.0	0.000																			
															00	4.0	.0	1.000	.0																				
930	31	A2	30130	56402	345	38A	INSTL COMP	83-06-10	(2)	2MH1	O	RO	SSN	O	SUM	10.0	8.0		2.0	1.250																			
															47	10.0	8.0	1.000	8.0																				
930	31	A2	30130	56402	347	56E	PPG MODS	83-08-17	(2)	6CPT	O	RO	SSN	O	SUM	23.7	23.7		.0	1.000																			
															38	23.7	23.7	1.000	23.7																				
930	31	A2	16258	22115	420	31A3	RPR SFTY V	83-05-06	(3)	7CG1	RO	FF	O	SUM	.0	.4		.4	0.000																				
															22	.0	.4	1.000	.4																				
930	31	A2	16258	22117	522	41B	INSP BLR (	83-07-08	(1)	5CC1	O	RO	FF	O	SUM	.0	4.0		4.0	0.000																			
															46	.0	4.0	1.000	4.0																				

Figure A-5. Line-item allowance/expenditure detail list.

REPORT NUMBER: PM-L18B

REPORT TITLE: SHOP WORK CENTER (WC) PERFORMANCE OVER LAST THREE PERIODS

PURPOSE: To review work center performance and identify foremen who contributed to this performance.

The PM-L18B report (see Figure A-6), organized by shop, work center, and foreman code, is issued every 4 weeks to summarize work center performance on all KEYOP line items that have closed during the past three 4-week periods. The dates covered by these three periods are shown under the report title. Work center performance is reported in terms of allowances, expenditures, saved hours, and PFs. Total figures show performance for each work center and shop. This report can be used to review work center performance and identify foremen who contributed to this performance.

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	GRP SHOP	The shop group to which the shop, covered by the report, belongs; e.g., 920 = Structural shop group 930 = Mechanical shop group 950 = Electrical/electronics shop group 970 = Service shop group
2	SHOP	The shop to which the work center belongs.
3	W.C.	The work center to which the hours were charged.
4	FOREMAN	Two-digit code identifying each foreman.
5	ADJUSTED ALWD	A work gang's share of the man-hours allowed by P&E to accomplish all of the work center's line items from KEYOPs that have closed during the previous 12 weeks. The man-hours allowed to the work center are prorated among work gangs in proportion to their man-hours expended on all the work center line items during this period. This number is the total MNHR. ALWD for a foreman on all line items reported in the PM-L18A (field 15). The work center's total allowed hours for the 12-week period is shown following the individual foreman (work gang) entries.
6	ADJUSTED EXPEND	A work gang's share of the man-hour expenditures for all of the work center line items from KEYOPs that have closed in the previous

<u>Field</u>	<u>Title</u>	<u>Description</u>
		12 weeks. This number is the total ADJUSTED EXPEND for a foreman on all line items reported in the PM-L18A (field 18). The work center's total expenditures for the 12-week period is shown following the individual foreman entries.
7	PERF AL/EXP	Foreman PF shows a work gang's performance efficiency for its share of the work center line items from KEYOPs that have closed in the previous 12-weeks. It is equal to the ADJUSTED ALWD (field 5) divided by ADJUSTED EXPEND (field 6). A performance factor for the entire work center is shown following the individual foreman entries.
8	MNHRs SAVED	Man-hours saved, by a work gang, on its share of all the work center line items from KEYOPs that have closed in the previous 12 weeks. It is equal to the ADJUSTED ALWD (field 5) minus ADJUSTED EXPEND (field 6). The work center's total man-hours saved is shown following the individual foreman entries.
9	CURRENT PERIOD (1) ALWD	A work gang's prorated share of the man-hours allowed to the work center by P&E to accomplish all the work center line items from KEYOPs that have closed during the most recent 4 weeks of the 12-week period. The work center's total allowances for the current period are shown following individual foreman entries.
10	CURRENT PERIOD (1) EXPEND	A work gang's share of the man-hour expenditures for all work center line items from KEYOPs that have closed during the most recent 4 weeks of the 12-week period. The work center's total expenditures for the current period are shown following individual foreman entries.
11	CURRENT PERIOD (1) PERF	Foreman PF shows a work gang's performance efficiency for its share of the work center line items from KEYOPs that have closed during the most recent 4 weeks of the 12-week reporting period. It is equal to CURRENT PERIOD (1) ALWD (field 9) divided by CURRENT PERIOD (1) EXPEND (field 10). A

