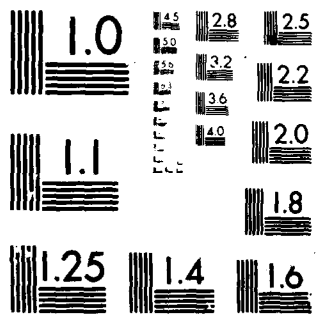
AD-A081 454 HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD F/G 15/5
HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYST--ETC(U)
FEB 80 R L KEESEE, R S CAMDEN, R M POWERS
UNCLASSIFIED HEL-TM-3-80-VOL-2 NL

1 OF 5
AD
A081454



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

Technical Memorandum 3-80

HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYSTEM

VOLUME II

FINAL REPORT

Robin L. Keesee
Richard S. Camden
Robert M. Powers
Patricia W. Kildluff
Susan G. Hill
James W. Gombash
Gary G. Sarli

February 1980
AMCMS Code 95239827000

The views, opinions, and findings contained in this report are those of the authors and should not be used as official DA position, policy, or decision unless so designated by other official documents.

Approved for public release;
distribution unlimited.

U. S. ARMY HUMAN ENGINEERING LABORATORY

Aberdeen Proving Ground, Maryland

AMCMS Code 95239827000 Technical Memorandum 3-80

14 HEL-TM-3-8Ø-VOL-2

6 HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYSTEM.

VOLUME II.

9 FINAL REPORT. 5 Jul 78-14 Nov 79,

10
Robin L. Keesee
Richard S. Camden
Robert M. Powers
Patricia W. Kildurr
Susan G. Hill
James W. Gombash
Gary G. Sarli

12 444

11 Feb[redacted]80

APPROVED: John D. Weisz
JOHN D. WEISZ
Director
US Army Human Engineering Laboratory

A

US ARMY HUMAN ENGINEERING LABORATORY
Aberdeen Proving Ground, Maryland 21005

172850 JM

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Technical Memorandum 3-80	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Human Performance Review of the Retail Repair Parts Supply System, ~~Volume I: Executive Summary,~~ Volume II: Final Report		5. TYPE OF REPORT & PERIOD COVERED Study Report 5 Jul 78 - 14 Nov 79
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) KEESEE, Robin L., CAMDEN, Richard S., POWERS, Robert M., KILDUFF, Patricia W., HILL, Susan G., GOMBASH, James W., SARLI, Gary G.		8. CONTRACT OR GRANT NUMBER(s) NA
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Human Engineering Laboratory ATTN: DRXHE-HE Aberdeen Proving Ground, MD 21005		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS AMCMS Code 95239827000
11. CONTROLLING OFFICE NAME AND ADDRESS Deputy Chief of Staff for Logistics HQ DA Washington, DC 20310		12. REPORT DATE 21 January 1980
		13. NUMBER OF PAGES 443
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) NA		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE NA

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

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

Approved for public release; distribution unlimited.

18. SUPPLEMENTARY NOTES

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

Logistics
Human Factors
Repair Parts

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

For DA ODCSLOG, an intensive 18-month study was made of the retail repair parts system. The problem addressed was whether the human performance demands of the system were compatible with the abilities of the soldiers. Selection criteria, appropriateness of training methods, consistency in manning of repair parts supply support activities across DA TOEs, inconsistencies in doctrinal publications on supply procedures, and potential system performance improvements from increased proportions of female soldiers in repair parts supply were studied. To identify and learn the significance of specific

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE human performance problems, observation and data collection visits were made in CONUS and USAREUR to 10 divisions, 7 major non-divisional units, and 83 company PLLs.

There were 11 principal findings although, in general, it was found that the repair parts supply system is too complicated for the current soldiers, of all grades, to operate. Of course, the system includes the selection, training, and doctrine subsystems.

Specific recommendations are made that narrow the gap between system demands and soldier abilities in the short term and that will close the gap in the future.

PREFACE

The study reported here was undertaken to find and resolve problems in the repair parts supply system that had led to widespread lack of confidence in the system's ability to provide needed parts. The report of the Tank Forces Management Study led by LTG Kalergis had findings in several sections related to repair parts:

> LOGISTICS - "The current system of providing repair parts is marginally adequate in peacetime. It is doubtful that it can provide responsive support to wartime armor operations." (Kalergis, et al., 1977, p 3-14) "Confidence in the logistical system is at a low level" (p 3-45).
>
> TRAINING - "Entry Level Training for PLL and TAMMS Clerks is too general and does not produce personnel technically qualified for their initial entry duties." (p 4-11)

MG Hill, a recent Deputy Commander of the III Corps, Fort Hood, TX, concluded after reviewing many problems that he perceived in the repair parts supply system that "the alternative to the corrective action suggested will be to observe a rapid deterioration, due to lack of spare parts, in the combat power of our force when committed to battle." (Hill, 1979)

With concerns such as these in mind, the Supply Branch, Supply and Maintenance Policy Division of DA ODCSLOG conducted a review to determine if ongoing studies would resolve the problems attributed to the repair parts supply system. The review concluded that most of the problems were related to human performance issues that would not be addressed by the ongoing studies. The US Army Human Engineering Laboratory was asked in March, 1978, to evaluate the validity of the human performance related design aspects of the repair parts supply system.

The normal mission of the US Army Human Engineering Laboratory (HEL) is to conduct basic and applied research in human factors engineering and to provide direct design support to all materiel development programs sponsored by DARCOM. As the proposed repair parts study was not within the understood Laboratory mission, it was conducted under the auspices of the Army Study Program (AR 5-5). The agency and individual representation on the Study Advisory Group (SAG) is shown in Table A. Table B summarizes the schedules and agenda of the meetings of the SAG.

This report gives a description of the methods used in the review of the human factors aspects of the retail repair parts supply system, and presents the findings and recommendations.

Table A. SAG Organization

Chairman - MG Nord, Director of Supply and Maintenance, ODCSLOG

Deputy Chairman - COL Kelly (COL Stalcup), Chief, Supply Policy Division, ODCSLOG

Study Sponsor - LTC Hospodar & LTC Hutcheson, ODCSLOG

Members -	LTC Wooten	DA, ODCSPER
	Mr. McDaniel	DA, DCSLOG (PLS)
	COL Taylor	TRADOC
	Mr. Mills	LOG C
	LTC Akin	FORSCOM
	MAJ Kirby (MAJ Baird)	USAREUR
	Mr. Snowden (Mr. Kelly) (Mr. O'Neill)	DARCOM
Observers -	LTC Bertelkamp	ODUSA(OR)
	Miss Harvey (Mr. Campo)	OASA (IL&FM)
	Mr. Smith (Mr. Hassis) (Mr. Schrait)	ODCSLOG
	LTC Rochon (MAJ Zschoke)	PAED
	Dr. Dunn	Study Management Office
	Mr. Bona	ACSAC
	LTC Norman	ODCSOPS
	COL Craven & LTC Durbin	TFMO
	LTC Robinson (MAJ Fischer) (SGM Southall)	Armor Center
	LTC Holcomb (MAJ Chippes) (LTC Sirois)	ARNG

TABLE B - SAG SCHEDULE AND AGENDA

SAG I - 10 Aug 1978

- Review study plan
- Review selection of CONUS study sites
- Review scope of the man-system simulation
- Present tentative SAG schedule

SAG II - 11 Oct 1978

- Summary of observation visits
- CONUS data collection plans
- Study schedule
- Simulation progress

SAG III - 4 Jan 1979

- The man-system model
- Issues raised in the preliminary analysis
- Review of data collection plans

SAG IV - 2 Apr 1979

- Preliminary results of CONUS data reduction
- USAREUR data collection plans

SAG V - 2 Jul 1979

- Present CONUS data
- Present preliminary USAREUR data
- Discuss preliminary findings
- Discuss further analysis and study plans

SAG VI - 30 Aug 1979

- Present preliminary recommendations

SAG VII - 14 Nov 1979

- Present final report

SUMMARY

This review of the human performance problems in the repair parts supply system was motivated in part by the report of the Tank Forces Management Study that found the repair parts system provided only marginal support in peacetime and was not likely to provide adequate support in war. Along with the expressed concerns of senior field commanders, this caused the ODCSLOG to undertake a review of ongoing studies related to identified problems. The review suggested that the majority of the problems not being addressed were related to human performance problems.

The study which began in July, 1978, has included visits to 83 company/battery/troop PLLs, 10 divisions, 7 major non-divisional units, and 3 USAR units. During these visits, operations were observed, time studies of PLL clerks were performed, data on supply response time were taken from PLL document registers, structured interviews were conducted with PLL clerks, motor sergeants, motor officers, and supply support activity personnel, and other objective data elements on operations performance were gathered where available.

The principal findings at the using unit level were:

(1) PLL performance is uneven.

(2) The PLL doctrine and procedures do not form an integrated job, making the work overly complicated.

(3) Substantial improvements can be made in AIT training for PLL clerks.

(4) The selection criteria for the PLL clerk MOS is too low for the degree of supervision, responsibility, complexity, and breadth of studies compared with other MOSs.

(5) The supervision of PLL is usually inadequate.

(6) There is no PLL performance feedback, making supervision and management difficult.

At the Supply Support Activity (SSA) level, there were five principal findings:

(1) The supply performance of SSAs, especially division SSAs, is less than desired.

(2) The doctrine and procedures for divisional SSAs are function or process oriented and do not form a coherent series of integrated jobs. This causes the procedures to appear overly complicated.

(3) Divisional and non-divisional SSAs are lacking in technical management and supervisory expertise either through inadequate personnel authorizations or insufficient experience and training of senior personnel on hand.

(4) Improvements in SSA management can be made by providing management information related to day-to-day operations.

(5) The current state of the supply section of most forward support companies is not consistent with their anticipated peace and wartime functions.

Recommendations are made that meet these findings and other identified human performance problems. Proposals for improvement are given in the areas of doctrine and procedures, supervision and management, selection, training, and mobility.

The conclusion of the study is that the retail repair parts system, as it and its ancillary systems exist in 1978-1979, is too complicated for the soldiers using it. Since its development and fielding in the mid-1960s, the DLOGS system has been adapted to an IBM computer, had the special supply procedure of QSS added, had its principal managers moved from the divisional maintenance battalion to the DMMC away from the assets being managed, and has gradually moved from a relatively unrestrained monetary resource situation to an environment where each unit is charged for its Class IX supplies by a separate but interconnected automated system. Through the same period in which these technical changes were taking place, the user population has changed with the cessation of the draft and the shrinkage of the Army, affecting enlisted and officer accessions. While there may have been a gap between average soldiers abilities and the minimum human ability requirements of the early DLOGS, the gap was bridged initially with selection of exceptionally capable personnel for key positions. Since the early 1970s however, the gap between human ability on hand and that required has increased markedly. It is the function of the recommendations presented in this report to narrow this gap by eliminating the more complex manifestations of the system and by improving through selection and training the capabilities of the officers nd enlisted personnel expected to perform the operations.

TABLE OF CONTENTS

Chapter | Page

I. INTRODUCTION

A. STUDY OBJECTIVES

The general objective of the human factors review of the repair parts supply system is to resolve for the DA DCSLOG the human performance related problems in the retail repair parts supply system. That is, the study was to determine if the repair parts supply system was compatible to soldier capabilities, if it is valid in human capability or performance terms, and if found wanting, to make recommendations for resolution of the problems. Organizationally, the scope of the study was retail supply of repair parts in using units, i.e., rifle companies, tank companies, through corps level repair parts management. In human factors terms, the study had no limits in scope being concerned with selection, training, and organization of personnel manning the system, and the personnel to software and hardware interfaces. The emphases within this broad study scope was on problems of combat battalions as opposed to combat service support battalions. Equal weight was given to division and non-divisional units. The one area ultimately excluded from the study was aviation units. The specific objectives listed in Table I-1 are given to show the detail and scope expected of the study.

B. ASSUMPTIONS

Several assumptions were made implicity at the beginning of the study. From all of the intensity and emotionalism concerning the nature and extent of problems portrayed by field commanders and doctrinal agencies, it was clear that the repair parts supply system had real and significant problems. Performance of the system was not judged satisfactory by senior managers. By the same token, it was assumed that the system was functioning to some degree and the system must have some positive attributes. Even if a new system was proved to be needed to overcome fatal faults of the current system, the shortcomings of the existing system should be defined in human, software, or hardware performance terms so that these design deficiencies could be avoided by the engineers of the replacement system. It was fundamentally assumed that the repair parts system must work in war as it does in peace.

Table I-1. Specific Objectives Given to Demonstrate the Scope of the Study

-Are Supply References (AMDF, TMs, TCs, Catalogs) too complex?

-Are procedures and formats too complex for soldiers?

-Can supply and status requests be simplified to expedite processing and prevent loss of documents?

-Are there too many supply sources (SSSC, QSS, DX, DSU)?

-Is the man-ADPE interface appropriate?

-Is ADP software timely and interpretable?

-Are repair parts personnel properly trained and assigned?

-Might women repair parts personnel perform better than men?

-Would reorganization improve morale and performance?

-Is additional mechanization needed?

-Does managerial intervention degrade PLL and ASL personnel performance?

In setting the orientation of the study, it was felt that the effort would be better if it focused on collection of quantitative data rather than reliance on qualitative data, i.e., opinions of users, systems personnel, and managers, even if all of the data that was collected was not directly applicable to what would materialize as human performance problem areas. It was also apparent that the number of individuals and units studied had to be large enough to assure that the resulting definition of problems with those of the repair parts system and not of individual unit personalities. Finally, data collected must be used for purposes of this study only and not used by managers for corrective action for any particular unit or units.

C. DEFINITIONS

Throughout this report, "system" is meant to include the men and women, doctrine, computer hardware, and computer software used in the retail repair parts supply process. Doctrine includes documentation of automated procedures, regulations, field and technical manuals, and training material and textbooks.

D. STUDY METHODS

Only one member of the study team had any previous experience in repair parts supply. So after the 5 July 78 initiation of the study, several weeks were spent studying the doctrine concerning mission, organizations, and procedures of the repair parts supply. This reading focused on AR 710-2, Materiel Management for Using Units, Support Unit, and Installations, in the Army and on the TM 38-L22-15 series, Functional Users Manual for Division Logistics Systems (DLOGS) (June 78) and Quartermaster School text for the PLL portion of the 76D10 AIT (Advanced Individual Training) course. A search was also made of the military journals for articles describing developments or problems in the repair parts supply systems. Following this learning phase, visits were made to several installations in CONUS to learn what people actually working in the system perceived to be the problem. These observation visits were made to the 9th Infantry Division, Fort Carson, CO, the 3rd Armored Cavalry Regiment, Fort Bliss, TX, the 9th Infantry Division, Fort Lewis, WA; the III Corps, Fort Hood, TX; and the 194th Armored Brigade, Fort Knox, KY. During these two- or three-day visits, interviews were held with PLL clerks, motor sergeants, and motor officers in line battalions; NCOs and warehousemen in tech supply offices; NCOs, supply warrant officers, and commissioned officers in division materiel management center Class IX sections, and other logistics staff officers and commanders.

The purpose of these visits was to gain a working familiarity and knowledge with the procedures used in TOE units as opposed to those outlined in doctrine, and to question the personnel involved in the system about their perceptions of problems and the relative importance of the various problems.

The experience of the observation visits was used to structure the data collection plan to be used in CONUS units. As indicated in the study schedule outline of Table I-2, visits were made for data collection during early CY79. The 4th Infantry Division, 3rd Armored Cavalry Regiment, and III Corps were each visited for two weeks with a team of 9 persons. At each site, approximately half of the team concentrated on study of PLL clerks and using unit practices with the remainder of the team studying the repair parts procedures in the supply support activities.

Having gained a good understanding of the procedures of the repair parts system, a data collection visit to USAREUR was made both to increase the size of the sample of divisions and major non-divisional units and to study the effects on repair parts procedures of the geographic dispersion of units in USAREUR compared to that in CONUS. In USAREUR, each of the four full divisions was visited for two or three days with a team of 8, half working in a line battalion and the other half at the DMMC and TSO. Four non-divisional units were visited for two days each. On return from USAREUR, analysis of the CONUS data continued and analysis of the USAREUR data began. Details of the data collection methods are given in later sections. A summary of the number of units visited for observation or data collection is given in Table I-3. A list of the major units and dates of visits is given in Table I-4.

E. THE STUDY TEAM

The study team included individuals having graduate education or experience in industrial engineering, human factors engineering, mathematics, experimental psychology, social psychology, and computer systems design. One of the team members was a retired Quartermaster Officer, and two others were or had been ordnance and medical service corps reserve officers. Through the period of the study, a total of 12 professionals made significant contributions.

Table I-3. Sizes of the Observation and Data Collection Samples.

	Observed	Data Collected	Total*
PLL	45	47	86
Divisional SSA	6	7	10
Non-Divisional SSA	3	5	7
USAR	3	-	3

*Total unique sample, i.e., some units were visited both for observation and later for data collection.

Table I-2. Outline of the Approximate Study Schedule

Jul-Aug 78	Study of Doctrine
Aug-Oct 78	Observation Visits
Nov-Dec 78	Analysis and Preparation for Data Collection
Jan-Mar 79	Data Collection in CONUS
Apr-May 79	Data Collection in USAREUR
Jun-Jul 79	Data Analysis
Aug-Sep 79	Development of Recommendations

F. ORGANIZATION OF THE REPORT

Through chapters on unit level and division and non-division SSA analysis, detailed analysis of aspects of the problems are presented, data collection methods are described, and the results and conclusions described. Following these chapters, recommendations for PLL, SSA, Corps, and general policy are given.

II. UNIT LEVEL ANALYSIS

A. THE SITUATION AT THE UNIT LEVEL

The PLL Clerk. Using units such as tank companies, and mechanized rifle companies are authorized to maintain a small stockage of repair parts within their organizational maintenance section. Generally, these sections are led by a motor sergeant and consist of six or more organizational mechanics and recovery specialists, a PLL clerk, and a TAMMS clerk. PLL stands for prescribed load list which is a unique title of the listing of the repair parts authorized for stockage for a particular unit. In use, PLL refers to the list, to the actual stock maintained and to all of the repair parts procedures for using units. PLL clerk is the title of the individual who requests repair parts, maintains a stockage, keeps the supply record, and distributes the repair parts to mechanics vehicle crews, and others. The TAMMS clerk is responsible for maintaining the maintenance records of vehicles and other major end items that are the responsibility of the organizational maintenance section (TAMMS is The Army Maintenance Management System). Both the PLL and TAMMS clerks have the MOS 76D10, Materiel Supplyman. The section supervisor, the motor sergeant, is a 63C40 and all of the mechanics in this section are in career management field 63. The organizational maintenance section is responsible for diagnosis of vehicle problems, performance of simple repairs, exchange of major components, performance of services such as oil changes and lubrications, and technical guidance to vehicle drivers and crews in operator maintenance for the 25 or more wheel and tracked vehicles in the mechanized companies. In the chain of command, the motor sergeant reports to a motor officer who is a LT designated to perform the duty by the company commander; very often it is the company executive officer. The motor officer typically has the MOS of the combat arm of the unit. The motor officer is supervised directly by the company commander, but his work is coordinated closely with the battalion motor officer who in turn reports to the battalion commander. The battalion S4 is rarely involved in day-to-day maintenance operations.

Publicized Problems. The LTG Kalergis Report (1977) and other sources alleged that the repair parts system in using units had many problems: PLL clerks were not well trained and were not able to accomplish their jobs, the DLOGS procedures were complex and too difficult for unit personnel to follow, the DLOGS and other supply references were written at such a level that made it difficult for using unit personnel to read, supervision of the PLL clerks was inadequate because of ill-trained motor sergeants, accounting for parts in units was not acceptable, and many unit motor sergeants obtained a majority of their required parts from sister units and other informal sources obviating a dependence and sense of trust in the supply system.

The Observation Visits. The observation visits to units in CONUS were each taken with a team of two or three professionals and were undertaken for several reasons. First, knowledge of a system gained purely by reading doctrine is often too abstract to apply to system problems without a working knowledge of the context of the operations of the using units. The observation visits were made to become familiar with the environment of the repair parts operations and to understand what the users perceive to be the system problems. Interviews were pursued to try to identify the source or cause of the problems and the validity and seriousness of purported problems. It was also hoped to be able to identify any human performance related problems that had not been noted by other sources. Finally, the experience was to help in deciding how the study resources should be distributed in the coming data collection phase.

Because of the small sample of supply support activities visited, the results of the observation visits dealt primarily with unit level problems. There were five primary findings:

1. The DA TOE authorized one 76D10 to do the PLL and TAMMS duties for most companies, but the workload appeared to be great enough that all of the units visited had augmented this by MTOE or informally with another clerk.

2. Accuracy of personnel assignments appeared to be a problem in that fewer than 10 of the 43 company PLL clerks visited were 76D. Explanations by the motor sergeant or motor officer of not having a 76D10 as the PLL clerk even when they were available were fairly consistent. They felt that the 76D was not capable of doing the PLL job, almost always after having given the new 76D a two or three-month trial. This lack of capability was usually attributed to inadequate training even, in some cases, where the individuals in question were found to have difficulty reading or were in fact functionally illiterate. Clearly then, training could not be the whole problem.

3. From conversations with PLL clerks who were 76D AIT graduates and with their supervisors, it appeared that these soldiers were minimally trained for only the mainstream of PLL duties. While it was evident that the training system was burdened by the demands of a broad MOS and limited training time, the suggestion was equally clear that the training product

was not equal to the task.

4. The criteria for selection of soldiers for 76D training came into question from two directions. Commanders, especially maintenance battalion commanders who had a large concentration of CMF 76 soldiers, indicated that many of these soldiers had marginal abilities and were consequently discipline problems with a significantly greater frequency than other large CMF groups within the battalion.

5. Another problem appeared from these observation visits to be quite significant. Given that the incumbent was mentally capable and motivated and was properly trained through OJT, AIT, or combination; given that another individual was assigned as the TAMMS clerk; and given that the PLL clerk was excused from duties, it was frequently the case that the PLL clerk was working exceptionally long hours, often a consistent 10-12 hours per day on PLL duties alone.

Besides these primary observation findings, several issues alluded to by others were found to have the potential for further study. Ease of comprehending the supply references, procedural complexity due to the number of supply sources, difficulty in supporting low density equipment, and the shallow nature of PLL clerk supervision were all termed secondary findings deserving further study.

Three of the primary problems, selection criteria, training adequacy, and personnel assignment accuracy, were problems mentioned previously by others although the severity of the personnel assignment inaccuracies had not been indicated. The workload finding was potentially serious because if it was a problem at current peacetime transaction volumes, it would be debilitating at higher wartime transaction volume.

The results of these observation visits at the PLL level led to studies of selection criteria for the 76D MOS, the nature of the training in the 76D10 AIT course, the range of support expected from TOE organizational maintenance sections, and the consistency of repair parts doctrine for using units. It was also decided on the basis of the visit experience that a significant portion of the data collection effort should be devoted to learning how PLL clerks spend their duty time.

B. SELECTION AND THE 76D MOS.

The Army's method of deciding who meets minimum mental standards for joining, and for which MOS the recruit may qualify is based on results of several paper and pencil tests of mental ability, aptitude, and knowledge. The current tests are the Armed Forces Qualification Tests (AFQT) and the Armed Services Vocational Aptitude Battery (ASVAB). The ASVAB is based on the Army Classification Battery (ACB) and the Army Qualification Battery (AQB) which were developed by the Behavior and Systems Research Laboratory (an organization now called the US Army Research Institute for the Behavioral and Social Sciences (ARI)). In the research leading to the ACB, the tests of ability or information given in Table II-3 were developed. To predict the future performance of recruits in the various groupings of career fields, the individual tests of Table II-3 were combined in various ways to arrive at composite scores for aptitude areas as shown in Table II-4. The clerical aptitude area score (CL) consisting of equal weights of arithmetic reasoning (AR), word knowledge (WK), attention to detail (AD), and classification attentiveness (CA) is used for the 76 series MOSs. For 76D, the current requirement is a CL score of 95, raised from 90 in March 1979. In the original ACB development, it was intended that aptitude area scores of 90 or below would predict poor performers and scores of 110 and above would predict candidates for future technical leadership positions. By the same March, 1979, change, the unit supply specialists, MOS 76Y10, must have a CL score of 100.

MOS 76D, materiel supply specialist, is a complex specialty which encompasses the duty positions of supply management, receiving, preservation and packaging, storage and handling, PLL clerk, equipment maintenance (TAMMS) clerk, and direct exchange. The content of these seven duty positions described in Table II-5 should be compared in level of detail, responsibility, and extent of interaction with automated systems with the content of the supply administration and supply handling duty positions of the 76Y summarized in Table II-6. These two duty positions along with armorer duties comprise the duties of one unit position, the unit armorer working underneath the unit supply sergeant, an MOS 76Y20 or 76Y30. When it is realize that the 76D duty positions are seven different jobs, and that as PLL clerk and equipment maintenance (TAMMS) clerk, the 76D is working for a supervisor of a different MOS (63B/C) and must therefore

Table II-3. The ACB

Test		Time Required
A. AFQT (yields Word Knowledge, Arithmetic Reasoning, and Pattern Analysis scores used in the AOB; given at AFEES		1 hour
B. AQB (given at AFEES) or ACB (given at reception stations)		
1. Automotive Information (AI)		
2. Classification Inventory (CI)		
a. Combat (CC)		
b. Attentiveness (CA)		
c. Electronics (CE)		
d. Maintenance (CM)		
3. Electronics Information (EI)		
4. General Information (GI)		
5. Trade Information (TI)		
6. Science Knowledge (SK)		
7. Attention-to-Detail (AD)	Total	2 hours
C. ACB (given at reception stations)		
1. Mechanical Comprehension (MC)		
2. Arithmetic Reasoning (AR)		
3. Word Knowledge (WK)		
4. Mathematics Knowledge (MK)		
5. Pattern Analysis (PA)		
6. Auditory Perception (AP)	Total	3 hours
	Grand Total	6 hours

Maier & Fuchs, 1972, p. 28.

Table II-4. Composite Scores

Aptitude Area	Battery	Composite
CO (Combat)	ACB	AR + TI + PA + AD + CC
	AQB	No Change
FA (Field Artillery)	ACB	AR + GI + MK + EI + CA
	AQB	2AR + GI + EI + CA
EL (Electronics Repair)	ACB	AR + EI + TI + MC + CE
	AQB	AR + EI + TI + CE
OF (Operators and Food)	ACB	GI + AI + CA
	AQB	No Change
SC (Surveillance and Communications)	ACB	AR + WK + MC + PA + AP
	AQB	Not Computed
MM (Mechanical Maintenance)	ACB	MK + EI + TI + AI + CM
	AQB	EI + TI + AI + CM + AR
GM (General Maintenance)	ACB	AR + SK + MC + AI
	AQB	AR + SK + AI + TI
CL (Clerical)	ACB	AR + WK + AD + CA
	AQB	No Change
ST (Skilled Technical)	ACB	AR + MK + SK
	AQB	AR + SK

Maier & Fuchs, 1972, p. 29.

Table II-5. Materiel Supply Specialist

CMF 76

MATERIEL SUPPLY SPECIALIST
(Materiel Supply Sp)

MOS 76D

Summary

Supervises or performs duties involving supply management, receipt, storage, care and preservation, and issue of Class VII (major end items) and Class IX (repair parts) supplies.

Duties

MOSC 76D10. Receives, stores, maintains and issues major items and repair parts. SUPPLY MANAGEMENT. Prepares and maintains stock records and other documents such as inventory, stock control, accounting, and other supply reports. Operates office machines. Processes receipts and turn-in documents. Computes requisitioning objectives and reorder points. Prepares requisitions. Processes inventory documents. Uses catalogs in identification of major assemblies, subassemblies, and associated repair parts. Performs technical edit, stock accounting and application by researching catalogs, manuals, publications, parts list, microfiche and other available means. Functions as an exception editor by retrieving and analyzing catalog data and daily activity files data pertinent to systems rejected documents. Maintains maintenance float records. RECEIVING. Visually inspects, counts, and classifies incoming equipment and repair parts. Compares materiel received against items shown on shipping documents or turn-in documents for correctness of item description, markings, quantity, and condition. PRESERVATION AND PACKAGING. Re-packs and re-marks damaged containers. Cleans items for preservation and/or packaging. Spot checks outgoing shipments to assure proper packaging/re-packaging and content. STORAGE AND HANDLING. Establishes and keeps current identification cards for shelved or binned materiel and maintains locator card system to indicate physical location of materiel in storage. Participates in location surveys and inventories. PLL CLERK. Requests, prepares and maintains prescribed load list. Prepares request for issue and turn-in of supplies. Processes turn-in and direct exchange of repair parts. EQUIPMENT MAINTENANCE CLERK. Initiates and keeps current records and logs on equipment operation and maintenance. Coordinates modification work orders. Codes equipment and maintenance data for automated data processing application. Prepares reports on equipment readiness. DIRECT EXCHANGE. Operates direct exchange and shop stock activities.

AR 611-201, C11, p. 3-76-9.

Table II-6. Unit Supply Specialist

CMF 76

UNIT SUPPLY SPECIALIST
(Unit Supply Sp)

MOS 76Y

Summary

Supervises or performs duties involving request, receipt, storage, issue, accountability, and preservation of individual, organizational, installation, and expendable supplies and equipment.

Duties

MOSC 76Y10. Performs unit supply functions. SUPPLY ADMINISTRATION. Operates office machines. Keeps administrative files. Posts supply regulations, publications, records, and forms used. Uses supply catalogs in identification, assembly, and breakdown of supplies. Processes supply requests and distributes supplies. Prepares requests and turn-in documents. Posts transactions to record of demand. Prepares laundry rosters and lists. Processes prepositioned receipt cards. Initiates inventory adjustment documents. SUPPLY HANDLING. Receives, loads, unloads, segregates, stores, issues and delivers organizational and installation supplies and equipment. Verifies unit of issue, description, and quantity of requested material against issue/turn-in documents. Moves property to issue or transfer points, prepares storage facilities to facilitate issue, inventory, and segregation of supplies by type of class within fire and safety requirements. Inventories supplies and equipment and records results. Performs salvage operations by identifying, sorting, and cleaning supplies. Inspects clothing and equipment record of newly assigned personnel to determine shortage and unauthorized items. Processes individual and organizational laundry. Assists in maintenance and storage of unit basic load. ARMORER DUTIES. Secures and performs organizational maintenance on unit arms. Maintains authorized repair parts stock. Prepares required reports for commander.

MOSC 76Y20. Performs unit supply functions and supervises personnel involved in small unit supply activities. Performs duties shown in preceding level of skill and provides technical guidance to lower grade personnel in accomplishment of these duties. SUPPLY ADMINISTRATION. Posts transactions to organizational and installation property books and supporting transaction files. Maintains hand receipts and other related functions at unit or organization supply level. Determines equipment needs by comparing property book records with authorization media. Establishes priorities and assigns work to assure effective and efficient operation of functional area. Inspects completed work for accuracy and compliance with established procedures. Establishes and conducts on-the-job training for unit supply personnel. Maintains automated supply system for accounting of organizational and installation supplies and equipment. Applies principles of automatic data processing input, filing, processing, and output techniques and capabilities to supply operations. Reviews and annotates changes to unit equipment status report. Computes supply usage factors. Coordinates supply activities with supply and service and motor transport units. Supervises issue, handling, storage, and security of sensitive items, basic loads, and small arms. Supervises organizational maintenance of small arms.

MOSC 76Y30. Supervises personnel involved in large supply activity. Performs supervision and management duties shown in preceding level of skill. SUPPLY ADMINISTRATION. Assists in development of equipment requirements. SUPPLY HANDLING. Trains personnel for and supervises external load rigging of rotary-wing aircraft. Assists in development of equipment requirements.

MOSC 76Y40. Performs duties in staff activity involving unit supply operations. Analyzes operational statistical data and reports to ascertain functional trends, conformance to standards and directives, and efficiency of operation. Coordinates supply activities with supply and service and motor transport units. Assists in development of troop basis.

AR 611-201, C11, p. 3-76-25.

function very much as a journeyman rather than an apprentice, it becomes apparent that the 76D MOS is extremely demanding requiring post AIT competence greater than that of the 76Y.

Although this seeming inconsistency in aptitude score and job difficulty is of concern, there is another issue that may be more important. In the ACB development, it was predicted that the overall validity coefficient of the new aptitude area scores would be .65, with the CL score having a .68 validity coefficient (Maier and Fuchs, 1972, p 23). That is, it was expected that the correlation between the CL score and the performance of recruits assigned an MOS on the basis of this score would be .68 on a scale of 0-1. The performance measure used in the ACB development was success in AIT training rather than on-the-job performance. While this made the research and development easier, AIT performance with its concentration on reading of texts is obviously not the same as job performance. In other words, the ACB aptitude area scores were validated on performance measures having questionable validity.

Unfortunately, the work of Maier and Fuchs which predicted a validity coefficient for CL of .68 has not been borne out by Quartermaster School experience. Data compiled by an educational specialist at the School indicates that the correlation between the CL score and school performance of 76 series AIT students is only .33 (Hampton, 1978 and 1979). This means that instead of the CL score predicting 46% of the student performance variance ($.68^2$), the CL score actually predicts only 11% ($.33^2$) of this variance. Essentially, then, the CL score has little or no practical value as a predictor.

C. READING LEVELS

Concerns have frequently been voiced by persons in the logistics community that one of the key problems at the using unit is that the PLL clerk cannot understand the reference material. There have often been answering concerns that the grade level measurements give a distorted picture and that the material is not overly complex. To this second point of view, a detailed discussion of the origin, limits of use, and other factors about the measures of textual reading grade level (RGL) is given in Appendix B.

Looking to the first issue, this study team asked the Adjutant General (TAG) personnel to measure the RGL of AR 710-2. It was learned that this regulation had an RGL of 14.7 based on 55 samples from the text (10 is the minimum sample size). If the prose associated with the tables, figures, and appendices is included, the RGL is reduced to 13.9. This slight reduction is likely due to the very short structure of sentences used in the captions and footnotes to tables and graphs. This does not suggest that the tables, graphs, and appendices are easier to understand than the text, only that the associated prose is simplier in style.

Using the same procedures as TAG, this study team measured the RGL of the DS4 Customer Procedures manual, TM 38-L32-11 (test). The text was at the 10.3 level, and including a sample of tables and graphs gave an average RGL of 9.9.

The RGL measures of AR 710-2 and the automated procedures manuals should be viewed in light of the DA standards. DA Circular 310-9 (1978, p 3) provides that training, technical, and equipment publications should have an overall RGL of 7 for E-1 through E-4, an overall RGL of 9 for E-5 and E-6, and RGL of 12 for senior NCOs and warrant officers as targets with the maximum overall RGL not more than 1.0 RGL above the target.

In comparison with this 9.9 to 13.9 RGL range of the references, it has been reported that the reading ability of AIT supply students at the Quartermaster School is 6.5 grade although the test used may indicate a one-half to almost full-grade downward bias (Hampton, 1979). Allowing fully for this possible bias the average students' ability at 7.5 is 2.4 RGL below the average passage of the DS4 manual and 6.4 below the average passage of the primary regulation. During the period this data was collected, some 5% of the AIT students were female. Since recruiting regulations at the time required them to be high school graduates, and since female soldiers cannot be assigned to the combat battalions that are addressed in this study, the average reading ability of AIT graduates who are assigned to line battalions is somewhat lower than the 6.5 to 7.5 given here. More importantly, the data given here are averages. For one-half of the AIT students, the gap between the reading material and their ability is wider than that given above.

The conclusions of the review in Appendix B should be repeated at this point: The measures of RGL of text are valid indicators of comprehension difficulty but a student's comprehension is affected by motivation, interest, and knowledge. While the student should bring to the classroom some measure of these qualities, instructors should be able to manipulate these factors to narrow, but not fully close, the material and ability gaps.

D. TRAINING

The formal advanced individual training (AIT) for the repair parts personnel at the using unit level is the course for the 76D10 MOS taught at the US Army Quartermaster School (QMS), Fort Lee, VA. The course is self-paced with a nominal length of 12 weeks although the average student finishes in 10 or 11 weeks. Officially, the course text, "A Self-Study Course", is a programmed text whose completion takes 11 of the 12 weeks with the remaining week consumed in 2 practical exercises. The first of these involves performing duty positions in a training warehouse and the second simulates PLL and TAMMS clerk positions in using units as well as DSU stock accounting control positions.

Many of those in the field dissatisfied with the repair parts system allege that the problems are due to the poor training of 76D10 AIT graduates and that this poor training is due to the self-paced programmed instruction course format. For this reason, a careful review was made of the research literature and educational technology dealing with program instruction and is reported in Appendix C. This review also included research dealing with the training of students having low aptitudes. The results of this review and comparison of the conclusions with the 76D course format will be summarized here.

Programmed instruction has been found to be an effective and efficient teaching method in university settings with college students, in industrial settings for acquisition of new computer programming skills by experienced programmers, and in the other armed services for instruction of highly technical electronic skills. No research was found that supported its use in training students having low aptitudes. Indeed, research in evaluating methods of instruction for low aptitudes emphasizes that the courses should not depend on written material. The 76D student population has a high proportion of low aptitude students: 13% category IV students, 11% lower category III students, and 60% category mid to upper category III.

Programmed instruction should be organized into frames. The organization of the material should present small units of learning, should require a high rate of student responses, should require responses for each new individual element of learning, and should provide immediate feedback as to the correctness of the responses. Although the material should be designed to minimize incorrect responses, it should provide for branching to additional frames to repeat the misunderstood material content and to reinforce the positive responses. Finally, material should be repeated a number of times for reinforcement and retention.

The 76D "A Self-Study Course" has little of these attributes. Major concepts and large amounts of material are presented in single frames. Compared to the material presented, a low rate of response is required and these responses include large amounts of information. For most of the instruction blocks, feedback is not immediate. The form of the response options do not inherently discourage errors as they should, and if errors do occur, the text may require repeating of the same material instead of other material or offer no repetition at all. Last, material is usually presented just once, with student responses to build retention coming only at the point of initial presentation, at a possible summary practical exercise, and in either the "school warehouse" or the "round robin" exercises at the end of the course.

From this comparison, it is apparent that the 76D text is self-paced and self-study, but is not in the format of effective programmed instruction. It is further doubtful that the course should depend on written text as virtually the only instructional medium.

E. ORGANIZATION

In the study of doctrine undertaken at the start of the project, it was found from the DA TOEs that one 76D10 E4 or E5 was authorized per company, battery, or troop in tank and mechanized battalions. This one 76D10 was usually referred to as the equipment maintenance clerk, and was expected to do both PLL and TAMMS clerk duties. Another 76D10 was typically authorized under the augmentation condition and designated as the PLL clerk. This organization is different from what was found in the initial observation visits. In 7 of the 8 battalions visited, at least two individuals were assigned the PLL and TAMMS duties. If the company PLL clerks were co-located in the battalion HQ maintenance section, there was usually an extra E5 or E6 assigned as NCOIC and the individual companies would each have one or two clerks located in the company maintenance shop. This included a TAMMS clerk and possibly another who worked as the "local" PLL clerk handling the paper and parts flow from the company to the battalion PLL section.

Besides the variance from TOE (not necessarily variance from MTOE), there seemed to be a variation in PLL clerk workload that depended on unit type, training activities, and average vehicle age. The analysis reported here looks at the variance by unit type. As shown in table II-7, a PLL clerk of a rifle company in a mechanized infantry battalion supports 24 vehicles, composed of wheeled vehicles and M113 armored personnel carriers (APC). In a tank company, the PLL clerk supports 25 vehicles consisting of tanks and wheeled vehicles. The tanks are much more complex than the APCs and there are slightly more of them within the overall total. The worst case is the 41 vehicles supported by the PLL clerk of an armored cavalry troop consisting of two or more types of tracked vehicles and a variety of wheeled vehicles. Looking at the number of mechanics supported by the PLL clerk, there are almost twice as many mechanics per PLL clerk in the armored cavalry troop as in the mechanized rifle company.

In CONUS, the lack of an authorized PLL clerk or TAMMS clerk is almost always filled, with a mechanic or combat arms MOS authorized elsewhere in the MTOE. This fill is independent of the workload variance implicit in the TOE. USAREUR, by contrast, has authorized by MTOE a second 76D for all line battalions, also independent of vehicle and mechanic induced workload variations.

While on the subject of TOE variation, it seems reasonable to jump to the division SSA level. As there is only one DA TOE for a division materiel management center (DMMC), a variance in workload from division to division should be expected. Table II-7 shows that the supported load varies from 1006 vehicles in the line battalions of an infantry division and 200 organizational mechanics to 1926 vehicles and 440 organizational mechanics in the line battalions of an armored division. Looking at the tech supply organization (TSO), the TOEs for maintenance battalions do vary with division type. Presented in the table is the number of vehicles in line battalions and the number of organizational

TOE ANALYSIS

PER	VEHICLES	ORG MECH	TOE
PLL CLERK:			
RIFLE CO (MECH)	24	6	7-047HO, C16
TANK CO	25	7	17-37HO, C15
AR CAV TRP	41	11	17-107HO, C17
DMMC:			
INF DIV	1006	200	29-3H5, C5 7-15HO, C1
INF DIV (MECH)	1748	400	7-45HO, C1 17-35HO, C2
AR DIV	1926	440	17-35HO, C2 7-45HO, C1
SPLY SEC PERSONNEL, MTNC BN:			
INF DIV	12	2.4	29-15HO, C2
INF DIV (MECH)	17	4.0	29-25HO, C3
AR DIV	26	5.9	29-35HO, C25

Table II-7. Summary of Workload Differences Implicit in TOEs.

mechanics supported per person in the maintenance battalion supply section. Again, there is a significant variance in implicit workload. In an infantry division, one TSO supplyman supports 12 vehicles and 2.4 organizational mechanics, less than half the number supported by a TSO supplyman in an armored division.

The argument is usually made that the Class IX retail organization supports more than just vehicles which is true. However, data to be presented later indicates that fewer than 10% of the PLL lines in divisions are nuclear-biological-chemical (NBC) equipment and arms room related, with the remainder being tank/automotive and communications/electrical, most of which is vehicle related. If it is fair to believe that the ASL composition does not deviate significantly from that of the PLLs, the numbers of vehicles and organizational mechanics supported per SSA individual seems to be a good indicator of work volume that has not been addressed in TOE design.

F. DOCTRINAL MATERIAL ANALYSIS

Through initial reading of the doctrine, it was clear that in places the description of procedures was unclear, and in other places that complimentary doctrinal material did not agree on the steps constituting a procedure. To rigorously pursue these apparent discrepancies in procedures, it was decided to follow what is described in detail in Appendix D and is called A Doctrinal Material Analysis (DMA). In this, descriptions of major procedures that the PLL clerk must follow are compared in the references that do or should speak on the subject. The DLOGS manual (TM 38-L22-15-2), the DS4 manual (TM 38-L32-11 (test)), AR 710-2, C5, the field manual on organizational maintenance (FM 29-2), the TAMMS manual (TM 38-750), and the QMS 76D AIT text ("A Self-Study Course") were all examined. The steps included in each reference were compared and noted on a worksheet.

For instance, all six of the references address the procedure for request for issue for a DX (direct exchange) item. The DLOGS manual gives 16 steps, DS4 gives 13 steps, AR 710-2 gives 8 steps, FM 29-2 is 5 steps, 6 steps are listed in TM 38-750, and the AIT text teaches 9 steps. Clearly, a new PLL clerk looking to the references would be confused if he compared any pair of publications. The summary results just for request for issue procedures are presented in Table II-8. As can be seen, there is considerable variation in the number of steps described for request for issue for other part categories besides DX. Since DS4 is to replace DLOGS, some lack of agreement between these two

Table II-8. Summary of Doctrinal Material

Analysis of Request for Issue

PROCEDURE, REQUEST FOR ISSUE:

	NUMBER OF STEPS IN PROCEDURE				
	PLL	DX	QSS	RECOVERABLES	FRINGE
TM 38-L22-15-2	11	16	9	9	9
TM 38-L32-11 (TEST)	8	13	10	17	-
AR 710-2, C5	3	8	9	16	-
FM 29-2	3	5	7	7	2
TM 38-750	-	6	-	-	-
QMS 76D SP	11	9	10	4	-
(HEL)	(11)	(18)	(10)	(23)	(9)

procedures may be acceptable. On the other hand, the procedures taught in the QMS 76D course should consistently agree with one or the other of the automated procedures manuals. It agrees in number with DLOGS on PLL items, DS4 on QSS items, and neither on DX and recoverables, and does not address request for fringe items. Similar inconsistencies are evident in FM 29-2 and TM 38-750.

Looking at the procedures descriptions from a different point of view, Table II-9 presents the number of information items required to complete various forms according to instructions in different doctrinal references. Taking the first column as an example, the DLOGS and DS4 manuals indicate that 8 items are prepunched on the DA 2765 completed as an AØA and that 7 items must be entered. AR 710-2 says that 7 are prepunched and 10 are required and the AIT text teaches 8 as prepunched and 6 as required. In further conflict it has been the HEL observation experience that 11 are prepunched and 9 are required to be entered.

The discrepancies continue with other forms. The QMS course instructs students to complete 15 items on the DA Form 2064 Document Register where HEL has found and the DS4 manual agrees 20 items are required.

Two summaries have been presented here of selected results of the doctrinal material analysis. Summaries of the rest of the analysis along with the detailed analysis worksheets are reproduced in Appendix D.

The Army is supposed to have a standardized supply system. Small differences might be expected between manual and automated systems, but these should not be evident at the using unit for processes like requests for issue. The differences in procedure description among the references make more difficult the writing of instructional material, enforcement of standards by inspectors at all levels, the learning of the procedures by personnel not formally schooled, and the inertial resistence to regulatory or procedural change.

G. DATA COLLECTION METHODS

CONUS Observation Visits. The purpose of the observation visits was to allow the study team to become familiar with the procedures and the working environment of the repair parts supply system and to learn how system personnel perceived the problems. Each of the visits was made by

Table II-9. Summary of Doctrinal Material Analysis for Forms Completion

FORMS:

	NUMBER OF ITEMS TO COMPLETE					
	DA 2765 PP*	DA 2765 MAN	DA 2765 -1	DA 2064	DA 2042	DA 3318
TM 38-L22-15-1	8/7	16	-	19	-	-
TM 38-L32-11(T)	8/7	17	-	20	16	-
AR 710-2, C5	7/10	15	17	19	TM 38-750	16
FM 29-2	7/7	13	16	18	15	19
TM 38-750	-	-	-	-	14	-
QMS 76D SP	8/6	17	-	15	13	-
(HEL)	11/9	18	21	20	16	19

*PREPUNCHED/COMPLETION DATA

two or three professionals for a period of up to three days. Although the visits included work at the supply support activity (SSA) level, a significant portion of each visit was devoted to using units. Here, informal interviews were conducted with PLL clerks, motor sergeants, motor officers, battalion motor officers, and battalion maintenance technicians. The units visited included light infantry, mechanized infantry, tank, signal, and engineer battalions plus divisional and non-divisional cavalry squadrons. In all cases, the interviews were conducted in the work area of the unit personnel addressed with a successful effort being made to minimize the presence of escorting NCOs or officers either from the division staff or the battalion staff. Persons interviewed were told the purpose and objectives of the study, identification of the study sponsor and study agency, that this interview was not a part of an inspection nor were the answers to be used in a comparison of units, and that the interviewer was interested in the problems of the repair parts system as seen by the interviewed individual.

The interviews were not structured but pursued the expressed opinions about problems as given by the interviewee.

Design of Formal Data Collection. In the formal unit level data collection, detailed observations of the major elements of the PLL job and time consumed by job elements, standardized collection of opinions and general information, and objective data on the performance of the supply system as seen by the using units were all desired. To attain these objectives, it was decided that a time study of PLL clerks would be conducted with these same PLL clerks interviewed according to a standard questionnaire. After the CONUS data collection, it was decided that an objective data sheet would also be completed for each time studied PLL clerk. The final element of the strategy was that wherever the data collector doing the questionnaire and objective data sheets finished his work, for all of the PLL clerks being time studied, he would enlarge the sample size for this data by interviewing other PLL clerks within the same battalion or in a nearby battalion.

Design of the Time Study. The time study of PLL clerks as designed and conducted was to determine how PLL clerks spend their PLL duty day. The objectives of the time study were therefore different from those of an industrial time study where the intent is to set work or performance standards. In CONUS, the time study design was that 3 to 5 PLL clerks within a battalion would be time studied for 3 days each, and then the data collection team would move on to another battalion. Thus, within the two-week duration of each of the CONUS data collection visits, three battalions would be studied at each installation. Installations in CONUS were selected to give representation to both divisional and non-divisional units and battalions within divisions were selected to sample the various types of combat battalions. In USAREUR, three PLL clerks within one battalion were time studied for the 2 or 3 day duration of the study team's visit to the major unit. The type of the battalion selected in USAREUR agreed with the combat orientation of the major unit.

In conducting the time studies, the PLL clerks and motor sergeants were told that the time study was not an evaluation of individual or unit performance, but was an evaluation of the demands of the system. They were told that the results would not be reported in any manner that might reflect on the individual or unit. The data as reduced to automated records is coded by the name of the time study data collector, unit and date of the study, and through corresponding questionnaire information, can be segregated by MOS, MACOM, type battalion, or type of major unit (division versus non-division).

In CONUS, the PLL clerks and motor sergeants of a battalion about to be addressed for data collection were gathered on the afternoon prior to the start of the data collection for the introductory briefing described above. The following morning, the data collectors were awaiting the PLL clerks in the battalion motor pool. In USAREUR, this introductory briefing was held on the first morning of the data collection.

The conduct of the time study had data collectors present at the battalion motor pools on arrival of the PLL clerks from the company or battalion morning formations with the time study proceeding continuously until the PLL clerk left the motor pool area for lunch. Similarly in the afternoon, the time study was conducted from arrival of the PLL clerk in the motor pool after the noon formation until the end of the PLL clerk work day. Exceptions to this coverage were rare in CONUS but occurred occasionally in USAREUR due to transportation delays of the data collectors.

Questionnaire Data Collection. Although referred to in this study as a questionnaire, the format of the data collection was actually that of a structured interview. To establish an informal rapport with the PLL clerk or other unit personnel, the data collector used the questionnaire as a prompting aid in asking questions in the same form and in the same sequence to each person interviewed. The questionnaire was administered in a conversational style as the data collector, sometimes with an assistant, made notes as to the response. At analysis, the responses were later categorized with answers summed according to categories. The interview questionnaire forms are reproduced in Appendix E.

Objective Data. Several lines of objective data were desired from the using units. To compare with the level of activity observed during the time study, the number of transactions per day as recorded in the document register for the previous six months was recorded. A second item of interest was the composition of the unit PLL. The number of lines, number of lines at zero balance, and number of PLL lines in various commodity areas were recorded. To get some solid measure indicating PLL clerk dependence on proper practical references, a list of desired references was compared with references that the PLL clerk had on hand. In this inventory, the currency of the reference was as important as its presence.

The last item in the objective data collection was perhaps most important. Since all of the widely reported supply performance statistics reflect performance down to but not below the supply support activity level, objective performance data at the using unit level was desired. In this, the time to complete a supply request action was obtained from the document register for such categories as PLL requests, DX requests, and fringe item requests. Segregated by request priority, this data was the elapsed time from the document number date to the date of receipt of the part or date of the first status on the request.

The objective data collection forms are at Appendix F.

H. QUESTIONNAIRE RESULTS

Questionnaire Administration. The interview questionnaires were administered to all of the PLL clerks that were time studied in CONUS and USAREUR. Where time of the interview data collector permitted, additional PLL clerks were interviewed to expand this sample. In battalions where time studies were conducted in CONUS, motor sergeants and battalion maintenance technicians were interviewed if they were available. Unfortunately, in USAREUR, there was rarely enough time on the part of the data collector who completed the interviews and objective data sheets to administer the questionnaires to motor sergeants and the maintenance warrants. In the following paragraphs, key questions in the PLL clerk interviews will be reviewed. The detailed reduced data in draft worksheet form for the PLL clerk, motor sergeant, and battalion maintenance technician questionnaires is included in Appendices G, H, and I respectively.

The PLL Clerk. Table II-10 indicates that the average PLL clerk in CONUS has about 8 months experience compared with 16 months in USAREUR. This disparity seems to be due to the stability of the USAREUR tours and in part due to the turbulence of PLL clerk incumbents in CONUS units. On that issue, there is another difference between CONUS and USAREUR. In CONUS units, less than one-fourth of the PLL clerks are in the 76 career management field (retail supply) as opposed to over 70% in USAREUR. In CONUS many motor sergeants and motor officers commented during either the observation or data collection visits that 76D AIT graduates had been found unable to adequately perform the job and had been replaced by personnel of mechanic or combat arms MOSs. If this is a true explanation for the few 76 series MOS PLL clerks in CONUS, the difference between CONUS and USAREUR can be explained by the variations in TOE allowances for 76Ds, one per company/battery/troop in CONUS versus two in USAREUR, and the difference in 76D fill for major units, 85% approximately in CONUS and 100-105% in USAREUR.

Formal Training. Table II-11 indicates that a very significant portion of PLL clerks have had no formal training: 50% of PLL clerks in CONUS and 31% in USAREUR report that they have had neither AIT or local post or theatre training.

PLL Clerk Procedures. One of the advantages of the automated SSA procedures is the provision for prepunched 2765 AØA requests for issue forms given to PLL clerks for all of their PLL lines. The data shown in Table II-12 suggests some problem in their use since almost 30% of the PLL clerks indicate that they never use the prepunched forms. Even in divisions, 12% of the PLL clerks admit that they never use them and no more than 40% say that they use the prepunched AØAs for all of the PLL

Table II-10 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:

	CONUS	USAREUR	BOTH
EXPERIENCE:			
N	33	31	64
MEAN	7.9 MONS	16.19 MONS	11.94 MONS
S.D.	7.2 MONS	10.6 MONS	
PMOS:			
76D/Y/P	22.3%	71.9%	45.6%
MECHANICAL	33.3%	9.4%	22.0%
COMBAT ARMS	44.4%	18.8%	32.4%
MECHANICAL EXPERIENCE	52.8%	25%	39.7%

Table II-11 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:

	CONUS	USAREUR
FORMAL TRAINING*:		
POST/THEATER	28%	6%
QMS	19%	66%
OTHER	3%	
NONE	50%	31%

*MAY HAVE ATTENDED MULTIPLE SCHOOLS.

	CONUS	USAREUR
PLL STORAGE**:		
TRUCK	14.7%	37.5%
TRAILER	67.6%	53.1%
6T VAN		9.4%
CONEX	35.3%	
BUILDING	17.6%	

**MAY HAVE MULTIPLE SITES.

Table II-12 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:

PRE-PUNCHED 2765:

	DIV	NON DIV	BOTH
USE FOR PLL	39%	13%	30%
SOME USE	49%	39%	43%
NEVER USE	12%	48%	27%

USE AMDF:

EVERY REQUEST	61%
SOME REQUESTS	33%
NONE	6%

KEEP DOCUMENT REGISTER PAGES:

DESTROY WHEN COMPLETED	16.2%
1-3 YEARS	60.3%
OTHER	23.5%

requests. On a more critical question, 6% of the PLL clerks confess that they never use the AMDF in preparation of requests for issue and a significant number, 33%, do not use the AMDF on every request.

Where AR 710-2 requires that a PLL be inventoried at 6 month intervals, fully 90% of the practicing PLL clerks find it necessary to inventory more often as shown in Table II-13. The other item in this table addresses a complaint very frequently heard from supervisors of PLL clerks. That is that the system rejects many of the PLL clerks requests for a wide variety of reasons. Over 35% of the clerks indicate that a large number of their requests are rejected for being DX or QSS items. These rejections are due to the PLL clerk's failure to consult the appropriate catalog prior to submitting the request, consulting an out of date catalog, or the supply support activities' failure to update and distribute catalogs.

Financial Management. Table II-15 includes three questionnaire items on the issue of financial management at the company level. When asked if they maintained a record of the Class IX expenses for their company, 82% of the PLL clerks said that they did maintain such a record. Many critics of the system say that the PLL clerk is the authority that makes expensive and wasteful financial decisions. Asking the PLL clerk if he decides whether a part is too expensive for the unit to request at some point in time, a question that should elicit positive responses if the above supposition were true, only one-fourth of the PLL clerks answered that they had that authority. The remainder deferred such decisions to the motor sergeant, motor officer, or some higher authority. With these controls, 40-60% of the units run out of money at least occasionally.

PLL Supervision. Toward the end of the questionnaire interview when rapport between the data collector and the PLL clerk should have stabilized, the clerk was asked questions about his supervision. First, who or where do you go when you have a problem with the repair parts procedures? Only 13% of the PLL clerks gave their motor sergeant as source of such technical assistance, 27% first consult other PLL clerks, and 26% asked either the maintenance warrant or the unit motor officer. In the second item summarized in Table II-16, the PLL clerk was asked who acted as his supervisor. 62% of the clerks answered that for some significant portion of his duty time, it was someone other than the motor sergeant.

Table II-13 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:

INVENTORY PLL:	
1 MON OR LESS	28.4%
2-3 MONS	62.7%
6 MONS OR LONGER	9.0%
REASONS FOR REJECTED REQUESTS:	
DX	7.6%
QSS	29.1%
NSN	24.0%
SUPPLY CLASS	8.9%
RECOVERABLES	12.7%
OTHER	17.7%

Table II-14 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:	
TIME REQUIRED FOR PARTS RUN:	
30 MIN OR LESS	29%
31-60 MIN	29%
61-120 MIN	22%
LONGER THAN 120 MIN	20%
HELP ON PARTS RUNS:	
PLL CLERK ONLY	25%
1 HELPER	63%
2 HELPERS	9%
OTHER	3%

Table II-15 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:	
MAINTAINS EXPENSE RECORD:	82%
INDIVIDUAL DECIDES PART TOO EXPENSIVE:	
PLL CLERK	26%
MOTOR SERGEANT	22%
XO OR MOTOR OFFICER	28%
CO CDR OR HIGHER	24%
FREQUENCY UNIT OUT OF MONEY:	
NEVER	39%
SOMETIMES	19%
FREQUENTLY	22%
DOES NOT KNOW	20%

Table II-16 Summary of Questionnaire Results

PLL CLERK INTERVIEWS:

SOURCE OF TECHNICAL ASSISTANCE:	
OTHER PLL CLERKS	27%
BMT/XO/MOTOR OFFICER	26%
MOTOR SERGEANT	13%
AR 710-2	7%
DMMC/SSA	21%
OTHER	6%
PERCEIVED SUPERVISOR:	
MOTOR SERGEANT	38%
MTR SGT & OTHER	16%
OTHERS	46%

Summary. The results of these interviews suggest that the system has several problems. First, a large number of the PLL clerks have no formal training and must rely on the doctrinal references for technical instruction. This lack of good training is seen in the use of the prepunched 2765 and the AMDF, the references maintained by the unit, and in the request reject rate and reasons for rejection. The financial management role of the PLL clerk is one task ignored by the doctrinal references related to PLL. Finally, the questionnaire results would indicate that the average motor sergeant does not provide adequate technical supervision of the PLL clerk.

I. OBJECTIVE DATA RESULTS

Introduction. Several objective data items were desired from the using unit level. For possible comparison with the questionnaire or other data, the size, status, and composition of the unit PLL was needed, as was an inventory of the PLL clerks reference publications. To place the time study data in proper perspective, the activity level during the study needed to be compared with the activity level over the previous six months. And most important, the PLL clerk is in a position to fully evaluate the performance of all levels of the supply system above him taken as a whole. The paragraphs that follow describe the results of the objective data collection which is based on a data item form given in Appendix F.

PLL Status. Tables II-17 and II-18 present summaries of the number of lines and lines zero balance for PLLs studied in CONUS and USAREUR respectively. Of interest in both Table II-17 and the division portion of II-18 is the high standard deviation and wide range in number of total PLL lines. It was obvious in the observation and data collection visits that the larger PLLs were more actively managed by the PLL clerk and intensively supervised by the motor sergeant. This would suggest that the PLLs smaller than ½ to 1 standard deviations below the mean are somewhat inactive and may be of questionable utility. The non-division-common PLL total line average is depressed somewhat by inclusion of the ADA (air defense artillery) motor pool PLLs which are generally quite small.

For CONUS and the USAREUR divisions, the lines at zero balance are between 12% and 17.6% of the total lines. The large number of lines zero balance in the non-divisional-missile PLLs is usually and reasonably explained as stockage problems at the wholesale level.

Table II-17 Summary of PLL Status (CONUS)

PLL OBJECTIVE SITUATION:

	N	MEAN	SD	RANGE
TOTAL PLL LINES	43	147.4	68.5	50-380
LINES NON TK-AUTO	38	13.7	26.8	0-157
LINES C-E	27	9.3	11.7	0-55
LINES Ø BAL	43	18.0	9.5	3-40

Table II-18 Summary of PLL Status (USAREUR)

PLL OBJECTIVE SITUATION, USAREUR:

	N	MEAN	S.D.	RANGE
TOTAL PLL LINES				
-DIVISIONS	27	119.2	48.9	59-253
-NON DIV-COMMON	6	84.2	47.7	30-152
-NON DIV-MISSILE	4	557.0	78.8	444-612
-COMBINED-COMMON	33	110.0	50.5	30-253
LINES Ø BALANCE				
-DIVISIONS	27	20.9	15.6	1-65
-NON DIV-COMMON	6	19.8	11.2	8-39
-NON DIV-MISSILE	4	134.8	62.8	54-192
-COMBINED-COMMON	33	21.4	15.6	1-65

PLL Composition. The information on number of lines that are tank automotive in Tables II-17 and II-19 indicates that this portion of the PLL is greater than 90% in the CONUS PLLs studied and about 80% in the division PLLs studied in USAREUR. Data were included in the non-tank-automotive categories of Table II-20 only if such lines were on a PLL. The small sample sizes, especially for NBC lines, indicates that a good proportion of the units do not carry such parts as part of their formal PLL. The small number of such lines recorded on PLLs and the small number of units that maintain any such lines indicates either that the usage rate of such parts is quite low or that the usage and stockage is unrecorded.

Publications. The percentage of PLL clerks studied having on hand publications related to their job is given in Tables II-21 and II-22. In the first of these tables, note the low number, 18%, that have the DLOGS system overview manual, TM 38-L22-15-1. Compared to the percentage of PLL clerks studied in divisions that have the using units manual, 84%, this would suggest that the distribution of parallel or complimentary manuals in a series has not worked well. The low percentage of PLL clerks having the 76D Soldiers Manual can be explained by the previous questionnaire data indicating only 45.6% of the clerks are in the 76 CMF. In Table II-22, the result that 68% of the clerks studied had an AMDF code reference guide yet 97% had the monthly AMDF microfiche suggests that a large number of the clerks can make only limited interpretation of the wealth of information presented in the AMDF. A critical point in this table is that over 1/10th of the PLL clerks studied did not have either a current DX or a current QSS list.

Request Rate. The workload of PLL clerks had been of concern previously to the study team and was a source of frequent complaint by the PLL clerks. The data in Table II-23 was obtained by recording the number of request transactions per day for the 6 months preceding the date of the study team visit. While the results indicate a seemingly low number of requests per day, the very high standard deviations indicate a very uneven workload with very significant peaks. This day-to-day variation may be due either to lack of continuous attention to duties by the PLL clerk, a variation in mechanic repair and maintenance activities, variation in training load requiring vehicles, or combination of all of these factors.

Table II-19 Summary of PLL Composition

PLL OBJECTIVE SITUATION, USAREUR:

	N	MEAN	S.D.	RANGE
DX LINES				
-DIVISIONS	18	20.7	12.8	1-53
-NON DIV-COMMAND	6	9.8	5.7	1-18
-NON DIV-MISSILE	4	231.2	27.8	208-260
-COMBINED-COMMON	24	18.0	12.3	1-53
TANK/AUTO LINES				
-DIVISIONS	23	92.0	44.8	40-225
-NON DIV-COMMON	6	71.8	47.2	17-139
-NON DIV-MISSILE	1	61.0	-	-
-COMBINED-COMMON	29	87.9	45.2	17-225

Table II-20 Summary of PLL Composition

PLL OBJECTIVE SITUATION, USAREUR:

	N	MEAN	SD	RANGE
COMMO/ELECTRICAL				
-DIVISIONS	24	18.7	-	2-50
-NON DIV-COMMON	6	10.8	6.6	1-20
-COMBINED-COMMON	30	17.0	11.9	1-50
ARMS RM LINES				
-DIVISIONS	13	7.2	6.0	1-22
-NON DIV-COMMON	1	4.0	-	-
-COMBINED-COMMON	14	7.0	5.8	1-22
NBC LINES				
-DIVISIONS	5	3.6	3.2	1-9
-NON DIV-COMMON	2	3.0	2.9	1-5
-COMBINED-COMMON	7	3.4	2.9	1-9

Table II-21 PLL Clerks' On Hand Publications

PLL OBJECTIVE SITUATION:

PUBLICATION	% HAVE
AR 710-2	91
TC 38-2/TM 38-L22-15-1	18*
TC 38-2-1/TM 38-L22-15-2	84*
TC 38-2-2/ TM 38-L22-15-3	10*
TC 38-2-3/TM 38-L22-15-4	10*
TM 38-750	89**
FM 29-2	63**
76D SOLDIER'S MANUAL	62

*DIVISIONS ONLY

**1 MACOM SAMPLED

Table II-22 PLL Clerks' On Hand Publications (Continued)

PLL OBJECTIVE SITUATION:

PUBLICATION	% HAVE
AMDF MONTHLY	97
AMDF I&S	76
AMDF HISTORY	32
AMDF CODE REF	68
CODE REF - I&S	34
CODE REF - HISTORY	16
DX LIST	89
QSS LIST	89
PLL LIST	91
SOP	57

Table II-23 PLL Request Rate

PLL REQUEST RATE:

	N	MEAN, REQUEST/DAY	S.D.
DIVISIONS	2850	9.2	19.4
NON-DIVISIONAL UNITS	1703	6.8	13.7

Supply System Responsiveness. To obtain this data, the data collector reviewed the PLL clerk's document register and recorded the document number date and the date of transaction completion for all transactions within a certain category for the last 30 days for which such transactions occurred. As an example, while working on PLL requests the data collector would have ignored days on which no transactions involved PLL items. To balance the sample over time and to limit the weight given to local unit peaks or crisis, only 1 or 2 transactions per category per day were recorded.

These results are intriguing in many ways. Before discussing specifics, two cautions are in order. The first is that some categories and some combinations of categories and priorities have very small sample sizes and should not be taken as stable results. Second, the word "fringe" in a table refers to all non-PLL items required by the company. That is, fringe is meant here as items that are required Class IX items that do not happen to be on the unit's PLL list.

Table II-24 gives the number of days to receive a part for divisions in PLL and fringe categories. With fair sample sizes, it appears that, for the units visited, it takes slightly longer to receive a PLL part than a non-PLL part and that there is little or no difference in the Ø5 and 12 priority. Perhaps of more importance is the result that it takes more than 10 days on the average to receive any priority Ø2 part. In all cases, the standard deviations are quite high indicating a very skewed frequency distribution.

The results in Table II-25 indicate that DX parts are obtained faster than the non-DX parts summarized in Table II-24 although the standard deviations in DX performance are proportionately higher compared to the means. The higher standard deviation of the Ø2 priority DX transactions might suggest that the DX stockage is not well tailored to support NORS requirements. The existence of QSS data suggests that some PLL clerks felt the need to record their QSS transactions in a document register.

The non-divisional supply system responsiveness presented in Tables II-26 and II-27 indicate somewhat better Ø2 performance than the divisions. This appears to be especially true in DX where the mean response time for an Ø2 request was 4.6 days versus the 9.6 days of the divisions.

Table II-24 Supply System Performance at the Using Unit, Divisions

SUPPLY SYSTEM RESPONSIVENESS, DAYS TO RECEIVE PART:

	DIVISIONS			
	PRIORITY	N	MEAN,DAYS	S.D.,DAYS
	02*	39	14.3	16.6
PLL	05	390	27.5	32.8
	12	368	24.5	29.3
	02	355	11.6	14.6
FRINGE	05	155	23.9	17.8
	12	483	22.1	18.3

*1 EXTREME POINT DELETED

Table II-25 Supply System Performance at the Using Unit, Divisions

SUPPLY SYSTEM RESPONSIVENESS, DAYS TO RECEIVE PART:

	DIVISIONS			
	PRIORITY	N	MEAN,DAYS	S.D.,DAYS
	02	147	9.6	19.6
DX	05	61	6.8	11.7
	12	103	13.0	16.9
	02	13	1.2	.6
QSS	05	4	10.0	8.9
	12	41	11.7	8.8

Table II-26 Supply System Performance, Non-Divisional Units

SUPPLY SYSTFM RESPONSIVENESS, DAYS TO RECEIVE PART:

	NON-DIVISIONAL UNITS			
	PRIORITY	N	MEAN,DAYS	S.D.,DAYS
PLL	02	27	8.4	15.3
	05	231	25.1	37.2
	12	260	24.5	31.8
FRINGE	02	176	16.5	25.8
	05	123	21.4	21.4
	12	306	28.7	29.1

Table II-27 Supply System Performance, Non-Divisional Units

SUPPLY SYSTEM RESPONSIVENESS, DAYS TO RECEIVE PART:

	NON-DIVISIONAL UNITS			
	PRIORITY	N	MEAN,DAYS	S.D.,DAYS
DX	02	69	4.6	10.2
	05	100	10.8	19.2
	12	105	8.9	18.7
QSS	02	5	15.7	25.0
	05	16	46.9	62.4
	12	7	19.6	19.6

The results in Tables II-28 and II-29 on the number of days required to receive status is limited because of the small samples. In these tables, the number in parentheses below the mean days is the sample size for that combinaton of category, priority, and status code. The BF (no record) and BQ (confirmation of cancellation) columns cannot be interpreted directly since these status codes are the result of a PLL clerk submitted follow-up or cancellation request that followed the original request for issue by an indeterminant number of days. The other columns, CA (rejection code from a SAILS installation or a handwritten code from the immediate SSA), BB (backorder) and BM (passed to higher source) columns are of value to show the overall lag in receipt of status after a request transaction and to show the wide variation in such responsiveness. For instance, for 41 priority 12 PLL requests, an average 46 days passed before the clerk received a backorder status.

Summary. Overall, the high variance in supply system responsiveness could be imagined to lead by itself to a lack of confidence in the system.

Table II-28 Supply System Performance, Status, Divisions

SUPPLY SYSTEM RESPONSIVENESS, DAYS TO RECEIVE STATUS:

	PRIORITY	DIVISIONS, MEAN DAYS (N) CA	BB	BF	BM	BO
PLL	02	43.0 (6)	--	39.7 (12)	--	13.0 (1)
	05	11.0 (4)	40.0 (21)	35.9 (36)	21.0 (4)	55.0 (5)
	12	10.5 (6)	46.0 (41)	38.3 (26)	--	31.9 (8)
FRINGE	02	12.8 (6)	21.9 (18)	27.1 (27)	11.4 (21)	10.8 (5)
	05	25.5 (2)	37.3 (12)	27.3 (14)	16.0 (5)	40.5 (3)
	12	35.1 (7)	32.9 (51)	20.1 (10)	10.9 (15)	69.5 (4)

Table II-29. Supply System Performance, Non-Divisional Units

SUPPLY SYSTEM RESPONSIVENESS, DAYS TO RECEIVE STATUS:

	PRIORITY	NON-DIVISIONAL UNITS, MEAN DAYS (N) CA	BB	BF	BM
PLL	02	67.7 (3)	26.9 (4)	--	--
	05	16.5 (15)	23.6 (16)	63.0 (3)	--
	12	70.8 (12)	78.0 (23)	39.7 (7)	--
FRINGE	02	--	28.9 (37)	47.0 (5)	27.0 (5)
	05	4.0 (2)	25.4 (23)	--	10.5 (2)
	12	32.2 (12)	36.3 (6)	31.8 (4)	14.2 (8)

III. DIVISION SUPPLY SUPPORT ACTIVITY ANALYSIS

A. THE SITUATION

Overview. The function that provides using or customer units with supplies is the Supply Support Activity (SSA). This entity processes requests for repair part supplies from customer units, maintains a stockage of repair parts at division level called the authorized stockage list (ASL), accounts for this stockage, issues from the stockage according to requests from customers, causes the stockage to be replenished, and obtains from higher supply sources parts needed by users that are not on hand in the ASL. The SSA also handles the collection of defective items that must be recovered for their remanufacture, repair, control, scrap value, or other purpose. These functions are all performed under both stock and financial accounting controls.

Organization. The SSA function within divisions is split between the Maintenance Battalion, Division Materiel Management Center, and the Division Data Center. These 3 are elements of the Division Support Command (DISCOM), one of the five major commands within a division. The Division Data Center (DDC), led by a MAJ and part of the DISCOM Headquarters and Headquarters Company, is responsible for the maintenance and operation of the division's IBM 360/30 computer which provides ADP support to the division including the repair parts system.

The Division Materiel Management Center (DMMC) has the mission of accounting for and managing the division's materiel supply and maintenance. Commanded by a LTC, the DMMC is made up of sections dealing with maintenance and groupings of classes of supply. The largest is the Class IX section led by a MAJ and consisting of about 28 persons. Processing of supply documents including requests and receipts, accounting for flow and stockage of parts, and managing stockage are the general missions of this Class IX section. It interacts with customers, the Maintenance Battalion, the DDC, and higher supply and maintenance sources.

The last and largest of the 3 DISCOM elements of the repair parts system is the technical supply, meaning repair parts, portion of the maintenance battalion. The maintenance battalion of an armored, infantry, or mechanized infantry (AIM) division is composed of 6 or more companies; the headquarters and light maintenance (HLM) company, the heavy maintenance company, the missile maintenance company, and the 3 forward support companies (FSC). All but the FSCs base their activity in the division rear trains while each of the FSCs is assigned to support a brigade. To provide general repair parts support, the division stockage of repair parts, the ASL, is maintained by the supply platoon of the HLM (usually called the technical supply office (TSO)), and the supply section or platoon in each FSC. All missile peculiar parts are stocked in the missile maintenance company and are not addressed in this study. These tech supply elements of the maintenance battalion physically receive and store parts, and make issues to customer units.

ADP support to the division repair parts system is through a computer program called the Division Logistics System (DLOGS) developed by the Computer Systems Command in conjunction with the Army Logistics Center.

To many in the divisions, the DMMC Class IX section is viewed as the manager of the repair parts system in the division, and the tech supply of the maintenance battalion is seen as the operator. More fairly the tech supply operates the flow and stockage of the physical parts and the Class IX section operates the document flow and upkeep. The DDC is an essential element that serves Class IX as it would any other customer.

Observation Visits. As described in Chapter II, visits were made to units in CONUS to observe the repair parts operations to improve the understanding of the system gained from reading doctrine. Spending more than 55% of the total duration of these visits at activities above using unit level, informal and unstructured discussions were held with Class IX section and TSO personnel on problems that they encountered with the DLOGS processes, the SSA organization interactions, interactions with higher supply sources, and customer interactions. Facilities were toured, tech supply and Class IX clerks and NCOs interviewed, and discussions were held with DISCOM and G-Staff officers and commanders.

A number of problems were evident at the close of these visits. The doctrine that support the system taken as a whole was sometimes incomplete and vague. Work and storage conditions in the tech supply warehouses were frequently poor by commercial or military depot standards. The QSS warehouse procedures were involved compared to other ASL lines and were rarely followed closely. Repeatedly, it was noted through direct observation or expressed complaints from interviewed personnel that there were not enough NCOs in the TSO to provide technical guidance and to lead work teams. From the appearance of the warehouse bins, number of lines noted per location, the number of locations not marked and other factors such as general housecleaning noted during the tours and visits to the TSO warehouses and conversations with personnel, the conclusions were suggested that warehouse location and inventory accuracy were not closely managed.

Other Problems. Other sources suggested that serious problems existed in the TSO receiving sections and in DX. Reports were noted that received shipments were not promptly processed either in posting the receipts to the records or in placing the stock in storage locations to allow issuance. Another alleged problem in receiving was the reliability of processing the receipt document telling both the higher sources that the stock was received and the division SSA that materiel release orders could be filled on that line. Making sure the receipt document and the amount received agree and getting the new stock in the proper warehouse location were other problems.

In DX, it appeared from reports that the manual calculation of stockage levels was not often done correctly or if correctly performed, not followed in actual practice.

B. DATA COLLECTION METHODS

The data collection procedures used for the division SSA were not as rigid as those used at the using unit level. The relative complexity of the procedures at this level, the relative seniority and experience of the personnel, and the individuality of the operation and organization within each division dictated a more flexible approach. A series of data collection guides were assembled around the five topics given in Table III-1.

These data collection guides were used to direct detailed data collection discussions with key Class IX personnel. In individual interviews, these officers, warrants, and NCOs were asked how they accomplished major processes within their area of responsibility, and what problems they encountered in those tasks. They were also asked if they collected any data to assist in management of their technical area and, if such data was available, if it

Table III - I. Overview of DS SSA Data Collection

DATA OVERVIEW:	ITEMS
DS SSA -	
- CL IX OFCR OR TECH SPLY PLT LDR	20
- DOC CONTROL & EDITTING OR CUSTOMER ASSISTANCE	77
- SPLY MGT - STOCK CONTROL	78
-SYSTEMS BRANCH	18
-TECH SUPPLY - WAREHOUSE	80

related to human performance. Besides these detailed technical discussions, a survey was conducted of the key personnel to learn and record their technical background. The survey was interested in their total years service, portion of that service spent in supply, previous supply support activity experience, and training related to supply and automated supply management systems. Finally, to obtain measures of the performance of supply support activities across the Army, sampling surveys of three types were conducted in the warehouses. Parts in bins waiting for customer pickup were checked to determine if the parts belonged in the bin, i.e., the DODAAC on the materiel release document matched that of the customer bin; the quantity in the bin matched that of the attached material release order; and if there was accompanying documentation with the parts. The other two surveys were of location accuracy and of inventory accuracy.

The technical discussions with key personnel were held at all supply support activities visited in CONUS and USAREUR. Customer bin surveys and personnel experience surveys were also conducted in both MACOMS. The location and inventory accuracy samples were taken in USAREUR. There were two people in this data collection subteam in CONUS and three in USAREUR.

C. ANALYSIS OF THE DMMC

Organization. FM 54-2, the FM on the Division Support Command, states that the DMMC provides to divisional units centralized and integrated materiel management that includes both supply and maintenance (pg 3-23). To fill this mission, doctrine provides the organization form shown in Table III-2. This provides supply sections for one or more classes of supply, a property book section, and a maintenance section. Among the supply sections, the Class IX supply section is the largest and its TOE organization is shown in Table III-3. The DMMC TOE is the same for armored, infantry, and mechanized infantry divisions.

The personnel section of the TOE adds some additional guidance as to the working organization of the Class IX section. As shown in Table III-4, the TOE indicates that the supply management branch should be organized along aircraft, automotive, communications-electronics, general, and weapons-missile lines. Although the supply management branch is to

TABLE III - 2. ORGANIZATION OF THE DMMC

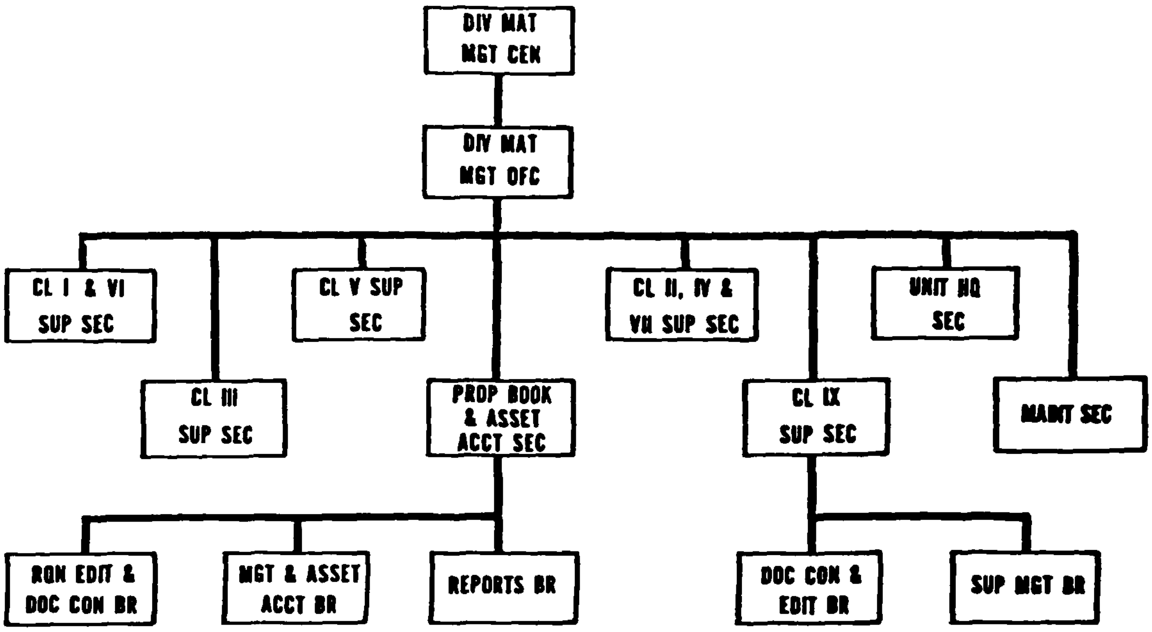
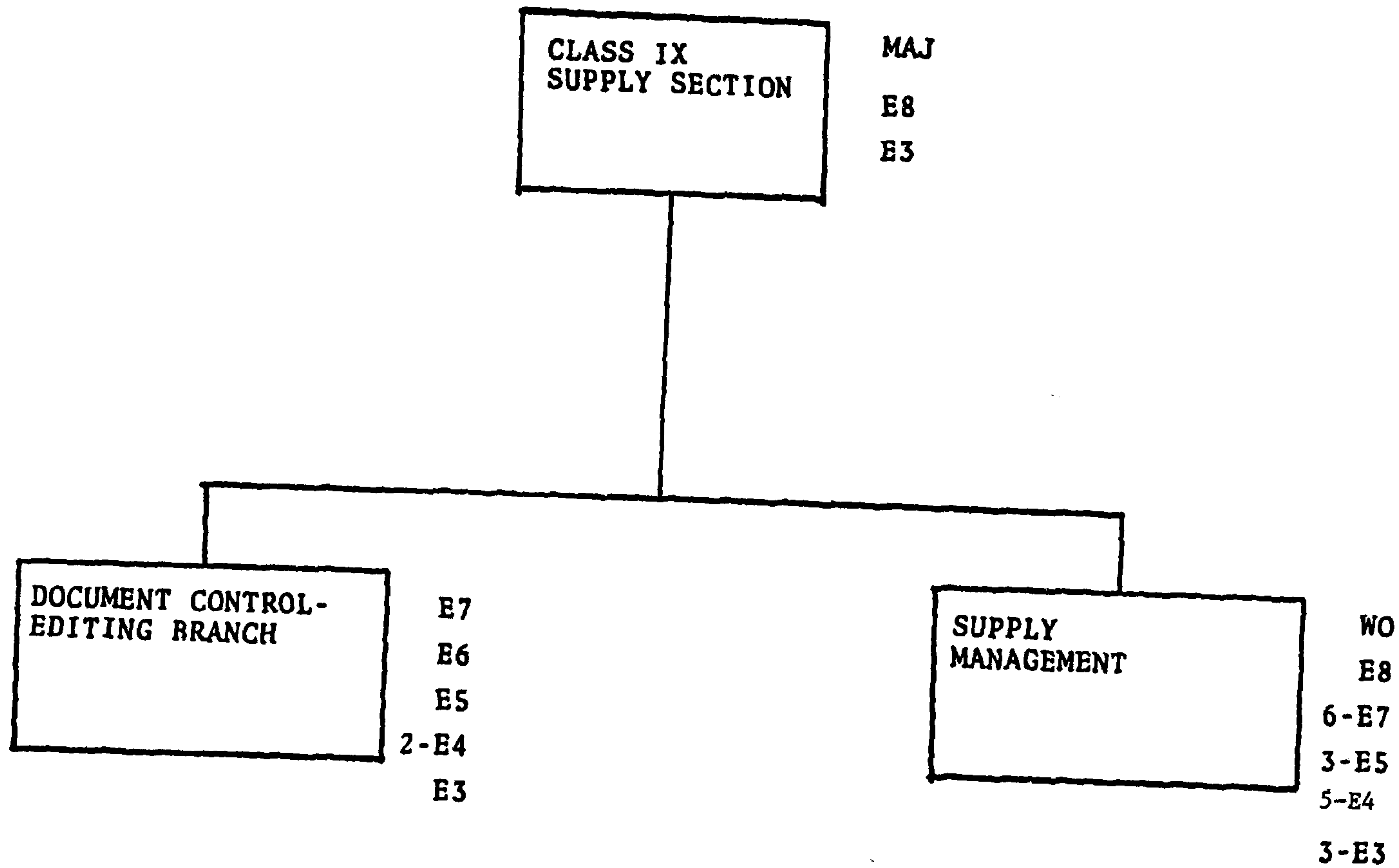


Table III - 3. Class IX Section Organization and Authorized Strength *



*TOE 29-003H, C6

Table III - 4. The AIM DMMC

TOE 29-003H — TABLE OF ORGANIZATION AND EQUIPMENT — TOE 29-003H

SECTION II: PERSONNEL ALLOWANCES

PARA (a)	LINE (b)	DESCRIPTION (c)	GRADE (d)	MOS (e)	BRANCH (f)	1 (g)	2 (h)	3 (i)	AUG A (j)	B (k)	CADRE C (l)	ASI (m)	1 (n)	2 (o)
09	12	STOCK CON-ACCT CL	E-4	76P10		2	2	2				F9		
	13	STOCK CON-ACCT CL	E-3	76P10		1						F9		
		PARA TOTAL				14	13	12			6			
10		CLASS IX SUP SEC												
	01	REP PARTS SUP OFF	MAJ	~~04204~~ 92800	SN	1	1	1			1		11	
	02	CH REP PRTS SUP NCO	E-8	76Z5K	NC	1	1	1			1	F9		
	03	REPORTS CLERK	~~E-4~~ E-3	~~71020~~ 71L10		1	1	1					01	95
		PARA TOTAL				3	3	3			2			
11		DOC CON-EDIT BR												
	01	DOC CON-EDIT SUPV	E-7	76P40	NC	1	1	1			1	F9		
	02	A DOC CON-EDIT SUPV	E-6	76P30	NC	1	1	1			1	F9		
	03	DOC CON-EDIT SP	E-5	76P20		1	1	1				F9		
	04	DOC CON-EDIT SP	E-4	76P10		2	2	1				F9		
	05	DOC CON-EDIT SP	E-3	76P10		1								
		PARA TOTAL				6	5	4			2			
12		SUP MGT BR												
	01	SUPPLY MANAGEMENT TECH	WO	762A0	QM	1	1	1			1			
	02	CHIEF SUPPLY MGT NCO	E-8	76Z5K	NC	1	1	1			1	F9		
	03	AIRCRAFT PARTS SUP NCO	E-7	76D40	NC	1	1	1			1	F9		
	04	ASST SUPPLY MGT NCO	E-7	76P40	NC	1	1				1	F9		
	05	AUTMV PARTS SUP NCO	E-7	76D40	NC	1	1	1				F9		
	06	COMMEL PARTS SUP NCO	E-7	76D40	NC	1	1	1			1	F9		
	07	GEN-SPE PARTS SUP NCO	E-7	76D40	NC	1	1	1			1	F9		
	08	WPNS-MSL PARTS SUP NCO	E-7	76D40	NC	1	1	1			1	F9		
	09	~~AIRCRAFT PARTS SUP SP~~ MATERIEL SUPPLY SP	E-5	76D20		~~1~~ 3	~~1~~ 3	~~1~~ 3	1			F9		
	10	~~AUTMV PARTS SUP SP~~ MATERIEL SUPPLY SP	~~E-5~~ E-4	~~76020~~ 76D10		~~1~~ 4	~~1~~ 4	~~1~~ 4	1			F9		
	11	~~COMMEL PARTS SUP SP~~ MATERIEL SUPPLY SP	~~E-5~~ E-3	~~76020~~ 76D10		~~1~~ 3	~~1~~ 2	~~1~~ 2	2			F9		
	12	~~GEN-SPE PARTS SUP SP~~	~~E-5~~	~~76020~~		~~1~~	~~1~~	~~1~~				~~F9~~		
	13	~~WPNS-MSL PARTS SUP SP~~	~~E-5~~	~~76020~~		~~1~~	~~1~~	~~1~~				~~F9~~		
	14	~~AIRCRAFT PARTS SUP SP~~	~~E-4~~	~~76010~~		~~1~~	~~1~~	~~1~~	~~1~~			~~F9~~		
	15	~~AUTMV PARTS SUP SP~~	~~E-4~~	~~76010~~		~~1~~	~~1~~	~~1~~				~~F9~~		
	16	CLERK TYPIST	E-4	~~71020~~ 71L10		1	1	1						
	17	~~C-E PARTS SUP SP~~	~~E-4~~	~~76010~~		~~1~~	~~1~~	~~1~~	~~1~~			~~F9~~		
	18	~~GEN-SPE PARTS SUP SP~~	~~E-4~~	~~76010~~		~~1~~			~~1~~			~~F9~~		
	19	~~WPNS-MSL PARTS SUP SP~~	~~E-4~~	~~76010~~		~~1~~	~~1~~	~~1~~	~~1~~			~~F9~~		
		PARA TOTAL				19	18	17	4		7			
13		MAINTENANCE SECTION												
	01	MAINT MGT OFF	MAJ	94803	SN	1	1	1			1		11	
	02	ACFT MAINT OFF	CPT	X4823	TC	1	1	1						

DA ... 2719

THIS ... PRACTICABLE
FROM ... DDC

have this commodity orientation, no such detail is provided for the document control and editing branch.

The actual organization of the Class IX sections of 7 divisions visited during data collection is shown in Table III-5 where the first column repeats the DA TOE distribution of personnel. Although the remaining columns for the divisions differ from the DA TOE, there are many mutual similarities. r of the seven divisions have 36 or more personnel which is at least six more than the DA TOE. Just two of the seven have strengths approximately equal to the DA figures. In all of the seven divisions, the document control and editing section has been enlarged significantly over that suggested by the TOE. All of the divisions diverted NCOs and enlisted men from the supply management branch to perform specialized functions such as PLL management, QSS management, or inventory adjustment reports. Finally, no division visited used the commodity orientation suggested by the TOE.

The implementation of some special functions was quite standard. All of the divisions visited had a PLL management function and all but one division had two or more persons assigned to this area. Four of the seven divisions had a QSS manager and six had specialists working on inventory adjustment reports.

The commodity orientation of the supply management branch suggested by the TOE seems historically based on the MOS predecessors to the 76D. It is understood that before April, 1976, there were a series of MOSs, 76Q through 76U, that denoted repair parts supply in major commodity areas such as tank-automotive, aircraft, or missile. It would have been logical to organize the supply management branch along the commodity orientation of the supply MOSs and natural to fail to delete the commodity orientation when the commodity specialized MOSs were combined into 76D in April, 1976.

This brief review of the organization of Class IX sections raises two issues. Empirically, the divisions have found that the DA TOE provides too few staff for the Class IX section and that the organization of that staff suggested by the doctrine is inappropriate to efficient performance of the work. The divisions have added personnel to the DA TOE, either to match a workload greater than that envisioned by the shapers of doctrine, or to make up for the lack of ability or expertise of the personnel on hand. Similarly, the organization suggested by the doctrine in the DA TOE has not been followed, either because that organization is inefficient for the actual work to be performed, or, the personnel on hand cannot efficiently perform the range of duties implicit in that commodity oriented organization.

Table III-5. Summary of Organization and Manning of DMMC's.