<u>Field</u>	<u>Title</u>	<u>Description</u>
		current period PF for the entire work center is shown following the individual foreman entries.
12	PREVIOUS PERIOD (2) ALWD.	A work gang's prorated share of the man-hours allowed to the work center by the P&E to accomplish all the work center line items from KEYOPs that have closed during the middle 4 weeks of the 12-week reporting period. The work center's total allowances for Period 2 are shown following individual foreman entries.
13	PREVIOUS PERIOD (2) EXPEND	A work gang's share of the man-hour expenditures for all the work center line items from KEYOPs that have closed during the middle 4 weeks of the 12-week reporting period. The work center's total expenditures for Period 2 are shown following the individual foreman entries.
14	PREVIOUS PERIOD (2) PERF	Foreman PF shows a work gang's performance efficiency for its share of the work center line items from KEYOPs that have closed during the middle 4 weeks of the 12-week reporting period. It is equal to PREVIOUS PERIOD (2) ALWD (field 12) divided by PREVIOUS PERIOD (2) EXPEND (field 13). A Period 2 PF for the entire work center is shown following the individual foreman entries.
15	TWO PERIODS AGO (3) ALWD	A work gang's prorated share of the man-hours allowed to the P&E to accomplish all the work center line items from KEYOPs that have closed during the first 4 weeks of the 12-week reporting period. The work center's total allowance for Period 3 are shown following individual foreman entries.
16	TWO PERIODS AGO (3) EXPEND	A work gang's share of the man-hour expenditures for all work center items from KEYOPs that have closed during the first 4 weeks of the 12-week reporting period. The work center's total expenditure for Period 3 are shown following individual foreman entries.
17	TWO PERIODS AGO (3) PERF	Foreman PF shows a work gang's performance efficiency for its share of the work center line items from KEYOPs that have closed during

Field

Title

Description

the first 4 weeks of the 12-week reporting period. It is equal to TWO PERIODS AGO (3) ALWD (field 15) divided by TWO PERIODS AGO (3) EXPEND (field 16). A Period 3 PF for the entire work center is shown following the individual foreman entries.

PH-L108										SHOP WORK CENTER (WC) PERFORMANCE OVER LAST THREE PERIODS										ISSUE DATE 18 JUL 83									
										BY SHOP, W.C. AND FOREMAN CODE										DATA DATE 18 JUL 83									
										(PERIOD COVERING APR 23 TO JUL 15)																			
										10 11 12 13 14 15 16 17																			
										CURRENT PERIOD (1)										PREVIOUS PERIOD (2)									
										ALWD. EXPEND. PERF										ALWD. EXPEND. PERF									
										TWO PERIODS AGO (3)																			
</																													

REPORT NUMBER: PM-L19A

REPORT TITLE: FOREMAN PERFORMANCE AND MAN-HOUR SAVINGS OVER LAST THREE PERIODS.

PURPOSE: Track foreman performance efficiency on production work.

The PM-L19A report (see Figure A-7) shows foreman work gang performance on line items of KEYOPs that have closed during the last three 4-week periods. The dates covered during these three periods are shown under the report title. A line showing foreman name, code, and shop precedes the list of line item performance data. The foreman's PF is shown for each closed KEYOP line item, regardless of work center, to which the foreman's work gang charged. Allowances, expenditures and saved hours (+-) also are shown for each line item. For a foreman, line item entries are listed by availability number (positions 3-5 of job order number), customer order number (positions 1 and 2 of job order number), SWLIN (positions 6-10 of job order number), and KEYOP. Summary performance information for each of the three 4-week periods, as well as the full 12 weeks, is shown following the entries for separate line items. This report is issued every 4 weeks.

The computer program used to produce this report has a designator that can be used to adjust, by some percentage, the line item expenditure data. The effect of such an adjustment is to automatically increase or decrease, by some percentage, the actual expenditures. This adjustment will also affect the summary performance indices for foremen. For applications where no adjustment is needed, the designator will be set at 100 percent. In some situations, however, if the report is to be used as a basis for an incentive or goal setting system, the standard or goal difficulty can be adjusted by setting the designator higher or lower than 100 percent. When the designator value is not equal to 100 percent, the value will be shown under the report title.

<u>Field</u>	<u>Title</u>	<u>Description</u>
1	JOB ORDER	Ten-digit job order number shown on the KEY-OP document.
2	KEY OP	Three-digit KEYOP number shown on the KEYOP document.
3	SHOP WC	The shop and work center to which the work was charged.
4	KEYS-WC	The shop and work center having primary responsibility for the completion of the KEY-OP.
5	PERF AL/EXP	Performance factor that shows foreman work gang efficiency on this line item. It is equal to ADJUSTED ALWD (field 10) divided by MNHRS. EXP (field 11).

<u>Field</u>	<u>Title</u>	<u>Description</u>
6	SAVED MNHRS	The man-hours saved by the work gang on the line item. It is equal to the ADJUSTED ALWD (field 10) minus the MNHRS. EXP (field 11).
7	PEID	A code that identifies the P&E who wrote the particular KEYOP.
8	KEY OP CLOSING DATE	The data on which the KEYOP was closed (YY-MM-DD).
9	KEY OP CLOSING PERIOD	The 4-week period (within the 12 weeks covered by the report) during which the KEYOP closed: Current = Most recent 4 weeks. Period 2 = 4 weeks previous to Current. Period 3 = 4 weeks prior to Period 2.
10	ADJUSTED ALWD.	The work gang's share of the man-hours allowed by P&E to accomplish the line item. When only one foreman charges to a line item, all the man-hours allowed for the line item go to that foreman's work gang. When two or more foremen have charges to a line item, the total man-hours allowed are prorated among the foremen in proportion to the man-hours each foreman's respective work gang expended on the line item. ADJUSTED ALWD is equal to the product of ALWD (field 12) and % RESP (field 14).
11	MNHRS. EXP.	The total man-hours expended by the work gang on the line item.
12	LINE-ITEM PERFORMANCE ALWD.	The total man-hours allowed by P&E to accomplish the line item.
13	LINE-ITEM PERFORMANCE EXP	The total man-hours expended by <u>ALL</u> work gangs on the line item.
14	LINE-ITEM PERFORMANCE % RESP	Percent responsibility shows how much of the work on a line item was done by the work gang. It is the proportion of the total actual man-hours expended on the line item that were charged by this work gang.

$$\text{Percent Responsibility} = \frac{\text{Actual man-hours expended by this work gang}}{\text{Total actual man-hours expended on the line item}}$$

<u>Field</u>	<u>Title</u>	<u>Description</u>
15	SD	A one-letter standard designator showing the method used by P&E to calculate the man-hour allowance: E = Engineered A = Estimated O = Nonstandard U = Uniform method and standard
16	TYPE	A two-letter availability type code; e.g., RA = Restricted availability TA = Technical availability RO = Regular overhaul PS = Post-shakedown availability
17	HULL TYPE	Typically, this code shows the type of vessel on which the work was performed; may also indicate that other types of work were done; e.g., SS = Diesel submarine SSN = Nuclear submarine SSBN = Ballistic missile submarine Other codes denote surface vessels or other types of work.
18	PERF AL/EXP	Shows the PF for the foreman's work gang on all line items of KEYOPs closed during the designated period. It is equal to ADJUSTED ALWD (field 20) divided by MNHRS. EXP (field 21).
19	SAVED MANHRS	Shows the total man-hours saved by the work gang on line items of KEYOPs closed during the designated period. It is equal to the ADJUSTED ALWD (field 20) minus MNHRS. EXP (field 21).
20	ADJUSTED ALWD.	Shows the work gang's total allowed hours for line items of KEYOPs closed during the designated period.
21	MNHRS. EXP.	Shows the total man-hours expended by the work gang on line items of KEYOPs closed during the designated period.

The last line in the report shows performance information for all three periods combined. Field 18 shows the foreman work gang's PF on all line items of KEYOPs that closed during the three periods. It equals the total adjusted man-hours allowed (field 20) divided by the total man-hours expended (field 21). Field 19 shows the work gang's average saved man-hours per period. It equals the total adjusted man-hours allowed (field 20) minus the total man-hours expended (field 21), the difference divided by 3. If the resulting average saved man-hours amount is greater than zero, the work gang has saved labor hours.