Class IX Section DMMC	TOE 29-003H Personnel Allowances	DIVISION						
		A	B	C	D	E	F	G
Section HQ	1-MAJ 1-MSG 1-PFC	1-EM 1-MAJ 1-CW4 1-MSG 1-SFC	1-MAJ 1-MSG 1-EM	1-MAJ 1-MSG	1-CPT 1-MSG 1-SP4	1-MAJ	1-MAJ 1-MSG 1-SP5	1-MAJ 1-MSG 1-EM
Document Control & Editing Br	1-SFC 1-SSG 1-SP5 2-SP4 1-PFC	1-SFC 1-SSG 1-EM	1-SFC	1-SFC	1-SFC 1-SSG	1-SFC	1-MSG 1-SFC 3-EM	1-CW2 1-SFC 3-EM
Editor		2-SP4	2-SP4 2-EM	1-SSG 1-EM	1-SP4 1-EM	1-SP5 5-EM		1-SP4 3-EM
Local Purchase/ AØB,AØE		2-SP4	1-SP4 2-EM	2-SP4	1-SP4	1-SP5	1-SP4	1-SFC 1-SSG 2-EM
Pre-edit errors		1-SP4	1-SP4	1-SFC 1-EM		1-SFC	1-SP4	1-SP5
Batch/Filing/ Distribution		1-SP5 2-EM	1-SFC 3-EM	1-SSG 3-EM	1-SP4 3-EM	1-SP5 1-EM	1-PFC 1-EM	2-EM
Customer Assistance						2-SFC 2-EM		2-SFC 1-EM
Receipt Processing				1-SP4		1-SP4	1-SP4 1-EM	
Statistics				1-SP5				1-MSG 1-EM
Document Control & Editing Br Subtotal	9	16	16	15	12	17	14	24

Table III-5. Continued

Class IX Section DMMC	TOE 29-003H Personnel Allowances	DIVISION A	B	C	D	E	F	G
Supply Management Branch	1-WO 1-MSG 6-SFC 5-SP5 6-SP4	1-CW3	1-CPT 1-LT 1-MSG	1-CPT 1-CW2	1-CW2 1-SFC	1-CW2 1-MSG	1-CPT 1-SFC 1-EM	1-CW3 1-CW2 1-SFC
ASL Management (Common)		2-SFC 1-SSG 2-SP5	2-SFC 2-SSG 2-SP5 4-EM	3-SSG 1-SP5 3-EM	2-SFC 1-SSG 2-SP5 3-EM	1-SFC 1-SP5 1-EM	3-SFC 1-SSG 2-SP5	2-SFC 1-SP5
ASL Management (A/M)		1-SSG	1-SSG	1-SSG 2-EM	2-SSG	1-SFC 1-EM	1-SFC 1-EM	1-SFC 1-EM
PLL Management		1-SFC 1-EM	1-SFC 1-EM	1-SFC 1-EM	1-SSG	1-SFC 1-EM	1-SFC 2-EM	1-SFC 1-SSG
QSS Management		1-SSG		1-SSG 1-EM			1-SP5	1-SFC
DLOGS errors						1-SP4	1-SP4	1-SP5
Inventory Adjustments			1-SSG 1-SGT	1-SFC 1-EM	1-SFC	1-SFC	1-SSG	1-SSG
Others			2-SFC 1-SSG 1-SGT 1-SP5	1-MSG 2-SFC	1-SFC 1-SSG 1-EM	3-SFC 1-SP5	1-SFC 4-SSG 2-SGT 1-EM	
Supply Management Branch Subtotal	19	10	23	21	17	15	25	13

Table III-5. Continued

Class IX Section DMMC	TOE 29-003H Personnel Allowances	DIVISION						
		A	B	C	D	E	F	G
DMMC Subtotal	28	26	39	36	29	32	39	37
DX Management			1-SFC 3-SSG 1-EM	1-SGT 2-EM			1-LT 1-SFC	
Keypunch Section	1-SGT 4-EM	1-SGT 8-EM	1-SGT 7-EM	1-SGT 11-EM	1-SGT 7-EM	1-SGT 7-EM	1-SGT 11-EM	1-SP5 4-EM
Class IX DMMC Total *	33	35	52	51	37	40	53	42
DSU Total *	27-33	38 (38)	39 (44)	53 (59)	42 (42)	45 (48)	59 (64)	44 (48)
Total Class IX Strength	60-66	73	91	104	79	85	112	86

*The Class IX DMMC total includes all personnel assigned by TOE/MTOE to the DMMC Class IX section. This figure includes some persons who actually work in the DSU TSO. Such persons assigned to the DMMC but working in the TSO were included in the TSO totals in Tables III-20, III-21, and III-22 and given here in parenthesis.

Personnel. Structured interviews were conducted in each DMMC Class IX section visited in USAREUR and ocassionally in those in CONUS to learn the relevant technical background of the key personnel. Total service experience, general experience in supply, training related to the DMMC functions, and experience closely related to the incumbents' DMMC duties were noted for the NCOICs of supply management and document control and editing, supply technicians, senior editors, ASL managers, and managers of specialized functions like PLL, QSS, DX, and IAR. Almost all personnel in the roles in the USAREUR divisions visited were interviewed with the exceptions being those on sick leave, PCS moves, and other such reasons for being unavailable.

The results presented in Table III-6 suggest that the overall experience of key personnel in DMMC positions is limited. The number of months experience for both direct DLOGS experience and for the related experience categories indicate that the majority are on their first duty assignment in this area. Comparing the number of months direct experience and the months of related experience shows the suprising result that most of the NCOs and officers have had only one other assignment in either Class IX supply or in an automated supply management position. Note that in this sample, 41% of the NCOs have been reclassified into supply and that only 37% of the key personnel hold the additional skill identifier (ASI) of F9 indicating attendance at the Quartermaster School DLOGS course or OJT DLOGS experience sufficient enough to be awarded an ASI. As there were no known management procedures to cause the result, the difference in ASI frequency between USAREUR and CONUS is thought to be largely chance.

The data of Table III-7 shows the proportion of careers of key personnel spent in supply duties and in specific DLOGS assignments. Although the sample is essentially the same as that of Table III-6, the seemingly low percentage of time in supply combined with the number of NCOs reclassified shown in the previous table suggests that many of the reclassifications have been relatively late in the NCOs' careers. The average warrant officer in this sample had 3.3 years experience in DLOGS, just one more year than the average DLOGS experience of the remainder of the sample.

From these two tables, it seems that the majority of the key personnel are in their first DLOGS assignment and that few have had more than two previous assignments in either Class IX supply or working with an automated management

Table III - 6. Experience and Training of Key DMMC Personnel

		USAREUR					CONUS		BOTH
					F9 ASI		F9 ASI		
GRADE	N	Months Direct Experience[1]	Months Related Experience[2]	Number Reclassified	N	N with ASI	N	N with ASI	% with F9 ASI
O-WO	5	23.8	23.6	2	5	0	6	0	0
E7-8	25	21.5[3]	27.9	14	27	10	9	1	30.1
E6	8	25.9	22.5	1	8	5	7	3	53.3
E5	6	16.3	25.7	3	6	5	1	0	71.4
E1-4	7	12.3	0.0	1	7	5	2	0	55.5
TOTALS	51			21	53	25	25	4	37.2

1. Direct experience with DLOGS in a DMMC.

2. Related experience, that is, experience in Class IX supply or experience in other automated SSA. This would include unit PLL, TSO, Depot, SAILS, etc.

3. Includes two NCOs with extraordinary DLOGS experience, ie, 90 and 84 months. Excluding these, mean direct experience is 15.8 months for the remaining 23.

Table III - 7. Experience of Senior DMMC Personnel

	0	WO	E8	E7	E6
Sample Size	1	4	1	20	7
Supply/Total Service	80%	65%	30%	50%	50%
DLOGS/Total Service	24%	24%	6%	12%	24%
Mean Total Service,Years	9	13.9	25	17.3	12.0

system. Overall, this data clearly suggests that there is little technical expertise in DMMC Class IX sections. The key personnel have little related experience compared to civilian equivalents who would be expected to have career long relevant experience. To make up for this shortage of expertise through experience, the Army builds expertise through training, but the specialized training that is available, the short, self-paced, nominally two-week F9 ASI course, has been received by fewer than 40% of this senior group.

Technical discussions were held with many more officers and warrant officers than are reflected in the samples reported in the above data. This data has served to confirm the subjective view resulting from these discussions that many warrant officers and most officers have little of the technical expertise required for them to fill their roles of technical consultant and technical manager of the Class IX DMMC section.

Document Editing. Because of the need for correctness of detail on document input to a computer system, document editing is a necessary first step in processing requests and other transactions. A good editing function prevents the laborious keypunching and other manual handling of documents that would obviously not be accepted by the computer program. It should also reject documents that are too illegible to be keypunched and should make returns of documents to originators quickly so that problems can be resolved promptly. Besides an edit for legibility and completeness, it is also desirable to accomplish a technical edit that would serve special control functions. Requests for issues through routine channels must be rejected for items that are DX or QSS and those for recoverable items must be checked to insure the old item has been turned in. An edit should attempt to detect keypunch errors and to insure the requested NSN is a valid one. Finally, all of the codes that do not affect DLOGS processing but will precipitate a rejection from SAILS or other sources should be checked.

An edit, to be effective, should be as close to the source of the request as possible to minimize document handling and to minimize the delay in processing good requests, and to speed error feedback to the originator. An editing process should also identify units that cause an undue number of rejections for remedial help.

Document editing is addressed in three doctrine publications. To begin with, the appropriate regulation, AR 710-2, has its principal discussion of editing in the issue, turn-in, and shipment procedures section of the chapter on support unit procedures, Chapter 3. First, the discipline of the regulation is set in paragraph 3-54b:

> "b. Procedures to be used for processing forms vary between automated and manual accounts. The major Army commander may designate specific forms to be used as outlined above. Procedures may also be modified to meet the needs of particular automated systems. Instructions contained in the remainder of this section generally apply and will be used as guides where deviation is necessary."

Then, paragraph 3-54e and paragraph 3-54e(1) describe the overall function:

> "e. The supply support activity will perform a minimum edit of all requests received from supported units.
>
> (1) All requests will be edited to ensure that mandatory entries are correct and complete. Supply support activity personnel will make every effort to correct obvious errors. If errors are found that cannot be corrected, the request will be rejected using the appropriate status code. When changes are made to the supported unit's request, the supply support activity will advise the supported unit of the changes. Chapter 2, section III, provides information regarding mandatory entries on supply requests."

Later, the extent and method of the edit is suggested by paragraph 3-55b. In this paragraph, a decentralized DSU is taken to mean a non-divisional DSU and a centralized DSU refers to the divisional DSU organization with a DMMC:

> "b. These procedures emphasize the utilization of the Army Master Data File Reader Microfilm System (ARMS) at the decentralized DSU. Editing at centralized DSU is performed according to instruct-

ions issued by the applicable Inventory Control Center (ICC) and may not necessarily utilize the microfilmed AMDF."

The relevant FM (FM 54-2) and the automated procedures manuals (TM 38-L22-15 series and the TM 38-L32 series) are mutually consistent. They say that the TSO should carry out an edit for completeness and legibility and that the DMMC document control and editing section should perform a technical edit using the AMDF, TMs for major end items, and the supply bulletins. This technical edit should determine if the NSN requested is valid and if other codes on the request are correct. It is implied, but not stated, that the completeness and legibility edits should be in the forward support companies.

The implementation doctrine, i.e., FMs and automated procedures manuals, omit mention of methods of informing the unit if changes are made in their request as a result of the edit, and the methods for determining correctness are all are manual.

The editing practice in the divisions is close to that in the doctrine on the surface. All but one division had an initial, manual edit for completeness and legibility, and only one division, a different one, did not have a technical edit. None of the divisions had any effective editing in the forward support companies, and two divisions had editing in the TSO - there it was done with DMMC personnel. The more significant variance was that all of the divisions that performed the technical edit did so with a specially written computer program rather than manually.

The computer programs in the divisions that perform the technical edits are called pre-edit programs as they precede the DLOGS program. The pre-edit program used by a particular division is typically unique to that division. Rarely was consultation with other divisions mentioned in discussion of the origin of a pre-edit program. In most cases, the programs were developed through some combination of effort of the Class IX officer and the supply technicians of the DMMC defining requirements and doing the programming, with some occasional help in programming, from system operators of the DDC. Personnel involved generally indicated that the development spanned a number of months.

The pre-edit programs for 6 divisions are summarized in Table III-8. Each checks certain fields of the input documents where errors were thought likely and where the developers could conceive a checking algorithm. All of the divisions checked

Table III-8. Functional Content of Pre-Edit Programs

DIVISIONS

Class IX Pre-edit	A	B	C	D	E	F	G
Manual Edit							
Location	DMMC	DMMC	DMMC	DMMC	DSU	NONE	DSU
Personnel	SP4	SP4/PFC	SSG	SP4	SFC		SP4/PFC
Quality	extensive	average	average	average	good	poor	good
Computer Pre-edit	yes	yes	yes	no	yes	yes	yes
Pre-edit clerk	SP4	SP4	SFC		SFC	SP4	SP5
Input into pre-edit	AØA	AØA	AØA		AØA	AØA	AØA, DGZ, AØE, ZSL
Fields checked							
NIIN	yes	yes	yes		yes insert correct FSC	yes	yes
QTY (numeric)	yes	yes	yes		yes qty > 500 or > $500	yes	yes
U/I	yes	yes	yes		yes	yes	yes
Class of supply	yes	yes	yes		yes	yes	no
Acquisition Advice Code	yes	yes	yes		UNK	no	yes
Phrase Code	yes	yes	yes		UNK	no	no
Recoverability Code	yes	yes	no		UNK	no	yes
Special Control Item Code	yes	yes	yes		UNK	yes	no
Weapon System Designator Code	no	no	UNK		yes	no	yes
Other	PA Funded						Expendability
Data Samples: #AØA input	43451	44203	50851		Do not collect any statistics on errors	16039	11296
#raw rejects	9412 (21.6%)					4319 (26.9%)	2505 (22.2%)
#rejects to unit	3395 (7.8%	2779 (6.3%)	4305 (8.5%)			$\frac{3580}{63929}$ = (5.6%)	799 (7.1%)
	3 months	3 months	3 months			3 months	1 month

the NIIN validity by comparing with a computer tape of the AMDF, the quantity to insure all characters were numeric and that it was reasonable (usually less than or equal to 500), the unit of issue also against the AMDF, and in 5 of the 6, the class of supply was checked to see if it was Class IX.

Note that one division checked to see that the weapons system designator code (WSDC) was included on all NORS requests and caused such requests to be rejected for manager review if missing. Although the WSDC is required for NORS request processing at SAILS, here, it is causing rejection of a request that may be filled within the division. This code would be better checked in a post DLOGS edit.

In all cases, the time of professional military managers and technicians was diverted for a considerable time to develop a local solution for a requirement common to all DLOGS divisions. The technical requirement for a pre-cycle edit is one where the personnel resources were not adequately provided by TOE to allow accomplishment by the manual procedures described in the automated procedures manuals.

To illustrate this, the PLL time study results showed that it took an average 1.066 minutes to research a request on the AMDF. For the typical 15,000 requests processed a month by division DMMCs in 20 working days, this amounts to 12 hours of continuous inspection per day - a pace that would be difficult to maintain with accuracy. This load would require dedication of at least two EM in the document control and editing section which, with pre-edit programs, is often twice the strength called for in the DA TOE.

Data on the number of requests not processed on the first attempt by either the pre-edit programs or by DLOGS is shown in Table III-9. The data is a collection of that available from the divisions visited in observation and data collection visits. Obviously, to be of value, this collection of rejection rate data must be assumed to be separate samples originating from a homogeneous population of PLL clerks. If any bias exist, this is perhaps an optimistic view of the real rate of errors committed. Since each division checked only a subset of the total possible error types, as shown on Table III-8, any particular division's pre-edit reject rate will be lower than the real frequency of faulty requests. With this in mind, note in Table III-9 that where both the total number of AØA requests for some period

Table III-9. Rate of Error Detection in Pre-Edit and DLOGS Programs

DIVISION	# months	# AØA input	Initial rejects	Rejects to unit	Not on AMDF	UI error	SCMC SCI AAC	WSDC PC	RC	FC	QSS	DX
					*Reason for Rejects to Unit from Pre-Edit(%)**							
A	3	50851	N/A	4305	1.2%	2.4%	2.6%	2.2%	X	X	N/A	N/A
B	3	44203	N/A	2779	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	1	16039	4319	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3	63929	N/A	1177	0.6%	X	0.3%	X	0.9%	X	3.8%	N/A
D	1	11296	2505	799	2.6%	X	1.0%	0.1%	3.0%	0.3%	N/A	N/A
E	3	43451	9412	3395	1.8%	X	3.1%	0.3%	2.4%	X	N/A	N/A
F	1	∿15000	N/A	1476	N/A	N/A	N/A	N/A	0.2%	N/A	2.9%	0.3%
Average Initial Rejects:			22.9%									
Average rate of return to unit based on available data:					1.2%	2.4%	1.8%	1.2%	1.6%	0.3%	3.6%	0.3%
Average combined reject to unit rate:				12.4%								

*UI - unit of issue
SCMC - supply categories of materiel code
SCI - special control item
AAC - acquisition advice code
WSDC - weapon system designator code
PC - phrase code
RC - recoverability code
FC - fund code

**Percentage of total AØA input.

and the number rejected by the pre-edit programs were available, i.e., divisions C, D, and E, the average rate of rejection due to the pre-edit program was 22.9%. Each of these rejected requests, about 3,500 per month in the average division, is referred to a manager for manual resolution. Of these, almost 1/4 in divisions C, D, and E, to better than 1/3 in all the sampled divisions, can not be corrected by the managers and must be returned to the unit. In addition, another 3.9% of all requests are rejected by the DLOGS program for faults that cause return of the request to the unit.

This very high reject rate is a serious indictment of the state of training and technical discipline or supervision of the PLL clerks taken as a population. However, the critical result of the high rate of rejection is the increase in request processing time, due to the organizational remoteness of the originators from the managers who may or may not correct the fault, and due to the lack of supervisory control over this manual correction process. This reject handling process could account for a day or more of the average total time to receive a part presented in Tables II-24 and II-26 of Chapter II.

In the remainder of the present Table III-9, requests returned to the units for various reasons are shown as the percentages of total requests. The largest such category shown is the request for issue with an AØA DA 2765 of an item that is on the QSS list, which was an average of 3.6% of all requests.

Data on the total rate of rejects from the DLOGS program was only available in one division. These results, displayed in Table III-10, indicate that 9.15% of all AØAs are rejected; and that the most frequent cause is for a manager controlled line. This 34.5% is almost entirely DX and QSS lines since the actual monitoring of an ASL line by an ASL manager is rare and such a designation of the line on the DLOGS master inventory record (MIR) is the normal method of controlling AØA requests for issue for DX and QSS items.

The ultimate result of these estimates is the projection of rejection probabilities given in Table III-11. Shown there is the probability that a request would be accepted without corrections at the division level, 0.700. The unity complement of this acceptance probability is the probability that a request will be rejected to a manager at least once. This is computed to be 0.300.

Table III-10. Distribution of DLOGS Errors at One Division

3 Jan - 26 Jan	# AØA input	#AØA DLOGS edit errors
	~10500	961 (369 03IPD) ≈ 9.15%

DLOGS error		Frequency	Rel. Freq. (%)
2	U/I mismatch with MIR	61	5.9
3	error in QTY field	18	1.7
4	doc # date & serial # not all numeric	21	2.0
5	invalid transaction code	33	3.2
6	error in priority code	24	2.3
7	error in demand code (not R,N,or O)	25	2.4
9	UAAC or SUAAC missing or invalid	290	28.1
11	cc 22 not A or M or DSU code is wrong	37	3.6
14	NIIN is manager controlled	355	34.5
16	no NIIN match with MIR	12	1.2
18	invalid DIC or transaction code	11	1.1
19	sub available with NIIN at Ø balance	26	2.5
27	"L" transaction has invalid sup addr or RON	5	.5
28	duplicate doc #	5	.5
36	NORS request does not have WSDC	58	5.6
37	QTY exceeds 500	15	1.5
42	DODAAC and DSU are not compatible	32	3.1
	Other	2	.2
		1030 errors (some multiple errors)	

Table III - 11. Estimates of Rejection Rates From Pre-Edit and DLOGS Programs

	Source	Probability
Pre-edit Reject	Table III - 9	.229
Pre-edit Accept	1 - .229	.771
DLOGS Reject	Table III - 10	.092
DLOGS Accept	1 - .092	.908
Division Accept	.771 (.908)	.700
Division Reject	1 - .700	.300

The inquiry into pre-edit programs has raised two important results. The first is that the rate of referrals of requests to managers within divisions is extremely high, about one in four, indicating poor preparation of requests by using units and generation of a large manual workload for ASL managers. This manual correction and return to the cycle is an interruption in the automated process that is difficult to manually supervise and police. Given the state of training and experience of mid-level EM in the manager positions, it is a likely location for loss of documents. Further, the conscientious resolution of these faulty requests consumes a major portion of a manager's time precluding spending more time on legitimate management of his assigned portion of the ASL.

The second issue is that the independent pre-edit program development in almost all divisions represents a large and needless personnel resource expenditure that has resulted in sub-optimum editing performance and has detracted from standardization of the Class IX supply system. Lastly, this need for a comprehensive edit is not believed to have been met by the DS4 development.

Request for MPN items. The regulatory doctrine on technical editing of requests for issue of a non-NSN part, a part that carries a manufacturer's part number (MPN), is not clear. As evidence, the relevant paragraphs of AR 710-2, paragraph 3-55g(1) and (2), are given here:

> "g. Requests for non-NSN items will be processed as follows:
>
> (1) Technical edits of non-NSN requests for possible conversion to NSN will not be performed at this level; therefore, rejects cannot be made for lack of an NSN.
>
> (2) Prior to submitting requisitions for non-NSN items to the next source of supply, action will be taken to determine if the requirement can be satisfied locally.

The first paragraph clearly says a technical edit will not be done at the direct support SSA and the second appears to say that one will be conducted. To attempt to satisfy a requirement locally, a technical edit would be required to identify the local source.

Table III-12 lists the less serious contradictions in the regulation on the format of the request. The two real contradictions are whether the manual DA 2765 can be used for MPNs shorter than or equal to 15 digits and whether exception data is required for missing FSCM codes.

In practice, a mixture of the DA 2765 and the DD 1348-6 was used in each of the divisions visited for data collection. In all of these, the divisions required complete exception data reasoning that this would prevent rejection for lack of this data at higher levels. More importantly, six of the seven divisions attempted conversion of MPN to NSN and five of these maintained large end item TM libraries for this purpose. In the six, the first step in the conversion process was to check the MCRL-1 which translates MPNs to NSNs. Two of the six kept records of such successful conversions and bolstered these records by capturing the conversions at higher supply levels through the AE1-BG status cards. Some would note for future reference the NSN conversions in the TM referred to in the exception data. The overall consensus of the AØB/AØE processing clerks was that they could convert about 50% of the MPN requests from using units in the DMMC.

While against the regulation, this technical effort seems worthwhile since the successful conversions are made at the supply echelon having a large stockage of parts and a correspondingly high probability of filling the request within the division. The first point at which an attempt to convert an MPN is legal is on entry to the Defense Automatic Addressing System (DAAS), insuring referral of the request to the NICP. Attempts to convert at division level, if successful close to a majority of the time, reduce the supply response time, reduce manual handling between division and corps, and reduce chance of loss within the COSCOM.

The processing of AØB/AØE requests is neither an insignificant problem of the repair parts system nor a major one presently although the number of MPN items will increase sharply in the next several years. One division was found that maintained AØB/AØE demand records, and to estimate the real magnitude of this problem, the records were searched to learn the transaction volume and potential impact on the ASL. It was only possible to study about 70% of one-year's records which were in MPN sequence. It was found that 1,605 lines had at least one demand, 54 had six or more demands, and 229 lines had a total quantity demanded of 6 or more. Extrapolated

Table III - 12. Summary of AR 710-2 Guidance on AØB/AØE Requests

Type of Request	AR Guidance Para 3-55g(4) & (5)	Para 2-18.1
MPN $\leq$ 15 digits	DA AØB (2765 implied)	DD 1348-6 or DA 2765 pp only
MPN $\geq$ 15 digits	DD AØE 1348-6	DD 1348-6
No FSCM	Complete Exception Data & AØE on DD 1348-6	Not Addressed
No MPN	Same as above	Only situation requiring exception data.

to 100% of the lines, an estimated 2,290 lines had at least one demand, 77 had 6 or more demands, and 327 had a quantity demanded of 6 or more. The methods and procedures used in the MPN technical edits are described in Table III-13.

It has often been said by those not directly involved in the development that DS4 will "handle" MPN requests. This expectation may be unfortunate. DS4 will create on its catalog, the asset balance file (ABF), analogous to the DLOGS MIR, an MPN entry to keep track of dues-in, dues-out, and stock status. It will not automate MPN to NSN conversions, issue NSN substitutes for MPNs, nor automate the transmittal to the end item Materiel Readiness Command of a DA 1988 upon the issuance of an MPN item as called for in AR 710-2, paragraph 3-55g(3).

Keypunching Documents. By DA TOE (TOE 29-003H, C6), the keypunch function is organized under the HQ section of the DMMC and consists of an E6 74D30 as supervisor and four 74B10 cardpunch operators. Four IBM 129 cardpunch machines are also provided. Table III-14 gives the organization of the keypunch section in 7 divisions and some indication of their workload.

Although positioned by TOE and in practice in the DMMC HQ, often called the Systems Branch, the keypunch section's biggest customer is the Class IX branch which generates about 3/4ths of their workload. If one weights the monthly punch volume by the monthly verification volume, which amounts practically to another punch, it appears that each operator produces 11,000 to 12,000 cards per month.

There are three aspects of the keypunch operation that deserve attention. The prepunched request cards produced for using units and the DWA receipt cards are both cards with many fields already punched and with little handwritten information on the card needing to be punched. Unfortunately, it appears that prepunching the information on the card does little to reduce the work time. The cause, in our repeated observations, is that the keypunch operators duplicate the card and then hand-hold the original to read the handwritten information and punch the appropriate fields. The net benefit of the prepunching is a reduction in opportunity for keypunch errors in certain fields.

Table III-13. Summary of AØB/AØE Procedures

AØB/AØE Requests	Divisions A	B	C	D	E	F	G
Personnel Assigned	SP4	2-SP4	SP4	SP4	SP5	SP5	PFC PV2
Maintain stock accounting records	Yes DA Form 1296 ~2300 lines	No	No	Yes DA Form 3318 ~2000 lines	No	No	No
Part numbered lines on ASL	No	No	No	No	No	No	No
TM library	Avg	Extensive	None	~85% of TM's	None	Avg	Extensive
Request form	2765-1	2765-1 or 1348-6	2765-1	1348-6	2765-1 or 1348-6	1348-6	2765-1 or 1348-6
Technical edit for conversion	Yes	Yes	No	Yes	Yes	Yes	Yes
Microfiche and references used	AMDF MCRL-1 MCRL-2	AMDF MCRL-1	None	AMDF MCRL-1 MCRL-2	MCRL-1 MCRL-2	AMDF MCRL-1 VII Corps MPN list	AMDF MCRL-1 ARI list
Record AE1-BG conversion status	No	No	Use to close due-in file	Record on DD Form 3318 & correct TM	Yes keep card file	No	No
PN-NSN conversions		54%				~50%	
Average number of AØB/AØE requests per month		230/432			266/175		

Remarks

*Reviewed 1605 lines in division A
54 lines qualified for ASL based on 6 demands/year
229 lines had demands for quantity >6 during past year

*Divisions D and E had included part numbered items on the monthly due out to unit listing.

Table III-14. Keypunch Operations in 7 DMMC's.

KEYPUNCH OPERATIONS

	TOE	A	B	C	D	E	F	G
KP-129	4	4	4	4	4	4	4	4
-029				1		1	2	
OPERATORS	1E6	1E5	1E6	1E6	1E5	1E5	1E5	1E5
	4EM	10EM	7EM	11EM	7EM	6EM	11EM	4EM
1000/MON		116	55	80	80-130	-	160-190	-
% VERIFIED		20	0	90-95	10-15	<25	0-5	-

The second issue is that the keypunch operator MOS, 74B, has been discontinued and current operators will be assigned the MOS of the majority of their peers in their current assignment. For 74B10s in DMMCs, this means these E3s and E4s will become 76D10s adding however slightly to the population of under trained holders of this MOS described in earlier sections. While this is generally not a welcome change for these soldiers, it poses a larger problem. This change means that future 76D10 and 76P10 soldiers will be assigned to the keypunch section taking them out of the mainstream of their MOS for one or more years. For recent AIT graduates, this wastes their entry level supply training, causing them and the Army problems in their second assignment. Training is made more difficult as ADP equipment operation is added as a duty position to 76D and 76P. Finally, the IBM 129 keypunch is a sophisicated tool whose full potential is not likely to be realized in the hand-me-down OJT training typical of a small section led by a junior NCO trained in supply rather than ADP equipment.

The last issue in this section concerns the low percentage of documents verified in most divisions. Only one division was found that kept records that could be used to estimate operator error. There, records of manager detected errors were studied for a 39-day period for each of the 8 operators. The average error rate was 3.98% of cards contained one or more errors and the standard deviation across operators was 11.40%. The sample size was 156 operator-days since all 8 operators were not present for duty every day of the period. A keypunch error can result in a faulty request detected by the pre-edit, DLOGS, or SAILS programs or in an undetected faulty request that will cause either non-receipt or receipt of unwanted parts. With so many other sources of error in the repair parts system, many of which are not amenable to local detection, it is unfortunate that verification is not practiced more widely.

Document Control. The Document Control and Editing (DC&E) Branch is one of the two organizational elements defined by the DA TOE for DMMC Class IX section of AIM divisions (TOE 29-003H0). By its title, it can be assumed to have a document control function and an editing function. The doctrinal basis and procedures description for the editing function were discussed in an earlier section. A careful search of the DLOGS and DS4 manuals has failed to find any section that sets out to define the work of document control or to describe the procedures to be used in document control. The DC&E Branch is often referred to throughout the automated procedures manuals as the origin or terminus of some action or process, but never are the document control procedures summed in one place. From the earlier presentation of the Class IX section organization, the DA TOE sets the DC&E Branch as a total of six NCOs and enlisted men. Most divisions have augmented this with the average being 13 and the range extending from 9 to 21. This augmentation exists along side use of pre-edit programs which, from the earlier section on that topic, should do the work of two editors freeing them for document control. DC&E usually provides for document distribution within the Class IX Section and for courier service to the FSCs. Document preparation for the daily DLOGS cycles usually requires an evening shift.

DLOGS Cycles. No construction foreman would schedule his crew to begin work at the job site every day at 0700 if the hammers, saws, and other tools would not arrive until one or more hours later. But this is the situation in the Class IX Section in divisions.

The execution of the DLOGS program by the DDC is a matter of schedule in every division visited. However, DLOGS is usually not the first program to be run in the daily DDC work routine. Even if this daily DDC schedule starts on time, if the first program has a variable execution time, then DLOGS, with its own somewhat variable execution time, will finish its run and output process at varying times day-to-day. This obviously complicates the work scheduling in both the DMMC Class IX section and in the TSO warehouse.

Most senior personnel in the Class IX section are satisfied with the average cycle frequency of about three per week shown in Table III-15. Increasing the cycle frequency to five per week would improve the workload management in both the Class IX section and in the TSO but improving the accuracy of the output time of day is thought to be more important.

Location Surveys and Inventories. TM 38-L32-12(TEST) and TM 38-L22-15-3 state that location surveys will be conducted every three months to insure that the stock records and actual parts locations agree. This survey should note both location disagreements with records and also the locations that include stock for which there is no record. With location accuracy assured by the quarterly surveys, para 3-64C, AR 710-2, requires an inventory to be conducted every six months.

III-15. DLOGS Cycle Frequencies

	DIVISION				
	A	B	C	D	E
Average Cycles/Week	3.8	5.2	2.9	3.4	2.6

The location surveys and inventories are each a series of steps that must be carried out by the DMMC Class IX section, TSO, and the DDC. These steps must be closely coordinated, and if the DLOGS and DS4 manuals would be believed, directed by the DMMC. As the vast majority of the work falls in the TSO, the start of location surveys and inventories is by mutual agreement between these two parties. Since the evidence of problems in this area appears primarily in the TSO, a full discussion will be presented in the later section on TSO processes.

ASL Management. By the title, one would expect that the prime function of the Supply Management Branch of the Class IX section would be to manage the authorized stockage list (ASL). Reinforcing this expection, the NCOs of this branch are called ASL managers in the divisions as opposed to parts supply management NCOs as in the DA TOE.

The connotation of the job titles used is not fulfilled by their work. ASL managers spend the majority of their time reacting to or doublechecking the results of the automated processes. Lack of knowledge and confidence and past experience has caused many ASL managers to daily review the previous cycle input to insure that the manager entered transactions have indeed been posted during the latest cycle. In this instance, instead of saving time, the system has increased the workload.

Another major daily work of the ASL manager is the resolution of transaction errors from the pre-edit and DLOGS programs. The error lists are delivered to the supply management branch by the DC&E Branch. The ASL managers each work off the errors falling within their assigned block of stock numbers. They either correct the error by changing the faulty transaction cards and returning to the next cycle, or return the document and an explanation to the unit, typically a supply request to a customer unit. Usually, this requires that they locate the original source document, filed for this purpose, draft a new document, submit the new document to keypunch, visually edit the document on return from keypunch, and pass the document back to DC&E for the next cycle.

Only one division, the 24th Infantry Division, had a management method for insuring that all DLOGS errors were returned to the cycle or to the unit and this was done with their DLDED (Division Level Data Entry Device) prototype.

Other daily manager tasks, of a reactionary nature include:

-review of DWA receipt documents

-correction of SAILS rejects

-review of due-in records for validity

-review of on-hand and due-in quantities for replenishment action

-researching transaction history for inventory adjustment records

-manual substitution

Other ASL manager responsibilities require intense effort on a less frequent basis. These include weekly MIR updates and quarterly catalog and ASL demand updates.

Actual ASL management reduces to the 20-30 manager controlled lines for which he bears responsibility for stock availability and for controlling issuance of that stock.

The most experienced ASL manager in the divisions is usually given the responsibility for establishment and maintenance of a so-called combat ASL. Although doctrine to guide combat ASL formation is understood to be in development by the Logistics Center, all but one division visited had something that they called a combat ASL. Abuses of the intent of stockage policy regulations included:

-establishing and stocking a combat ASL that was in addition to the existing ASL;

-constraining the ASL to about half the lines of a typical heavy division resulting in low demand accommodation, a failure to back up PLL lines, and a reported deterioration in maintenance of non-deadlining features of major end items.

<u>QSS</u>. The quick service supply is generally thought of in the divisions as the source for high volume, low cost parts. As QSS operations are centered in the TSO, a full discussion will be presented in the TSO section.

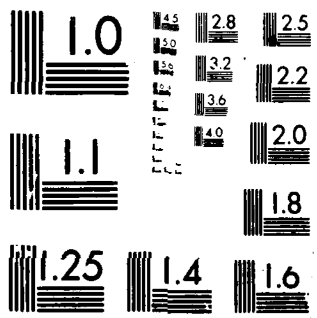
It is worth noting here, however, that 4 of the 7 divisions visited had an NCO titled the QSS manager in their DMMC. This individual monitored ASL to QSS conversions, the weekly QSS cycle, and was the DMMC liaison with the QSS section of the TSO.

AD-A081 454 HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD F/G 15/5
HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYST--ETC(U)
FEB 80 R L KEESEE, R S CAMDEN, R M POWERS

UNCLASSIFIED HEL-TM-3-80-VOL-2 NL

2 OF 5

AD
A081454


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0

Customer Assistance and PLL Manager. In all seven divisions studied, one function established in the DMMC Class IX section is the Customer Assistance and PLL manager and in six of the seven the function had an NCO and one assistant. Generally, the PLL manager was the DMMC individual responsible for reconciliation with the using units, the PLL update process, technical assistance with the PLL clerks, and, in some cases, monitoring PLL performance.

The first of these, PLL reconciliations, is the most visible. The doctrinal guidance from AR 710-2 states, "a validation process to review the continued need for quantities of items due-in from the supply support activity is essential and will be performed at least every 30 days." (para 2-25e(1)) The DLOGS procedure that intends to fill this requirement is the request/requisitions due-out to units listing which lists those items that are due-out to each unit and gives their latest supply status. The automated procedures manuals suggest that this list be produced and distributed twice monthly although Table III-16 shows that the frequency varied among divisions.

Note that four of the divisions produced the due-outs weekly, and three divisions expected units to reconcile bi-weekly. In four divisions where attention had been focused on requiring the users to reconcile, one indicated the response was "low," another said the response rate averaged 75%, the third said 90%, and the fourth had set 75% as an acceptable goal implying that their response rate historically was somewhat less. With these much less than 100% responses, it is easy to see why the governing management statistic is the percent of units responding. However, over the long-term, the quality of the reconciliation in terms of average number of discrepancies per unit might be more important.

Besides this problem of discipline, there are four conceptual problems with the DLOGS reconciliation process, one of which may be remedied in DS4. The AR passage quoted earlier called for a validation of the continued need for the part. The automated procedures manuals for the using unit parenthetically mentions as an option asking the mechanics if the need for a part still exists. There is no deliberate procedure established for the fundamental verification of continued need. What remains is a validation of the paperwork.

III-16. Dues - Out to Unit List Frequency

Division	Due-Out List	Reconciliation	Remarks
A	Bi-weekly	Bi-weekly	Log-out & suspense
B	Weekly	Bi-weekly	Monthly division wide mtg for reconciliation; expect return every 2 weeks.
C	Weekly	Monthly	Log-out & 15 day suspense
D	Weekly	Monthly	
E	Bi-weekly	Bi-weekly	Log-out, log-in, 5 work day suspense
F	Weekly	Monthly	No follow-up.
G	Bi-weekly	Monthly	Log-in & suspense

DLOGS (TM 38-L22-15-1)

Bi-weekly

In doing paperwork reconciliation, DLOGS provides a list of all items due-out to the unit. This list does not include items that have been requested since the previous dues-out list and for which MROs have been produced and that should have been received by the unit. Thus, the hopefully large number of requests that are filled by on-hand stocks never appear on the dues-out list. The problem here is that if the parts are lost or misplaced after the MRO is sent to the TSO, the PLL clerk has no sign from the system that his request was ever received. The doctrine provides that if a requested part is not received and the request does not appear on two successive due-out lists, it may be presumed lost. The PLL clerk is to then cancel the first request and reorder. The relatively high frequency with which PLL clerks mentioned the released for issue (RFI) problem, meaning RFI indicated but never received, as the most critical of the repair parts system leads one to take this issue seriously. It is understood that DS4 may improve this situation by listing all requests received by the system since the last due-out lists and showing the status of each.

The third of the conceptual problems with the DLOGS reconciliation is that it is a tops-down reconciliation in a system that is supposed to be user driven. The customer of this system is the one that checks his records with the "vendor" and initiates or takes remedial action. The customer cancels and reorders if the vendor has no record of his request. A customer-oriented system would have the customer records acted on by the supplier; the system would have a reconciliation that had bottoms-up characteristics.

In the vein of hypothetical problems, it is conceivable that the more frequent dues-out list distribution practiced in several divisions may be causing more harm than good. The DLOGS doctrine suggests bi-weekly dues-out list distribution and tells the PLL clerk that if a part is not received and does not appear on two successive dues-out lists, he may cancel and reorder. That is, if the part or its reference does not appear in 30 days, assume the request was lost. Now, the weekly publication of the dues-out list cuts the time interval to two weeks but does not otherwise speed up the SSA activity. It is conceivable that a low priority request could be submitted to the DMMC and due to generally slow handling and a referral to a manager for error correction, take two weeks to emerge as either an MRO or a passed requisition. Thus, the more frequent dues-out list publication frequency could be generating extra requests and excess parts.

This hypothesis is fully supported by the supply responsiveness data of Tables II-24 and II-26 that showed mean days to receive parts in the 21 to 29 day range for Ø5 and 12 priorities. With standard deviations of 18 to 37, these distributions would indicate a significant number of the requests could have been cancelled by the regulation criteria and most could have been cancelled with the more frequent dues-out list frequency.

The final problem is that both the DLOGS and DS4 dues-out lists appear not to be well adapted to the needs of the PLL clerk. The date of list preparation, used as a cut-off date, is given as day and month rather than the Julian date that is the central thread of all request documentation. Some dozen other human engineering improvements are presented and discussed in the later recommendation chapters.

The second most important role of the PLL manager is overseeing the PLL update. Based on interviews with the PLL managers, there are no major faults in this automated process.

The quarterly PLL change list gives the unit a list of the current PLL with specific suggestions for adjusting stockage and suggests the addition or deletion of lines all based strictly on demand criteria. The units are to note what actions, if any, are to be taken with each suggestion and to return the annotated change list to the DMMC.

One division had kept records of the rate of return of the marked up change lists and found that the rates had been 57% and 37% of units in the last two quarters.

Another, perhaps hypothetical, problem is the result of the division move to establish combat ASLs. As the divisions shrink the number of ASL lines to improve mobility and to meet the goal expressed in AR 710-2, there will be an increasing number of PLL lines not backed up by the ASL. The results of such shifts in one division was that unit confidence in the supply system deteriorated markedly according to senior commanders. The changes in ASL stockage policy had not been made widely known and unit personnel could not understand why system response to PLL replenishment request was so slow. Clearly, shrinking ASL size and uncovering PLL lines calls into question the 15-day supply basis of PLL stockage criteria.

Like the dues-out list, the orientation of the PLL change list to the needs of the PLL clerk could be improved and human engineering suggestions are made in a later section.

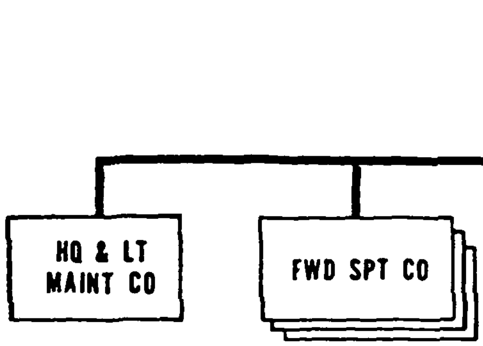
The demand summary listing is a summary produced by DLOGS and DS4 for the customer unit giving the number of demands for each line requested over the preceding six months. This study has uncovered no practical use for this list. On inquiry, the justification is given that it provides the units a current demand history on which to operate should their ADP support be interrupted. This logic assumes that the demand history is essential to operation of the PLL. In a moderate to intense combat environment, few PLL clerks are likely to be interested in the regulatory correctness of changes in their PLL. As long as the PLL clerk has a copy of his PLL, he has no need to justify or freshly constitute the PLL. A PLL clerk should be able to operate for months without a new PLL list. Most unfortunately, this rationalized need for the demand summary list places in doctrine doubt about the reliability of ADP support.

The lesser two functions of the PLL manager are customer assistance and PLL performance monitoring. In geographically disbursed divisions, PLL managers are hard pressed to call on all of the using units and their PLL clerk. Most do not make the effort, relying on the distribution and return of DLOGS lists with covering DFs to maintain contact and to gather PLL performance information. The PLL managers usually expressed willingness to give technical help to any unit or PLL clerk asking for it, but there was not a great amount of evidence that this consumed a significant part of their time.

D. TSO PROCESSES

Organization. The physical handling of repair parts is the portion of the direct support SSA performed by the division's maintenance battalion. As shown in Table III-17, the maintenance battalion of a heavy division, i.e., an armored or mechanized infantry division, is composed of a headquarters and light maintenance (HLM) company, a heavy maintenance company, a missile maintenance company, and 3 forward support companies (FSC). DS stocks of repair parts are kept in all but the heavy maintenance company and the stocks kept by the missile maintenance company are missile peculiar.

TABLE III-17. COMPANIES COMPOSING THE MAINTENANCE BATTALION OF AIM DIVISIONS



All of the lines in the authorized stockage lists (ASL) except the missile related lines are stocked in the HLM, which by TOE is supposed to be 50% mobile. In chapter 7, AR 710-2, the acceptable range for number of ASL lines is 4,000 to 6,000 lines with 5,000 being the objective. Each of the FSCs is to maintain a portion of the stockage for lines most frequently demanded by the brigade to which they are attached. The FSC TOEs intend to provide enough repair parts vans to allow 100% mobility with up to 1,500 lines.

The organization charts of Tables III-18 and III-19 show that the supply platoon or section is just one of several in these companies although the tech supply office (TSO) is the largest element of the HLM. A more detailed organizational structure for the HLM supply section, the main TSO, is presented in Tables III-20, III-21, and III-22. These tables show staffing provided in TOE 29-36HO for maintenance battalions of armored divisions and TOE 29-026H for mechanized infantry division maintenance battalions. Along side these columns, the actual organization and staffing of the 7 divisions studied are shown.

These tables show considerable variation. The TOEs for armor and mechanized infantry differ in structure and in strength even though their missions are practically the same. The mechanized infantry provides a LT and a warrant officer for the TSO headquarters, specifies staffing for DX and QSS, and has six more personnel over all, although it does not include a transportation section. In counting the transportation assets, there is a 13-man difference in supply personnel. In actual practice, the divisions organize their main TSO into a receiving/shipping section, a warehouse section which does the storage and issuance, a DX section, and a QSS section. What is called the warehouse section may be subdivided into sections responsible for storage and issuance in a warehouse building, vans including MILVANS and repair parts vans, and yards. These smaller storage and issuance elements, i.e., vans or yard, may be co-equals with DX, QSS, and receiving with an NCOIC over all or over some subset of these elements.

Even though one LT was authorized in the DA TOE for the mechanized infantry division TSO and none for the armored, note that 5 of the 7 divisions found DX to be so critical as to require the assignment of a LT. Total DX staffing similarly averaged 9, twice that authorized by the one TOE that addresses it.

TABLE III-18. ORGANIZATION OF A HEADQUARTERS AND LIGHT MAINTENANCE COMPANY

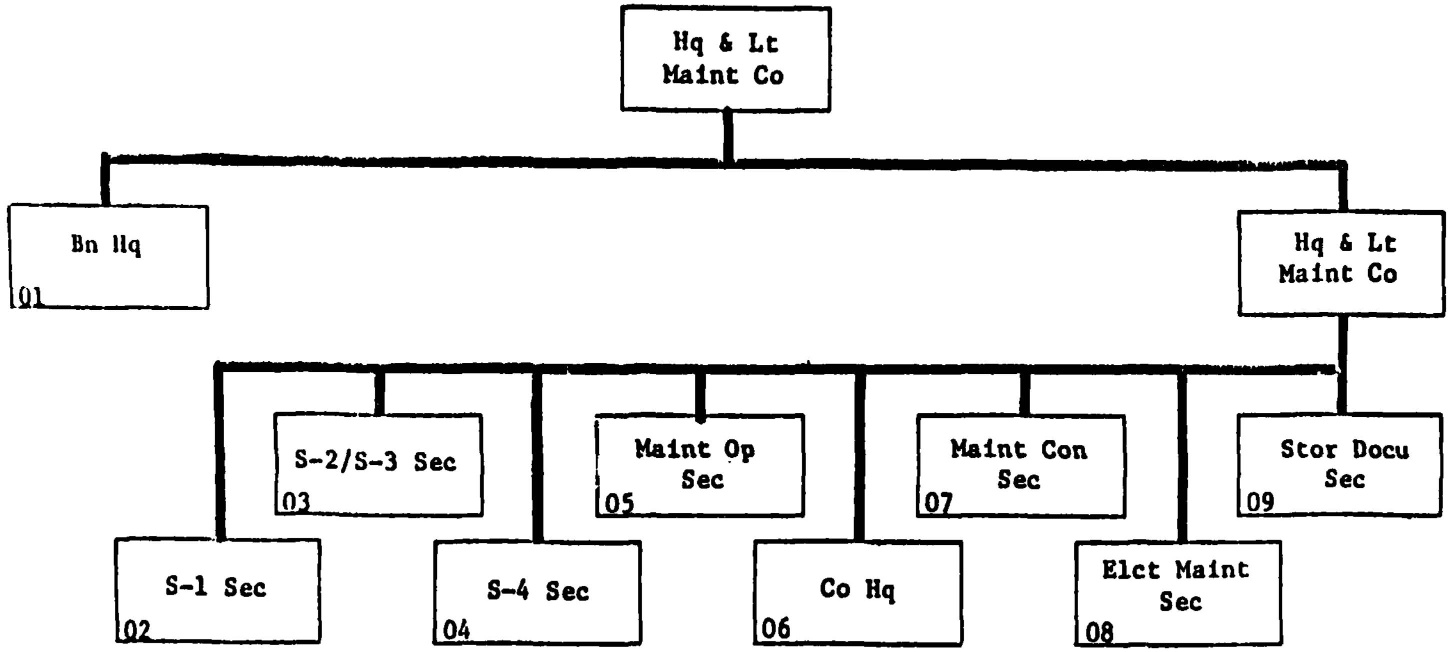


TABLE III-19. ORGANIZATION OF A FORWARD SUPPORT COMPANY

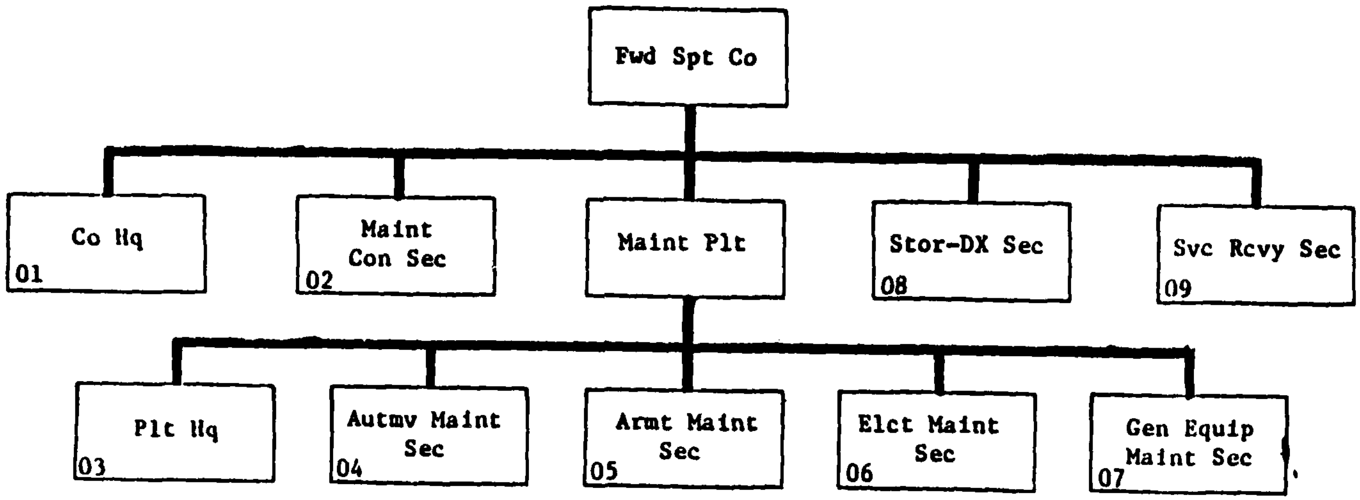


TABLE III-20. TECH SUPPLY STAFFING IN SEVERAL DIVISIONS - PLT HQ

	DIVISION								
	AR	IN(M)	A	B	C	D	E	F	G
PLT/SEC HQ	WO 1 E7	LT WO 1 E7	CW4 2 E6	CW1 1 E7	LT 2 E7 1 EM	CW2 1 E7	CW2 3 E6 1 EM	2 E7	LT 2 E7 1 E6 1 EM
STOCK ACCTG/EDITORS	2 EM	1 E5 4 EM	1 E5 2 EM		1 E7 2 EM		1 E5 5 EM		4 EM
TRANSPORTATION	3 E5 4 EM				1 E5 4 EM	1 E5 8 EM	1 EM	1 E5 4 EM	1 E5 4 EM
QUALITY CONTROL				1 E5 3 EM			2 E6 2 EM	1 EM	1 EM
OTHER			1 E5			3 EM			

TABLE III-21. TECH SUPPLY STAFFING IN SEVERAL DIVISIONS - WAREHOUSE

	DIVISION								
	AR	IN(M)	A	B	C	D	E	F	G
RECEIVING/SHIPPING	4 E5 12 EM	1 E6 4 E5 11 EM	1 E5 6 EM	1 E5 7 EM	10 EM	1 E5 11 EM	1 E5 3 EM	1 E6 3 EM	1 E5 8 EM
WAREHOUSE			2 E5 11 EM	2 E5* 8 EM	2 E5 12 EM		11 EM	2 E5 10 EM	1 E5 5 EM
VANS				2 E5* 10 EM	1 EM	1 E5 6 EM			1 E6 5 EM
YARDS			1 E5 2 EM	1 E5* 4 EM	1 EM		1 E5 10 EM	1 EM	1 E5 2 EM
DX - PARTS		1 E6 1 E5 2 EM	LT 6 EM	1 E6 1 E5 10 EM	LT 4 EM	1 E5 4 EM	LT 1 E7 10 EM	1 E5 9 EM	LT 4 EM
DX - RECORDS				1 E5 2 EM		1 E7 3 E6 1 EM			
QSS		1 E5 5 EM	3 EM	1 E5* 2 EM	1 E5 2 EM	1 EM	1 E5 4 EM	1 E5 2 EM	1 E5 3 EM
FIELD RETURNS					3 EM		1 E7 4 EM		

* E4 APPOINTED ACTING SGT

TABLE III-22. TECH SUPPLY STAFFING IN SEVERAL DIVISIONS - SUMMARY

			DIVISION						
	AR	IN(M)	A	B	C	D	E	F	G
TOTAL	27	33	42	59	48	44	64	38	48
TOT - TRANS	20	33	42	59	43	35	63	33	43
APPROX LINES ASL & NSL, 1000's			11.3	10.6	12.0	9.7	13.2	8.0	12.2

The primary problem evident in the staffing is the scarcity of NCOs present in the warehouse section of the TSOs. Table III-23 gives for each division the total enlisted men, i.e., E4 and below, the number of NCOs, and the ratio of enlisted men to NCOs all based on the personnel reported in Tables III-20, III-21, and III-22. The ratios show that over the whole TSO, an NCO is responsible for 5 subordinates, a reasonable span of control for technical work. But if we look at the warehouse separately, the warehouse meant to include receiving, vans, and yard, the NCOs average span of control is 12.8! The span of control for the remainder of the TSO is an average 3.2 EM per NCO. All of this suggests that various special functions are thought to need an NCO even though the function needs little additional manning. In this category are QSS, DX, quality control, and field returns. It appears that NCOs have been shifted from the principal receiving, storage, and issuance functions of the TSO to the more peripheral functions. The consequences of this shift and conjectures as to the motivations for it will be discussed in later sections.

A final and important aspect of the TSO staffing should be observed. In all of the divisions visited, the HLM TSO was larger than that provided by either of the heavy division DA TOEs. The MTOEs may have authorized this strength but it appeared in most divisions that the HLM TSO augmentation came at the expense of the supply sections of the FSCs. In a limited sample of about 6 FSC supply sections, the average size of the section was 7 whereas the DA TOEs provide 15-19 supplymen.

To consider the availability of technical expertise to properly run the TSO, the summary of experience shown in Table III-24 should be reviewed. The individuals whose experience and training are summarized here were all in positions supervising one or more sections, including the E4s. Non-supervisory E4s were not included in this survey. The relatively short average total related experience of the E6s through E8s compared to their probable total time in service shows the influence of the reclassified NCOs. Of the E6s through E8s included in the sample,50% were reclassified. Considering all of the NCOs interviewed in TSO functions, 45% were reclassified. As disturbing, the E4s which make up 24.1% of the first line or higher TSO supervisors (derived from Tables III-20, III-21, and III-22) have an average

III-23. SPAN OF CONTROL IN TSOs

TSO (w/o Trans)	AR	IN(M)	A	B	C	D	E	F	G	Div Avg
			DIVISION							
TOT EM	18	22	32	52	37	35	52	30	37	39
TOT NCO	8	10	8	6	7	8	11	8	9	8.1
EM/NCO	2.2	2.2	4.0	8.7	5.3	4.4	4.7	3.8	4.1	5.0*
Warehouse incl/ Receiving, Vans, Yards										
EM	12	11	20	29	25	17	24	13	20	21
NCO	4	5	3	1***	1	2	2	4	4	2.4***
EM/NCO	3.0	2.2	6.7	29.0	25.0	8.5	12.0	3.2	5.0	12.8*** ** *
Remainder of TSO (w/o Trans)										
EM	6	11	12	23	12	18	28	17	17	18
NCO	4	5	5	5	6	6	9	4	5	5.7
EM/NCO	1.5	2.2	2.4	4.6	2.0	3.0	3.1	4.2	3.4	3.2

*Average of ratios for each division
**Without the extremes, Div B, & C, would be 7.1
***Not counting 5 acting SGTs.

Table III-24. Experience and Training of Key TSO Personnel

	Experience, Months			Technical Training				
					MOS Source			
Grade	N	Direct[1]	Other[2]	N	AIT	OJT	Reclassified	F9 ASI
O-WO				4	-	-	-	1
E8-E7	5	42.6	9.8	5	0	1	4	1
E6	5	37.6	26.8	5	4	0	1	5
E5	16	22.1	21.0	17	7	1	9	9
E4	11	13.9	5.8	11	8	0	3	7
TOTALS				42	19	2	17	23

[1]Experience working in a TSO warehouse

[2]Related experience such as DMMC, PLL Clerk, Depot, etc.

total related experience of less than 20 months. On a brighter note, 23 of the 42 supervisors had the F9 ASI indicating DLOGS proficiency although it is not required by the DA TOEs.

Table III-22 indicated that the main TSO operations are sizable with the smallest numbering 38 and the largest having 64 persons. A LT or warrant officer is usually assigned to lead the TSO. Unfortunately, only 4 of these individuals were interviewed for this survey and 3 of these were LTs. The months of total related experience of these three officers in charge were 4, 6, and 8 months.

Receipt Processing. In concept, the role of the receiving section is simple but complicated in actual practice. On arrival of a shipment, this section should sort each item by destination within the division. The possibilities here are a storage location within the HLM TSO, DX, QSS, or direct to a customer. For direct shipment to a customer the items are sorted according to the DSU supporting the unit or often placed directly in a customer bin if supported by the HLM TSO.

For other than large, out size items, parts are received in a large (several feet per side) heavy duty cardboard box known as a multipack which might contain 100-250 individual shipments, each shipment being a result of a single requisition. A shipment may have more than one associated package within the multipack depending on the quantity of the requisition. Usually placed on the underside of the lid, an envelope will be attached to the multipack containing ADP receipt cards with the document identifier code (DIC) of DWA. One of these receipt cards will be included for each shipment and will contain the same basic information as the DD 1348-1 attached to one package of each shipment. The 1348-1, with a DIC of A5A, and the DWA will give the NSN, quantity, requisition document number, priority, DSU storage location, and other information but in different formats. If the document serial number field has a customer DODAAC, then the shipment is to be passed directly to a customer. A highly desirable procedure is to check the DWA and 1348-1 NIIN and quantity against each other and against the NIIN and quantity of the parts to insure agreement. This is important as the depots and central containerization ports may have weaknesses in their issuance and shipping quality control functions.

An essential step in receipt of ASL replenishment items is to check the storage location given on the DWA with the TSO locator deck. The locator deck, called a warehouse location file in the DS4 manuals, is a manually maintained card file of the locations of all stocked items. The file is in NIIN sequence and is often the only current and accurate record of location.

If a new location must be assigned, doctrine says that the location must be selected as a function of the item's shelf life, susceptibility to pilferage, security requirements, and other attributes. Besides these factors that are coded on the AMDF, other factors such as weight and cubic volume should also be considered.

Whether a customer order or stock replenishment, the destination DODAAC, bin code or storage location is marked with a felt pen or other instrument on the box, package, or across the face of the document so that it can be read easily. This procedure by the receiving clerk was followed in most of the divisions.

There are several problems with the practice of these procedures that will be discussed in the next several paragraphs. This material is based on observations of the study team.

In all of the divisions studied but two, the only check made of incoming shipments was with the locator decks and this check was not made consistently. In one division, copies of the 1348s were kept and matched with the DWAs, and in another, an inspection was usually made of the DWA to 1348-1 for item agreement on NIIN and quantity. Two other divisions captured substitutes by observing the status codes on receipt documents.

Despite being the center of attention in the receiving section, the locator deck is accessed frequently by supplymen from other TSO sections. Changes to the deck are made frequently by a variety of personnel often with little supervision or coordination. To properly accomplish a location change, a stock location card must be manually produced and posted to the locator deck with the previous card for the NIIN destroyed. A stock location change card must be completed and submitted to the DMMC for inclusion in the DLOGS or

DS4 cycle. The cycle should produce prepunched/preprinted stock location cards to replace the manually prepared cards. Thus, the location change required manual completion of two card forms and access to the locator deck twice in addition to physically moving the stock. Failure to research the possible existence of multiple locations for an item prior to the change may result in lost stock if too many old stock location cards are destroyed.

The complete inspection of incoming shipments is tedious and becomes onerous in the often poor working conditions of this section. Receiving is usually in an area near large docks or garage doors which is typically not a pleasant area to conduct paperwork reconciliations during bad weather. Further, the arrival of shipments is unpredictable and causes an uneven workload. When a series of shipments arrive close together or when the availability of the full work force is interrupted for some reason, the piling up of unprocessed shipments is highly visible. A backlog in the storage and issuance section would be manifested by a relatively inconspicuous stack of MRO cards. By comparison, even a small backlog in receiving stands out and is likely to attract command attention.

The obvious expedient to processing a receiving backlog is to streamline the incoming checks. The process can be reduced to simply sorting according to destinations marked on the 1348-1 and submitting the DWA cards to the DMMC without inspection. This perpetrates to the division accounting records any errors made in the wholesale depot which may amount to 1% or more. This form of workload adjustment would be difficult to prevent through anything other than close supervision with some form of performance feedback. Haphazard receipt processing will manifest itself in declining location and inventory accuracy and in increasing warehouse denial rates. Unfortunately, these measures are somewhat unspecific since they are also indicators of poor performance in storage and in issuance. The relative frequencies in doctrine of the location surveys and inventories, quarterly and semi-annually, makes these forms of potential feedback somewhat removed from the daily struggle in receiving, so these measures are not as closely watched as warehouse denials. Perhaps due to the frequent command pressure brought on by the visibility of backlogs, the receiving section consistently appeared to have the lowest morale in the subjective judgment of the study team of any part of the TSO.

Storage and Issuance. The TSOs main reason for being is to store and issue repair parts. The actual storage area for all the parts other than very heavy or out-sized items may be entirely within a warehouse, entirely uploaded into repair parts vans or adapted MILVANS, or some combination of the two which is the more frequent. Large items like tank track, cannon tubes, or engines in their sealed containers are usually stored in an open area which is unpaved as often as not.

Whatever the physical arrangement of the storage area and organization of the storage and issuance work parties, the major tasks are the same. This section places in proper storage location items from the receipt processing section, and issues parts to customers as directed by materiel release orders. The MROs are printed on either the DA 2765 punched card or the DD 1348-1 forms and carry the DIC of A5A. MROs arrive either in batches in priority order as produced by the DLOGS cycle or handcarried to the TSO by PLL clerks. The handcarried requests are usually limited to IPG I requests needed for NORS end items. The PLL clerk first takes his AØA request to the DMMC Class IX section or to the TSO stock control office to determine availability of the part from the stock status report and to verify PLL clerk identity. The walk-through requests are filled on arrival at the DSU.

The batched MROs are filled in priority sequence. The stock is located, quantity counted, and if appropriate to the size and quantity of the parts, packaged usually by placement in a paper or plastic bag. A copy of the A5A MRO is attached by staples or tape to the parts and the parts are placed in the customer's bin or in a bin for transfer to the FSC supporting that customer.

As time permits, the personnel of the storage and issuance sections conduct location surveys and inventories perhaps augmented by personnel from the receiving section. Personnel of this section may also assist in receipt processing.

The DLOGS cycle output does not arrive at the TSO at a consistent time of day. The variation from target time may be several hours on a cycle to cycle basis and it is not uncommon for the DLOGS cycle to be delayed for a day or more due to circumstances outside of the repair parts system. This DLOGS output variation causes large swings in the workload since most of the work involves issuance based on MROs and receipts from the previous day. This complicates work scheduling and balance between warehouse sections.

The work environment is wanting in some divisions with the worst being those with most or all of the ASL uploaded in vans that are accessed from an open platform. In these situations, all storage, issuance, location surveys, and inventories are conducted without protection from the elements.

There was nothing found in the study to suggest that the more junior warehousemen are not susceptible to reducing their workload by losing MROs. The large span of control of warehouse NCOs would make this relatively easy to do. In the opinion of this study, this is a potential point for losing documents but loss here is not thought to be any greater than several other points in the process. In at least one division, a cumbersome logbook procedure had been instituted to absolve the warehouse of guilt but a sufficient quality control team had not been provided to identify the other holes in the system.

The proof of the foregoing discussion of procedures and problems is found in some indicators of warehouse performance computed from samples of location and inventory accuracy and customer bin accuracy gathered in the data collection visits. For the location and inventory accuracy, data collectors would select at random 50 - 100 NIINs from the stock status list and record the location and on hand balance. Having checked the locator deck to see if the NIIN location had been changed, the data collection moved to the storage location and noted if the location was marked, if the location was marked with the NIIN, and counted the quantity on hand.

The results of these surveys are shown in the upper part of Table III-25. Over 323 lines checked in division main TSOs, the location accuracy was 82%. Put the other way, almost 20% of the lines were not in the location of the most current record. Note that the NIIN was marked in less than half of the locations checked. The more telling result is that in little over half of the lines sampled, the on hand balance was within plus or minus 25% of the balance recorded in the stock status. This tolerance range was an attempt to give liberal allowance for any walk-thru issues or turn-ins that might have occurred. The surveys conducted in the FSCs are so limited in sample size to not be taken with any confidence.

Table III-25. TSO Warehouse Performance

	HLM		FSC	
	N	% Accuracy	N	% Accuracy
<u>Sampling Survey</u>				
Number of Divisions Sampled	4		2	
Location Accuracy	323	82.0%	39	87.2%*
Location Marked with NIIN	303	46.7%	32	71.9%*
Inventory On hand within +/- 25% of Stock Status	295	54.6%	17	64.7%*
<u>Customer Bin Survey</u>				
Customer Bins Surveyed	140		75	
Shipment Accuracy	2324	93.3%	1069	80.4%
Categories of Error				
Wrong Quantity	2324	0.8%	1069	2.3%
Wrong Unit	2324	2.3%	1069	1.5%
No Documents	2324	3.7%	1069	15.7%

*With the small size of these samples, these results should be used only to suggest the probable range of the measures.

The location and inventory accuracies indicate the system status several steps from the hands of the using unit. Moving closer to the customer, surveys were made of the contents of customer bins to check just the accuracy of pulling the right NIIN in the correct quantity and placing the shipment in the correct customer bin. Of almost 2500 shipments checked in 140 bins in 7 divisions in both main and FSC TSOs, 93.2% were found to be accurate. Of the almost 7% in error, almost 4% had no documents, a little over 2% were in the bin for the wrong customer, and not quite 1% had the wrong quantity.

One other indicator of overall success at keeping track of stock is the warehouse denial rate. This is the percentage of total materiel release orders that cannot be filled because stock is not physically on-hand when the DLOGS stock records indicated that it was. The warehouse denial rate was noted where access could be gained to the original DLOGS supply performance reports or to manual logbooks maintained within the TSO. All of the data is presented in Table III-26 to demonstrate the month-to-month and inter- division variation. Weighting equally all of these samples, the average raw warehouse denial rate is estimated to be 8.7%. In the Chapter 7, AR 710-2, definition of materiel release or warehouse denials, an objective or management level is not given (AR 710-2, page 7-5). An objective of 2% is given in the Appendix Q of the AR where examples of charts are presented (Figure Q-8, page Q-4, AR 710-2).

Location Surveys and Inventories. Two of the more complex processes required within the division SSA are the location surveys and stock inventories. AR 710-2 requires that inventories will be conducted of DS/GS stocks semi-anually and, by implication, that location surveys will be conducted with the same frequency. The automated procedures manuals hold the inventory interval at six months but suggest that the location survey be done quarterly.

According to the automated procedures manuals, the DMMC directs the TSO to conduct a location survey or inventory. In practice, timing of these surveys is and must be a consensus. The much more complex of the two, the location survey, will be discussed here with occasional references to the DS4 procedures reproduced as Tables III-27 through III-32.

Table III-26. A Sample of Raw Warehouse Denial Rates

Division	Warehouse Denial Rate, % — Month 1	2	3	4	5	6	7
A*-All	11.0	7.5	13.5	37.0	12.6	15.4	13.7
B**-HLM	4.8	7.8	3.8				
-FSC	22.1	19.4	9.1				
C***-HLM	3.3	3.4					
D**-HLM	1.9	1.6	1.7	1.6			
E*-HLM	1.9	1.2					
F*-HLM	0.7	9.0	5.1				

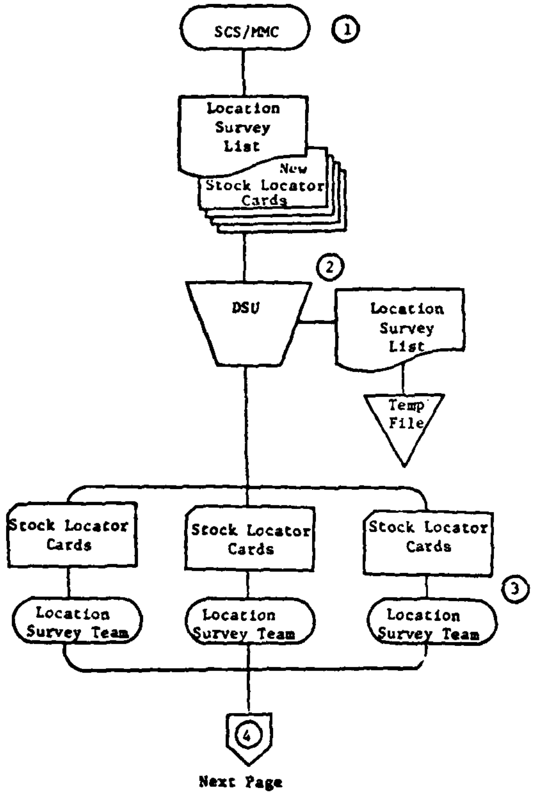
*Data taken directly from DLOGS Supply Performance Report.

**Data from log book maintained by TSO.

***Before researched by a quality assurance function, the rates were 6.9% and 7.4%.

SECTION XIV. LOCATION SURVEY AND CHANGE

DATA FLOW



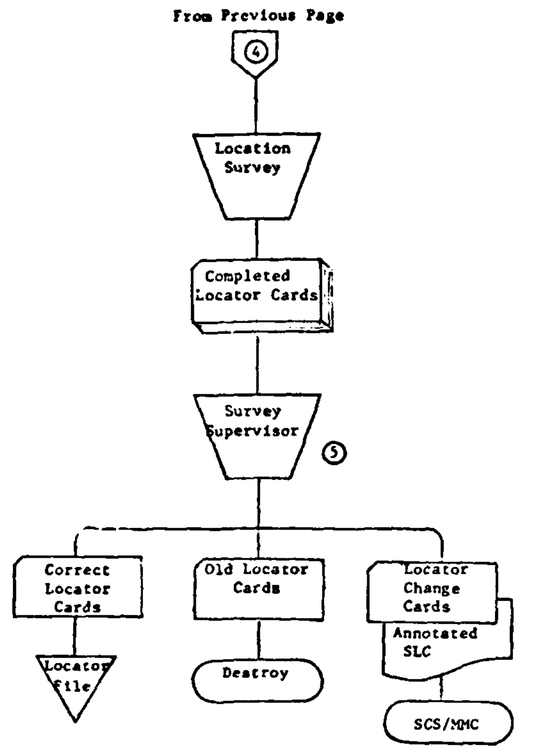
ELEMENT	STEPS
Stock Control/MMC	(1) A location survey is a check of actual storage locations against recorded storage locations to insure that supplies are located at places specified and that identifying data are correct. Each quarter the Stock Control Section/MMC will: a. Direct DSU's to conduct a Location Survey. b. Furnish each DSU with two Location Survey Lists (LSL) and a deck of prepunched/preprinted Stock Locator Cards (SLC) which correspond with the entries on the LSL.
Survey Supervisor	(2) Upon receipt of the Location Survey List and deck of Stock Locator Cards at the DSU: a. Check the Stock Locator Cards against the Location Survey List for completeness and accuracy. Duplicate locations are valid for QSS only if the items belong to the same OUF group. b. Group the cards into survey lots such as rows, aisles, or areas and give the cards to the survey team responsible for the survey of that particular area. Mark the listing to show the names of the team members and the cards they received. The listing should also be annotated with the survey date, time started, and time completed.
Survey Teams	(3) The survey teams then go to their assigned locations. When conducting a location survey, keep in mind that for a given stock number and condition, the automated system can record only "one" location code. This code should always be the prime location. If an item is stored in multiple locations, the stock number in the Warehouse Locator File must show that stock number in a prime location. The stock number in the prime bin location must likewise show that it is a prime location on the bin tag. The bin tag is annotated to show alternate location(s). The bin tag for the stock number in the alternate location(s) must also show that it is an alternate location, and be annotated to show the prime location. This method will provide the necessary cross-reference, simplify the survey, and increase accuracy.

Figure 72. Location Survey Procedures.

Table III-27. The DS4 Location Survey Procedures (from TM 38-L32-12 (Test))

SECTION XIV. LOCATION SURVEY AND CHANGE

DATA FLOW



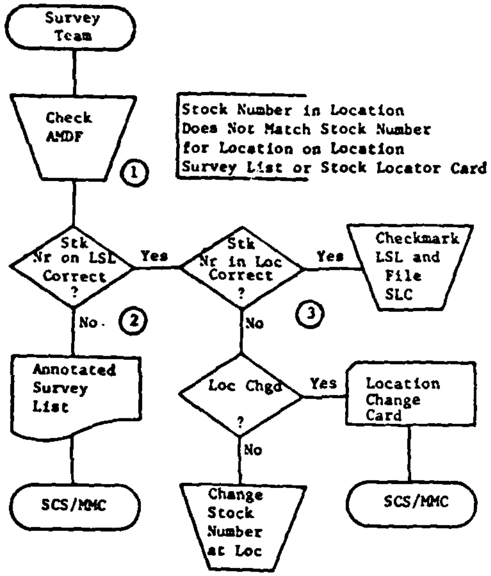
ELEMENT	STEPS
Survey Teams	(4) During the survey, either of four situations may occur for a given location, which will require the following appropriate action: a. Stock Number in location matches stock number for location shown in the LSL and SLC. Sign Location Survey Card, place card in location, and proceed to next location. b. STOCK NUMBER IN LOCATION DOES NOT MATCH STOCK NUMBER FOR LOCATION SHOWN IN THE LSL AND SLC. c. NO ITEM IN LOCATION. d. STOCK NUMBER IN LOCATION, BUT NO ENTRY ON LSL AND NO SLC.
Survey Supervisor	(5) Upon completion of the survey, the survey supervisor will: a. Check the area to insure all locations and items have been surveyed. b. Pick up stock location cards in the order of their listing on the LSL. Check the cards in. c. Separate all the cards that have incorrect or missing locations, or minor deficiencies. d. File the cards that have no discrepancies in the completed survey file. Correct all deficiencies noted on the Locator Card, mark the card "corrected" and current date in "Counter and Date" block and file card in completed survey file. e. Place all correctly completed stock locator cards in the Warehouse Locator File and destroy old file cards that are replaced. f. Prepare and forward to Stock Control/MMC stock location change cards where prime locations are incorrect or missing. g. Forward a copy of the annotated Stock Locator List to Stock Control/MMC.

Figure 72 (Cont). Location Survey Procedures.

Table III-28. The DS4 Location Survey Procedures (from TM 38-L32-12 (Test))

SECTION XIV. LOCATION SURVEY AND CHANGE

DATA FLOW



ELEMENT	STEPS
	STOCK NUMBER IN LOCATION DOES NOT MATCH THE STOCK NUMBER FOR LOCATION SHOWN IN LSL AND SLC.
Survey Team	(1) When the stock numbers do not match, three possibilities exist: A stock number was changed, either or both stock numbers were relocated but not recorded in the Availability Balance File (ABF), or a combination of stock number change and unrecorded relocation occurred. In any case, check both stock numbers against the AMDF, and both stock numbers and locations against the Warehouse Locator File to determine the corrections that are required.
Survey Team	(2) If the stock number on the list is wrong (AMDF shows changed stock number), enter correct stock number on the LSL. This could happen occasionally if a receipt with a changed stock number is warehoused after the location survey process is begun, but before the receipt is processed.
Survey Team	(3) If the stock number shown on the LSL and SLC is correct, but the stock number at the location is different, then determine if the stock has been relocated. a. If the stock location has been changed: (1) Annotate the LSL and SLC to show correct location. (2) Prepare a Stock Location Change Card. (3) File corrected stock locator card in warehouse locator file until you receive a corrected stock locator card from the stock control section/MMC. b. If the stock location has not been changed, but the stock number has been changed (YDM card not posted): (1) Change the stock number at the location to match the changed stock number in the LSL and SLC. (2) Checkmark the LSL entry to show a match. (3) File the corresponding SLC in the locator file.

Figure 73. Location Survey - Unmatched Conditions.

Table III-29. The DS4 Location Survey Procedures (from TM 38-L32-12 (Test))

SECTION XIV. LOCATION SURVEY AND CHANGE

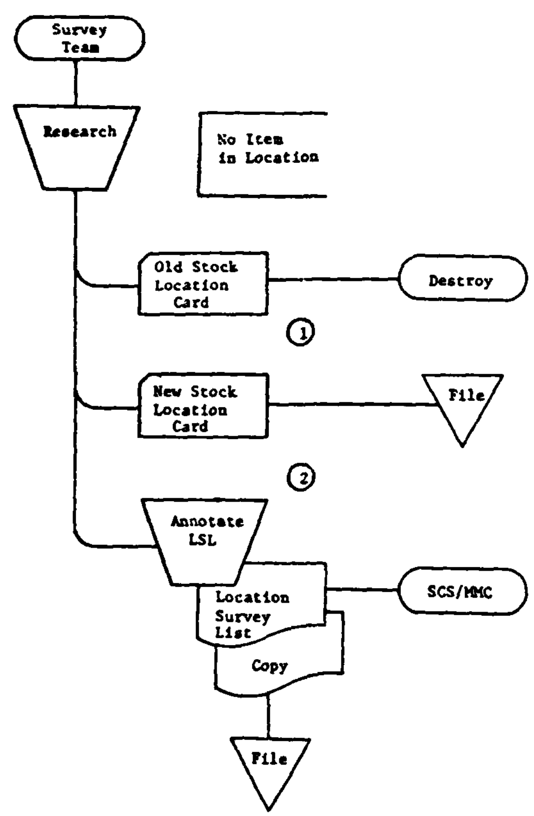
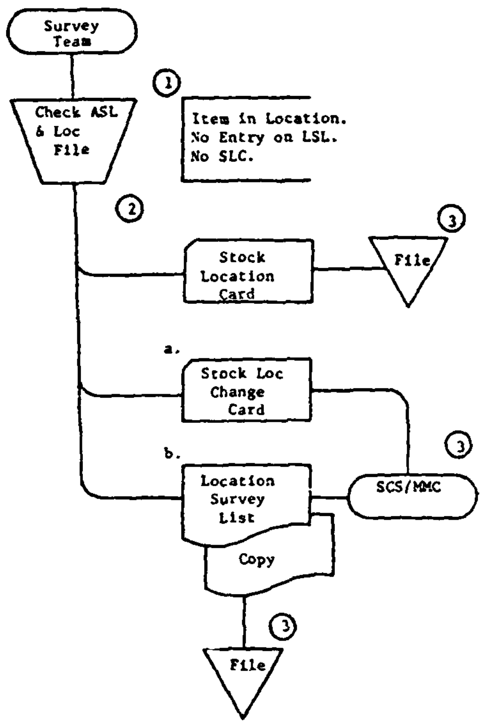
DATA FLOW	ELEMENT	STEPS
		NO ITEMS IN LOCATION. For those situations in which no items are found in the location:
	Survey Team	1 File stock location card in warehouse locator file and destroy old card it replaced.
	Survey Team	2 Annotate Location Survey List as zero balance.

Figure 74. Location Survey - No Item in Location.

Table III-30. The DS4 Location Survey Procedures (from TM 38-L32-12 (Test))

SECTION XIV. LOCATION SURVEY AND CHANGE

DATA FLOW



ELEMENT	STEPS
	ITEM IN LOCATION, NO ENTRY ON LSL, AND NO SLC.
Survey Team	1 When an item is in location and there is no entry for the location on the LSL and no corresponding SLC, two possibilities exist: a. Either the stock number and location were never recorded in the Asset Balance File, or b. The stock number is in an alternate location and the stock number is shown elsewhere in its prime location.
Survey Team	2 Check to determine if the stock number is in the warehouse locator file and determine the prime location of the stock number (item). a. Prepare a stock location card (if the item is not in the warehouse locator file) and a stock location change card. b. Annotate the LSL to reflect the correct DSU code, prime location, stock number, noun, and unit of issue. c. When the stock location change card is received by Stock Control Section/MMC, actions are taken to place the item on the Availability Balance File.
Warehouse Supervisor	3 File both the Stock Location Card and LSL. Batch the Stock Location Change Cards, label, and send to Stock Control/MMC together with a copy of the annotated Location Survey List.

Figure 75. Location Survey - No Locator Card.

Table III-31. The DS4 Location Survey Procedures (from TM 38-L32-12 (Test))

SECTION XIV. LOCATION SURVEY AND CHANGE

LOCATION SURVEY LISTING

DSU	LOCATION	STOCK NUMBER FLD	UI	NOMEN	CND	PIC	ALTERNATE LOCATION
A	QA116	2805 05 M12 3456	SE		A		
A	ABCDF	1615 05 001 6441	EA	TRANSMIS	A	S	
A	A9914	1615 05 004 8885	EA	HEADROTA	A	T	
A	E1241	1615 05 010 7386	EA	EXTENSIO	A		
A	NOLOC	4110 05 011 9442	EA	REFRIGER	A	X	
A	P1234	1650 05 014 2038	EA	SERVOCYL	A	P	
A	A1236	1560 05 015 2983	EA	BOOMROTA	A	A	
A	A1237	1560 05 015 2991	EA	BOOMROTA	A	A	
A	C1246	1560 05 019 0223	EA	RUDDER	A	L	
A	A1234	1005 05 021 2430	EA	LOCKBACK	A	Z	
A	C1247	1560 05 021 3634	EA	RUDDER	A	L	
A	A1238	1560 05 021 3635	EA	BOOMROTA	A	A	
A	E1243	1615 05 040 8240	EA	FAIRING	A		
A	R5110	1560 05 051 5624	EA	FAIRING	A	F	

Figure 76. Sample Location Survey List.

Table III-32. The DS4 Location Survey Procedures (from TM 38-L32-12 (Test))

A location survey begins with the production of a location survey list (LSL) and a deck of prepunched and preprinted stock locator cards (SLC). Believing the DS4 example in Table III-32, the location survey list is in NIIN sequence and, by the instruction of Table III-27, the survey supervisor in the DSU is to manually check the list against the SLC deck for completeness and accuracy. Then, without any ADP sorting equipment, he is to arrange the SLC deck into rows, aisles, or other features of physical location and to deliver these survey lots to survey teams. The location survey list should then be marked to show names of team members and the cards for which they are responsible. That is, the location survey list in NIIN sequence is to be manually marked with the names of the team members responsible for certain cards, where one card equals one NIIN and where the cards should at this point be in location sequence. Recall that the common lines portion of most division ASLs exceeds 5000 lines.

Moving to the actual warehouse locations, the described procedure depends on the bin tag to identify any locations for a NIIN other than the prime and indicates that the warehouse locator deck will have only the prime location. This is an unfortunate procedural dependence as this study has found only about half of the locations in division warehouses marked with any NIIN and little evidence of bin tags marked with secondary locations. It has also found that where warehouses had a significant number of multiple locations for many lines, the situation in the majority of divisions visited, the warehouse locator deck was the key to the information on multiple locations. Secondary locations are usually manually marked on the locator card for the prime location, or placed directly behind the prime location card. Note that these problems with handling multiple locations for a line refer to two or more storage locations within the same geographic, physical facility like a building or complex of buildings within the same company or organization, and does not refer to one location in the main TSO and another in a forward support company.

Throughout these DS4 location survey procedures, the warehouse locator file is to be referred to frequently by members of the survey teams with similarly frequent adjustments made to the file to correct errors. With a large number of secondary locations in most warehouses, the possibility that multiple "corrections" would be made to the card for a particular line is quite high with the final "correct" location depending on who corrected last.

Besides this likely procedural fault, the location survey depends for completeness and accuracy on bin tags which frequently do not exist and on continuous access to the locator deck by the whole of the survey team, leading to certain confusion.

Interestingly, the survey procedure depends on the warehousemen to resolve any failure to find the correct NIIN in the correct location. Finding any discrepancy, he is to check the AMDF to insure that the NSN has not changed. If the number has changed, the stock moved without any record of the new location, or any other discrepancy, he is to manually mark the location survey list, change the NSN on the bin tag, manually mark the locator deck card (the procedure actually says to manually prepare a new location card and to destroy the old one), and prepare a location change card. The procedures neither describe how to consolidate multiple locations nor suggest that consolidation be attempted which seemingly encourages the multiple locations.

The location survey and inventories both require a substantial pool of available, trained manpower to accomplish. They require extremely close coordination among the Class IX section of the DMMC, TSO, keypunch, and DDC just to execute the procedures in the correct sequence. Inevitably, there is substantial pressure from the supported units below, quickly manifesting itself from above, to keep the TSO functioning through the survey periods. Either the surveys are conducted on a cyclic basis requiring continuous and close coordination or are conducted under extreme time pressure that encourages errors. As noted earlier, the procedures unfortunately depend on the existence of well maintained bin tags and warehouse locator deck, a dependence that is not realistic especially since creation of an accurate locator deck is one of the prime objectives of the procedure.

The complexity of the procedure is not helped by the clarity or organization of the procedures manual. In Table III-28 under step 4, 3 possible problems are listed, but no reference is given to discussion of the actions to be taken. It happens that the appropriate steps are on the following pages but clarity would have been served with a reference. No reference is made to the example Location Survey List of Table III-32.

Clearly it is fair to conclude that the procedures for location survey, and inventory, which are inseparable, are oriented toward ease of programming the maintenance of the machine records and not on using the power of the computer to perform tasks that are repetitive, time consuming, and prone to human error. With DS4 and DLOGS, the warehousemen must decide if an error exists in a stock location and initiate or make changes to the MIR/ABF, warehouse locator deck, and location survey list. He should only be required to note the NIIN that is present if other than that printed on the stock locator card and the computer should determine if error exists and make the necessary changes.

To briefly move from review of the procedures to data from the study, responsible DMMC personnel, usually the Class IX officers, were asked about the frequency that they conducted location surveys and inventories. The results in Table III-33 show that, averaging across divisions, location surveys are conducted no more frequently than every 6 or 7 months and inventories every 8 or 9 months, if at all. This tends to validate the location and inventory accuracy samples presented earlier.

Perhaps in defense of the automated procedures developers, it appears that the procedures were designed for a stable, orderly, well maintained warehouse, one in which location inaccuracies are less than the Chapter 7, AR 710-2 objective of 5%; where inventories are similarly accurate; and where there are very few, if any, multiple locations.

DX. The direct exchange function is an extremely important and visible one to support and combat commanders throughout the division. The DX supplies those repairable items for which repair is authorized at the direct support level, that have sufficient demands to merit listing on the ASL, and for which the maintenance battalion agrees to accept the workload burden. In addition, some items repaired at the GS level are also carried by the DX activity. The items in this category are typically deadlining components of major end items, such as vehicle engine starters and generators.

The number of lines supplied by the divisional DX activities visited are given in Table III-34. There is considerable range with one division having but 110 lines and another 484.

Table III-33. Frequency of Location Surveys and Inventories in Several Division

Division	Months Since Last Location Survey	Months Since Last Inventory
A	15	15
B	6+ - Cyclic but not quite on schedule	6+ - Cyclic but not quite on schedule
C	4- One in progress	?
D	5- One in progress	5- One in progress
E	6	12+
F	Regularly -?	Regularly -?
G	New 6 month cyclic procedure started	New 6 month cyclic procedure started
Doctrine	3	6

Table III-34. Stockage of DX Lines

Number of Lines Stocked Per Location

Division	HLM	Forward Support Companies		
		1	2	3
A	484	?	?	79
B	110	30	61	74
C	150	67	?	?
D	465	0	0	0
E	301	Small number hand receipted		
F	337	0	0	0
G	202	?	57	?

That DX tends to have problems was evidenced by the frequent complaints from PLL clerks, motor sergeants, motor officers, battalion maintenance technicians, and others in combat battalions that DX response is unsatisfactory. Parts are not on hand and are slow to be delivered. The finding that a DX activity has overstated its stockage requirements or has excess on hand quantities occurs frequently in Army Audit Agency reports on Class IX SSAs and is at odds with the customer complaints. Twelve problems related to DX were identified in this study, are described below, and are summarized in Table III-35.

(1) The Army's retail stockage policy is based on a sum of allowances for the response time of the wholesale supply system to placement of an order, called the order-ship time (OST); an allowance for contingencies, especially interruptions in supply channels, called the safety level (SL); and an allowance to rationally minimize the cost of processing orders by having some stock in addition to the OST and safety level, so that an item must not be ordered each time one is used. This last level is called the operating level. The sum of the quantities for OST and safety level is the reorder point quantity and the sum of this reorder point (ROP) quantity and the operating level is the requisition objective. When stock is reduced to or below the ROP, a requisition is placed that, on the average, should arrive as the stock is depleted to the safety level quantity. This is summarized in Table III-36.

Unfortunately, no evidence could be found in para 3-114 of AR 710-2, the DX section of direct support procedures, that the procedures used to compute the requisition objective for DX items includes an operating level even though the performance goals for DX are the same as for the ASL: demand satisfaction of 75%. Two factors compound the effect of this regulatory oversight. In USAREUR, the divisions typically use an OST in the neighborhood of 50 days which is fixed for all lines under DLOGS procedures. The DX lines use actual OST for each line which, because of the DX lines typical high usage and essentiality, is likely to be less than the fixed ASL figures which is an average of all ASL lines. As the safety level is 25% of the OST for DX, this too is affected.

The other factor is the matter of customer expectations. While the AR 710-2 goal may only be 75% demand satisfaction for DX, customers seem to expect that since they are turning in a defective but repairable item, they should always receive

Table III-35. Summary of Problems in Divisional DX Activities

1. DX supply performance goals are inconsistent with DX stockage policy due to omission of an operating level.

2. Use of the 22 work day stockage table is usually incorrect leading to overstated requirements.

3. The AR 710-2 stockage tables are difficult to use and overstate requirements when repair or resupply times exceed 30 days.

4. The procedure for replacing washouts degrades supply performance.

5. Stock record accounting procedures vary greatly among MACOMs.

6. Divisional DX manning greatly exceeds doctrinal levels.

7. Divisional DX activities are supplied from a number of maintenance facilities.

8. Stock accounting records are usually poorly maintained and inaccurate.

9. DX procedures for customers vary greatly among divisions.

10. DX is paperwork intensive.

11. Procedures for exchange between GS and DS DX activities are not given in DS level doctrine.

12. The net requirement for customer stockage of DX lines is understated.

Table III-36. Comparison of ASL, QSS, and DX Stockage Policies and Objectives

	ASL		QSS	DX	
	DOS	EOQ	EOQ	REPAIR DOS	RESUPPLY DOS
AR 710-2 PARA	3-30	3-29	3-30,3-30	3-114	3-114
OL	15	VARIES (EOQ)	EOQ (90 MIN)	0	0
SL	15	15	15	25% REPAIR TIME	25% RESUPPLY TIME
OST	50-70	50-70	50-70	ACTUAL REPAIR TIME	ACTUAL RESUPPLY TIME
ROP	SL+OST	SL+OST	SL+OST	25% OST	25% OST

DEMAND SATISFACTION: OBJECTIVE = 75%
MGT LEVEL = 70-80%

DOS = DAYS OF SUPPLY

a replacement. That is, it is the observation of the study team that customers working to achieve the 100% materiel readiness goal sought by battalion and higher commanders usually expect the demand satisfaction in DX to be 100%. This expectation may be due to the intended one-for-one exchange procedure.

Faced with the frustration that the properly computed requisition objectives do not seem to match the customer and command expectations, it is not surprising that the requisition objectives or desired on-hand quantities are seemingly overstated often and intentionally.

(2) The work week of the maintenance facility is an integral part of the repair cycle requirements as defined in para 3-114, AR 710-2. It is stated there that the average repair cycle time "is determined by using only those working days of the month during which the maintenance facility is in operation." When a 5½ day work week is used, this procedure must be done as a prerequisite to using Table 3-37, Repair Cycle Requirement (based on a 22-day work month). In DX calculations of repair cycle time at every DX activity visited, Saturdays, Sundays, and holidays were not backed out of the repair cycle time, but Table 3-37 was used to calculate the repair cycle requirement. Hence the DX repair time is based on a 30-day month and the repair requirement only assumes 22 days a month. This gives an overstatement of 36% on the repair cycle requirement.

In actuality, the introduction of the number of days of operation of the maintenance facility for the purpose of establishing stockage levels is irrelevant and confusing. From the point of view of the DX managers, when a component is to be rebuilt, it is removed from the on-hand stocks until it returns from repair. The repair time is simply the number of elapsed days that the part spends in the maintenance facility. This is directly analogous to OST in the supply area. If the maintenance facility works 7 days per week, this will be reflected in a lower repair time and consequently a lower repair cycle requirement.