DISTRIBUTION LIST

Chief of Naval Operations (OP-01), (OP-11), (OP-115) (2), (OP-12), (OP-13), (OP-135C4), (OP-14), (OP-140F2), (OP-15), (OP-987H), (OP-04), (OP-40), (OP-401), (OP-403), (OP-43)
Chief of Naval Material (NMAT 00), (NMAT 04), (NMAT 05), (NMAT 0722), (NMAT 08), (NMAT 01M), (NMAT 00K), (NMAT 04B)
Chief of Naval Research (Code 200), (Code 270), (Code 440) (3), (Code 442), (Code 442PT)
Chief of Naval Education and Training (00A), (N-21)
Chief of Naval Technical Training (016)
Commandant of the Marine Corps (MPI-20)
Commander in Chief, United States Naval Forces, Europe (2)
Commander Naval Air Systems Command (AIR 400)
Commander Naval Sea Systems Command (SEA 07), (SEA 070K), (SEA 07A)
Commander Naval Supply Systems Command (SUP-03)
Commander Naval Military Personnel Command (NMPC-013C)
Commanding Officer, Naval Aerospace Medical Institute (Library Code 12) (2)
Commanding Officer, Naval Technical Training Center, Corry Station (Code 101B)
Commanding Officer, Naval Training Equipment Center (Technical Library) (5), (Code N-1)
Commanding Officer, Office of Naval Research Branch Office, Chicago (Coordinator for Psychological Sciences)
Commander, Army Research Institute for the Behavioral and Social Sciences, Alexandria (PERI-ASL), (PERI-ZT), (PERI-SZ)
Commander, Air Force Human Resources Laboratory, Brooks Air Force Base (Manpower and Personnel Division), (Scientific and Technical Information Office)
Commander, Air Force Human Resources Laboratory, Williams Air Force Base (AFHRL/OT)
Commander, Air Force Human Resources Laboratory, Wright-Patterson Air Force Base (AFHRL/LR)
Commander, Air Force Human Resources Laboratory (CNET Liaison Office AFHRL/OTLN)
Commanding Officer, U.S. Coast Guard Research and Development Center, Avery Point
Commander Navy Recruiting Command (Code 20)
Commander Naval Air Development Center
Commander Naval Weapons Center
Commander David W. Taylor Naval Ship Research and Development Center
Commander Naval Surface Weapons Center
Commander Naval Ocean Systems Center
Commander, Charleston Naval Shipyard
Commander, Long Beach Naval Shipyard
Commander, Mare Island Naval Shipyard
Commander, Norfolk Naval Shipyard
Commander, Pearl Harbor Naval Shipyard
Commander, Philadelphia Naval Shipyard
Commander, Portsmouth Naval Shipyard
Commander, Puget Sound Naval Shipyard
Commanding Officer, Naval Air Rework Facility, Alameda
Commanding Officer, Naval Air Rework Facility, Cherry Point
Commanding Officer, Naval Air Rework Facility, Jacksonville
Commanding Officer, Naval Air Rework Facility, Norfolk
Commanding Officer, Naval Air Rework Facility, Pensacola
Commanding Officer, Naval Air Rework Facility, North Island, San Diego
Commander, Aviation Logistics Center, Patuxent River
Commanding Officer, Aviation Supply Office

Commanding Officer, Naval Coastal Systems Center
Commanding Officer, Navy Fleet Material Support Office
Commanding Officer, Navy Public Works Center, Great Lakes
Commanding Officer, Navy Public Works Center, Norfolk
Commanding Officer, Navy Public Works Center, Oakland
Commanding Officer, Navy Public Works Center, Pearl Harbor
Commanding Officer, Navy Public Works Center, Pensacola
Commanding Officer, Navy Public Works Center, San Francisco
Commanding Officer, Navy Public Works Center, Seattle
Commanding Officer, Navy Ships Parts Control Center
Commanding Officer, Naval Supply Center, Bremerton
Commanding Officer, Naval Supply Center, Charleston
Commanding Officer, Naval Supply Center, Norfolk
Commanding Officer, Naval Supply Center, Oakland
Commanding Officer, Naval Supply Center, Pearl Harbor
Commanding Officer, Naval Supply Center, San Diego
Commanding Officer, Naval Underwater Systems Center, Newport
Commanding Officer, Naval Weapons Station, Charleston
Commanding Officer, Naval Weapons Station, Colts Neck
Commanding Officer, Naval Weapons Station, Concord
Commanding Officer, Naval Weapons Station, Seal Beach
Commanding Officer, Naval Weapons Station, Yorktown
Director, Naval Civilian Personnel Command
Director, General Accounting Office (National Security and International Affairs)
Director, Naval Civilian Personnel Command, Capital Region, Arlington
Director, Naval Civilian Personnel Command, Southeast Region, Norfolk
Director, Naval Civilian Personnel Command, Pacific Region, Pearl Harbor
Director, Naval Civilian Personnel Command, Northeast Region, Philadelphia
Director, Naval Civilian Personnel Command, Southwest Region, San Diego
Director, Naval Civilian Personnel Command, Northwest Region, San Francisco
Director, Office of Personnel Management, Western Region, San Francisco
Director, Defense Equal Opportunity Management Institute
Defense Productivity Program Office
U.S. Army Sergeant Majors' Academy
Institute for Defense Analyses, Science and Technology Division
Defense Technical Information Center (DDA) (12)

END

FILMED

10-84

DTIC