In one division, the study team had the opportunity to record the resupply time and rate, repair cycle time and rate, and the requisition objective computed from the preceding data for 56 DX lines. Of these, 54 had overstated requirements and in 16 of these, it appeared that the 22-day table had been read incorrectly, besides it being the wrong table. The percentage overstatement found using the requisition objective computed by the formula was 55.2%. The average quantity overstatement was 6.2 items.

(3) The physical arrangement of the tables for calculating stockage requirements found in AR 710-2 may lead to error. Two methods of calculating repair and resupply cycle requirements are presented in AR 710-2, either a formula or tables. When the resupply time or repair cycle time is greater than 30 days as it often is, the tables are not an accurate approximation of the formula. Every 30 days, a discontinuity occurs in the tables which causes an error to accumulate in the resupply or repair requirement. This error is an overstatement of the requirement and is significant at low resupply and repair rates. For example, for a resupply rate of 5 per month and a resupply cycle time of 62 days, the formula yields a true requirement of 13 while the tables give a requirement of 16. AR 710-2 encourages use of the tables and does not indicate how to calculate the reorder point if the formula method is used.

The arrangement of Table 3-38, AR 710-2, makes it awkward to use. There is no explanation that the number in parentheses represents the reorder point quantity. There are no column headings on any but the first of the four pages of the tables. The spacing between columns is different on each page making it difficult to combine pages to make a more usable table.

(4) DX is intended to function on a one-for-one exchange basis. If all of the items turned in for repair were successfully fixed, the DX activity would be self-sufficient after the initial stocking. However, some items returned are broken or worn to the point that they cannot be repaired at the direct support level. These unrepairable items, commonly called washouts, must be replaced through replenishment requests from higher supply sources. The procedure established for this replenishment has three troublesome aspects.

AR 710-2 directs in para 3-114(d) that replenishment requisitions be submitted "whenever the cumulative quantity of washouts equals the difference between the resupply cycle quantity and the reorder point quantity." One of the two more significant problems is that by waiting for the number of washouts to accumulate to start the replenishment action, the on-hand and on-order stockage shrinks below what is to start with an unacceptably low level. That is, since there currently is no operating level, every washout reduces the net asset position one more below what ought to be the reorder point.

The second serious problem is that there is a period of one repair cycle time during which the future washout is being identified before the replenishment requisition is submitted. In effect, this lengthens the resupply cycle time by one repair cycle time for all washout replacement requisitions which are the only replenishments expected.

The last point on washout replacement is that the procedures statements should include instructions for submitting a requisition to bring the asset position into agreement with the requisition objective and reorder point quantity after their quarterly recomputation. This adjustment should also insure consideration of the washout balance.

(5) The USAREUR supplement to AR 710-2 and USAREUR Pamphlet 710-1, Direct Exchange, changes the basic stock accounting form from DA 3029-R to DA 1296 and introduces a totally new set of DX transaction codes. These changes, especially on the DX transaction codes, are significant enough to preclude much transfer of knowledge for experienced DX personnel transferring between CONUS and USAREUR.

(6) Manpower assigned to divisional DX activities greatly exceeds the levels envisioned by the DA TOEs. Table III-37 summarizes the manning of the DX function in the 7 divisions visited and shows that all of the sampled divisions were using more personnel than the four intended. If the actual manning of more than a few of the divisions was near that of the doctrine, one could assume some inefficiencies in the remainder. Indeed, it was the study team observation that one or two of the LTs in these facilities were so located to minimize any negative impact they might have elsewhere. But overall, the mean and median manning, 9 and 10 people respectively, is a good estimate of the actual strength required to properly operate a divisional DX supply point. Note that these figures do not include personnel involved in DX in the forward support companies.

(7) One of the factors complicating the DX operations are the large numbers of repair facilities supplying most DX functions. Divisions had to deal with up to 5 separate repair facilities for rebuild of common DX items. This creates tremendous overhead and difficulty in keeping suspense files, reconciliations, and other records. In addition, some of these facilities are distant from the DX point and only provide pick up and delivery once a week. This adds delay to both ends of the repair cycle time.

Table III-37. Summary of DX Manning*

	EM	SGT	SSG	SFC	LT	TOTAL
Division						
INF (M)	2	1	1			4
A	9	1				10
B	5	1	3	1		10
C	12	2	1			15
D	6				1	7
E	4				1	5
F	10			1	1	12
G	4				1	5

*Includes personnel working on DX records or parts handling from DMMC Cl IX Section and Maintenance Battalion TSO. Includes only supply function, does not include repair function.

(8) It was the general observation of the study team that the DX records are not well maintained and are frequently inaccurate. In spite of the fact that division DX lists were generally only several hundred lines, the units had difficulty in keeping stock accounting records accurate and current. Thirty-nine percent of the stocks that were sampled were not within 25% of the recorded on-hand balance. Location accuracy and markings for storage locations were generally better than overall warehouse performance, probably because DX has so few lines. Location accuracy was 91%, and 83% of the locations were correctly marked.

(9) In addition to the differences in DX procedures among MACOMS, there are many significant procedural differences among divisions. Five of 7 divisions had DX lists over 3 months old. Quality and legibility of these lists varied greatly. The use of the DHA card and requirements for document numbers also varied. Three divisions required the DHA cards, the document identifier for recording a demand. Five divisions required document numbers on the DX tag, the DA 2402.

(10) The DX operations are paperwork intensive. The study team estimates on the basis of their observations and studies that over 3/4ths of the total work in a properly operating division DX activity is in keeping stock records, document preparation, and other paperwork. It is easy to understand how an analyst unfamiliar with the detailed upkeep required of the records would underestimate the workload when preparing a TOE.

(11) The division DX point often is a customer of a general support DX or other repair facility. The policy and procedures for this exchange of parts is not provided by AR 710-2, USAREUR supplement to AR 710-2, or USAREUR Pamphlet 710-1. Local implementation in this area varies. Local forms and informal records are often kept for stock accounting purposes. Duplicate 2402 tags are often used for the exchange between DS and GS DX points increasing the paperwork burden. Reconciliation procedures must be devised and followed and determination of the appropriate stockage levels left to the creativity of the DS DX personnel.

(12) Under DX, but at the customer level, the interviews of the division PLL clerks gave the finding that only 32% of the clerks kept DA 3318s, the form for manual record of demands,

for their DX lines. The remainder never used the 3318 or did not know what it was. The implication here is that most PLLs that could justify having DX lines do not and that the divisions' stock requirement for DX lines is, therefore, understated.

In one division, it was possible to review the DA 2402 exchange tags over a five-day period to obtain the information of Table III-38. This division had a staffing level near the median but was short of experienced supervisors. All together, the situation was not atypical and the true satisfaction of about 50% may not be unusual. Several divisions report much higher rates of satisfaction for DX, up to 90% in one case. Two of these divisions were aided in attaining this reported satisfaction through overstated stockage requirements found in the course of this study.

QSS. The promise of QSS was simplicity for users and operators alike. The reality has been disappointment and frustration.

The concept of the quick service supply was that detailed accounting could be replaced with summary accounting for those ASL items that were very low in cost but that generated a disproportionate share of the detailed transaction load. To obtain QSS items in the original concept, a PLL clerk was to complete an informal want slip, present it to the QSS, a QSS clerk would pull the items from storage, and hand them to the PLL clerk. No records would be kept of usage by PLL clerk or unit. A formal due-out procedure was not provided, perhaps because it was implicitly assumed that the low cost of the item would cause the operating level to be relatively large and zero balances would be infrequent. The only such provision was that if the QSS was zero balance in a line and a PLL clerk had a high priority NORS request, that PLL clerk would be allowed to submit a NORS AØA on a DA2765 through the DMMC. Further, units could keep a 7-day supply of any QSS item and, because of the summary accounting philosphy, would not list QSS items on the PLL.

At the TSO, the QSS clerk would issue the parts to the PLL clerk from the want slip without making any record of the source or size of the demand. On storing QSS stock, the QSS warehousemen would count out and separate the quantity equal to the reorder point quantity. This reorder point quantity is usually placed in a paper bag and stapled closed. When stock is issued down to the reorder point quantity, the bag will be opened to continue issues. At the opening of the bag, a reorder point card, usually in or attached to the bag, would be marked with the on-hand quantity and sent to the DMMC for inclusion in the weekly DLOGS QSS cycle.

Table III-38. Five Day Sample of DX Satisfaction in One Division

	Number of Transactions Priority			Total	%
	03	06	13		
Satisfied	171	74	179	424	50.4
Due-Out	197	61	160	418	49.6
TOTAL	368	135	339	842	
Percent of total, by Priority	43.7	16.0	40.3		

This card triggered a recalculation of the requisition objective and reorder point based on time since the last replenishment and caused a replenishment requisition to be executed.

Compared to this intended procedure, the implementation in divisions differed significantly. First, the stockage policy had some features that appeared to work against the best supply performance. For an item to qualify for QSS stockage, it must have sufficient demands to qualify for ASL stockage, have a unit price of $7.50 or less, and an economic order quantity equal to a supply of 3 months or more. Contrary to the typical customer perception, very high demand items are eliminated by this last stipulation. The limits of QSS are marked on the EOQ table in Table III-39. It has been explained that the minimum EOQ requirement was added to reduce the financial liability of having any major monetary corner of the ASL released from detailed accounting. This requirement kept the very high volume lines that were moderate in cost whose extended value might be significant from appearing on QSS. It may also be that the drafters of the QSS procedures simply did not want any QSS line to have many replenishment transactions per year.

The change 5 to AR 710-2 raised the upper cost limit from $5 to $7.50. According to the knowledgeable DALO-SMS personnel, this change was based on inflation for wholesale hardware that had occurred between the introduction of the QSS concept and the date of the change. It is believed, however, that DLOGS programs had not been updated to incorporate this change.

As will be noted later, the supply performance of QSS is not generally high but a review of the stockage criteria may give an explanation. When an item is converted from ASL to QSS, every PLL in the division is authorized a 7-day supply of the item. Because units are no longer charged for the items, because units must no longer account for the items, and because obtaining items from QSS is actually more trouble for a PLL clerk than routine supply, the system encourages the PLL clerk to ask for more than is needed, especially at the time of ASL to QSS conversion. This surge in demand, if not sharp enough to drive stock to zero balance, is likely to cause the EOQ to be increased which causes the operating level, if expressed in days of supply, to be reduced. Put another way, as the demand increases, the order quantity is increased

Table III-39. QSS Stockage Criteria

ANNUAL QUANTITY DEMANDED IN UNITS	UNIT PRICES IN DOLLARS																					
	.01	.02	.03	.06	.10	.18	.32	.56	1.00	1.80	3.20	5.60	10.	18.	32.	56.	100.	180.	320.	560.	1000.	Over 1000
1	1	Not ASL demand supported										1	1	1	1	1	1	1	1	1	1	1
2	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	2	2	1	1	1	1	1	1	1	1
3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	1
6	6	6	6	6	6	6	6	6	6	6	6	5	4	3							1	1
10	10	10	10	10	10	10	10	10	10	10	8	8	5	4							1	1
18	18	18	18	18	18	18	18	18	18	15	11	9	6	5				Price> $7.50			1	1
32	32	32	32	32	32	32	32	32	27	20	15	11	8	6							1	1
56	56	56	56	56	56	56	56	48	36	26	20	15	11	8	6	5	4	3	2	2	1	1
100	100	100	100	100	100	100	84	63	48	35	27	[illegible]	15	11	8	6	5	4	3	2	2	1
180	180	180	180	180	180	160	110	85	64	48	[illegible]	27	20	15	11	9	6	5	4	3	2	1
320	320	320	320	320	270	200	150	110	85	[illegible]	48	36	27	20	15	11	8	6	5	4	3	2
560	560	560	560	460	250	270	200	150	[illegible]	84	63	48	36	26	20	15	11	8	6	5	4	2
1000	1000	1000	870	610	480	350	270	[illegible]						35	26	20	15	11	8	6	5	2
1800	1800	1400	1100	820	640	480	[illegible]	27						8	36	27	20	15	11	9	6	3
3200	2700	1900	1500	1100	850	630	480	36			EOQ < 3 months			3	48	36	27	20	15	11	8	3
5600	3600	2500	2100	1500	[illegible]	840	630	48						4	63	48	36	26	20	15	11	4
10000	4800	3400	2700	[illegible]	1500	1100	840	64						10	84	63	48	35	26	20	15	5

Select the unit price column that is equal to <u>or larger</u> than the unit price of the item.

Select the annual demand row that is equal to <u>or less</u> than the annual demand of the item.

The EOQ for the item is the number at the intersection of the selected column and row.

but not quite as quickly since the frequency of ordering is also increased somewhat. With more frequent ordering, the average number on hand given in days of supply will be reduced. This makes the stock more vulnerable to variations in demand. With no limits on quantity demanded, PLL clerks are likely to ask for quantities greater than that needed immediately which plays into this stockage vulnerability. The chance is good that a zero balance will result with units then motivated to hoard whenever quantities become available. Conceivably, extremely high demand for a $7.50 item could lead to operating levels of less than 10 days supply. This would theoretically cause return of such a problem QSS line to the main ASL, but it is believed that DLOGS deletes lines from QSS only for insufficient demand.

For possibly two reasons, no division visited had converted to QSS all of the lines that were eligible. Moderate to high volume lines with large operating levels are likely to have correspondingly high demand satisfaction. While the conversion of lines to QSS was expected to reduce the number of detailed transactions on a few lines, freeing personnel to perform better on the remainder, the immediate result of converting moderate to high volume lines to QSS is a reduction in demand accommodation and especially demand satisfaction. This drop in supply performance statistics reported to higher commanders is often unacceptable to Class IX officers.

The other possible argument against QSS conversion is the loss of control by the Class IX officer, particularly where the existing QSS section of the TSO does not have a good record of customer satisfaction. Converting all eligible lines would only make such a situation worse.

An important accompaniment to QSS implementation is the shift of stock accounting and control burden from the DMMC to the TSO. Stock management in QSS is carried out by the conscientious bagging of the reorder point quantity, and monitoring of the reorder point quantity and replenishment card submission. On normal ASL lines, the warehouse personnel must count the on hand quantity only during inventories, which is less frequent than twice a year in the average division, and when a warehouse denial occurs. For a QSS line, the reorder point quantity must be counted at every replenishment. Another aspect of this is with the unique procedures of QSS, warehousemen must be dedicated to the function rather than shifted among functions as are personnel in receiving, warehouse, and yard operations.

The net result of increasing QSS size is an increase in TSO workload, a reduction in keypunch operations in the DMMC, reduced transaction volume input to the daily DLOGS cycle, and an increase in editors and manager referrals caused by PLL clerks submitting AØA requests for QSS items.

Like DX, no mass of performance data was readily available in the divisions. The number of lines stocked per division is given in Table III-40. In one division that had a QSS operation above average in organization and functional housekeeping, the QSS satisfaction for a one-week period was just 53.7% even though only 17% of the lines were at zero balance. This observation suggested the study of stockage criteria and the hoarding hypothesis described earlier. Apparently, most of the unfilled demands were in a small number of lines. And in another division, the average fill rate in the forward support companies was 14.7% over a 6-month period when a total of over 2000 QSS requests were received.

Across 7 SSAs visited, just 48% of the 315 lines sampled had the reorder point quantity separated. The reorder point card was present in 24% of the lines where it should not have been, i.e., where it should have previously been sent to the DMMC.

The other end of the QSS performance chain belongs to the PLL clerk. In four of the seven divisions, the QSS requests were not made on an informal want slip but on a DA 2765 with information fields to be completed varying among these four. In at least some of the divisions, the 2765 was in addition to a want slip and, in some cases, the want slip was to be prepared with the warehouse location of each line requested noted on the want slip and the requested lines entered in warehouse location sequence. The usual explanation for the 2765 requirement was that the PLL clerk could submit the same document to the DMMC if the QSS could not fill the request for a NORS item. This preparation for what should be an exception suggests a frequent occurence and frequent zero balances. Obviously, the detailed procedures required for acceptance of the "informal" want slip or 2765 in many of the QSS facilities is more trouble for the PLL clerk than submitting a routine AØA request.

Perhaps the greatest paradox in the retail repair parts system is the speed of the typical QSS. Calls are frequent for adoption of over-the-counter repair parts operations similar to a commercial auto parts store and have been heard

Table III-40. Stockage of QSS Lines

Number of Lines Stocked Per Location

Division	HLM	Forward Support Companies 1	2	3
A	311	0	0	0
B	2825	306	301	362
C	1491	0	0	0
D	1786	?	?	102
E	1822	0	0	0
F	963	378	439	391
G	963	Very small stockage. QSS allowed on PLLs.		

from TOE line battalion NCOs and officers as well as from supply professionals in logistics doctrine and analysis agencies. In the face of the repeated and enthusiastic proposals, only two of the seven divisions had such a procedure for their QSS even though the over-the-counter concept is implicit in the QSS procedure. In the other five, low priority requests were queued and filled just as DLOGS processed MROs and the stock was delivered to the customer through the forward support company or other normal channels mixed with stock having A5As attached. Except for high priority NORS requests, the fastest response to a QSS request is typically three days.

In part, this lack of speed is due to the token implementation of QSS in the forward support companies. In three divisions, the SSAs had no QSS stocks and in 3 others the forwards stocked less than 10% of the lines stocked in the main TSO.

The lack of a full QSS activity in the FSCs almost by itself eliminates the possibility of quick service. Possible reasons for this oversight are a shortage of warehousemen and competent supervisors for the special function, lack of storage space, or the inability of DLOGS to provide full independent ADP support to multiple QSS sites.

The last observation to be noted about QSS is that it was implemented with division unique pseudodetailed accounting computer programs in two divisions. In these, customers were charged for the items requested but detailed stock accounting records were not maintained and the requisition objective was not recomputed with each summary demand. It was explained that the DLOGS QSS program was not responsive enough at one run per week although it appeared in one of the two cases that the DLOGS program had not been tried.

Overall, it seems fair to say that the QSS implementation has generally not lived up to expectations, with one or two exceptions. QSS usually requires more work of the PLL clerks and increases the TSO workload. It is not clear that the TSO increase in work offsets the reduction in keypunch workload stemming from the reduction in number of detailed request transactions. It may very well be that QSS implementation as practiced in most divisions is a net increase in division SSA workload, and with greater certainty, an increase in division-wide work when customers are considered, all for little or no real performance improvement.

E. STATE OF REPAIR PARTS MANAGEMENT IN DIVISIONS.

Point of View. In visiting for observation or data collection ten of the Army's sixteen active divisions, there were many conversations of varying duration with field and company grade officers, warrant officers, and NCOs about problems in their jobs related to repair parts supply. Through these discussions and the attendant study and observation of their organizations, the study team formed its own opinion as to the contribution of this senior element to the problems of the repair parts system. This section presents these perceptions of the study team. The statements are general and refer to the view across the divisions without identifying the one or two exceptions to each generality. It is not presumed that these perceptions are perfectly equivalent to the complete and objective truth, but are the honest view of the observers.

Confusion of Organization. The organization of the repair parts system in a division is affected by the prime players, the DMMC, TSO, and customer companies, and by the peripheral, not necessarily secondary, players consisting of the customers' chain of command, i.e., the combat command chain, the logistics staffs, and the special staffs of MAIT and IG. The role of each will be addressed in turn.

At the DMMC, the Class IX officer and his subordinate warrant officers and NCOs generally view themselves as the lead in repair parts matters. The experience data presented earlier indicated that the technical experience of the typical LT or NCO was rather limited. The conversations with CPTs and MAJs showed a similar lack of relevant technical experience or training and usually yielded the notion that these individuals viewed themselves as managers of policy with the technical details being the unquestioned responsibility of the supply technicians and NCOs. The organization of the Class IX section of the DMMC was usually straightforward and supportive of the mission.

The maintenance battalion is quite another matter. Frequently having a commander with a maintenance orientation, the battalion's repair parts supply system is partially overlaid on its maintenance organization. The maintenance battalion is, in most divisions, the largest battalion of the division, numbering 800-1200 officers and enlisted men, depending on MTOE. Between its maintenance and supply missions, it probably has more performance statistics reported to the division command group than any other battalion. The focus of the supply attention is on the main ASL maintained by the headquarters and light maintenance company. This is the one company commander in the battalion that has supply as a majority of his mission, but the commanders of the three forward support companies and the missile maintenance company have significant supply responsibilities as well. However, the supply operations are often conducted, not through this command chain, but, through a special battalion staff called the Materiel Management Office or the Materiel Operations Office. This office ostensibly coordinates and expedites critical maintenance and supply operations within the maintenance battalion and consists of several pairs of officers and NCOs each designated to attend to major commodity areas. In most divisions, one of the office's CPTs is designated the tech supply officer and in more than one division ran the tech supply function in the four affected companies.

Where the DISCOM has assigned a forward area support coordinating officer (FASCO) to the brigades, this officer may also act as a coordinator or expeditor of supply matters, especially actions between a customer battalion and the forward support company, or between the forward support company and the headquarters and light maintenance company or DMMC. As the FASCO may come from any of the DISCOM battalions, he may or may not be technically qualified for this role and may only supply greater visibility to a problem.

The best illustration of the smoothness of the interactions between the DMMC and TSO might be to recall interviews in which both DMMC Class IX officers and the maintenance battalion tech supply officers would often identify themselves as being the division's tech supply officer and later answer a question about relationships with the other organization as being improved, implying previous, if not ongoing, problems. The organizational separation of the stock accounting and stock handling and maintenance functions has exacerbated what would be, in any case, a difficult relationship.

A specialist in half of an operation will always wonder if his counterpart is fully supportive when the command spotlight of performance statistics covers them both. This can result in natural but controllable animosity when the representatives of the two protagonists are frequently officers who do not fully appreciate the technical implications of the issues.

If a customer fails in an attempt to resolve a Class IX problem through the Class IX chain, he may attempt a resolution through either the command chain or the battalion-brigade staff chain. The number of possible paths from motor sergeant, motor officer, commander or S4 at one level to an FSC warrant officer or commander, FASCO, brigade motor officer, brigade S4, DISCOM staff, DMMC commander or Class IX officer, maintenance battalion commander, or maintenance battalion staff is seemingly infinite and evidence existed in most divisions that all combinations had been used at some point.

To the above is added the independent work of the division IG and MAIT team. The MAIT team may occasionally be called upon to help expedite some supply action and will be called on for technical guidance by the customer battalions. While the senior NCOs of both the IG and MAIT usually attempt to follow the external SOP of the DMMC and TSO, evidence that guidance or inspection standards conflict with the desired procedure is common.

It frequently seems that the many expeditors within a division may be working at cross purposes and are complicating the already difficult DMMC-TSO operation. One wonders if some of these special coordinators and instructors might better contribute to system performance by taking a section of the TSO and reducing the span of control there, contributing their experience to ASL management, or helping the PLL manager in the DMMC to identify and help problem PLL clerks.

Confusion of Objectives. The managers of the repair parts function in the divisions have several objectives that may not be simultaneously achievable. Chapter 7 of AR 710-2 calls for the achievement of certain demand accommodation, demand satisfaction, ASL size, warehouse denial rate, and other goals. The MACOMs have encouraged the establishment of combat ASLs with near complete mobility. All divisions work under strict budgets for repair parts, and are under unrelenting pressure to maintain high states of materiel readiness. If there was previous doubt about the real ability to attain all of the Chapter 7, AR 710-2, goals at one time, it should be recognized that the regulation objectives were written before the combat ASL and financial objectives achieved prominence.

Confusion of Leadership. The split of stock accounting and physical maintenance of the stocks is perhaps not natural and takes an extra measure of leadership ability to overcome. Besides this issue, the divisions lacked technical leadership. Where the existence of serious performance problems existed, an action oriented style of management was adopted that in some cases tended to camouflage problems with high visibility programs like establishment of combat ASLs, conversion of MILVANS into repair parts vans, and other special programs. Most unfortunately, these programs divert both supervisory and operating personnel from the prime missions, making the performance problems more acute.

Looked at another way, some incumbent managers appear to have preferred to take their own knowledge and that of the NCOs and warrant officers as a given value and to make changes to the outside of the system rather than identify the areas about which more knowledge of the automated procedures or customer requirements is needed, insure that it is obtained by some member of the management team, and apply the technical knowledge to the problems.

Conclusion. These views in no way should imply that the personnel working within the repair parts system are not working to their best capabilities. Instead, the confusion with the system inherently promotes human performance problems. This confusion cannot be quantified, as can number of ASL lines, but it is equally important to identify these non-quantifiable but real behavioral problems and to work toward their solution because they are problems of human performance in themselves and create other such problems throughout the organizations. The solution of the problems described above are as important as the procedures, automated process, and AIT training problems discussed in earlier sections to the goal of providing efficient and effective repair parts supply to customer units.

IV. PRINCIPAL FINDINGS AND RECOMMENDATIONS FOR USING UNITS

A. PRINCIPAL FINDINGS

Many problems in the repair parts system at the using unit level can be noted but it will help to focus on a few that are critical and comprehensive. The six principal findings given below are not necessarily in strict order of importance.

1. PLL performance is uneven.

a. The prime basis of this finding rests on the observations of the study team in visiting 83 different PLLs in two MACOMS, a sample that is almost evenly distributed between divisional and nondivisional units. While in almost every battalion visited there were one or more PLLs that appeared to be active and well maintained, there were as many or more that showed significant evidence of haphazard operation.

b. Under the title Objective Data Collection, it was found that almost 25% of customer requests are rejected by division pre-edit programs and that the average zero balance of PLLs in the units visited range from 12 to almost 20 percent. Among similar heavy companies, there is a high standard deviation and wide range of number of PLL lines indicating primarily differences in attention to upkeep of records and, to a lesser extent, dependence on informal means of supply in some companies. Eleven percent of the PLL clerks were without a current QSS or DX list which would reduce their rate of success at getting requests accepted by the supply support activities.

c. Supporting the notion of poor performance on the part of some PLL clerks were the responses to some questions of the PLL clerk interviews. 33% of the clerks indicated they use the AMDF only on some requests and 6% indicated that they never use this catalog. Although 27-70%, depending on MACOM, replied that they never used the prepunched 2765 that would lead to reduced errors by the PLL clerk and the SSA personnel, samples of several thousand Class IX requests in two divisions showed that the use of the prepunched and preprinted requests was between 1.8 and 5.2% of total requests.

d. Subjective evidence to support this finding coming from sources other than this study are the complaints of senior field commanders about the functioning of the repair parts system that usually focus on symptoms seen at the using unit level. Further, commanding generals of two CONUS installations have seen fit to implement extraordinary training programs directed at improving PLL clerk confidence and a third installation has practiced an extraordinary reconciliation program to improve PLL performance.

2. The PLL doctrine and procedures do not form an integrated job, making the work overly complicated.

a. The doctrinal material analysis showed significant fragmentation and inconsistencies in its comparison of the DLOGS and DS4 automated procedures manuals, AR 710-2, the 76D AIT texts, and the field manuals dealing with organizational maintenance. There is no single comprehensive guide that describes all of the procedures that the PLL clerk must follow nor is there one that systematically makes references to doctrinal publications that give descriptions of portions of the job procedures.

b. The motor sergeant is the NCO best suited to supervise the PLL clerk from geographic and work interrelationship considerations. However, the doctrine setting the PLL job procedures has made no provisions for assisting the motor sergeant in his PLL supervisory role and the maintenance community has made no moves to insure that he is trained for this function. In all, the doctrinal provision for supervision of the PLL clerk is weak.

c. The regulatory and TOE doctrine ignore the PLL insofar as providing a work and storage facility for what is intended to be a 100% mobile function.

d. The PLL clerk must deal with several sources of supply, each having a different implicit or explicit SOP. The complexity of the PLL job seems to depend as a power function on the number of sources. That is, keeping track of due-ins and status from three sources of supply appears to be 2 or 3 times as complicated as if there were but two sources.

e. The finding from the comparative analysis of combat company TOEs that the PLL clerk manning given in DA TOEs did

did not change as the apparent workload in number of vehicles and mechanics supported increased by a factor of almost 2 suggests that the job content has not been given serious consideration.

3. Substantial improvements can be made in AIT training for PLL clerks.

a. The doctrinal material analysis showed that inconsistencies between the 76D AIT texts and other doctrine existed.

b. The review of the programmed instruction research literature indicated that the 76D AIT self-paced text is not a faithful implementation of recognized programmed instruction practices.

c. Research conducted and reported by HumRRO concluded that written instructional material should be held to a minimum for low aptitude students. Instruction in the 76D self-paced course is entirely by written texts.

d. Where active hands on training is recommended for low aptitude students by the HumRRO study, the 76D AIT course has perhaps only 10-15% of the course time in hands on practical exercises.

e. With the PLL duty position of the 76D having relatively high visibility, the instruction for the 76D is combined with the 76P for eight of the twelve weeks of AIT. This reduces the concentration on PLL procedures.

4. The selection criteria for the PLL clerk MOS is too low for the degree of supervision, responsibility, complexity, and breadth of duties compared with other MOSs.

a. DA TOEs provide two 10skill level supplymen to most heavy combat companies such as tank companies and rifle companies of mechanized infantry battalions. These two are the 76D PLL and TAMMS clerk and the 76Y armorer. With a required clerical aptitude score of 100, the 76Y has a technically trained and experienced first level supervisor in the form of the company supply sergeant. Since this supply sergeant has but the one subordinate, the 76Y10 can be expected to receive a good measure of technical guidance and assistance. The 76Y10 starts unit duties as an armorer clearly in the role of an apprentice to the supply sergeant.

b. The 76D starting work in one of these same companies as a PLL clerk serves under a motor sergeant who has no related technical training. Even with experience in repair parts supply, the 63 series NCO has 8 to 13 subordinates and cannot be expected to either closely supervise the PLL clerk or to provide frequent technical assistance and guidance. Obviously, the 76D starting unit duties as a PLL clerk is expected by both the doctrine and the unit personnel to perform as a journeyman.

5. Supervision of PLL is usually inadequate.

a. It was noted during the course of the observation and data collection visits that if a motor sergeant has any understanding of PLL it is usually limited to the mainstream procedures.

b. The regulation describing the duties of each skill level of each MOS and the requisite knowledge at each of these positions, AR 611-201, says that the 63C30 should requisition spare parts, not that he should supervise the PLL clerk in making such requests, and the entry for the 63C40 mentions neither performance of the function or supervision of the PLL clerk.

c. The question of PLL clerk supervision was addressed in two ways in the PLL clerk interviews. PLL clerks were asked to identify the individual that functioned as their supervisor. Only 38% of the PLL clerks gave the motor sergeant as their supervisor and 46% of the clerks indicated some other individual was their sole supervisor. Even with 38% indicating the motor sergeant as their primary supervisor, just 13% responded that they approached the motor sergeant for technical assistance.

6. There is no PLL performance feedback making supervision and management difficult.

a. It was frequently observed in conversations and interviews with motor sergeants and motor officers that these first and second level supervisors were unaware of the conditions of their PLL.

b. Having studied the doctrine and observed the motor pool activity, it is apparent that if close supervision is to be maintained it must be either through continuous over-the-shoulder observation or through frequent audit of PLL records and inventory. Given the span of control of the motor sergeant and the visibility of his work, close supervision of the PLL clerk with the existing tools available is unlikely.

c. With the PLL clerk attached to a semiautomated process, useful management information on PLL performance should be provided to assist the motor sergeant and motor officer in their supervisory duties.

B. RECOMMENDATIONS

The recommendations given for improvement of repair parts supply in using units will attempt to answer a deficiency noted in one of the principal findings or to meet a specific problem detailed in the rationale. In both this chapter and the one following on SSAs, the recommendations will be categorized into sections dealing with doctrine and procedures, supervision and management, training, selection, and mobility. Within each category, the recommendations will be ordered by a very approximate phasing that indicates the study team's view of both the importance and necessary development time to effect the change. Phase I is short-term meaning 6-12 months, Phase II is the one to two year midterm, and longer term items are noted in Phase III.

Note should be made of the CMF 76 Restructured Supply Staffing and Training Concept. The QMS developed this concept with the effort beginning in 1977 and the concept has progressed to the point of being staffed worldwide by MILPERCEN in the fall of 1979. As staffed by MILPERCEN, the concept would (1) eliminate the 76D MOS and distribute the direct support duties of the 76D between the 76P and 76V; (2) create a 76C to take the using unit duties of the 76D; and (3) merge the 76C with the 76Y at skill level 30 to create an NCO knowledgeable about all using unit supply activities. Since the concept has not yet been approved by DA and may be changed in some details, it is not treated in the recommendation directly; in any case, many of the unit level problems, including most of those in selection and training, are not addressed by the 76C concept paper.

I. Doctrine and Procedures

Phase I

1. Require a Monthly PLL Review to include:

   (1) Validation of mechanic's need,

   (2) Reconciliation of Due-Out List with Document Register

   (3) Inventory PLL and submit inventory copy to SSA

   (4) Request replenishment of inventory.

   Rationale: The PLL Clerk is now expected to validate the need for all parts due-in (AR 710-2, para 2-25e(17)), reconcile monthly the due-out list with the document register (AR 710-2, para 2-25f), and inventory the PLL semi-annually (AR 710-2, para 2-38d). These separate provisions are not inter-related by the doctrine logically or temporally although they are inter-dependent for success, and being separate, each must be separately remembered, conducted, and supervised. Validation of need as part of the reconciliation is mentioned only parenthetically and as an option in the automated procedures manuals. Monthly reconciliation is the current doctrine and is sufficient, whereas the PLL inventory now required to be conducted semi-annually is too infrequent. Requiring greater frequency for a task that takes a few hours for the fewer than 300 lines is not unreasonable.

   The recommendation would integrate the four tasks into one logical sequence to be called the Monthly PLL Review that would help insure accomplishment of the validation and inventory through increased visibility, and would simplify supervision since the motor sergeant could focus on one event instead of the previous three. The last task emphasizes the objective of full PLL stockage rather than avoidance of zero balances.

2. Change doctrine to say explicityly that 4 weeks or 2 Due-Out Lists, whichever is longer, must pass without including a request before it may be assumed lost, and canceled and re-submitted.

   Rationale: In their desire to improve PLL performance, many divisions produce DLOGS due-out lists weekly rather than the bi-weekly production recommended and assumed by the automated procedures manuals. These manuals also allow the PLL clerk to cancel a request and to re-order if the requested item is not received or the request fails to appear on two successive due-out to unit lists. By increasing the due-out list frequency, the divisions give themselves less than two weeks to successfully process a request and get the part to the unit. With pre-edit rejections approaching 25%, a typical DLOGS cycle frequency of about three per week, and document and parts handling slowed by passage through the FSCs, a significant proportion of valid requests could take two weeks or longer to yield a part or an appearance on the due-out list. Thus, the increased due-out list frequency is causing the generation of unnecessary cancellations, new requests, and excess parts since the cancellations frequently do not catch up with the MROs.

3. To simplify the PLL Clerk job, require that DX and QSS lists be combined, in NIIN sequence. This list should include all lines that require exceptional processing such as those obtained through local purchase or local fabrication.

   Rationale: Besides simplifying the PLL clerk's job, combining the two lists is likely to result in one list that has improved organization and print quality because of greater management attention.

4. Include any summary of demands with PLL Change List and issue PLL Change List quarterly, to coincide with a Monthly Review.

   Rationale: The demand summary listing of DS4 is useful only as additional information at the quarterly PLL add/delete decisions and then the information is a repetition of the information in the PLL Change List except for lines not meeting PLL stockage criteria. The utility of the demand summary information is limited then to guiding the unit commander to those lines that almost qualified for stockage and that he might want to add as commander's prerogative.

   The argument is frequently made that the quarterly demand summary is needed so that the PLL Clerk would have current information in the event that ADP support would be interrupted. Such an interruption would likely occur only with hostilities, in which case the PLL clerks would be relatively unconcerned about the strict demand criteria justification of PLL additions. And in day-to-day operations, the PLL clerk has no need for the demand summary list for any purpose so its loss would be of no significance.

5. Simplify the PLL Change List by (1)eliminating unnecessary information and (2)substituting prose or abbreviated English words for codes. Where information for a PLL line exceeds 1 output line, use 2 or more.

   Rationale: The DS4 PLL Change List example is reproduced in Table IV-1 and shows the Recommended Stock Number Field for new preferred substitutes for NSNs on the PLL. The example also shows the use of several one and two digit codes bearing no direct relationship to the code meaning. For instance, the Stockage List Code uses Q to mean demand supported, M for provisional, and Z for non-demand supported. Even the Action Code is a two-digit code which could have read AD for adding a line, DL for deleting the line, and CH to indicate a change in quantity stocked. Instead, the code is an "X" and a number.

SECTION IX. PRESCRIBED LOAD LIST

PLL CHANGE LIST

PREPARED 08 AUG 78 DS4 SUPPLY MANAGEMENT REPORT AGL-C35

DODAAC WFAAB2 SUB PLL

PLL CHANGE LIST

RECOMMENDED STOCK NUMBER FLD	CURRENT PLL STOCK NUMBER FLD	NOMEN	UI	REC	EXP	DSC	SIC	TYP	END ITEM	ESTAB DATE	UNIT PRICE	6 MONTH DMD QTY	ANNUAL DMD QTY	IRL QTY	CLD QTY	RCMD QTY	ACTION CODE	REMARKS
	2805-05-K01-1267	PEN	OZ			0	Z	A	TRUCK	8046	.21			1	5	1	X3	
1615-05-001-0012	1615-05-010-7386	EXTENSIO	FT		X	)	Z	A	TRUCK	8046	30.00			100	5	100	X2	
	1005-05-021-2430	LOCKBACK	PR		X	0	Z	A	TRUCK	8046	2.34			3	5	3	X3	
	1650-05-056-2286	SERVOASS	PG		X	)	Z	A	TRUCK	8046	38.97			1	5	1	X3	
	2835-05-156-9780	ENGINE	PR		X	1	P	A	TENT	8047	85.00			3	5	3	X3	
	7615-05-166-5504	HEADROTA	PR		N	0	Z	A		8047	72.10			3	2	1	X3	
2805-05-637-1332	2805-05-632-1266	PIN	EA			0	Z	D	TRUCK	8046	6.53			5			X1	
2805-05-N35-6129	2805-05-H23-4292	DESK	EA			0	Z	D	TRUCK	8056	.37			5			X1	

ENDPAGE 2

Figure 53. PLL Change List

Table IV-1. Example of PLL Change List in DS4 (from TM 38-L32-11 (Test))

Since the substitute stock number is likely to be an infrequent occurrence, the horizontal space on the print out used for it should be re-distributed to allow two or three digit abbreviations in lieu of the one or two digit codes without inherent meaning. The example of a possible rearrangement is shown in Table IV-2. This new format provides only that information needed or of real use to the PLL clerk and presents it in a more understandable manner. Note a provision to simplify the PLL clerk's response to each recommendation and that the date of the whole sheet is given as a Julian date which is the standard form for supply transactions. The DS4 example gave the date in day and month.

Another item is that any substitute or recommended NSN that would occur would be noted by an explicit message printed beneath the appropriate line in the list and might read "THIS NSN, 1234-00-567-8910, SHOULD BE SUBSTITUTED FOR THE NSN IN THE ABOVE LINE," or be noted in the RECOMMEND ACTION field by using two or more lines.

Finally, where information is provided that is coded elsewhere such as in the AMDF, the code description is given at the bottom of the listing for readers such as motor sergeants and motor officers who are likely to review the listing but are unlikely to be familiar with the code meanings.

6. To provide management information for unit Motor Officer or CO, include critical Non-PLL Requests, i.e., NORS demand history, with PLL Change List.

   Rationale: If it is felt that some demand summary information is needed, it should be provided as part of the PLL Change List to reduce somewhat the distribution load and should be edited in some manner to reduce the mass of such data and improve its usefulness. Supplying just the demand history of NORS requests would be one method of usefully accomplishing this editing.

Table IV-2. Recommended Format for PLL Change List

PLL CHANGE LIST

PREPARED: 9220 (8 AUG 79)

UNIT DODAAC: WAKXYZ

STOCK NUMBER	NOMEN	DSC	EC	END ITEM	UI $	UNIT PRICE	* LAST *NORS	6 MONTHS DMD	* QTY*	OLD AUTH QTY	RECOMMEND ACTION	NEW AUTH QTY $	COST TO ADD	AGREE	MODIFY
2805-00-123-4567	PIN	ASL	G	M35A1	EA	8.21	0	18	40	2	INCREASE QTY TO	3	8.21	AGREE	MODIFY
1640-00-524-1122	WASHER	QSS	G	M105	EA	.18	0	15	18	2	DELETE-QSS	0		AGREE	MODIFY
1450-00-540-4321	WIDGET	DX	C	M60A1	EA	420.00	2	8	8	2	NO CHANGE	2		AGREE	MODIFY
1840-00-545-8192	EXTENSIO	NSL	C	M60A1	EA	18.20	8	21	50	12	DECREASE QTY TO	2		AGREE	MODIFY
2440-00-560-1119	PIPE	RECOV	C	M60A1	EA	44.10	2	15	16	0	ADD	2	88.20	AGREE	MODIFY
1444-00-610-2440	CLAMP	NSL	C	M151A3	EA	2.00	5	18	30	2	CHANGE NSN TO			AGREE	MODIFY
											1440-00-610-2441	2		AGREE	MODIFY

TOTAL COST TO ADD = $ 96.41

NON-PLL REQUESTS

STOCK NUMBER	NOMEN	DSC	EC	END ITEM	UI $	UNIT PRICE	* LAST *NORS	6 MONTHS DMD	* QTY*	UNIT ACTION (NONE REQUIRED)
1430-00-123-6789	WHATZIT	NSL	C	M60A1	EA	18.19	2	2	2	

CODE REFERENCE
- EC-ESSENTIALITY CODE
  - C ESSENTIAL FOR END ITEM OPERATION
  - D ESSENTIAL FOR CREW OR OPERATOR
  - E ESSENTIAL FOR WEATHER OR LAWS
  - F NOT COMBAT ESSENTIAL
  - G NOT ESSENTIAL

7. Improve utility of PLL List by (1)eliminating unnecessary information, and (2)replacing codes with abbreviations, thus creating increased space for manual uses of the PLL List.

   Rationale: Comparing the DS4 example of a PLL List given in Table IV-3 and the recommended format of Table IV-4, it can be seen that the simplifying improvements described in Recommendation 5 above have been applied here.

8. Change the Document Register, DA 2064, to include column for price and additional space for high-priority signatures; or set Army standard for format of price information. Rationale: Price was an entry in almost every document register observed. Similarly, signatures of commander's validating high priority requests frequently obscured the NIIN. Providing space and formats for this information would simplify transition of 76D from school to unit and between units.

9. Change designation of all publications bearing on PLL to AR, FM, or TM status to facilitate distribution. This will primarily affect CDA code reference guides.

   Rationale: Currently, the reference guides for the AMDF and other microfiched catalogs can only be obtained from USA Catalog Data Agency. While USACDA has done a commendable job of making the requesting procedure an easy one, it is a non-standard procedure and may account for the result in the PLL objective data collection that 32% did not have the AMDF code reference guide and where 76% of the clerks had the AMDF I&S, only 34% had the I&S Code Reference.

10. Delete requirement for PLL Clerks supported by DS4 to maintain a Due-In suspense file emphasizing requirement to post latest status to the Document Register.

   Rationale: Most of the divisions visited held status cards from higher levels until processed through a weekly DLOGS status update program.

SECTION IX. PRESCRIBED LOAD LIST

PLL LISTING

PREPARED 15 AUG 78	DS4 SUPPLY MANAGEMENT REPORT	PCN AGL-034
DODAAC WFAAB2	PRESCRIBED LOAD LIST	PAGE 1

RECOMMENDED STOCK NUMBER FLD	PLL STOCK NUMBER FLD	NOMEN	UI	REC	EXP	DSC	SIC	TYP	END ITEM	DATE ESTAB	UNIT PRICE	EXTENDED PRICE	AUTH QTY	ON QTY	LOC	REMARKS
	2805 05 E04 3456	RIM	EA			O	C	D	GOBBLER	7104	$ 2.25	$ 11.25	5			
	2805 05 E05 4567	SHIM	EA			O	C	D	DESK	7305	.35	1.75	5			
	2805 05 E06 3525	RING	EA			O	C	D	TURKEY	7104	.45	2.25	5			
	2805 05 F01 3221	SEAL	EA			O	C	D	TURTLE	7305	4.95	24.75	5			
	2805 05 F02 4429	BEAR	EA			O	C	D	TRACK	7305	7.85	39.25	5			

Figure 55. Prescribed Load List.

Table IV-3. Example of PLL List in DS4 (from TM 38-L32-11 (Test))

Table IV-4. Recommended Format for PLL List

PRESCRIBED LOAD LIST

PREPARED: 9220 (8 AUG 79)

UNIT DODAAC: WAKXYZ

STOCK NUMBER	NOMEN	DSC	EC	END ITEM	UI	$ UNIT PRICE	$ EXT PRICE	AUTH QTY	QTY DUE IN	LOCATION	O/H
2805-00-112-4567	SEAL	ASL	C	M35A1	EA	14.20	142.00	10	0		
1440-00-142-1119	RINGSET	RECOV	C	M60A1	EA	8.19	24.57	3	1		
1440-00-189-2480	STARTER	DX	C	M60A1	EA	120.10	240.20	2	0		
2540-00-202-1192	BEARING	NSL	G	M151A3	EA	4.20	25.20	6	1		

CODE REFERENCE
EC-ESSENTIALITY CODE
- C ESSENTIAL FOR END ITEM
- D ESSENTIAL FOR CREW OR OPERATOR
- E ESSENTIAL FOR WEATHER OR LAWS
- F NOT COMBAT ESSENTIAL
- G NOT ESSENTIAL

In any case, the status indicated on the due-out listing is no more than an average three days behind that on a status card if the due-out list is produced weekly, the usual case. Asked the purpose of the Due-In Suspense File, no PLL Clerk answered that was used to keep track of dues-in in quantity or in time. The principal answer given was that it provided knowledge on the status of requests which is information to be recorded in pencil on the document register on receipt of status information. This file appears to be of interest to inspectors only and to be unnecessary work for the PLL Clerk.

Phase II 11. Provide PLL Clerk a listing after each DS4 cycle of the status of all requests submitted for that cycle, all other transactions submitted for that cycle, and all transactions outstanding that have not been previously indicated as released for issue, passed, or backordered.

Rationale: The DS4 system has several open ended procedures that are to be manually closed and that have high potential for loss of transaction documents. Technical editing, keypunch, and referrals to managers from the pre-edit and the DS4 programs are among the manual steps where SSA personnel can abuse the system by losing documents through intent or negligence. Similarly, a few PLL situations were observed where clerks had entered request transaction data in their document register for which they had not prepared and submitted a request to the SSA.

A procedure is needed that will tell the PLL Clerk, and his supervisor, what requests and other transactions submitted by him were captured by the automated process. The due-out lists do not now perform this function since they omit those requests acquired by the system and for which an MRO has been produced. So with the current due-out lists, a request that has not appeared on a due-out list and for which no part has been received could have dropped out of the system at several points or may still be valid.

The recommended procedure will give the unit a record of the transactions acquired by the system for the indicated cycle, which will validate the document register, give more timely feedback as to unit errors, reduce the mystery surrounding lost records, and increase confidence in the system.

Note that this recommendation is not a complete roll-up of all the unfilled requests to date, but only a record of the unit's transactions for the reported cycle - it would typically be 10-20 lines on one page.

12. Extend automated support to DX, eliminating manual record of demands, second source of parts, and the DA 2402.

    Rationale: In the PLL Clerk interview results, it was indicated that just 32% used the DA Form 3318s to keep a manual record of demands for their DX lines. This is required since DLOGS does not automate DX records. To insure better up-keep of PLL stockage on these usually critical lines, DX stock control and accounting should be automated with the customer transactions similar or identical to the procedures for non-DX lines. This would simplify the PLL Clerk's job by eliminating use of the DA Form 2402 and probably another source location for parts.

13. Integrate stock and financial accounting systems to provide PLL Clerks with one set of records from one distribution source.

    Rationale: Currently, the PLL Clerks in divisions must reconcile the DLOGS due-out list with the document register, and then reconcile a COLEX or CAMUS expense summary with the document register. The DLOGS list comes from the DMMC possibly delivered through an FSC and the financial summary comes through the battalion S-4. Combining the two systems at least as they manifest themselves to the using unit would greatly simplify the PLL Clerk's job. It should also improve the accuracy of the financial system since the PLL Clerk is the individual currently responsible for reconciling the two systems.

14. Combine all doctrine bearing on PLL into one document or make one document the key to the job making specific references to other publications. This document would be updated with the same frequency as the relevant AR.

    Rationale: This recommendation meets the principal finding that the lack of integration of the doctrine serves to complicate the work.

15. Provide Unit Commanders, Motor Officers, and Motor Sergeants with commanders guide or section in organizational maintenance FM that: (1) summarizes PLL procedures
    (2) lists all pertinent references with descriptions of topics covered
    (3) describes inspection & supervision technique

    Rationale: In finding that PLL supervision is inadequate, it is clear that a supervisor interested in the PLL operation must go through the same tangle of regulations, automated procedures, manuals and other doctrine in self-study as a PLL clerk does. An organized, accessible reference would make supervision easier and reduce the mystery surrounding PLL procedures.

16. Consider giving DA guidance for monetary turn-in credit to unit COLEX/CAMUS/TUFMIS/STANFINS accounts.

    Rationale: With few exceptions, all PLL clerks operate under some financial accounting system that imposes some budgetary restraints at the company/battery/troop level. The observation that the budget highly motivates PLL Clerks toward frugality should be applied to the problem of low rates of return for excess parts and reparables. In most divisions, the allowances for serviceable, excess parts is 10% or less.

17. Provide PLL Clerk near-immediate feedback as to request and other transactions accepted. This should be accomplished at the FSU at the time of transaction submission. A device like the Division Level Data Entry Device (DLDED) would accomplish this.

Rationale: The learning of accuracy in tasks from tank gunnery to administrative procedures depends on the speed, reliability, and detail of the performance feedback. Feedback to PLL Clerks as to errors now is unreliable and occurs two or more days after the event which is the prime behavioral cause for the near 25% reject rate. Recommendation 11 above seeks to make the reliability of the feedback 100%, i.e., the PLL Clerk always gets feedback on submitted requests, and standardizes the delay time. This Phase III recommendation intends to make the feedback as to the acceptability of a request or other submission at the place and time of submission. This will allow the PLL Clerk to make on the spot corrections and will be an important learning tool as it quickly identifies mistakes.

II. Supervision & Management

Phase I

1. AR 611-201, Enlisted Career Management Fields and Military Occupational Specialties, includes descriptions of qualifications and duties for each MOS at each skill level. For 63B/C30, change "Requisitions spare parts, tools, and supplies." (pp 3-63-13 to 3-63-17) to "Supervises and instructs PLL Clerk in requesting, storage, issuance, and accounting for repair parts. Supervises and instructs TAMMS clerk in the upkeep of maintenance records. Arranges for request of tools and supplies."

Rationale: This AR describes the work content for each duty position of each combination of MOS and skill level in the Army. As such, it can be part of the basis for training program development, career evaluation through such instruments as SQTs, and the job description authority for configuring TOEs. With this regulation serving as a basis for the development of other doctrine, it is imperative that it properly reflect the PLL clerk supervision and training aspects of the motor sergeant duty position.

2. In AR 611-201, include supervision of repair parts supply as a duty for 63C40.

   Rationale: Skill level 40 is the level specified for motor sergeants in the DA TOEs for combat battalions. For the 63C40, AR 611-201 makes no mention of PLL or repair parts supply. The regulation should be changed to include the recommended sentences given in the recommendation 1 above.

3. Develop, distribute and encourage MACOMS to use exportable training package on repair parts studies for motor sergeants and motor officers. Course should be 40 hours with at least 24 hours on DS4 procedures.

   Rationale: While there is a need for resident training for potential PLL supervisors, there is a great need to address the inadequate knowledge of PLL held by incumbent motor officers and motor sergeants. Since motor sergeants are unlikely to attend advanced NCO or other resident TRADOC schooling, are likely to stay in the same motor sergeant duty position for the 3-5 years of an assignment, and often have 3-5 motor sergeant assignments in succession prior to retirement, it is clear that the only way to reach this population is through the MACOMs to which they are currently assigned.

   Many of the short courses now used by installations in CONUS dwell on not only the theory of manual PLL procedures, but train the students on the details of manual record keeping. This leaves too little course time available for instruction in the automated procedures that the motor sergeant and PLL clerk students are most likely to see. Such courses should review the logic and theory of the manual procedures but have a substantial majority of the course time spent on the DLOGS and DS4 procedures.

4. Modify the 320 hour Junior Officer Maintenance Course (8C-77D, Armor School), syllabus to increase repair parts instruction from the current 11 hours to 40 hours with at least 24 hours on DS4 procedures.

   Rationale: As junior company grade officers are shifted among duty positions in combat battalions to broaden their experience, the turnover through company and battalion motor officer positions is quite high. During the term of a motor sergeants assignment to a company, he may see three or more motor officers. Besides the within battalion turbulence, there is a higher rate of flow of new officers to combat battalions than flow of motor sergeants. The motor officer course is a good vehicle for transporting knowledge of repair parts operations to the first line PLL supervisors. Going on the basis of the number of subordinates that work in the PLL specialty, one-eighth of the motor officer course or 40 hours should be devoted to PLL operations. It should, however, perhaps be a greater proportion of the 320 hour course since the motor officer and motor sergeant supervise a fewer number of specialities. That is, there may be eight or more enlisted personnel in the company motor pool, but they can be categorized into track vehicle mechanics, wheeled vehicle mechanics, armament mechanics, TAMMS clerk, and PLL clerk.

5. The DA policy for PLL arrangement is separate PLLs for each company in mechanized battalions. Co-locating PLLs within battalions should be permitted only for short periods and should be discouraged. Consolidated battalion PLLs is not DA policy and exceptions by MACOMS should be limited.

   Rationale: The observations of colocated PLLs in battalions in USAREUR and CONUS were that this method does effectively concentrate expertise in the PLL section and makes it available to all PLL clerks. However, it inevitably leads to specialization as certain PLL clerks show adeptness at technical editing of the requests of their peers, making parts runs to DX and TSO, and other portions of the task. Colocation is frequently inefficient as company motor sergeants usually assign a mechanic to the managing of the paperwork and parts flow to and from the PLL section. Colocation also causes some loss of awareness and control of the company PLL by the motor sergeants. In tactical situations, besides the motor sergeants being unfamiliar with aspects of PLL when it can be most critical, colocation ignores the combat doctrine that says tank companies and mechanized rifle companies will be cross attached to form tank heavy or infantry heavy battalion combat teams. It would appear that company integrity is essential to allow brigade commanders the opportunity to allow brigade commanders the opportunity to make such rearrangements.

Phase II

6. Consider requiring advanced NCO course for, or as prerequisite for, E6-63C30 which would include 40 hours of repair parts instruction with at least 24 hours on DS4 procedures.

   Rationale: Requiring attendance at such a course would be a more permanent method of insuring that motor sergeants have adequate training in PLL.

7. Consider requiring attendance at Basic Warrant Officer Course for newly appointed 630As. Include 40 hours of instruction in repair parts supply with at least 24 hours on DS4 procedures.

   Rationale: Recruitment for the warrant officer program is from DS and GS mechanics who have had no opportunity for observing PLL operations, and from the junior motor sergeant population that has been found wanting in PLL knowledge and PLL supervision abilities. Currently, the basic warrant officer course is understood to be an option with new warrants being given the choice of attendance. While the PLL clerk interviews indicated that the clerks occasionally turned to a battalion maintenance technician for help in PLL matters, the frequency of such references confirmed the observation of the study team that the battalion maintenance technicians have not significantly more knowledge of PLL procedures than the motor sergeants.

8. Provide unit motor officer information monthly to help in his management of the PLL to include:

   - number of requests for the period, total and by IPG
   - number of NORS requests
   - unit to SSA request processing time
   - monetary value of requests
   - monetary value of receipts
   - average number of transactions per DS4 cycle
   - average age of requests submitted
   - average number of DLOGS cycles between dates of unit transactions
   - average DS4 cycles per week for the period
   - maximum unit transactions for a cycle during the period
   - number of requests rejected, classified by type of error
   - number of requests that were PLL replenishment
   - summary of other transactions, AØB, AØE, AC1, DHA, etc.
   - number and value of excess items on hand
   - summary of reconciliation statistics such as number of cancellations as a result of

reconciliation, number of requests due in to unit, extended dollar value of due-ins to unit.

Rationale: Even with a good understanding of PLL procedures, the unit motor officer still must employ continuous or frequent observation of the PLL clerk to maintain close supervision. In an automated environment, the computer system should provide management information to substitute for these possibly time consuming methods. Such indicators as those given in the recommendation would help the supervisor follow the quality of the work through reports of error rates and certain reconciliation statistics, and timeliness of the work through measures of the transactions volume.

III. <u>Training</u>.

Phase I 1. Improve the PLL Clerk AIT instruction by rewriting the students' texts to make them more consistent with the accepted principles of programmed instruction. The texts should present and then require reinforcing responses on elements of information, should repeat material frequently, should have short units, and have consistent knowledge-of-results feedback. A portion of the 76D AIT text has been rewritten to conform with programmed instruction principles and is presented in Appendix K.

Rationale: The basis for this recommendation is summarized in the Principle Findings for Using Units. A review of the principles of programmed instruction and shortcomings of the 76D self-study text are given in Appendix C. An example of proper implementation of programmed instruction for PLL students is given in a later appendix.

Phase II 2. Improve the AIT instruction for the PLL clerk duty position by introducing as a significant practical exercise (3-5 days) interaction with a DS4 simulator.

Rationale: The "round robin" phase of the 76D/P AIT course at the Quartermaster School gives a credible practical exercise for manual PLL operations, TAMMS record keeping and warehouse operations - although the warehouse model is so perfect as to give high expectations to the students that will be shattered on assignment to any of the locations visited by the study team. The PLL practical exercise should require a realistic transaction volume, should permit students to submit requests and other transactions containing errors, and should show the consequence of errors. The simulation should have the students go through a PLL change exercise, and a reconciliation exercise that would illustrate the limitations that this DS4 list has in validating all the requests in a document register.

3. Consider training media alternatives to self-paced, programmed text instruction, especially computer aided instruction, and some lecture or conference format instruction.

   Rationale: The review of programmed instruction and instruction techniques for low aptitude students given in Appendix C indicated that self-paced, programmed instruction could be an effective method of training. The problem that this recommendation addresses is that the media for the training of category III and IV students should be something other than a written text since these students typically have reading deficiencies. There may be many alternatives to written textbooks, but computer aided instruction and lecture or conference format instruction should be given serious consideration. Computer aided instruction is expensive but provides the action orientation that is desirable for low aptitude students and is a different instruction format from that found in most high schools. The lecture method, found to be an effective means of training and instruction for thousands of years, would be a useful change of pace if used in the AIT course for some significant minority of the time. A very valuable advantage of the lecture method, if the instructor requires student interaction and responses, is that it would be a form of student evaluation. Specifically, the instructor would be able to identify those AIT students who cannot speak English but who have a good understanding of written English. The study team has attempted to talk with numerous such AIT graduates who had finished the 76D course usually in a significantly shorter period of time than the average student but who were performing poorly on the job since they could not communicate with the motor sergeant, mechanics, and SSA personnel.

IV <u>Selection</u>

Phase I

Aptitude selection criterion for PLL clerk MOS should be significantly higher than that for the unit supply clerk/armorer. The required Clerical Score should be 105.

Rationale: The point was made in the using unit principle findings that the complexity and performance expectations were significantly higher for the PLL clerk than for the supply clerk/armorer. It is understood that the principle motivation and method for adjustment of the selection criteria for any MOS is the AIT failure rate. However, it has been alledged that the failure rate cannot exceed 15% without incurring corrective action on school administrative personnel. Obviously, this negates the selection criteria adjustment process.

Phase III

2. An MOS selection procedure or instrument should be developed with a validity coefficient of .65 or greater demonstrated in large samples of AIT candidates for a variety of CMFs.

Rationale: The existing Army Classification Battery (ACB) was to have had a validity coefficient of .68 for the clerical aptitude dimension. Data from the Quartermaster School indicates that the correlation between the ACB clerical score and success in the CMF 76 AIT courses is .33. That is, the ACB was to predict 46% of the variance in AIT success (0.68 squared), but actually predicts just 11% (.033 squared) of the variance. With such low validity, the usefulness of the ACB and its deviative instruments becomes doubtful. New selection and placement batteries should be developed appropriate to the military accession population of the 1980s.

V. Mobility

Develop, test, and field a PLL storage shelter that would mount on a 1½T trailer, would provide storage for all PLL parts except large bulk or heavy items like tires and track, and would provide the PLL Clerk with an organized work place.

Rationale: The failure of TOEs to provide anything more than a 1½T trailer for the transport of the company's PLL suggests to unit personnel that the drafters of doctrine expect the typical 150 lines of repair parts to be dumped into the trailer for any movement out of garrison. An alternative to this apparent careless attitude is that the doctrine writers do not expect the company PLL to ever move from the garrison environment. Neither of these alternative interpretations are believed to be the case. Indeed, a large number of companies visited in both CONUS and USAREUR had constructured a wood and canvas shelter on a 1½T trailer or 2½T truck to house the PLL clerk, the PLL, and in some cases, the TAMMS clerk and records. The success of these hand-built shelters was mixed as the shelving for holding heavy parts and the anchors for repair parts cabinets would often fail under the high dynamic loads of cross-country movement.

V. PRINCIPAL FINDINGS AND RECOMMENDATIONS FOR SUPPLY SUPPORT ACTIVITIES

A. PRINCIPAL FINDINGS.

The problems of repair parts supply support activities in divisions and major nondivisional units can be stated in many ways with varying degrees of specificity. The five statements that follow are those findings that are most significant and about which attention should be focused.

1. The supply performance of supply support activities, especially division supply support activities, is less than desired.

a. According to the data from the PLL document registers, the mean time to receive an Ø2/Ø3 priority part in divisions is 11 to 14 days with a standard deviation somewhat higher than the mean. The mean time to receive a lower priority part is 22 to 27 days with a standard deviation of 18-33. The means, and especially the standard deviations, indicate that relatively few parts are received in the 3 to 5 days expected for an ASL fill.

b. Looking at measures that reflect performance in intermediate processes of repair parts supply, a sample taken by the study team indicated that location accuracy in division main TSOs was 82% and slightly higher in nondivisional TSOs, 85%. Even with a very generous allowance for transactions occurring after the latest posting of stock status, inventory accuracy was found to be only 55% in division main TSOs. Considering just those steps between picking stock and placing it in a customer's bin, accuracy here was found to be just slightly greater than 80% in forward support companies and 93% in division main TSOs.

2. The doctrine and procedures for divisional SSAs are function or process oriented and do not form a coherent series of integrated jobs. This causes the procedures to appear overly complicated.

a. The guidance on organizational structure provided by the DA TOEs and the field manuals is limited or impractical and the organization implicit in the automated procedures manuals is vague and inconsistent.

b. The structure of organizations implemented in these divisions vary somewhat among divisions but vary greatly from doctrine.

c. It was the consistent observation of the study team that divisions have great difficulty running complex processes, such as location surveys, catalog updates, and ASL updates, successfully.

d. Surveys of SSA doctrine showed no coherent, integrated continuous descriptions of key jobs in Class IX sections of DMMCs and TSOs. With attendant inadequacies of training of NCOs and warrant officers, and the number of reclassified NCOs inexperienced in supply, the automated procedures doctrine must be people oriented, not directed toward machine processes.

3. Divisional and nondivisional SSAs are lacking in technical management and supervisory expertise either through inadequate personnel authorizations or insufficient experience and training of senior personnel on hand.

a. The existing DA TOE for the maintenance battalion of a mechanized infantry division provides one E7 and seven E5s for the TSO. Similarly, the DA TOE for the armor division is one warrant officer, one E6, and four E5s for the TSO. In both cases, there is a critical shortage of senior NCOs provided to give adequate technical supervision to work parties and the armor division TSO TOE is lacking in junior NCOs to lead these work parties.

b. None of the DA TOE TSO positions now require a DLOGS or DS4 ASI even though the brunt of the decision making and records maintenance falls to the TSO in location surveys and inventories. Similarly, some DLOGS/DS4 knowledge is essential in warehouse research for inventory adjustment reports, cross-leveling, issuing for NORS requests, and processing receipt documents.

c. Of the key NCOs interviewed in the TSOs visited, 45% had not been a 76D/P/V prior to this assignment indicating that the NCOs on hand, while inadequate in number, are also inexperienced.

d. In the Class IX section of the DMMCs visited, the Class IX officers frequently noted that they assign their best NCOs to the ASL manager positions, yet fully 45% of these individuals have been reclassified and only 50% of the ASL managers held the DLOGS ASI. Overall, 37% of the key personnel in the Class IX sections had the DLOGS ASI.

4. Improvements in SSA management can be made by providing management information related to day-to-day operations.

a. It was frequently observed that the Class IX management in divisions was unaware of the existence or magnitude of certain operations problems and had no easy way of seeing the impact of some of their operations decisions. It was observed that gathering and organizing information that should exist in an automated environment would assist these managers in directing attention to problems of loss, schedule, and inefficiencies.

b. To obtain information of value on daily operations under DLOGS, the supply performance report could be run daily although intended to be a monthly report. This would give number of requests, warehouse denials, number of high priority requests, and a few other limited pieces of information.

c. DS4 provides two daily reports that indicate workload for the previous cycle. Such reports provide much data but are not oriented toward giving management information.

5. The current state of the supply section of most forward support companies is not consistent with their anticipated peace and wartime functions.

a. While most main division TSOs exceed the intended ASL size of 5,000 lines by several more thousand, the average lines carried in the forward support companies visited was just 1,100 compared to the TOE provided capacity of 1,500 lines.

b. The FSCs rarely implement QSS and provide little or no technical editing of requests from customer units being passed to the DMMC.

c. The current AIM DA TOEs authorize 15 to 19 supply personnel in each FSU supply section. In the units visited, the staff in the FSUs averaged 7 with the difference being used to increase the staffing of the main TSO.

d. The supply performance of forward support companies suggest that management attention is directed elsewhere. In the study sample, location accuracy in forwards was 87%, inventory accuracy 65%, and customer bin accuracy about 80%. In the forwards visited, the average number of zero balance lines was 344. In a sample of 15 FSCs in 5 divisions, the accommodation average was 46.5%, satisfaction 57.2%, and fill rate 26.6%.

B. RECOMMENDATIONS

I. Doctrine and Procedures

TSO

Phase I

1. The divisional maintenance battalion TOEs being developed and proposed by the USAOCC&S (29-26R, -27R, -36R, -37R) provide significantly greater TSO staffing and should be adopted.

   Rationale: This recommendation addresses the principal finding that the availability of technical expertise in the supply support activities is inadequate due in part to a shortage of senior personnel. As was discussed at length in Chapter III, the current DA TOEs do not provide enough NCOs in the division maintenance battalion TSOs to properly supervise and lead the warehouse work parties. These proposed TOEs for mechanized infantry and armor division maintenance battalions provide additional NCOs to the main TSO and the TSOs of the forward support companies. Besides supervisors, there is a significant increase in the staffing at the main TSOs which authorizes a manning level approximately equal to that found in the divisions visited. Recalling from the Chapter III discussion that the divisions visited augmented the manpower of the main TSO at the expense of the forwards, these proposed TOEs will allow the FSCs to retain sufficient strength to be viable supply operations. Approval of these proposed TOEs by TRADOC and HQDA, and implementation by the MACOMs would be an extremely good first step toward removing the manpower limitations to improved supply performance in the division main TSOs.

2. The proposed TOEs above should be expanded to include a Quality Control Section of 2 E6s and 2 E4s to be centered in the HQ and Lt. Mtnc. Co., all with DS4 ASI.

   Rationale: This addition would provide designated personnel to accomplish the causitive research required for certain inventory adjustment reports by AR 710-2 that was rarely observed in the divisions. Careful causitive research on IARs and on warehouse denials would identify for management problems in the repair parts supply operations that would otherwise go unnoticed, but that have significant impact on customer support. Such a section could also provide technical supervision for location surveys and inventories and, more importantly, could perform a regular program of location, inventory, and customer bin accuracy sampling studies that could identify operating problems for timely management resolution. Because tracking most problems would require continually crossing DMMC and the TSO functions, a good understanding of DS4 would be essential.

3. Consider substituting 76V for 76D in receiving, storage, and issuance; and 76P for 76D in QSS and DX.

   Rationale: According to AR 611-201, the 76V is a storage specialist expected to perform supply receiving, preservation and packaging, supply storage and handling, shipping and issuing, and inventory and administration for all classes of supply other than Class V and bulk Class III. Thus, the 76V should be able to perform most of the functions in a maintenance battalion tech supply now performed by 76Ds. From the same regulation, the 76P is a stock control specialist expected to be capable of stock accounting, stock control, and sales functions for all classes of supply other than ammunition, petroleum, and medical supplies. The 76P should be a capable substitute for the 76D in QSS and DX. Making the substitutions in DA TOEs and in MTOEs as soon as possible would remove the burden from the 76D AIT course of in depth instruction in the duty positions of 76D extraneous to using units. This may be a method of sharply increasing the PLL and TAMMS instruction given 76Ds while still providing nominal,rather than proficiency, training in the duty positions overlapped by 76V and 76P. Using units might then receive better trained PLL and TAMMS clerks without the long wait for the 76C.

Phase II 4. Change TOEs to require TSO officers, NCOIC, and section NCOs to have DS4 ASI.

Rationale: DS4 requires the tech supply personnel to correct through special transactions the errors in the automated stock records that are detected in location surveys, inventories, IAR research, and receipt document inspection. The expertise required to conduct these surveys and to resolve the detected errors exceeds or equals the expertise required of an ASL manager. It is reasonable then to require the same proficiency in automated supply procedures.

5. Consider raising the grade of main TSO platoon or section leader from LT to CPT to be more comparable with DMMC Class IX Officer.

Rationale: Continually, the leader of the maintenance battalions main TSO and the Class IX Officer of the DMMC must work together as the parts stock maintainer and the records maintainer of the division repair parts team. Although co-equals in organization and function respects, the 2 or 3 step difference in officer grades compounds any problems in organizational cooperation that usually exist and hampers free communication between the heads of the two complimenting organizations.

6. Develop an improved location survey process and procedure that facilitates consolidation of multiple locations. This program is not required to be part of the DS4 cycle.

   Rationale: Multiple storage locations for a given line within a warehouse existed in all of the divisions visited. Occurring perhaps with equal probability by intent and by error, the proliferation of multiple locations with the attendant increasing opportunity for losing stock, warehouse denials, and other confusion is obviously not desirable. Neither DLOGS or DS4 provide for stock record keeping for multiple locations, nor, worse yet, do they provide for stock location consolidation upon completion of location surveys. In divisions where thousands of lines have multiple locations per line and designation of the desired location can be a horrendous manual undertaking. To overcome this in one division, a warrant officer developed a procedure for consolidation using card merging and sorting equipment. In the instances where the procedure was used, the sorting procedure alone lasted eight hours. As the problem appears to be common in all divisions, at least those visited, the development of a program to support the stock consolidation procedure after location surveys is essential. At the same time, it is highly desirable that such a program simplify the location survey from the human point of view. Described in some detail in Chapter III, the current automated procedures require that the warehousemen prepare and submit specific special transactions to resolve errors in stock location, accuracy of stock identification by NSN, currency of NSN by the AMDF, and other such errors. The warehousemen-required responses should be limited to answering the questions of whether a certain NSN is in a given stock location, if the specified NSN is not there what NSN is, and the identification of any other stock present at the location.

This program need not be a part of the DS4 cycle, but could be a separate program used in the style of the divisions' unique pre-edit programs. Such an approach should reduce the program development time.

7. Develop DS4 capability to accommodate multiple locations.

   Rationale: While secondary stock locations often come about through the negligence of the TSO receiving section, secondary locations can also be assigned for good and valid reasons. Because such multiple locations will apparently always exist, the capability to account for stock in more than one location should be built into DS4.

8. Provide an integrated and consistent statement of doctrine and procedures.

   Rationale: Noted often in Chapter III, the doctrine for division supply support activities given in the automated procedures manuals, AR 710-2, the field manuals for the DISCOM and the division maintenance battalion, and TOEs do not always agree. Statements of doctrine are needed that, if not centralized, are integrated, coherent, and consistent.

9. Improve the MRO, location change card, inventory count cards, and other TSO transaction forms by eliminating information unnecessary for the immediate task, and using English words or abbreviations instead of alphanumeric codes.

   Rationale: The implementation of the MILSTRIP format in DS4 has the result that warehousemen are given transaction documents having a nearly contiguous string of alphanumeric characters. In lighting that universally appeared inadequate for reading tasks, the warehousemen must search among this string, perhaps split into two strings if the prepunched card has been so interpreted, for the information necessary for the task directed by the document identifier code. Each of these transactions should present the warehousemen only with that information required for the task. Any information to be conveyed to the warehousemen calling for exceptional procedures should be presented in words or abbreviations, not codes, on the transaction document. If the length of such messages exceeds available space on the first card, provisions should be made for a continuation card.

Phase III. 10. Develop and implement an integrated automated warehouse management system. As a first step beyond the data entry and editing functions of DLDED, develop automated location management at the receiving section, to include available locations sorted by cube, weight, pilferage, security, shelf life, essentiality, and distance from central aisle.

Rationale: The DS4/DAS3, DLDED, and LOGMARS developments are preceding toward completion with an awareness of one another but apparently without detailed technical coordination. Even with such technical coordination, the fruition of these projects will yield just a fraction of the potential performance payoff of an integrated automated warehouse management system. This recommendation proposes a warehouse management system, not an automated warehouse, that would begin by automating the warehouse locator deck. As was observed earlier, the day-to-day upkeep of the locator deck is frequently said to be the most difficult problem by knowledgeable TSO supervisors. Currently, locator decks require one or more dedicated clerks to make simple assignments of space to incoming shipments based solely on space availability.

11. Consider further automation in receiving section such as automated information acquisition.

    Rationale: Automating the acquisition of information from shipments would be the logical next step in development of a system centered in the receiving section. Results of the LOGMARS test scheduled for early 1980 will suggest the potential of this proposal.

DMMC

Phase I

1. Conduct a task analysis of all DMMC Class IX jobs to assemble job-specific doctrine and procedures. Develop job descriptions and revised TOE that displays specific job titles and job organization. Examples of the first steps in this task analysis are shown in Tables V-1, V-2, and V-3.

    Rationale: A task analysis is a human factors method of analysis that catalogs the step by step actions required in a process to include the information required at each step, source of that information, and any interactions with machines or other persons at this step. Such analyses are a standard part of the development process for aircrewmen in sophisticated aircraft, crewmen in complex weapon systems, and technicians performing involved maintenance procedures. From this task analysis, logical groupings of tasks can be made, and task groups assigned to individual positions within the Class IX section TOE organization. Following the task allocation, job descriptions can be developed and the job positions arranged into coherent organizations. Completion of the task analysis exercise will rationalize the repair parts supply operations, give the software developers a better appreciation of their inherent expectations of performance by the Class IX section personnel, identify

Table V-1. Revised Class IX Section Organization and Strength

REVISED CLASS IX SECTION ORGANIZATION AND STRENGTH

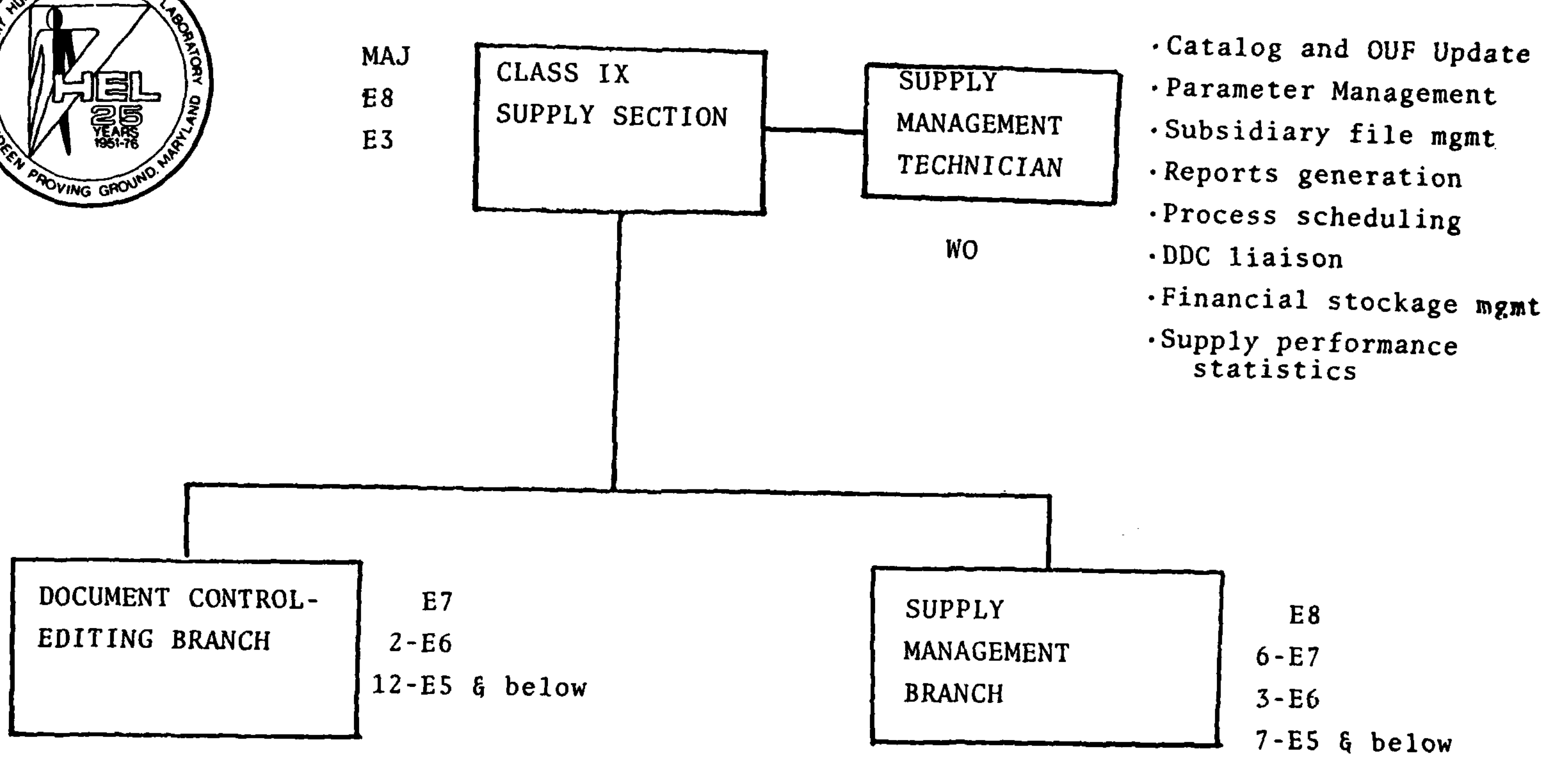


Table V-2. Preliminary Task Assignments in the Supply Management Branch

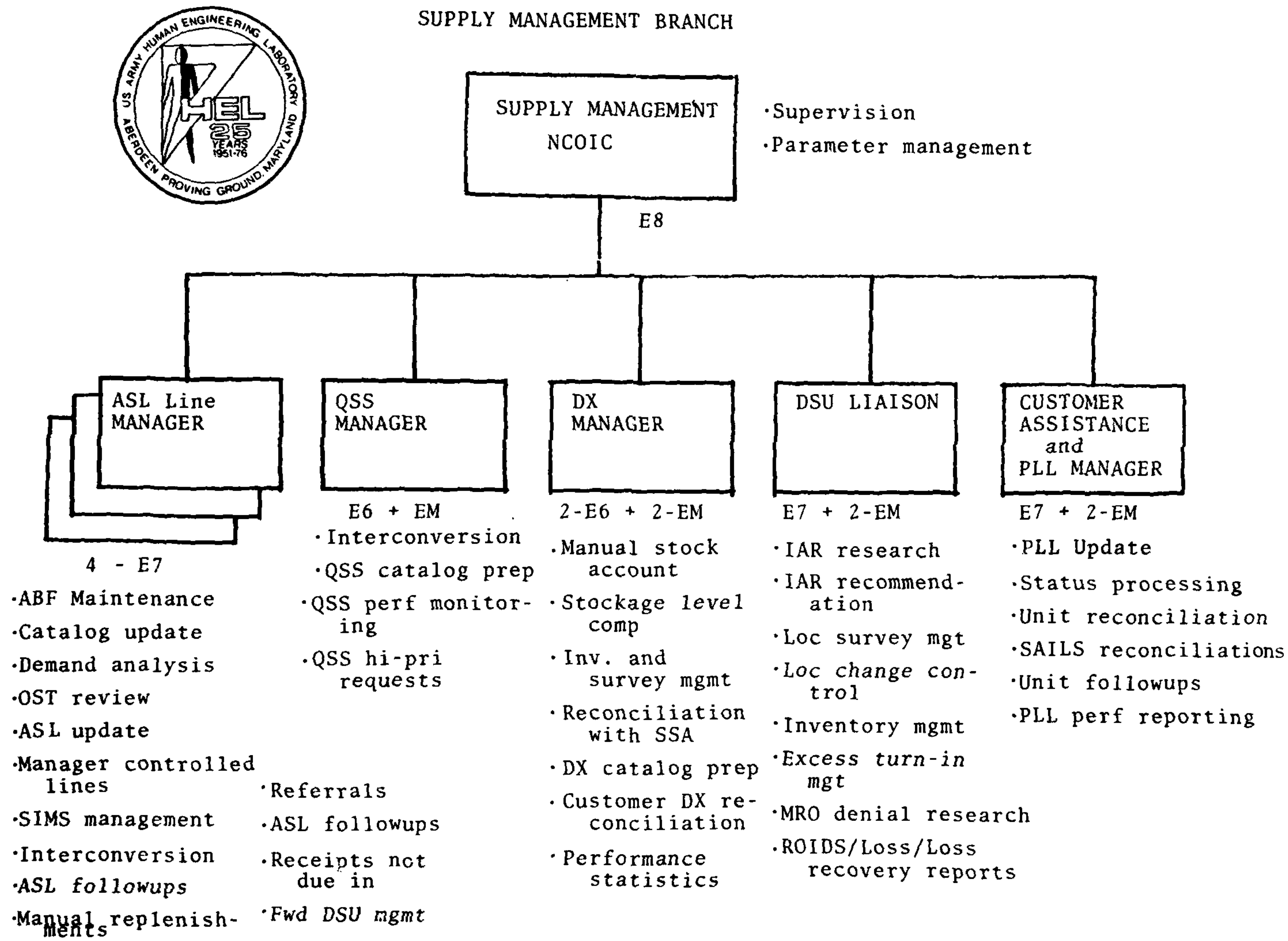
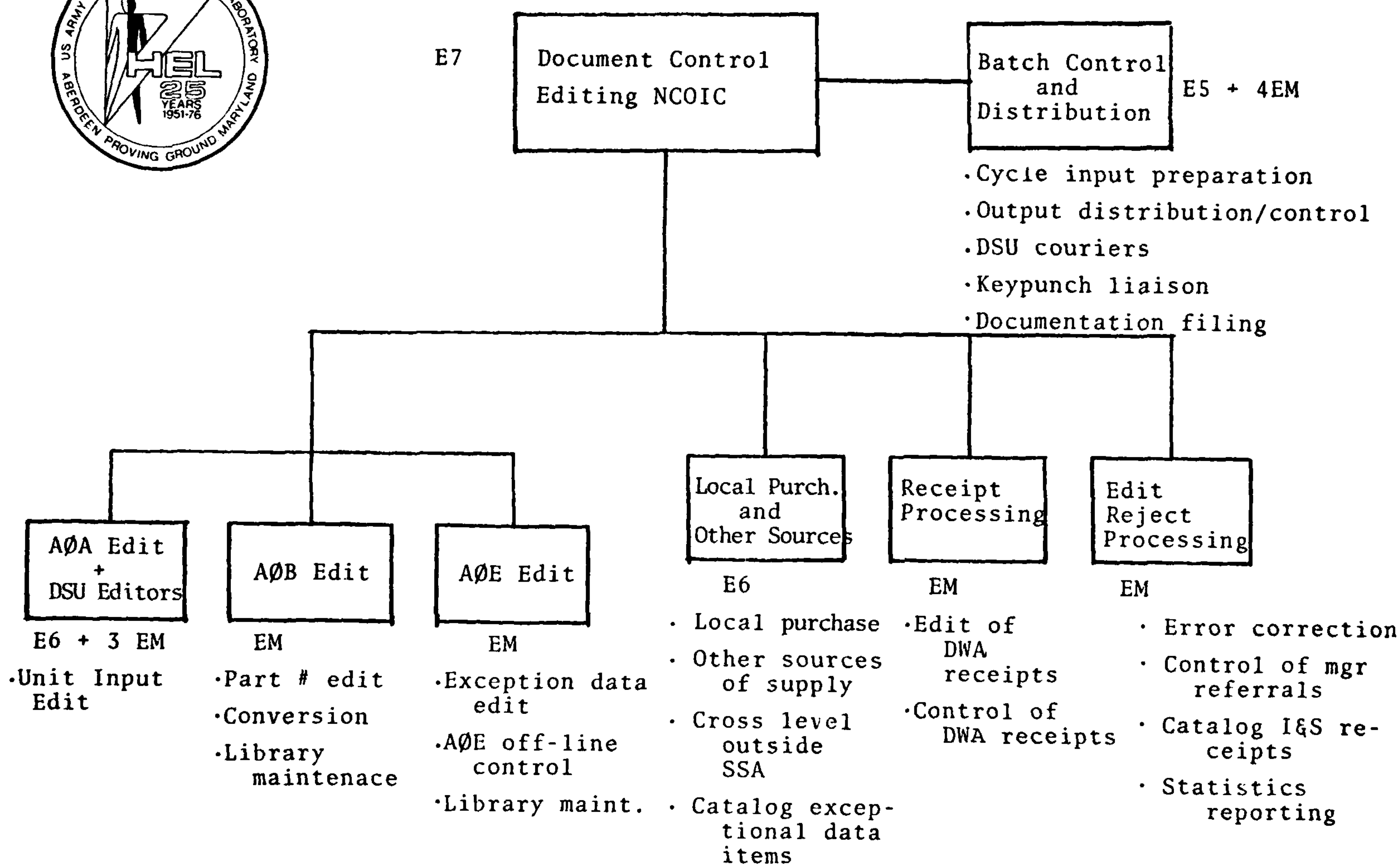


Table V-3. Preliminary Task Assignments in the Document Control and Editing Branch

DOCUMENT CONTROL - EDITING BRANCH



procedure and information gaps in the processes, provide better allocation of work among organization elements, and provide training developers a better basis for syllabus development.

2. Develop job aids for above positions.

   Rationale: Once the task allocation to individual positions has been made and job descriptions developed, the DS4 processes that a job position is expected to perform will be known. Job aids could be developed at this point to make the conduct of the more complex procedures simpler. Job aids, like the cockpit checklist used by pilots of high performance aircraft, usually list the key steps in a process and the important conditions controlling progress to successive steps. These aids reduce the dependence of the supply managers on memory of the process steps without a requirement to return to the detailed procedure description of the automated procedures manuals.

3. Provide one or two keypunch machines to DMMC Class IX sections for use by managers.

   Rationale: The spirit of distrust among organizational elements of the repair parts system is no more evident than in the careful counting and logging in and out of cards exchanged with the DMMC keypunch section in most divisions. The extent of this burden is seen in the dedication of one or more clerks to keeping this log in most Class IX sections. The tragedy of the situation is that the majority of the entries are for 5 cards or less and are for the ASL and PLL managers. If these managers had the opportunity to punch their own cards, it would take little, if any, more of their time even if they were without typing skills as it would save their involvement in batching the cards, logging the batch out, and receiving for the count and batch. Further, the cards would be edited as they were punched, eliminating possible resubmission to the keypunch section for resolution of errors. Besides reducing the logbook maintenance workload, the availability of one or two keypunches would improve the timeliness of manager prepared transaction submissions to the DS4 cycle.

4. Authorize manual technical edit for manufacturer part number (MPN) to NSN conversions at the SSA and for exception data requests. This authorization would include personnel and technical manual library.

   Rationale: Where technical edits to convert an MPN request to an NSN are now performed in divisions, DMMC personnel report a 50% rate of success. Assuming a conservative 50% fill rate, 25% of the MPN requests can be filled from the divisions' ASL, resulting in a significant reduction in the volume of AØB/AØE requests passed to higher sources and in improved support to customer units. The division ASL is, in many cases, the largest stock of parts between the customer units and the CONUS depot. From this, it makes sense to attempt the conversion at this level rather than at corps where, if converted, it can be filled only rarely because of the shallowness of corps ASL stockage. In the divisions that routinely made the conversion attempt, the function required one supplyman, usually a SP4, and seemed worth the personnel cost.

5. Designate an active focal point for collection, evaluation, and distribution of division unique Class IX programs.

   Rationale: In all of the divisions visited, considerable effort had been invested in the development of command unique computer programs to solve various Class IX operations problems. For instance, 6 of the 7 divisions had developed pre-edit programs with their own personnel.

Supply managers within the units often undertook such developments, unaware that similar programs had been completed by other divisions or were currently under development. While many of the functions for which these unique programs were written should have originally been part of DLOGS and DS4, the investment of the creative energies of the developers should be exploited by the other divisions for the good of the Army rather than ignored because the programs were not written by the appropriate agency. An analog of this proposal has been successful in the civilian R&D community for years. Users of the Digital Equipment Corporation PDP8 and PDP11 computers have organized with DEC support to collect and distribute programs written by users to augment the DEC supplied software.

Phase II. 6. Develop a standard edit program to replace the combinations of the division unique pre-edit program and the DS4 edit module. The new program must compare input transactions with catalog data.

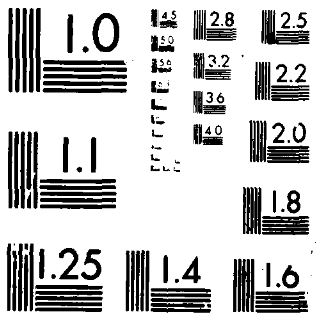
Rationale: The pre-edit programs are effective and necessary, but their use results in a situation like the judicial double jeopardy as a request can be rejected for errors by both the pre-edit program and DS4 program. These double rejections obviously incur substantial delays of the request. Also, the division unique programs are not uniform in quality and some are decidedly less than maximally efficient editors. This proposal seeks to eliminate the double jeopardy by combining the two serial edits and to make the edit program more comprehensive.

7. Develop a post-edit program for passed requisitions which would equal SAILS in scrutiny.

Rationale: All errors that can be detected by an automated process with information that is readily available within the supply system should be detected at the lowest level to speed return of the faulty transactions to the originating unit, if that becomes necessary.

AD-A081 454 HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD F/G 15/5
HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYST--ETC(U)
FEB 80 R L KEESEE, R S CAMDEN, R M POWERS
UNCLASSIFIED HEL-TM-3-80-VOL-2 NL

3 OF 5
AD
A081454



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

With the alleged uncertainites, or at least difficulties, in digital transmission of transaction traffic to the COSCOMs from the divisions, the delays in courier transmission, and the additional opportunities for misplacement and loss of transactions with another set of managers, it is clear that the point of most rigorous inspection should be at the automated process closest to the originator, meaning the division, rather than at the COSCOM as it happens to be now. This downward movement of the system choke point would speed feedback to the customer, more quickly giving him a chance to resolve the error and eventually obtain the desired part.

The rationale for a rigorous post-edit to SAILS standards instead of a more rigorous pre-edit may be subtle but is important. It is hoped that a majority of requests can be filled from ASL stocks. A request for an item that is on hand in the division ASL should not be rejected for not meeting SAILS standards. If the average fill rate in a division is 60% and the request rejection rate is 25%, estimates consistent with the study findings, then 15% of all requests are for items on hand but are rejected. While the causes for rejection of these 15% are not all related to the SAILS standards, this estimate suggests the pre- versus post-edit issue is significant. The objective of good customer support is served with a stringent post-edit. The objective of rigorous policing for comformity of customer requests is best served by a rigorous pre-edit.

8. Automate the SSA level MPN to NSN conversions using MCRL 1 or other means.

   Rationale: The rationale of this proposal is similar to that of recommendation 4 above. It would appear that if the information necessary to make a majority of the conversions is already in catalog form, the MCRL 1, definition of the concepts for the automation of the conversion should be at hand.

9. Increase automated support to the Inventory Adjustment Report process. Such support might include a list of previous IARs on a particular line, and a list or summary of transactions for that line for a specified time period.

   Rationale: Causitive research on the Inventory Adjustment Reports required by AR 710-2 is done with regularity in but one of the divisions visited and accomplished with care rarely in the others. In part, this lack of adherence to the regulation is due to the difficulty of attaining revelant information. This proposal is aimed at providing information that might lead to a simple and quick explanation of the adjustment. Often, an IAR for stock lost in one month may be followed by a stock gain IAR in the same line the following month, indicating some extraordinary delay in receipt processing. Knowledge of the first IAR would lead to an explanation of the second, but without knowledge of the first, explanation of the second might come, if at all, from many hours of studying daily transaction listings.

10. Local purchase and fabrication arrangements should be made by the SSA for, not by, using units.

   Rationale: The field manuals for the DISCOM and the divisional maintenance battalions suggest that the division supply support activity should make arrangements for local purchase and fabrication for parts not available from higher sources and for which these are authorized sources. AR 710-2 is unspecific on the issue. The automated procedures manuals suggest generally that all local sources should be considered before passing a high priority request. Thus, in many of the divisions visited, the customer units were expected to make their own arrangements for local purchase, fabrication by commercial shops, or fabrication from DIO facilities after approval had been obtained from the DMMC Class IX section. The Class IX section then executed paperwork for procurement authorization and funding. This cavalier approach by the DMMCs precluded the building up of a base of experience that would have been useful to all parties concerned and is at odds with the doctrine set in the field manuals. The centralization of such arrangements in the DMMC would be in the interest of providing improved supply support to customer units and is assignment of the task to the group having the requisite knowledge of supply regulations.

11. Change personnel assignment strategy within divisions to make assignments to highest percentage shortages rather than highest number shortages.

    Rationale: In division after division, the maintenance battalion was kept at a high rate of fill of entry level 76D personnel at the expense of the combat and combat support battalions needing relatively few 76Ds for PLL and TAMMS positions. In units where large numbers of technical specialists exist, a cadre of NCOs and lower enlisted men of the required technical specialty can more easily train the substitutes than in units where the MOS is one of a kind. The existing, apparently de facto, personnel doctrine should be reversed to fill the low percentage shortages first. The irony in the 76D is that a substitute MOS working as a PLL clerk will take months to learn the job while an excess MOS can be trained to acceptably perform the mainstream storage and issuance functions of a warehouse in a few weeks.

<u>General</u>

Phase I

1. Insure that the QSS benefits exceed the QSS management expertise, manpower, and storage facility costs by giving SSAs the option to either:

-Eliminate QSS within divisions, or

-Implement QSS with these attributes:

- -Quick, i.e., immediate or same day service, at all locations.
- -Only want slips should be used as request medium.
- -500 lines in main and each FSU.
- -Stock same list at each location.
- -Low price items, i.e., $2 limit.
- -Encourage stockage of small parts.
- -High volume, i.e., 50-100 demands/year.

Rationale: In most divisions, the QSS service is not "quick" with issues being at the same speed as materiel release orders. Observation in all of the divisions visited and limited data indicate that QSS demand satisfaction is typically less than ASL goals. Only a few of the divisions visited had QSS stockage in the forward support companies and two divisions were operating their QSS under command unique pseudo-detailed accounting, obviating the supposed advantage of reduced keypunch and computer transaction volume. Most divisions require a 2765 for QSS requests and some require a want slip in addition to the 2765. Any request procedure other than the informal want slip results in increased workload by PLL clerks. The cost of a QSS operation is substantial in that it requires diversion of management personnel at both the DMMC and the tech supply when such a resource is in short supply. Further, the implementation of a full QSS in the supposedly fully mobile forward support company supply sections would consume a sizable portion of their storage assets. For these reasons, constrained stockage conditions for QSS are given that would allow it to be manned for day-to-day operations by a single SP4 at each location without the continuous need for a supervising NCO. Also, the stockage constraints would permit QSS operation in the forward support companies without consuming a significant volume of their storage resources. To minimize confusion in stockage list preparation, distribution, and use, particularly issues in a line where one or more locations have zero balances, the proposal calls for the same stock to be maintained at each DSU.

2. Where QSS is implemented, clarify the request routing procedure for multiple QSS location and list situation in DS4.

   Rationale: As it is understood, DS4 allows for a QSS operation in each direct support unit with each having a unique stockage list. The DS4 procedures manuals give no indication as to the procedures to be followed when a QSS request is submitted to a DSU where the requested line is at zero balance. If the line is not a QSS line in the other DSUs, it is not clear whether the zero balance issue is replenished from one of the other DSUs, whether the customer unit should pass an AØA request through the supporting DSU, or whether the supporting DSU should hold an informal due-out to the unit as is sometimes now done.

3. Move the DX stock account computation function to the DMMC Class IX Section.

   Rationale: It was noted in the observation and data collection visits that the complicated DX stockage computations were not well performed consistently in the supply support activities, in part due to the shortage of supply expertise. A move of the stockage computation function to the DMMC where senior personnel are familiar with ASL stockage computations, albeit automated procedures, would improve the chances that these computations are properly and carefully completed.

4. Strongly encourage MACOM adherence to the DA standard DX stockage accounting procedure.

   Rationale: The promulgation of unique DX stockage accounting procedures and form usages by MACOMs negates the training and experience benefits of standard Army systems without demonstrable operating benefits. If a supply procedure favored by a particular MACOM is superior to the DA procedure, it should be adopted as the Army standard.

5. Simplify and improve the accuracy of the DX stockage computation procedures by eliminating the 22-day month stockage table and by redesigning the remaining tables to provide a longer time period coverage without multiple approximations.

   Rationale: As explained in the DX section of Chapter III, it was observed that when it was used at all, the 22-day table of the DX section of AR 710-2 is used incorrectly leading to overstated needs. Similarly, the other tables provide coverage for resupply and repair cycle times greater than 30 days by successive cycles through the table. Each iteration adds a positive discontinuity at the one-day column yielding a slight overstatement of the requirement.

6. Re-write the DX computation procedure to include an operating level. A proposed draft of the relevant sections of the regulation is in Appendix M.

   Rationale: A careful review of the DX stock computation procedures given in AR 710-2 showed that allowances were made for order ship time, the repair cycle time, and safety levels for both supply and repair, but no provision for an operating level was made. Yet, in all other respects, the DX computations paralleled those of ASL and QSS stockage.

7. Publish supply performance goals for divisional forward support companies.

   Rationale: As indicated in the principal findings, the forward support companies were found to be nearly nonfunctional in supply for several reasons, one of which is that the attention on supply performance statistics is entirely focused on the main tech supply. Commanders can be rewarded for good supply performance while ignoring the supply performance of the forward support companies. Indeed, the doctrine of Chapter VII, AR 710-2, provides no supply performance goals or objectives. In a limited sample, the FSC accommodation was 46.5%, satisfaction 57.2%, for a fill rate of 26.6%.

   Goals for the forward support company supply functions would focus equal attention on supply performance of the main and FSC TSOs. This will lead to increased management attention on the supply activities of the forwards which should lead to a realization of the full potential of forward supply support to the customers.

8. At all management levels, give the supply performance data for forward support companies equal visibility to that of the main TSO.

   Rationale: This proposal follows from the prncipal finding related to the supply activities of forward support companies and is based on the rationale of recommendation 7 above.

9. Standardize the manual computation, adjustment, and reporting procedures for supply performance indicators among MACOMs. The DS4 Supply Performance Report should be submitted along with a summary of the manual calculations.

   Rationale: It was consistently observed that each supply support activity, especially the divisions, go to considerable lengths to improve the supply performance indicators through morally rationalized manual adjustment procedures. Many of these computations are said to correct alleged shortcomings of the DLOGS supply performance report. Such SSA efforts at cosmetics divert management attention from identifying and solving actual problems and obscure the views of the unit situations from higher headquarters.

10. Delete the adjustment factor for QSS lines from supply performance reports.

Rationale: The supply performance adjustment factor for QSS is based on the questionable asumption that the QSS demand satisfaction is proportionate to the QSS zero balance percentage. Since the correction gives all divisions approximately the same increase in supply performance, the adjustment serves no purpose and should be discontinued to improve the clarity of the supply performance report.

Phase II

11. Speed the automation of DX stockage computation and stock accounting.

Rationale: Following upon recommendation 3 above, automation of the DX stock control and accounting would reduce the manpower requirement somewhat, reduce the opportunity for human error in the stockage computations, and greatly improve customer support through the likely attendant adoption of procedures that parallel the existing Class IX request procedures.

12. The validity of the performance goals for ASL, DX, and QSS should be verified given the present stockage criteria.

Rationale: The finding that the DX stockage policy lacked an operating level but retained the supply performance objectives of the ASL suggests that the relationship between the means (stockage criteria) and the end (performance goals) have not been thoroughly examined. In divisions, the automated procedures manuals give the ASL managers no guidance beyond the fundamental stockage criteria of 6 demands in 180 days to add and 3 demands within that period to retain a line on the ASL. By default, an ASL manager must assume that resolute following of the ASL stockage criteria will produce demand accommodation and demand satisfaction performance indicators within the acceptable ranges of Chapter VII, AR 710-2. Where this dogmatic following of the stockage criteria has been tried, the ASL swelled to thousands of lines greater than the Chapter VII goal for ASL size. All of this suggests that the performance goals should be validated with the authorized stockage criteria.

Phase III

13. As dedicated ADP support becomes available, consider realigning the stock accounting function with the supply operations in divisions. Options include simply moving the DMMC Class IX section back to the TSO of the Mtnc Bn's HQ and Lt Mtnc Co, form a TSO Company in the Mtnc Bn that would include the DMMC Class IX Section, or move Class IX supply to a Supply Battalion that would have forward support platoons.

    Rationale: It appears that the basis for formation of the DMMC Class IX section was consolidation of the ASL management function with the section responsible for document flow to and from the Division Data Center. If and when DAS3 is made available to the divisions, such a justification for the awkward organizational separation of stock handling from stock control would no longer be valid. Reconsolidation of stock management and stock operations functions in one organization with organic and dedicated ADP support would resolve the organizational friction observed frequently between the DMMC Class IX section and the TSO, leading to improved probability of successful accomplishment of the complex processes like location surveys and inventories.

14. Develop a system of increased automated support to the SSAs that is human oriented, especially dedicated support such as DAS3 and the concept DLDED, to assist in all functions of the MMC and TSO, including FSUs.

Rationale: DLOGS and DS4 have fundamental orientations toward machine efficiency: humans are assigned tasks to save program run time and internal program and system complexity. The proposed system would have minimization of training and experience requirements as system specifications. Exploiting the existing 1979 minicomputer technology would yield reductions in DMMC Class IX section manpower requirements while vastly improving the efficiency and accuracy of warehouse operations.

II Selection

Phase I 1. An off-line management system of NCO, WO, and Officer personnel trained in DS4 procedures should be established within HQDA to insure fill of key SSA positions by trained personnel.

Rationale: As noted in the principal findings on shortages of technical expertise, only about 50% of the ASL managers interviewed have the DLOGS ASI and just 37% of the key Class IX section personnel have the DLOGS ASI at a time when DLOGS trained NCOs appear in TSOs where the ASI is not yet required. This is a demonstration of the personnel management system's inability to manage ASI qualified specialists. Without other support from the personnel community, this proposal for off-line management of trained personnel should be implemented and operated until an improved personnel management system can be fielded.

Phase II 2. The development and fielding of an automated personnel accounting system that handles ASI and SSI codes should be encouraged.

Rationale: This proposed action meets the need described in the rationale for recommendation above.

III Training

Phase I 1. Encourage attendance of significant number (20-30%) of 76D-P AIT graduates to attend the 2-week T8 DS4 course.

Rationale: A cadre population would be created by this proposal consisting of experienced E4s and E5s who could function effectively in divisional or non-divisional MMCs or TSOs with confidence. This trained population would be a significant help in filling the need for technically qualified work party leaders within a few years.

Phase II

2. Develop and implement an Advanced DS4 Procedures Course for E5-E7 and 01-03 personnel. Course should be 4-6 weeks and should include fast-time simulation of SSA operations as a training device.

Rationale: The current DS4 course is two weeks in length and is thought to concentrate on the preparation of transaction and parameter input documents likely to be encountered by DMMC managers. The course proposed here would include this material but would concentrate on the accomplishment of the various processes for which the managers are likely to find themselves responsible. This training should be centered about a simulation of SSA operations that not only allows the trainees to make mistakes and see the results of those errors, but presumes that others in the system are also accidentally making mistakes. Such a training device is more likely to provide training to meet the realism of TOE units than the self-paced, programmed instruction used in the two-week course.

3. Develop and implement a Professional Automated Supply Course for Warrant Officers and interested E8s. The eight-week course would include:

-theory of retail supply management

-DS4 procedures

-introduction to COBOL 68/74 programming

-introduction to assembly language programming

-introduction to IBM 360/30 and DAS3 operating systems

-DAS3 operating procedures

Rationale: The warrant officers found in repair parts supply support activities are often the recent products of NCO career development programs. Yet, they often find themselves committed to the development of software solutions for unit problems perceived to be unique. To be prepared for the performance expectations of officers above and NCOs below, the warrant officer should have an understanding of the DS4 procedures and system at least as great as that proposed to be taught in the advanced DS4 procedures course, an understanding of the theory of retail supply management concepts employed in the Army, a detailed understanding of the DAS3 operating procedures and sufficient programming training to appreciate the organization, structure, and limitations of the automated supply procedures systems. Since the warrant officer will often be the only senior technical expert in non-divisional supply support activities, his thorough training is essential to the success of the DS4 and DAS3 implementation.

IV Supervision and Management

Phase I

1. Emphasize that supply performance of FSUs is to be as intensively managed as that of the main TSO.

   Rationale: Besides setting supply performance goals and objectives for the supply sections of forward support companies in doctrine, and reporting their supply performance with equal visibility to that of the main division TSOs, senior commanders should emphasize that attainment of the supply performance goals by forward support companies is as important as attainment by the main TSOs. This sharing of attention between the main and FSC TSOs is essential to the development of the forward supply sections into useful support organizations.

Phase II

2. Develop a management information system that gives TSO and DMMC managers and supervisors guidance for their internal, day-to-day operations. DS4 now provides through the Supply Performance Report which is intended to be run monthly, the following information, by DSU:

-Number of requests

-Accommodation

-Satisfaction

-Warehouse denials

-Number of ASL lines

-Lines zero balance

-Fringe lines

-Number of high priority requests

These indicators are received daily only if the Supply Performance Report is run daily which is not the intent of the automated procedures doctrine. In addition, information elements such as the following should be supplied:

-Measures of DX supply performance similar to the ASL

-Number of post-post transactions

-Location turbulence

-Number of vacant locations

-Location survey results

-Inventory accuracy

-Report of inventory count cards outstanding

-Report of location survey cards outstanding

-Request edit results

-Manager input errors

-Manager referrals outstanding

-DX washout rates

-MRO consolidation list by unit

- PLL to ASL match summary
- Unit reconciliation performance summary
- Request processing time by unit
- Extent of DSU cross-leveling transactions
- ASL turbulence
- Number of part number requests
- Number of receipts processed
- Number of receipt processing errors
- Number of receipts not due-in

Rationale: The numbers provided by the DLOGS and DS4 supply performance reports provide little information that might be useful in identifying operations problems or in making decisions about the assignment of personnel and equipment resources. With there being a shortage of technical expertise in the supply support activities, every assistance to the management function is needed. The management information proposed should be available in an automated environment.

V <u>Mobility</u>

The ASL mobility goals should be met with Repair Parts Vans or with systematically designed modification kits for MILVAN or other containers.

Rationale: The sometimes hastily prepared shelving that is fabricated and installed in MILVANS by the units often fails to withstand the high dynamic loads of highway and cross-country movement. The opening of some of these MILVANS at the end of a road march has been the discovery of a massive pile of mixed parts in the floor of the van following failure of the shelves. Even with sturdy shelves, the MILVAN conversions lack heating and usually lack lighting. Unless a building can be found into which the MILVANS can be driven or to which they can be docked, the warehousemen are exposed to harsh weather much of the year. Such exposure is not conducive to accurate processing of MROs, location surveys and inventories, and other transactions. Repair parts vans with their light, heat, and side curtains are more comfortable as could be the MILVANS with a systematically designed and engineered modification kit.

REFERENCES

Hampton, Ralph. Discussion of AIT student aptitudes and and reading ability, with Dr. N. Johnson of HEL, 2 NOV 78, QMS, Ft. Lee, VA.

Hampton, Ralph. Discussion of AIT student aptitudes and reading ability, with Dr. R. Keesee and Ms. S. Hill of HEL, 8 MAR 79, QMS, Ft. Lee, VA.

Hill, MG John G., Jr. Have We Enough Spare Parts to Win a War? _Army_, February, 1979, pp 34-36.

Kalergis, LTG James G. (Ret), and others, Tank Weapon System Management: A Program for Maximum Effectiveness, report of the Tank Forces Management Group, 1977.

Maier, Milton H. and Fuchs, Edmund F. An Improved Differential Army Classification System, US Army Behavior and Systems Research Laboratory, Apr 1972.

AR 611-201, Enlisted Career Management Fields and Military Occupational Specialities, C12, Sep 79.

AR 710-2, Materiel Management for Using Units, Support Units, and Installations, C5, Feb 79.

FM 29-2, Organizational Maintenance Operations, Aug 1975.

FM 54-2, The Division Support Command and Separate Brigade Support Battalion, Sep 1976.

TM 38-750, The Army Maintenance Management System (TAMMS), Cl, Oct 1978.

TM 38-L22-15 Series, Functional Users Manual for Division Logistics Systems (DLOGS), Jun 1978.

TM 38-L32 (Test) Series, Functional Users Manual for Direct Support Unit Standard Supply System (DS4), Aug 1978.

TOE 7-15HO, Infantry Division, Cl, Sep 1977.

TOE 7-45HO, Infantry Div (Mech), C2, Oct 1978.

TOE 7-47HO, Rifle Company (Mech), C17, Oct 1978.

TOE 17-35HO, Infantry Div (Mech), Armored Div, C2, Sep 1977.

TOE 17-37HO, Tank Company, C16, Oct 1978.

TOE 17-107HO, Armored Cavalry Troop, C17, Apr 1978.

TOE 29-3H5, Division Materiel Management Center Infantry Div, C6, Oct 1978.

TOE 29-15HO, Maintenance Battalion, Infantry Division, C3, Oct 1978.

TOE 29-25HO, Maintenance Battalion, Infantry Division, C3, Apr 1978.

TOE 29-35HO, Maintenance Battalion, Armored Div, C25, Mar 1978.

TOE 29-37HO, Forward Support Company, C27, Oct 1978.

QMS 50.450-50.463, "A Self Study Course" - Materiel Supplyman 76D, Feb 1978.

USAREUR Supplement to AR 710-2 (Proposed Draft), C5, Mar 1979.

USAREUR Pam 710-1, Unit/DSU/GSU Direct Exchange, C3, Feb 1979.

APPENDICES

Appendix

A. SUMMARY OF TRAVEL ACTIVITIES
B. TEXT READABILITY
C. PROGRAMMED INSTRUCTION AND TRAINING LOW APTITUDES
D. DOCTRINAL MATERIAL ANALYSIS
E. QUESTIONNAIRE FORMS
F. OBJECTIVE DATA SHEETS
G. PLL INTERVIEW SUMMARY
H. MOTOR SERGEANT INTERVIEW SUMMARY
I. BATTALION MAINTENANCE TECHNICIAN INTERVIEW SUMMARY
J. PLL TIME STUDY DATA
K. AN EXAMPLE OF PROGRAMMED INSTRUCTION: "A SELF-STUDY COURSE" MATERIEL SUPPLYMAN 76D, LESSON 1
L. IMPLICATIONS OF FEMALE PERFORMANCE RESEARCH ON FEMALE SOLDIER APTITUDE FOR WORK IN THE REPAIR PARTS SYSTEM: A REVIEW AND CRITICAL EVALUATION OF THE LITERATURE
M. DRAFT REVISION, CHAPTER 3, SECTION XV, AR 710-2, C5, DIRECT EXCHANGE
N. GLOSSARY OF ABBREVIATIONS AND ACRONYMS
O. SUMMARY OF RECOMMENDATIONS BY PHASES

APPENDIX A. SUMMARY OF TRAVEL ACTIVITIES

USAOCCS, Aberdeen Proving Ground, MD	22 Jun 78	Coordination for Ft Lee visit & discussion of study plan.
USALOGC & USAQMS, Ft Lee, VA	26 Jun 78	Briefing on study plan & visit to QMS facilities.
USAMILPERCEN, Alexandria, VA	4 Aug 78	Discuss 76D career progression & career problems.
USALOGC & USAQMS	7 Aug 78	Discuss 76D course & SQT.
USAMSAA, Aberdeen Proving Ground, MD	9 Aug 78	Present study plan.
SAG I	10 Aug 78	Present study plan.
USARI, Alexandria, VA	14 Aug 78	Discuss ACB development.
USLEA, New Cumberland, PA	22 Aug 78	Present study plan and discuss data availability.
USAMSAA, Aberdeen Proving Ground, MD	24 Aug 78	Discuss data availability.
4th Inf Div (Mech), Ft Carson, CO	29 Aug - 1 Sep 78	Observation
3rd ACR, Ft Bliss, TX	6-9 Sep 78	Observation
9th Inf Div, Ft Lewis, WA	12-15 Sep 78	Observation
ODCSLOG, Washington, DC	22 Sep 78	Discuss observation visits.
ODCSLOG, Washington, DC	6 Oct 78	Review plans for SAG II.
TAG, Washington, DC	6 Oct 78	Discuss readability of ARs.

SAG II	11 Oct 78	Observation results & data collection plans.
TAG, Washington, DC	1 Nov 78	Discuss readability data.
USAQMS, Ft Lee, VA	2 Nov 78	Reading level of students.
ODCSPER, Washington, DC	14 Nov 78	Discuss selection criteria.
III Corps, Ft Hood, TX	14-17 Nov 78	Observation.
USAQMS, Ft Lee, VA	20 Nov 78	Briefed on DS4.
ODCSLOG, Washington, DC	21 Nov 78	Preview of GO briefing.
USALOGC, Ft Lee, VA	29 Nov 78	General Officer Seminar on repair parts.
USAOCCS, Aberdeen Proving Ground, MD	30 Nov 78	Present study plan and progress.
USA Armor Center, Ft Knox, KY, and 194th Ar Bde	7-8 Dec 78	Motor Officer Course review and observation.
ODCSLOG, Washington, DC	22 Dec 78	Present model.
SAG III	4 Jan 79	Present model & CONUS data collection plan.
4ID, Ft Carson, CO	8-19 Jan 79	Data collection.
244 Engr Bn, Aurora & Rocky Mtn Arsenal, CO	13 Jan 79	Data collection.
III Corps, Ft Hood, TX	29 Jan - 9 Feb 79	Data collection.
807 Med Bde & 493 Engr Group, Dallas, TX	3 Feb 79	Data collection.
NCAD, USALEA, USACDA, New Cumberland, PA	13 Feb 79	Tour depot shipping section, discuss AR 710-2 revisions, discuss AMDF.

ODCSLOG, Washington, DC	14 Feb 79	Discuss USAREUR plans.
3ACR, Ft Bliss, TX	20 Feb - 2 Mar 79	Data collection.
USALOGC, Ft Lee, VA	8 Mar 79	Discuss DS4.
ODCSLOG, Washington, DC	16 Mar 79	IPR on AR 710-2.
USACORADCOM, Ft Monmouth, NJ	21 Mar 79	Briefed on DLDED development.
24ID, Hunter AAF & Ft Stewart, GA	22-23 Mar 79	Observe DLDED.
SAG IV	2 Apr 79	CONUS preliminary results.
HQ USAREUR, Heidelberg, Germany	9 Apr 79	Coordination.
HQ V Corps, 19th MMC, Frankfurt, Germany	10 Apr 79	Coordination.
HQ 32 AADCOM, Darmstadt, Germany	11 Apr 79	Coordination.
HQ VII Corps, 800th MMC, Nelligan, Germany	12 Apr 79	Coordination.
HQ USAREUR, Heidelberg, Germany	13 Apr 79	Coordination.
3AD, Frankfurt, Germany	17-18 Apr 79	Data collection.
42 Artillery Group, Giessen, Germany	19-20 Apr 79	Data collection.
11ACR, Fulda, Germany	23-24 Apr 79	Data collection.
8ID, Bad Kreuznach, Germany	25-27 Apr 79	Data collection.

1AD, Ansbach, Germany	30 Apr - 2 May 79	Data collection.
32 AADCOM, Ansbach, Wurzburg, Germany	3-8 May 79	Data collection.
800th MMC, Nelligan, Germany	4 May 79	Data collection.
3ID, Wurzburg, Germany	9-11 May 79	Data collection.
19th MMC, Frankfurt, Germany	11 May 79	Data collection.
SAG V	2 Jul 79	Preliminary findings.
USAMSAA, Aberdeen Proving	5 Jul 79	Discuss Air Line of Communication (ALOC) for air high-priority repair parts to USAREUR.
USAIRO, Philadelphia, PA	24 Jul 79	Visited by Mr. Bernard Rosenman to discuss HEL's findings in the repair parts study & their implications on the Retail Inventory Management Stockage Policy (RIMSTOP) underway at IRO.
ODCSLOG, Washington, D.C.	25 Jul 79	Discuss direct exchange (DX) & Quick Service Supply (QSS) Stockage policy inconsistencies.
USAOCCS, Aberdeen Proving Ground, MD.	26 Jul 79	Briefing on methods, progress, and preliminary findings of repair parts study.
USAOCCS, Aberdeen Proving Ground,MD.	2 Aug 79	Briefing on progress of repair parts study.
DARCOMPSCC, Tobyhanna Army Depot, PA	14 Aug 79	Discussed conduct of a marking test to be held in a USAREUR maintenance unit.

USALEA, New Cumberland Army Depot, PA	16,18 Oct 79	Attended the semi-annual meeting of the Army Logistics Systems Working Group.
101st Abn Div (Air Assault), Fort Campbell, KY	8-9 Nov 79	Observation of Direct Support Standard Supply System (DS4).

APPENDIX B. TEXT READABILITY

<u>Readability</u>. A "readability formula" has been defined as "a method of measurement intended <u>as a predictive device</u> that will provide quantitative, objective estimates of the style difficulty of writing." (Klare, 1963, p 3). These readability formulas look at writing style factors (as opposed to, e.g., format, organization, or content); attempt to determine which of these factors correlate most highly with some measure of comprehension of specific passages; and, by means of a regression equation, state the relationship of the style factors to comprehension. (Kern, Sticht, and Fox, 1970)

Numerous readability formulas have been developed using different populations, different style factors and different measures of comprehension on specific written material. In DA Circular 310-9, "Improving the Readability of Army Publications," two formulas have been given for use in measuring the readability of Army publications. These two methods are the Flesch-Kincaid formula and the Gunning's Fog Index.

<u>Flesch-Kincaid Formula</u>. As presented in DA Cir 310-9, this formula is a recalculation of the original Flesch Reading Ease Formula using Navy personnel and Navy training publications as the test population and comprehension passages respectively. The original formula was developed in 1948 (Flesch, pp 221-33) and has been characterized as "probably the most widely used (and consistently powerful)." (Sticht and Zapf, 1976, p 180) Another source describes the Flesch formula as correlating highly (as high as .98) with the Dale-Chall formula - another well-known and consistently accurate readability formula. (Klare, p 118) The original Flesch formula used civilians and school-age children with appropriate prose material as the test population. In 1975, Kincaid, et al, (Kincaid, Fishburne, Rogers and Chissom, 1975) recalculated the Flesch formula for use with Navy personnel and publications. In addition, the Kincaid formula allows a direct calculation of Reading Grade Level (RGL) as opposed to a conversion chart for raw score to RGL as used in the original Flesch formula.

Gunning's Fog Index. Again, this is a recalculated version by Kincaid, et al, for use with Navy personnel and publications. The original formula was developed by Gunning in 1952. This formula allows direct calculation of the fog index of a passage, and, although it is not explicitly stated in DA Cir 310-9, it is assumed that the fog index is equal to the RGL.

Both of these formulas quantify the same two writing style factors in the measuring of style difficulty. These factors are word length (as measured by the number of syllables) and sentence length. It has been found that "word and sentence difficulty factors" account for a major amount of the variance (54%) in a measure of comprehension. (Stoloruw & Newman, p 165) Both factors of word and sentence length are related to style difficulty: the length of the word is related to the speed of recognition, (McGinnies, Comer and Lacey, 1952, pp 65-69) and the sentence length is related to sentence structure. (Klare, p 170) These factors do not directly measure "understandability" of a written passage but seem to be the important elements in estimating style difficulty.

As stated above, numerous formulas have been developed. In choosing which formula is most appropriate for a specific use, several characteristics should be taken into account. The first characteristic would be the accuracy with which the formula can be used as a predictive device. The test population, method of comprehension measurement, and type of written passage used in development would be elements of the accuracy characteristic. The other characteristic would be the speed and ease with which the method can be applied. These characteristics, by their very nature, contain a trade-off factor in the selection decision. So a method for measuring readability must be chosen with specific objectives in mind.

The Army, in DA Cir 310-9, has defined the objective for improving readability as making the publications fit the target audience's needs. To accomplish this objective, a formula that is quick and easy to use for those people writing the publications, has some predictive accuracy, and is applicable to the target audience is desired.

The two approved formulas appear to have these characteristics. They can be quickly and easily used, and have been calculated with military (i.e., Navy) personnel and publications. The Flesch formula is a well-accepted predictive tool, and although not as much work has been done with the Gunning Fog Index, both formulas seem to have the characteristics needed to accomplish the Army's objective.

These methods of measuring readability have very specific results and users should be aware of the limitations. They are designed only to measure difficulty of writing style and do not measure that difficulty perfectly. They are not measures of good style. Reading Grade Level is not meant to be exactly equivalent to school grade, but rather RGL should give an indication of the level at which a certain degree of comprehension is achieved. The methods should not be used as measurements of understandability of the material. Format and organization are not taken into account in these measures.

There is also the problem of technical words used in writing to a specific audience. Many technical words are polysyllabic and would increase the RGL of a passage. However, these same words, because of their specific usage and the audience to which they are addressed might be very familiar. Thus the technical words would artificially inflate the RGL. This problem has not been adequately addressed, and at this time no procedures are available to adjust for technical words. In a similar manner, artificially short, choppy sentences will greatly decrease RGL but will not necessarily add to the understanding of the written material. It is important not to manipulate word and sentence length solely to reduce RGL if it does nothing to ease the comprehension of the passage.

The personal factors that readers bring to the situation are not addressed in the readability formulas either. Motivation, interest, and knowledge are not taken into account, yet they affect comprehension.

These limitations do not nullify the estimates of writing style difficulty given by the formulas, but the extent of their usefulness should be understood.

The procedures for use of the Flesch-Kincaid formula and Gunning Fog Index are described in DA Cir 310-9 along with RGLs for specified target audiences. These formulas are designed as predictive tools in estimating style difficulty and can be useful in analyzing writing style in order to meet the Army's objective of improving readability in order to fit the audience's needs.

REFERENCES

Flesch, Rudolph. A new readability yardstick. Journal of Applied Psychology, 1948, 32, pp 221-33.

Gunning, R. The Technique of Clear Writing. NY: McGraw-Hill, 1952.

Kern, R.P; Sticht, T.G; and Fox, L.C. Readability, Reading Ability and Readership. Human Resources Research Organization, HumRRO, pp 17-70, 1970.

Kincaid, J.P.; Fishburne, R.P.; Rogers, R.L.; and Chissom, B.S. Derivation of new readability formulas (Automated Readability Index, Fog Count, and Flesch Reading Ease Formula) for Navy enlisted personnel. Research Branch Report 8-75. Naval Technical Training Command, 1975.

Klare, George R. The Measurement of Readability, Ames, Iowa: Iowa State University Press, 1963.

McGinnies, E; Comer, P.B; and Lacey, O.L. Visual-recognition thresholds as a function of word length and word frequency. Journal of Experimental Psychology, 1952, 44, pp 65-69.

Sticht, T. G., and Zapf, D.W., eds. Reading and Readability Research in the Armed Services. Human Resources Research Organization, HumRRO FR-WD-CA-76-4, 1976, p 180.

Stoloruw, L.M., and Newman, J.R. A factorial analysis of objective features of printed language presumably related to reading difficulty, as presented in Klare, p 165.

APPENDIX C. PROGRAMMED INSTRUCTION AND TRAINING LOW APTITUDES

Programmed instruction (PI) is a method of learning that focuses on the individual. The features that differentiate PI from conventional (i.e., group-paced lecture) teaching methods and define PI as unique are: (1) responses to a limited amount of material are required from the student, (2) immediate knowledge of the response results are presented to the student, and (3) the student is allowed to proceed through the material at his own rate (Jacobs, Maier, Stoloruw, 1966, p. 1).

These principles were first put into practice by SL Pressey in the mid-1920s. He designed a small machine that would present questions to a student, who then pressed a button to record his answer. If the answer was correct, the next question would be presented; if incorrect, the question would remain until the correct answer was chosen.

The concept of a programmed "teaching machine" did not catch on until B.F. Skinner reintroduced the idea in the 1950s. He advocated a "machine" that required increased student response to specific information and immediate feedback. The theoretical basis for this method of instruction was founded on the concept of reinforcement.

In this conceptual framework, learning is defined as changed behavior. Reinforcement is used to accomplish this change. Reinforcement is defined as any consequence that increases the probability of the preceding action occurring again. In learning, when a correct answer is reinforced, it is more likely to occur again. In addition, the sooner the reinforcement follows the preceding action, the more effective the reinforcement becomes. Programmed instruction calls for immediate reinforcement of a correct answer to produce the desired effect (i.e., learning). This reinforcer (the specific method of reinforcement) is the feedback available to the student. A major assumption of PI is that knowledge of results is reinforcing in itself. Thus, the essential features of PI are explicitly related to reinforcement theory. (Deterline, 1962, p. 27).

Since PI reinforces very specific behavior, the objectives of the material must be clear. A program is composed of a series of segments of material that require a response. These segments are called frames and are arranged in a logical sequence to facilitate accomplishment of the objectives. The exact size (i.e., amount of material) of the frames should be determined by the material, although in a typically constructed response program small frames of one or two sentences are preferred so that one concept or item of knowledge can be reinforced at a time. A secondary reason for small frames is that students should be able to locate the precise point that is causing difficulty. (Fry, p. 131) This is important for the student as he proceeds through the program, but it is equally important as a means of locating trouble spots that the programmer should consider for revision.

Each of these segments requires an active response by the student. In most cases, this response is written, but it can also be thought, spoken, or contain some kind of manipulative task. It is preferable that the student's response be correct, even if that involves having the answer contained in that segment or the one preceding, or having "cues", such as the first letter of the answer, shown. It is an assumption that a student learns best when a correct answer is reinforced rather than being told an answer is wrong. (Deterline, 1962, p. 20). As the correct response is reinforced repeatedly, the "cues" can be lessened until none are necessary to elicit the correct answer.

The next step must be the immediate feedback of results. As stated before, this is the reinforcement which will facilitate learning. This feedback reinforces not only the correct answer, but reinforces paying attention to the program as well. (Deterline, 1962, p. 29) This sequence of frame leading to response which leads to feedback is known as the learning cycle. Within a program, the learning cycle for one concept should be repeated a number of times to guarantee understanding and retention. Variation of the specific frame content will help in eliminating student boredom as well as broadening the understanding of a specific frame content to a slightly different context. (Deterline, p. 31)

The ability of the student to learn the material at his own rate is another feature of PI. All students learn the same material; however, the self-pacing frees the fast learner from being held up by those slower, and frees the slower learner from being dragged through material before he fully understands it. Since all the students are working by themselves, this may also allow the instructor to give more individualized attention.

These principles of instruction can be utilized in a number of ways. "Teaching machines" are nothing more than a means of presenting the learning cycle so that only one frame can be worked on at a time and the response cannot be changed once it has been entered. Programmed textbooks offer an alternative. The frames are printed with the correct answers following on the next page. The relative advantages of the texts are that they are easy to use, store, and transport, more familiar than machines, and inexpensive. However, they do not generally last as long as machine programs and the student has the opportunity to "thumb through" and not follow the designed sequence. Programmed textbooks are usually arranged in a linear fashion with all students progressing through the program sequentially. Programmed texts can also be branched, where the next frame presented is dependent on the given response. This allows for correction and further explanation when a wrong response is given, and progression when the response is correct. Other media such as film, audio/video tape, slides or film-strips can also be used.

There has been considerable research on programmed instruction to see if the theoretical claims can be empirically substantiated. In general, the evidence supports the claims of greater learning effectiveness and less time needed to complete the same amount of material in comparison with conventional instruction. Listed below are some examples of the research performed:

(1) In a college-level elementary psychology class, it was found that significant learning took place with PI, and more learning occurred (as judged by a criterion test) when using small steps (frames) rather than large. Students using PI were not directly compared to those using conventional methods. (Coulson and Silberman, 1960)

(2) A study conducted by IBM showed a reduction of 27% in classroom time, higher scores on an achievement test, and a reduction in the range of scores when using PI for a computer equipment maintenance course in comparison to a conventional course. (Hughes & McNamara, 1961)

(3) The DuPont Company conducted a programmed training course in "Reading Engineering Drawings". The students spent 25% (on the average) less time in learning, and on the average scored 13% higher on the achievement test. The range of scores was also reduced. (O'Donnell, 1963)

(4) The US Air Force reported the total results of its application of PI increased achievement 10% and decreased learning time by 30%. (Air Force Manual 50-1, 1967) The courses and subjects used were not specified, however.

These experimental results support the value of PI in learning and time effectiveness over conventional methods. However, it may not be appropriate to broadly generalize these findings to the specific self-study course for PLL clerks--one of the seven different duty positions of the MOS 76D. The course contents, as well as the specific program design, vary widely across the experimental research reported above. The students tested in these varying studies also have differing characteristics--college students, as well as highly trained professionals.

Often in the empirical research done on PI, the general conclusion is that PI is effective but the specific findings differ. There are questions as to which type of response is most effective--constructed-response or multiple choice. Some research has indicated that written responses are essential while others contend that there are no differences between written and "thought" responses. These ambiguities suggest caution before making broad judgments. (Deterline, 1962, p 60)

When the principles of PI were developed, it was assumed that since the students would be progressing at their own pace, everyone, regardless of intellectual ability, would be able to learn the same amount of material, given enough time. However, this assumption has not held true when tested. There is a difference between high and low aptitude students when they are compared on a PI task. Achievement is related to intellectual ability. (Melching, 1965, p 9)

This result is particularly important because of its implication for program design. If intellectual ability was irrelevant then the same program would achieve similar results across all abilities. However, since ability does make a difference, it would be most useful to develop a program designed for specific use.

PLL clerks (MOS 76D10) are generally in the lower aptitude range. Strategies have been developed for training men of high and low aptitude taking into account principles of learning that are appropriate for the needs of the specialized group. The low aptitude trainees were basically individuals falling in Category IV of the AFQT. The elements of this "optimization strategy" for low aptitude students are: (1) immediate feedback, (2) inherent feedback qualities, (3) reduced dependence on reading as the instructional medium, (4) high response rate, (5) smaller units of learning (not to exceed 10-15 minutes of uninterrupted attention), (6) manipulative learning activities, and (7) high student/instructor interaction. (Bialek, Taylor & Hauke, 1973)

It can be seen that (1), (4), and (5) are the elements of the learning cycle within PI. The Bialek, et al., study did not use programmed instruction as such, but rather approaced training low aptitude soldiers with two assumptions:

(1) Men are most likely to behave in ways that will be rewarding or satisfying to them.

(2) Learning skills that are assigned and not necessarily personally meaningful is not rewarding to all men. (Bialek, et al., p 33)

In general, those with lower aptitudes have had unsuccessful experience with "learning" in the past. They have records of failure and are not satisfied with "learning for its own sake." Because they have not been reinforced in their prior experience for learning, it was thought that perhaps training should be fused on either making the rewards (reinforcement) very attractive, or design learning situations that will give positive experiences to build up the relationship between learning and satisfying results. (Bialek, et al., p 34) Bialek, et al., tested different learning tasks and methods and found that methods that maximized the amount of personal contact the student received, the more effective the instruction. (p 27) However, there were some tasks, i.e., tasks involving any kind of decision, that could not be effectively taught. (p 24) So even with this optimization strategy is task specific.

Further research that has concentrated on increasing personal interaction, while causing an increase in the student/instructor ratio, has advocated peer instruction. This has students who have mastered a particular area of study helping others who have not. Initial research has indicated gains in effectiveness for all aptitude levels, increases in motivation, self-confidence, and group morale. It has the added features of low cost and easy implementation. (Weingarten, 1972, p vi)

It is now appropriate to compare the "Self Study Course" for Materiel Supplyman 76D to the methods of instruction just reviewed. (See Table C-1) Although the course is called a programmed text, it bears little relationship to the "learning cycle" elements discussed previously. Material is presented in outline form, with pages of definitions and description presented before any response is required. The responses, in general, do not entail small, specific bits of information but rather much information needed to complete a whole operation (i.e., fill out a request for issue card), and there are no restraints on thumbing back through the text to find the information. The knowledge of results is occasionally given directly following the student's response, but more often a series of responses are given before there is any feedback contained within the text, or an instructor must be called to check the answers. The text is self-paced, allowing each student to work at an individual rate.

Other elements of PI do not seem to be significantly implemented in this course. There does not appear to be any effort in the design to eliminate mistakes in the student's response. If mistakes are made, there are no alternatives other than to read the same paragraphs again or ask an instructor for help. Once the questions have been completed to the instructor's satisfaction, a practical exercise is given. When this is completed and marked, this section of material is never reviewed again. Repetition and variation in presentation is almost wholly absent. This particular programmed text does not appear to have effectively utilized the elements of PI that have been designed to produce specific results. The more important question, however, is whether the program accomplishes its objectives in teaching the students material. Usually the program is improved by constantly evaluating the frames in terms of meeting the objectives of learning. (Lysaught & Williams, 1963, p 124-132) Validation of this text should be performed with the students who are taking the training. If a student does not easily understand the presented material, or errors are frequently made, either in a particular frame or a larger section of material, then rewriting of the material should be undertaken to accomplish the goal of teaching the individual. A particular program should be revised as much as is necessary to accomplish the teaching. This constant revision also keeps those writing the program in touch with the students and their requirements for learning. (Fry, p 44) Members of the HEL Repair Parts Supply Study Team have asked if the self-study course had been validated at the QMS, Ft. Lee, VA,

Table C-1.

Application of the Elements of PI in the Programmed Text "A Self-Study Course," Materiel Supplyman 76D

PI	"A Self-Study Course"
1. Small units of learning.	1. Large amounts of concepts & information presented together.
2. High level of student response.	2. Few responses compared with amount of material presented.
3. Response required for each new individual item of learning.	3. Much information tested at once.
4. Immediate knowledge of results.	4. Occasionally immediate feedback; but more often a series of exercises are completed and then an instructor must be called to verify answers.
5. Self-paced.	5. Self-paced.
6. Eliminate errors if possible.	6. No effort to eliminate errors in response.
7. Repetition of material.	7. Material is not presented more than once. Once response is made, no other practice frames until the Practical Exercise.
8. Variation in presentation.	8. Same material is reread if not initially understood.

and were told "no", so there is no information on the validity of the self-study course for MOS 76Ds.

The optimization strategy developed for low aptitude learners can be compared with programmed instruction (see Table C-2) as both contain major elements of the learning cycle. However, this strategy does offer additional elements (see Table C-3) in its attempt to meet the special needs of the lower aptitude trainees. In comparing these additional elements to the MOS 76D self-study course, the students have the opportunity for hands-on experience in a "school" warehouse facility. These activities are also conducted in a self-paced way, with each student proceeding through the five different warehouse positions at his own rate. The opportunity for manipulative activities is also available at the very end of the 12-week course in a section called "Round Robin". The students have exercises as PLL clerks, and as workers at the warehouse, QSS, DX, DMMC, etc., changing positions after a certain amount of time so practice in each area is received. However, the "Round Robin" exercises are only for a very limited amount of time.

The element of feedback contained within the given response would be difficult to implement within the context of the supplyman's pencil and paper tasks. The purpose of this element is to increase the interest and the reward of responding in the correct way. With further work, appropriate ways of using the qualities of inherent feedback could be found.

The element of reducing dependence on reading as the instructional medium is particularly important as that is now the only medium employed in this 76D course. It might be argued that the Supplyman's job entails a lot of reading so this change would not really be productive. It is not clear, though, that the specifically oriented paper and pencil tasks that PLL clerks perform are equivalent or comparable to reading. Further investigation of this question as well as other instructional media is needed.

Also discussed is the amount of personal interaction the student has within the learning situation. The optimization strategy recommends a high amount of student/instructor contact to facilitate the learning process. Much

Table C-2.
Elements of PI as Compared With Elements of the "Optimization Strategy" for Low Aptitude Learners

PI	"Opt. Strategy"
1. Small units of learning.	1. Small units.
2. High level of student response.	2. High response level.
3. Response required for each new individual item of learning.	3. Not specifically included but not incompatible (NSINI).
4. Immediate knowledge of results.	4. Immediate feedback.
5. Self-paced.	5. NSINI
6. Eliminate errors if possible.	6. NSINI
7. Repetition of material.	7. NSINI
8. Variation in presentation.	8. NSINI
9. NSINI	9. Feedback contained within the task itself.
10. Most PI has used reading as primary medium, but other media could be used.	10. Reduce dependence on reading.
11. NSINI	11. Manipulative learning activities.
12. PI elements do not encourage high interaction between student and instructor, but rather independent work by student.	12. High personal interaction between student and instructor.

Table C-3.

Application of the "Optimization Strategy" for Low Aptitude Learners in "A Self-Study Course," Materiel Supplyman 76D

"Opt. Strategy"	"A Self-Study Course"
1. Immediate feedback.	1. Occasional immediate feedback (see Table 1, #4).
2. Feedback contained within the task itself.	2. Difficult to implement.
3. Reduce dependence on reading as instructional medium.	3. Exclusively uses reading as medium.
4. High response rate.	4. Low response rate (see Table 1, #2 and #3).
5. Small units of learning.	5. Large amounts of material (see Table 1, #1 and #3).
6. Manipulative learning activities.	6. "School" warehouse and "Round Robin", 1 week out of 12.
7. High personal interaction between student and instructor, either by small group instruction (i.e., low student/ instructor ratio) or peer instruction.	7. Average ratio of 15-20 students/ instructor.

contact between students and instructors would provide a source of immediate knowledge of results, verbal (e.g., "That's right") and non-verbal (e.g., a smile) reinforcement of behavior as well as personal attention to the student and his individual problems. The Bialek, et al.,report concludes "those arrangements that maximize personal interaction during instruction are most effective, take less time, and are cheaper than techniques that do not feature this component." (p 27)

High interaction has been expressed by student/instructor ratios of 3-10 students per instructor. The average ratio in the MOS 76D self-study course is approximately 15-20 students/instructor. This does vary according to the differing requirements of specific sections of the course. However, a model has been devised where the students become both learners and teachers. The peer-instructional model has each student, after reaching subject mastery, instruct another student until he is ready to take the criterion test. High interaction is an implicit part of this model as students have individual tutors, without losing the self-paced element of PI. In addition, having peers as instructors could possibly reduce the dependence on reading as the instructional medium by allowing verbal explanation of the material. There also seems to be an effect of increased motivation to learn, as well as increased self-confidence and self-reliance as student both learns and teaches what he knows to a fellow student. Although this model does not oppose the theory of PI, some adjustments in PI course structure would have to be made in order to incorporate major elements from both educational methods.

This review has presented representative research indicating that programmed instruction is a viable method of teaching, but the essential elements are not adequately employed by the programmed text used to instruct MOS 76D. In addition, other methodological elements that might be useful as improvements, supplements, or alternatives to a well-implemented paper-medium, programmed instruction course have been presented.

REFERENCES

1. Bialek, Hilton, M., Taylor, John E., and Hauke, Robert N. Instructional Strategies for Training Men of High and Low Aptitude, HumRRO Technical Report 73-10, April 1973.

2. Coulson, J. E., and Silberman, H.F., "Results of An Initial Experiment in Automated Teaching," in Teaching Machines and Programmed Learning, A Source Book," A. A. Lumsdaine and Robert Glaser (eds), Washington, D.C.: National Education Association of the United States, 1960. pp 452-468.

3. Department of the Air Force, Programmed Learning Air Force Manual Number 50-1, Jan 1967.

4. Deterline, William A. An Introduction to Programmed Instruction. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1962.

5. Fry, Edward B. Teaching Machines and Programmed Instruction, An Introduction. New York: McGraw-Hill Book Company, Inc., 1963.

6. Green, Edward J. The Learning Process and Programmed Instruction. New York: Holt, Rinehart, and Winston, Inc., 1962.

7. Hughes, J. L., and McNamara, W. S., A Comparative Study of Programmed and Conventional Instruction in Industry. Journal of Applied Psychology, 1961, 45(4), p 225-231.

8. Hungerland, Jacklyn E., and Taylor, John E., Self-Paced Instruction in a Cognitively Oriented Skills Course: Supplyman, MOS 76Y10. HumRRO Technical Report 75-20, June 1975.

9. Jacobs, Paul I., Maier, Milton H., and Stolurow, Lawrence M., A Guide to Evaluating Self-Instructional Programs, New York: Holt, Rinehart and Winston, Inc., 1966.

10. Lysaught, J. P., and Williams, C. M., A Guide to Programmed Instruction, New York: John Wiley and Sons, Inc., 1963.

11. Melching, William H., Measures of Ability and Programmed Instruction Performance, HumRRO Technical Rpt 65-12, Dec 1965.

12. Skinner, B. F., "The Science of Learning and the Art of Teaching," in Teaching Machines and Programmed Learning, in Lumsdaine & Glaser (eds), Washington, D.C.: NEA 1960, pp 99-113.

13. O'Donnell, L. H., "Training of Plant Operators and Maintenance Personnel," in Programmed Learning: A Critical Evaluation, in J. L. Hughes (ed), Chicago: Educational Methods, Inc., 1963, pp 111-126.

14. US Army Quartermaster School, "A Self Study Course," Materiel Supplyman 76D. QMS 50.450-463 PI, Feb 1978.

15. Weingarten, Kenneth, Hungerland, Jacklyn E., and Brennan, Mark F., Development and Implementation of a Quality-Assured, Peer-Instructional Model, HumRRO Technical Report 72-35, Nov 1972.

APPENDIX D.

DOCTRINAL MATERIAL ANALYSIS

APPENDIX D. DOCTRINAL MATERIAL ANALYSIS

In the initial steps of this project, the HEL team carefully studied the doctrine on repair parts supply procedures for self-education. It was quickly apparent that there were inconsistencies. As the project progressed through the observation and early data collection visits, it became clear that the inconsistencies in the doctrinal publications on policy and procedure could be significant contributors to the human performance problems in the repair parts system. Simple calls for resolution of these inconsistencies on the basis of a general observation that they exist would be ineffectual. To demonstrate the magnitude of the problem, this detailed comparison was made of the doctrinal publications related to retail repair parts supply.

The PLL clerk job consists of several procedures, and the repair parts supply doctrine for the using unit discusses these procedures in varying degrees of detail. Differences occur from document to document due not only to the varying detail in each description but also the exclusion of discussion of some procedures in one or more documents.

The major procedures that should be discussed in unit repair parts supply doctrine are: (1) processing unit requests (PLL items, DX items, QSS items, status, etc.), (2) the necessary forms and how to complete them for the above information, and (3) additional procedures (reconciliation, suspense file, etc.). These three groups of procedures and a summary of the required number of steps in each procedure comprise the outline for the DMA. Throughout the entire analysis, you will be able to see not only what procedures are discussed but how much detail each of the materials devotes to them.

The doctrinal publications that are involved in this comparison include: (1) AR 710-2, C5 - Materiel Management, (2) TM 38-L22-15-2, C10 - Class IX (Repair Parts) Supply System Operating Procedures - Using Unit Procedures, (3) TM 38-L32-11 (Test), C1 - Functional Users Manual for Direct Support Unit Standard Supply System (DS4), Customer (User) Procedures (Divisional and Non-Divisional), (4) TM 38-750, C1 - The Army Maintenance Management System (TAMMS), (5) FM 29-1, Aug 1975 - Organizational Maintenance Operations, (6) FM 29-30-1, Feb 1976 - Division Maintenance Battalion, and (7) QMS 76D Text (QMS 50.450 - 50.463, Feb 1978 - "A Self-Study Course - Materiel Supplyman 76D").

HEL defined procedures for the major PLL tasks based on TM 38-L22-15-2 and on the experiences of the CONUS and USAREUR observations and data collection.

For each source of doctrine, the contents were reviewed to identify references to or descriptions of repair parts procedures. The procedures found were compared with the baseline procedures defined by HEL. As each step in the reference material fit or did not fit the baseline information, it was marked accordingly. If the step or information was contained in the doctrine, it was marked by an X, or in the case of the forms, either the card column number or the block number. If the doctrine did not contain a certain step or element of information, no mark was made. The reference page numbers for all the charted doctrinal material are included at the end of each reference column. No financial management information is included in the Doctrinal Material Analysis (DMA).

The detailed doctrinal material analysis is shown on the immediately succeeding pages. Following the detailed analysis, summary tables are given that give the number of steps specified for a procedure according to each source of doctrine. Given also are tables summarizing the number of entries required to complete a form according to each source. Finally, lists of logistic codes in various publications are compared for duplication and consistency of explanations.

APPENDIX D ORGANIZATION

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
I. Unit request processing						Using unit procedures detailed in TM 38-L22-15-2		
A. PLL item								
1. Determine if a PLL item	X	X	X		X		X	X
2. Check balance on hand		X	X				X	X
3. If on hand,issue part		X	X				X	X
4. If not on hand, check priority		X	X				X	X
5. If high priority, phone Class IX Form 1 (test) to DSU		X	X(telephone request to DSU - follow 2765, not Cl IX Form 1(Test)					X
6. Record Class IX Form 1 (test) in document register		X					X	X
7. Destroy Class IX Form 1 (test)		X						X
8. If low priority, fill out DA 2765, 2765-1, as an AOA.	X	X	X pp 2765 only		X (all priorities handled the same)		X	X
9. Fill out DA 1348-6 for AOE, or AOB.	X	X					X AOB only	X
10. Record all form information in document register.		X	X				X	X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
11. Forward DA 2765, 2765-1, or DA 1348-6 to DSU	X	X	X pp 2765 only		X		X	X
	2-18-p.2-19	p.1.1	p.3-.1.1-3-1.2		p.6-6-6-7		QMS 50.450 PT p. 6-24	
B. DX Item								
1. Determine if part is available for exchange	X	X	X	X	X		X	X
2. Issue part if on hand at PLL level.							X	X
3. If PLL, complete and attach DA 2402 to defective part.	X	X (no issue at PLL clerk level)	X (2402 is both a turn-in&request doc when exchanging an unuser DX item for a serv one)	X	X	X	X	X
4. Enter in document register			X				X	X
5. Record the turn-in & req for replacement issue on DA 3318.			X				X	
6. Send to DSU DX	X	X	X		X	X	X	X
7. Item not available for exchange for PLL item or non-PLL item.		X	X					X
8. Fill out DA 2765-1 w/justification.		X	X					X
9. Enter in document register		X	X					X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
10. Send to DSU DX		X	X					X
C. QSS Item								
1. Determine if QSS item	X	X	X		X		X	X
2. Fill out want slip/shopping list.	X	X	X		X		X	X
3. Submit to the clerk at QSS.	X	X (says the clerk at DSU)	X (DSU)		X		X	X
4. If on hand, issue items	X	X	X		X		X	X
5. Not on hand	X	X	X		X		X	X
6. Issue due-out to PLL clerk	X (carbon original want list)		X		X (no specific due-out just advise as to receipt)		X	X
7. High priority	X	X	X				X	X
8. Fill out DA 2765 or Class IX Form 1 (test)	X (2765 only with high priority designator	X	X				X	X
9. Enter request in document register only when high priority & back ordered.		X	X				X	X
	p.3-47-3-48	p.7.1	p.3-6.1		p.6-2		p.5-6 QMSX50.458 PT	

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
D. Recoverable (turn-in) items						Refers to AR 710-2, TM 38-750, & FM 29-25.		
1. QSS turn-in		X	X (also SSSC)					X
2. Serviceable QSS		X	X					X
3. Tag with NSN on part		X (no tag #)	X (no tag #)					X
4. Send to DSU QSS		X	X					X
5. If unserviceable QSS, destroy unless directed otherwise by TSO.		X	X (DSU or MMC)					X
6. Serviceable turn-in	X	X (not specific as to serviceability)						X
7. Fill out DA 2765-1, DIC D6Z.	X	X			X (or 2765; the -1 must have justification)		X	X
8. Enter request in document register	X	X			X		X	X
9. Send to DSU - part & document	X	X			X		X	X

p.3-47.1

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
10. Unserviceable turn-in	X		X		X			X
11. Determine recoverability code from AMDF - code A,D,F,HL	X							
12. DA 2765-1 w/justification	X		X,(or DA 2402 used as turn-in & req for replacement issue)					X
13. Enter in document register	X		X					X
14. Record on DA 3318			X					
15. Send to DSU	X		X					X
16. Code O, Z	X							X
17. Desire turn-in credit?	X							X
18. Fill out 1348-1 & proceed w/steps 12-14	X							X
19. No turn-in credit?	X							X
20. Dispose of item at organization level	X							X
21. Return copy of 2765-1 to requesting unit w/Block W dated					X			X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
22. Complete document register					X			X
23. Exchange item w/no turn-in unserv. item			X					
24. Justify request on 2765-1			X					
25. Submit to DSU								
26. Record in document register			X					
27. If turn-in of item is delayed because the unit cannot make a turn-in before installing the replacement, the issue point can issue an exchange item on a hand receipt, pending turn-in of the unserviceable item.								
	p.2-20-2-22	p.10.1	p.3-47.1		p.6-31			
<u>E. Non PLL, ASL & fringe items</u>								
1. Determine if item is authorized at PLL level of *maintenance*.		X						X
2. *High priority item*		X						X
3. Fill out Class IX Form 1 (test)		X						X
4. Low priority item		X						X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
5. Fill out DA 2765-1 (AOA) or DA 1348-6 (AOB, AOE)		X						X
6. Submit to DSU		X						X
7. Item not authorized for PLL/shop stock list level of maintenance.		X						X
8. Maintenance Officer fills out DA 2407		X						X
9. Send request to maintenance		X						X
		p.1.1-1.2						
F. Status								
1. DA 2765-AE1		X	X(status BB for ASL status BM for non-ASL)		X		X	X
2. DD 1348m					X			
3. Card also contains NSN, RON , unit of issue, quantity requested, PD, division requisitioner DODAAC		X	X				X	X
4. Card also contains status code, DSU code, transaction date.		X	X				X	X
5. Annotate col. j of document register w/status code (BB) and date status card was processed.	X(does not specify col. j)	X	X		X(date only)		X(in pencil)	X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
6. Send to DSU		X	X					X
7. Status cards are filed in the suspense file in RON sequence	X	X	X		X		X	X
8. Duplicates & carbons of the request may also be placed in file	X							X
9. Subsequent status cards update initial status & should be filed in front of old status card until receipt or cancellation & then destroyed.		X	X				X	X
10. Subsequent status cards apply to fringe items		X					X	X
11. Subsequent status cards contain estimated delivery date & DSU code is omitted		X					X	X
12. Record estimated delivery date & status code in col. j of document register			X					X
	p.2-22-2-23	p.19.1-21.1	p.3.17-1-3.27-1-.2		p.6-15		QMS50.451 PT p.6 463 p.3-9	

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
G. Follow-Up								
1. DA 2765-1 - AFI	X	X	X (check latest due-out before submitting follow-up)		X		X	X
2. AFI circled in red	X colored pencil/ ink	X	X		X colored pencil/ ink		X	X
3. Check document register & suspense file everyday to see if items or status has been received within time limit.			X				X	X
4. Prepare 2765/2765 from info in document register	X	X	X (AFI only)				X	X
5. Post card to document register DIC in col j in pencil	X	X					X	X
6. A status card AEI, ASI, AUI will be furnished by stock control section			X					
7. Use due-in copy of request for issue as follow-up					X			
8. If status on request has already been received use most current one - use letters AFI	X (Block D on DA 2765-1)	X (Block 1)	X in red		X (Block D)		X (Block 1)	X
9. Post to document register - DIC & Julian date of follow-up in col j.	X	X	X		X		X	X
10. Send to DSU		X						X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
11. Record reply to follow up in the document register; file card in front of all other documents pertaining to this transaction in the suspense file.			X					X
	p.2-23	p.16.1-18.1	p.3-28.1-32.2		p.6-15	QMS50.452 PT p.4-12		
H. Cancellation								
1. User can request cancellation at any time prior to receipt of the item.		X	X					X
2. Cancellations are used when all or part of a request is not needed.		X	X		X			X
3. Prepare cancellation on status card or latest due-in					X			X
4. Use DA 2765 when cancelling before status has been received.	X	X	X quantity cancelled in b. 8					X
5. DIC - ACI & quantity cancelled - other information same as document register	X ccl-3& 25-29 colored pencil/ ink	X b.8 red	X					X b. 8
6. Post to dcument register - ACI & dace action is initiated		X col j	X quantity if partial cancellation in col j in pencil					X

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
7. If status card already received, mark card ACI	X b D circle in red	X b 1 red	X red		X b D red		X b 1 red	X b 1 red
8. Enter data from card columns 67-69 into Block E	X red							
9. Enter quantity to be cancelled	cc 25-29X circle in reo	X b 8	X b 8 if less than full cancellation		X b 8 red		X b 8	X b 8
10. SUAAC		X b 6	X b 18				X b 6	X b 6
11. Enter in document register -ACI & Julian date & quantity if partial quantity		X col. j pencil	X in pencil date only		X col. i pencil		X col. j pencil	X col j pencil
12. Send to DSU		X	X					X
13. When confirmation of partial cancellation is received, erase the cancellation request entries in col. j. Enter in col. d in ink, cancelled, quantity cancelled & Julian date of confirmation of cancellation.		X	X					
	p.2-23-2-24	p.13.1-15.1	p.3-33.1-3.37.2		p.6-17		QMS 50.453 p.3-7	

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
II. Forms								
A. <u>DD 1348-6</u> - Used as Request for Issue with Exception Data, i.e., request for part numbered item. CC=card column, b=block								
1. DIC (AOB or AOE)		CC 1-3	CC 1-3				CC 1-3	CC 1-3
2. NSN or manufacturer's code - use Block 1 of ID data for overflow.	8-22	8-22	8-22 also management control number				8-22	8-22
3. Unit of issue.	23-24	23-24	23-24				23-24	23-24
4. Quantity requested.	25-29	25-29	25-29				25-29	25-29
5. Unit document number (DODAAC, Julian date, serial number).	30-43	30-43	30-43 (G for NORS/ANORS)				30-43	30-43
6. Demand code.		44	44				44	44
7. Weapons System Designator Code (WSDC).	55-56	55-56	55-56				55-56	55-56
8. Project code, if assigned.	57-59		57-59					57-59
9. Priority designator.	60-61	60-61	60-61				60-61	60-61
10. Required delivery date.	62-64							
11. If NORS/ANORS, or item needed to support a specific weapon system, enter NORS/ANORS deployment code or blank.	62-64		62-64					

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
12. Advice code.	CC 65-66	CC 65-66	CC 65-66					CC 65-66
13. Supply unit code.		67						67
14. Publication information code.	70	70	70					70
15. Reference publication.	71-80	71-80	71-80					71-80
Identification Data								
16. Manufacturer's code and part number *(only when can not be* accommodated in CC 8-22)		b 1	b 1				b 1	b 1
17. Manufacturer's name.		2	2				2	2
18. Manufacturer's catalog identification & date.		3	3				3	3
19. Technical order number.		4	4				4	4
20. Technical Manual number.		5	5				5	5
21. Name of requested item.		6	6				6	6
22. Description of requested item (color, size).		7	7				7	7
23. Identification of the end item (make, model number, series, serial number).		8	8				8	8
24. Enter "A" for aircraft or "M" for missile item. Enter the SUAAC.		9					9 SUAAC only	9

COMPARATIVE ANALYSIS OF PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
25. Explanatory remarks, if necessary.			b 9					
26. If the item requested is a repair part for a subdivided PLL or Shop Stock List (SSL), enter the appropriate PLL sub-unit code, for which the item is being ordered.			10					
27. If the request is high priority, have the unit commander authenticate the priority request by signing the document. Deliver to the supporting DSU.			X					
Reference Page Number	p.2-117-118	p.5a.1	pp.3-4.1-4.3				QMS 50.457 PT p.4-5	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
B. DA 2064 - Used as the PLL Clerk's Document Register								
1. Designation of the organization.	X	X	X		X		X	X
2. Unit DODAAC.	X DODAAC/ UIC	X	X also UIC		X		X	X
3. Julian date page is initiated.	X	X	X		X		X	X
4. Julian date of last entry on page.	X	X	X		X		X	X
5. Page number - in sequence.	X	X	X		X		X	X
6. Priority & date of request.	col. a	a	a		a		a	a
7. Document serial number	b	b	b		b		b	b
8. Unit SUAAC		c	c				c	c
9. Supporting Supply Activity requisition document number.					c			
10. Reserved for local use.	c							
11. Stock number & description of item.	d	d	d		d		d	d
12. Supply support activity (last 3 characters of its DODAAC).	e	e	e		e		e (says "last 3 characters of the 6-position requisitioner address code)	e

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 760 Text	HEL
13. Quantity requested.	col. f	f	f		f		f	f
14. Quantity received or turned-in.	g	g	g		g		g	g
15. Quantity due-in.	h	h	h		h		h	h
16. Date action completed.	i	i	i		i		i	i
17. Cancellation & verification.	i	i	i		i		i	i
18. Standard delivery date or status update.	j	j	j		j			j
19. Vehicle bumper number in pencil; if item is ordered to replenish your PLL, enter "PLL".	j (equipment number & hand receipt number)	j	j				j	j
20. On submission of follow-up, enter "AF1" & the Julian date in pencil.	j	j	j		i			j
21. On submission of cancellation request, enter "AC1" & Julian date in pencil.	j	j	j		i			j
22. If the request is for issue of a recoverable item, enter the turn-in document number on which the item was turned-in.			c					
Reference Page Number	p.2-51-2	p.9.1	pp.3-16.1-16.3		p.6-12 6-14		QMS 50.450 PT p.21-22	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
C. <u>Prepunched DA 2765</u> - Used as a request for issue. (pp-prepunched,X-to be entered)								
1. DIC (AOA)	cc 1-3 (pp)	cc 1-3 (pp)	cc 1-3 (pp)		cc 1-3 (pp)		cc 1-3 (pp)	1-3 (pp)
2. Item type.		7 (pp)	7 (pp)		7 (pp)		7 (pp)	7 (pp)
3. NSN.	8-22 (pp)	8-22 (pp)	8-22 (pp)		8-22 (pp)		8-22 (pp)	8-22 (pp)
4. Enter "A", "M", or leave blank for Aircraft, Missile, or common end item.		(pp)			(pp)		(pp)	(pp)
5. Unit of issue.	23-24 (pp)	23-24 (pp)	23-24 (pp)		23-24 (pp)		23-24 (pp)	23-24 (pp)
6. Service code of MILSTRIP requisitioner.	30-35 (pp)							
7. UAAC of requesting unit (5 digit code).		30-35 (pp)	30-35 (pp) unit DODAAC				30-35 (pp)	30-35
8. Demand code.	X	44 (pp)	44 (pp)		X		44 (pp)	44 (pp)
9. "Y"	45 (pp)							

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11(Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
10. Supply Supporting Activity DODAAC	cc 46-50 (pp)							cc 46-50 (pp)
11. DSU to which customer submits request.		67(pp)	67 (pp)		67(pp)		67(pp)	67(pp)
12. Signal code "A".	51 (pp)							
13. SUAAC.			54 (pp)					51 (pp)
	p.2-73	p.2.1-2.2	p.3-2.1-2.2		p.6-7		QMS 50.450 PT p.6	

Data to be Completed.	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
1. SUAAC.		cc 21 b 6					cc 21 b 6	cc 21 b 6
2. A/M/Blank - aircraft/ missile/common item.		22 b 6						
3. Julian date & serial number - G in first position for high priority.	b 11&12	b 11& 12	b 11&12		b C1		b 11	b 11 & 12
4. Quantity requested.	8	L	8		L		8	b L
5. Demand code.	13	pp	pp		13			
6. DODAAC.	10				15			
7. Service code.	9							b 9
8. Weapon Systems Designator Code (WSDC).	18	18	18		18		18	b 18
9. Advice code.	22	22	22		21		22	b 22
10. Priority designator.	20	20	20		20		20	b 20
11. Cost detail account.	L							
12. NORS - Enter "E" or "N".	21							b 21
13. Project code.			19					
	p.2-73	p.3.1-3.2	p.3-2.2		p.6.6-6.8		QMS 50.450 PT p.7-8	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
D. DA 2765 Manual - Used as a request for issue.								
1. DIC.		b 1	b 1				b 1	b 1
2. P for PLL or blank if not.		3	3				3	3
3. NSN.	4-6	4-6	4-6		4-6		4-6	4-6
4. SUAAC.		6, cc 21					6	6
5. Blank for Aircraft/Missile/ Common Item.		b, cc 22					6	6
6. Unit of issue.	7	7	7		7		7	7
7. Service code.	9							
8. UAAC.		10	9-10 (unit service assignment code & UAAC)				10	10
9. Julian date & serial number.	11&12	11&12	11&12		C1		11&12	11&12
10. G in first position for NORS/ANORS.	12	12	12		12		12	12
11. Demand code.	13	13	13		13		13	13
12. DODAAC.	10				15			
13. Weapons System Designator Code (WSDC).	18	18	18		18		18	18

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
14. Priority designator.	b 20	b 20	b 20		b 20		b 20	20
15. Enter "E" or "N" for NORS/ANORS.	21		21					21
16. Advice code or blank.	22	22	22		21		22	
17. Cost detail account.	L				I			
18. Supply unit code of the supporting DSU.		23					23	23
19. Quantity requested.	8	L	8		L		8	8
20. If non-PLL, enter description of the repair part being requested. If request is for a PLL item, leave blank.	0 (nothing about PLL or non-PLL)	M	0		M		M	0
21. If PLL, leave blank. If not PLL, enter the organizational parts manual, page number and year of edition.	P (nothing about PLL or non-PLL)	0	P		0		0	P
22. PLL, sub unit code.			18					
23. Project code.			19					
	p.2-74	p.5.1-5.2	pp.3-3.1-3.3		p.6-7-6-8		QMS 50.450 PT pp.3-3.1-3.3	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
E. DA 2765-1 - **Used** as a request for issue.								
All entries on the DA 2765-1 are the same as the 2765 manual with the following exceptions:								
1. In-the-clear address of the requesting unit.	b A				b A			b A
2. In-the-clear address of the supply support activity.	B				B			B
3. Statement of damage for DX items which are lost or destroyed and for which a replacement is needed, or initial issue items.					0			0
4. Signature of responsible officer.					0			
	p.2-15				p.6-8-6-9			

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
F. <u>Class IX Form 1 (test)</u>								
1. Submitted by.		X					Submitted to	X
2. Telephone (PLL clerks number).		X					X	X
3. RON (unit document number).		X					X	X
4. Submitted by.		X					X	X
5. At time.		X					X	X
6. On (date).		X					X	X
7. Document identifier code.		cc 1-3					cc 1-3	cc 1-3
8. NSN		8-20					8-20	8-20
9. Sub-unit activity address code (SUAAC).		21					21	21
10. Blank for aircraft/missile/common item.		22					22	22
11. Unit of issue.		23-24					23-24	23-24
12. Quantity.		25-29					25-29	25-29
13. UAAC		31-35					31-35 DODAAC	31-35
14. NORS code (G if NORS).		40					40	40
15. Demand code.		44					44	44

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
16. Weapons System Designator Code (WSDC).		cc 55-56					cc 55-56	cc 55-56
17. Priority designator.		60-61					60-61	60-61
18. Advice code.		65-66					65-66	65-66
19. NSN noun - name of part (required even if PLL).		X						X
20. End item.		X						X
21. Model number.		X						X
22. Publication		X						X
23. Page number of publication.		X						X
24. Date of publication.		X						X
25. NSN of next higher assembly if known.		X						X
Remaining portion of form completed at next higher level.								
		p.6a.1					QMS 40.455 PT pp. 4-6	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
G. <u>QSS Want Slip</u>								
1. Unit/organization.	X	X	X				X (unit & DODAAC)	X
2. Julian date.	X	X	X				X	X
3. NSN.	X	X	X				X	X
4. Quantity.	X	X	X				X	X
5. Sign name and enter grade.			X				X	X
	p.3-47 Fig.3-24.1	p.7a.1	p.3-9.1				QMS 50.458 PT pp.4-5	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
H. DA 2402								
1. DSU's DODAAC where item is to be exchanged.			b 1	b 1	b 1		b 1	b 1
2. Julian date.			2	2	2		2	2
3. Requesting unit's DODAAC.			3,11, 15	3,11, 15	3,11, 15		3, 11, 15	3, 11, 15
4. NSN and priority designator of the request; requesting unit must sign all high priority DX requests.			4	4	4		4	4
5. Noun nomenclature.			5,19, item	5,19, item	5,19, item		5,19, item	5, 19, item
6. Indicate whether Exchange item or EIR exhibit.			6	6	6		6	6
7. Nomenclature of the end item of the part you are turning in.			8,13, 17,21	8,13, 17,21	8,13, 17,21		8,13, 17,21	8, 13, 17, 21
8. Model of the end item.			9	9	9		9	9
9. Serial number of the end item.			10,14, 18,22	10,14, 18,22	10,14, 18,22		10,14, 18,22	10, 14, 18, 22
10. NSN of the unserviceable item.			23	23	23			23
11. Calendar date of manufacturer's last overhaul.			23	23	23			23
12. Name of manufacturer or overhaul activity.			24	24	24			24

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
13. Identify when failure was detected.			b 25	b 25	b 25		b 25	b 25
14. Indicates how the trouble was found.			26	26	26		26	26
15. Describe problem with the item - requestor's initials go beside the description.			27	27	27		27	27
16. Document number, priority, & SUAAC.							36	36
17. Date submitted.			on sections 2,3,4		on sections 2,3,4			on sections 2, 3, 4
			3-12.1-12.3	p.3-1-3-3	p.6-8-6-11		QMS 50.459 PT pp.5-6	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
I. <u>DA 3318</u>								
1. NSN	X				X			X
2. Brief item identification.	X				X			X
3. Stockage code.	X				X			X
DS (demand supported) - 3 demands in 180 days.								
MS (minimum stockage) - mission essential, essential repair parts stockage (ERPSL) or other special authorization.								
HD - high dollar - RD(T)					X			
4. Julian date that item was placed on PLL.	X				X			X
5. Initial stockage quantity.	X				X			X
6. Authorized stockage level.	X				X			X
7. Location of item.	X				X			X
8. Remarks include:	X cols. (a-e)				X cols. (a-g)			

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
a. End item application as identified by the Technical Manual								
b. Interchangeability & Substitution (I&S) data.								
c. Unit of issue.								
d. Date & reference number of publication authorizing stockage of item.								
e. Recoverability code (RD)								
f. Any reason for exceptions to stockage procedures - items with seasonal requirements or coverages due to unit pack.								
g. Items stocked for the support of special equipment must be identified.								
9. Record of demands section:	X				X			X
a. NSN.								
b. Organization document number assigned to the request; source identification code for items obtained from DX,SSSC,Cannibalization Point (CP).	col.a				col. a			col. a

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
c. Quantity requested or exchanged - circle when partial or total quantity has been received - due-in quantity is entered outside circle.	col.b				col.b			col. b
d. Blank - used at the close of the review period to record the total quantity demanded for the period.	col.c				col.c			col. c
e. Enter the balance-on-hand at the time of posting.	col.d				col.d			col. d
f. Entries pertaining to cancelled requests will be lined through.	X							
	p.2-96-2-97				p.6-21-23			

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
III. Additional Procedures								
A. <u>Receipt Procedures</u>								
1. Shipping documents are DA 2765, DD 1348-1 (DIC A5A)	X 1348-1 only	X	X		X DA 2765-1		X	X
2. DA 2765 is shipping document returned with items on-hand at the DSU; DD 1348-1 is returned with items not on-hand at the DSU.					X 2765-1 on-hand		X	
3. Using unit compares quantity received with document register.	X	X with col. f (quantity req.)	X with col.f		X		X with col. f (quantity & requested)adjust col. h-(quantity due-in)if necessary	X
4. Can receive 4 types of shipments: full, partial, short, and excess.		X					X	X
5. Log information from shipment in document register 2765, 1348-1. <u>Full</u> - col. g&i qty received & date (ink) <u>Partial</u> - col. g&i (pencil) <u>Short</u> - g&i (ink)requisition if necessary <u>Excess</u> - g&i (ink)		X 2765 only	X		X <u>on hand</u>-quantity <u>received</u> and date (col. g&i) <u>part on hand</u>-quantity due-in (col. h) -estimated delivery date in pencil (col. j) <u>none on hand</u>-due-in quantity (col. h) -expected delivery date in pencil (col. j)		X 2765/ 1348-1	X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
6. Turn in excess.		X on 2765	X on 2765-1				X	X
7. Organization receives the second (tissue) copy of the request as a due-in.					X			X
8. Place the supplies in unit stockage or issue as needed.			X					
9. If items received are repair parts, record the receipt and post the on-hand balance and PLL/SSL unit storage location to the PLL/SSL record, DA 3318.			X					
	P.2-20	p.32.1-32.2	p.3-40.1-3-42.2		p.6-11-6-14		QMS 50.454 pp.1-21	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
B. Reconciliation Procedures								
1. Using unit receives 2 copies of due-out listing.		X from TSO					X from DSU	X
2. Receive monthly supply and shipment status (cards of listing).	X	X periodically						
3. Compare list with document register/due-out records.	X d.o. records only	X document register only	X document register only				X document register only	X
4. Listing is in document number sequence.		X	X DN sequence also NSN sequence				X	X
5. List contains status of all items due-out and due-in.	X	X	X due-out only				X	X
6. Lists those items which have been released for issue since the previous list was prepared.		X	X also those cancelled				X	X
7. Annotate cards/listing to update due-out records for the unit.	X	X listing only	X listing only				X listing only	X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
8. Mark "rec" to right of item for requests that have been received.		X	X				X	X
9. For each request the unit wants to cancel, mark "CANCEL" to the right of the applicable item. Items that have the statement "RELEASED" cannot be cancelled. The document register should be annotated "ACI" with the Julian date in col. j for any items that are marked "CANCEL" on the list.		X	X				X	
10. When confirmation of cancellation is received (AE1 with status BQ), erase "ACI" and enter the status code BQ and the Julian date of the cancellation confirmation in col. i in ink.			X					
11. Mark "X" for each valid request - means item still needed.		X with the Julian date	X				X	X
12. If request is released for issue but you have not received it, annotate the document register - Released for issue (RFI) and Julian date in col. i in pencil.		X	X				X	X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
13. For each request that does not appear on the listing, enter "No record" and date of listing in col. i in pencil.			X					
14. If the item is not received by next listing, mark "Lost" in col. i of the document register and reorder using a new document number.		X	X				X	X
15. Submit a loss report to the DSU.			X					
16. Mark requisition "Cancelled" if it does not appear on 2 consecutive lists - reorder on document number if still needed.	X	X	X					X
17. If request is marked "duplicate Request Order Number (RON)" and one line is marked "RFI", a partial issue has been made and the balance is due-out. Either cancel the due-out line or mark "Lost" if not on the next list. Mark RFI line with "REC" if received but if not, mark "Lost" in col. i of the document register.		X	X					X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
18. If both lines are due-out, a warehouse denial of a partial issue has probably occurred. Mark both lines either "Received", "Cancelled", or "Lost". Both lines must be marked the same.		X	X if due-out or cancellation pending: mark - "Received" or "Cancelled"; if valid, mark "X"					X
19. Two or more lines are marked "Released", a partial issue has probably been made by more than one support unit. Mark each line received or valid.			X					
20. If an item is back ordered and you no longer need it, mark "Cancelled" next to the BB status on the listing and mark the cancellation on the document register with ACI and the Julian date in col. j in pencil.							X	X
21. If an item is backordered and still required, put an "X" in the date status column of the listing next to the status code BB and annotate the document register with BB & the Julian date of the listing in col. j.							X	X
22. If an item shows backordered on the listing but received in the document register, write "REC" in the date status column next to the status code.							X	X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
18. When completed with annotations to listing, keep one copy and forward the other one.		X TSO	X DSU				X DSU	X
	p.2-24	p.29.1-29.2	p.3-38.1-3-39.4				QMS 50.462 PT pp. 3-7	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
C. <u>Suspense File</u>								
1. Contains due-in copies of status cards.	X		X		X		X	X
2. All cards are filed in request order number (RON) sequence.	X	X	X		X		X	X
3. Cards are removed when total of due-in quantity is received.	X	X	X		X		X	X
4. Information on cards is in form of status codes.	X		X					X
5. Can keep duplicates/carbons of requests in suspense file.	X							X
	pp.2-22-2-23	p.19.1-21.2	p.3-16.3-3-28.1		p.6-15		QMS 50.451 PT pp.3-9	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
Storage Procedures								
1. Prescribed load stocks and related records will be maintained in an area readily accessible to maintenance personnel.	X							X
2. The Commanding Officer may collate PLL stocks and related records for several units in a central location when circumstances require centralization of maintenance and supply operations for several units. Stocks and records are maintained separately.	X							X
3. Repair parts are kept on shelves or in bins or cabinets, inspected periodically to insure that obsolete items are removed and replaced as applicable, and that no apparent damage has occurred since the previous inspection and items subject to rotation or obsolescence due to definite "shelf life" dates are rotated or replaced as required.	X							X
4. Each storage place must be labeled in some way.					X			X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
5. The location numbering system will be expressed in a combination of alpha-numeric characters.					X A3E21 CCDEB		X G-9-A D-I-C	X
6. Storage locations must be transferred from old PLL list to new one.							X	X
7. Storage locations are located in the far right-hand column of the PLL list.							X	X
8. Both drawer and bulk locations are available - parts can go in any open location depending on size.							X	X
	p.2-34.1				p.6-28-6-30		QMS 50.461 PT pp.2-5	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
E. <u>Inventory Procedures</u>								
1. Physical inventory of PLL stocks will be conducted at least every 6 months.	X							X
2. The result of the inventory will be posted to the DA 3318 (Record of Demands/Balance Record) or its automated equivalent.	X							X
	p.2-34.1							
F. <u>Record of Demands</u>								
1. The record of demands section of the 3318 is designed to record quantities of repair parts requested, regardless of the source. This specifically includes items obtained from another unit or from salvaged equipment during emergency situations.	X							X
	p.2-34.2							

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
G. <u>PLL Change List</u>	manual system		X as a result of demand history computation		manual system			
1. List is produced quarterly - 2 copies to each unit.		X					X	X
2. List reflects proposed additions, deletions, and stockage level changes.		X	X				X	X
3. NSN's and Management Control Numbers (MCN) are in National Item Identification Number (NIIN) sequence,, parts numbers in stock number sequence.		X NSN's only in NIIN sequence	X					
4. The CO is in charge of the PLL & has the final say.		X	X				X	
5. The following actions are taken on the PLL change list (both copies). A - addition B - deletion C - change in stockage level		X	X A-Recommended addition. C1-Level increases. C2-Recommended level decrease. D-Recommended deletion. D2-Delete-QSS item. D3-Delete-described (substitute) item. Preferred item is a recommended addition to the PLL. X1-Stock number change. Adjust unit records.				X	X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
			X2-Stock number and unit of issue of authorization quantity change. Adjust unit records. X3-Unit of issue and authorized quantity change. Adjust unit records. Ø-no recommended change.					
6. Actions are taken in PLL change code column.		X	X on both copies				X	X
7. Make a check mark to left of PLL change code for acceptance of change-draw line thru change code if to stay at old level; "adjust level to" left of the PLL Change Code if modifies and approves the proposed change. All actions must be approved by PLL unit commander.		X	X under "Remarks" column				X	X
8. Enter check mark to the left of the PLL Change Code for approved addition. Enter the noun nomenclature on the listing if not already there. Enter end item to the right of the PLL Code for which PLL item will be used. If other than the proposed PLL level is desired, enter "Adjust level to "to the left of the		X	X				X under "Remarks"	X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
PLL Change Code. All actions must be approved by the PLL unit commander.								
9. Make a check mark to the left of the PLL Change Code for approved deletion. If disapproved, draw a single line thru PLL Change Code. - "Adjust level to______" anything other than proposed level.		X						X
10. If other than the current PLL level is desired, enter the following to the left of the Change Code:"Adjust level to ____". All actions must be approved by the PLL unit commander.			X					
11. When completed send one copy thru DSU to TSO.		X	X(thru DSU to Stock Control or MMC)					X
12. Keep one copy until TSO copy is returned for unit file.		X	X(Stock Control or MMC)					X

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
13. When updated PLL list is received, compare each entry on the PLL Change List with the updated PLL Change List. Check with TSO for problems.		X	X(Stock Control or MMC)					X
14. When the catalog change process is run, a PLL Change List may be generated to report changes in stock number and Unit of Issue. Post these changes to the PLL records.			X					
15. If new prepunched requests are provided, place them in file and destroy the old prepunched requests.			X					
16. PLL unit commanders may also complete and submit PLL Change Request Worksheets for other items to be added, deleted, or changed.			X					
		p.28.1-28a.1	p.3-53.1-3-54.2				QMS 50.461 PT pp 3-7	

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
H. <u>Demand History</u>							p.2, QMS 50.450 HI says "You will no longer be required to keep a record of demands (DA 3318) as this is done by computer".	
1. The title insert of DA 3318 is prepared for each line item authorized for stockage and filed in a visible file cabinet or visible file folder in NIIN sequence.	X				X			
2. The DA 3318 records quantities of items requested, regardless of source - specifically applies to items obtained from another unit or from salvaged equipment during emergency situations.	X							
3. The status of items may be determined by colored tabs.	X				X			
4. A separate file of demand records (DA 3318 or automated equivalent) will be maintained to record demand history for non-stocked items. These items become candidates for addition to the PLL after meeting the criteria of 3 demands within the most recent 180-day period.	X				X			
		p.31.1						

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
5. A DA 3318 is prepared when a non-stocked item is requested for the first time. The title insert is not filled in at this time.	X				X			
6. There is 1 DA 3318 for each NSN in NIIN sequence. Draw a line thru demands more than 180 days old.	X				X			
7. When the stockage criteria is met, the quantity demanded by the 3 demands will be totalled and entered in col. "C" of third demand entry.	X				X			
8. The stockage level for the item will be determined from the authorized Stock Level Table from AR 710-2.	X				X			
9. The document number and quantity of the request will be entered on the next available line of the DA 3318 and underlined to indicate that the demands which qualified the item for stockage cannot be included in future reviews. The title insert section of the DA 3318 is now completed and filed in the PLL visible file.	X				X			

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11 (Test)	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
10. The Supply Supporting Activity (SSA) is notified of the addition.					X			
11. The non-stocked item demand file will be reviewed every 90 days for the purpose of removing cards for those items that no longer apply to equipment on hand or that have no demands in the most recent 180 days.	X				X			
12. These 3318's will be reused when practical or destroyed.	X				X			
13. A non-stocked item demand file is not required if automated PLL support is provided.	X				X			
14. All entries on the 3318 are in pencil.					X			
15. Manual computations of levels, and determination of PLL additions and deletions based on 3318 entries are not required, except for DX items.			X					
16. For DX items, compute levels and determine additions and deletions in accordance with Manual Computation List. All demands (requests), issues, turn-ins, on-hand balances, locations, and authorizations must be posted.			X					
	p.2-34.2-2-34.3				p.6-21-6-24			

IV. SUMMARY OF ANALYSIS OF PROCEDURES

A. Unit Request Processing	PLL	DX	QSS	TURN-IN	FRINGE	STATUS CODE LIST	STATUS	FOLLOW-UP	CANCELLATION
				(number of steps in each procedure)					
1. AR 710-2	4	3	8	14	-	App. F	3	5	5
2. TM 38-L22-15-2	11	7	8	9	9	Ref. AR 710-2	9	7	8
3. TM 38-L32-11 (Test)	8	9	9	14	-		9	9	11
4. TM 38-750	-	3	-	-	-		-	-	-
5. FM 29-2	3	3	6	6	-		4	4	4
6. FM 29-30-1	-	4	-	-	-		-	-	-
7. QMS 76D Text	10	5	9	3	-	Ref. AR 710-2	7	7	4
8. *HEL	11	9	9	21	9		11	9	12

*The number of steps involved in the HEL procedures is based on data collection experience and the TM 38-L22-15-2. No financial management procedures are involved.

AR 710-2 - Materiel Management for Using Units, Support Units, and Installations, w/C5, Feb 79.

TM 38-L22-15-2 - Class IX (Repair Parts) Supply System Operating Procedures - Using Unit Procedures.

TM 38-L32-11 (Test) - Functional Users Manual for Direct Support Unit Standard Supply System (DS4), Customer (User) Procedures (Divisional & Non-Divisional).

TM 38-750 - The Army Maintenance Management System (TAMMS), w/C1, May 78.

FM 29-2 - Organizational Maintenance Operations, Aug 1975.

FM 29-30-1 - Division Maintenance Battalion, Feb 1976.

QMS 76D Text - "A Self-Study Course" - Materiel Supplyman 76D (QMS 50.540 - 50.463).

B. FORMS

1. Forms	DA 2765 PP/Completion Data	DA 2765 Manual	DA 2765-1	DA 2064	DA 1348-6	DA 2402	Want Slip	Class IX Form 1 (Test)	DA 3318
	(Number of Data Points to be Filled In)								
a. AR 710-2	7/10	15	17	19	12	-	4	-	11
b. TM 38-L22-15-2	8/7	16	-	19	20	-	4	25	-
c. TM 38-L32-11	8/7	17	-	20	24	15	5	-	-
d. TM 38-750	-	-	-	-	-	15	-	-	-
e. FM 29-2	7/7	13	16	18	-	16	-	-	12
f. QMS 76D Text	8/6	17	-	16	17	13	5	25	-
g. HEL	11/9	18	21	21	21	17	5	25	9

2. <u>Forms discrepancies among the doctrinal material</u>

Code Definitions -

AR - AR 710-2, Ch. 5 - Materiel Management for Using Units, Support Units, and Installations.

TM - TM 38-L22-15-2 (TC 38-2-1) - Class IX (Repair Parts) Supply System - Supply Operating Procedures - Using Unit Procedures, March 1971.

FM - FM 29-2 - Organizational Maintenance Procedures, Aug. 1975.

QMS - Materiel Supplyman Self-Study Course from US Army Quartermaster School, Feb. 1978.

DS4 - TM 38-L32-11 (Test) - Customer (User) Procedures (Divisional and Non-divisional), 1 Sep 1978.

a. <u>DA 2765/Prepunched Data</u>

(1) TM, FM, QMS, DS4 - Item type is prepunched in cc7.
AR - Item type is not prepunched.

(2) TM, FM, QMS - Aircraft/missile/blank is prepunched.
AR, DS4 - Aircraft/missile/blank is not prepunched.

(3) AR - Service code for MILSTRIP requisitioner is prepunched in cc 30-35.

(4) TM, FM, QMS, DS4 - Service Code is not prepunched.

(5) TM, FM, QMS, DS4 - Unit Activity Address Code (UAAC) is prepunched in cc 30-35.

(6) AR - UAAC is not prepunched.

(7) TM, QMS, DS4 - Demand Code is prepunched in cc 44.
AR, FM - Demand Code is not prepunched.

(8) AR - "Y" is prepunched in cc 45.
TM, FM, QMS, DS4 - "Y" is not entered.

(9) AR, DS4 - Supply Supporting Activity DODAAC is prepunched in cc 46-50.
TM, FM, QMS - SSA DODAAC is not prepunched.

(10) TM, FM, QMS - Direct Support Unit (DSU) to which customer submits request is prepunched in cc 67.

(11) AR, DS4 - Supporting DSU is not prepunched.

(12) AR - Signal Code "A" is prepunched in cc 51.
TM, FM, QMS, DS4 - Signal Code "A" is not prepunched.

Summary of Discrepancies - DA 2765/Completion Data

(13) TM, SP - SUAAC in b. 6.
AR, FM, DS4 - no SUAAC.

(14) TM, AR, SP, DS4 - Julian date and document serial number in b. 11&12.
FM - b. C1.

(15) TM, FM - Quantity requested in b. L.
DS4, SP, AR - b. 8.

(16) AR, FM - Demand Code in b. 13.
TM, SP, DS4 - Prepunched.

(17) AR - DODAAC b. 10.
FM - b. 15.
DS4, TM, SP - No DODAAC.

(18) AR - Service Code b. 9.
DS4, TM, FM, SP - no Service Code.

(19) TM, AR, SP, DS4 - Advice Code in b. 22.
FM - b. 21.

(20) AR - Cost Detail Account b. L.
DS4, TM, FM, SP - no Cost Detail Account.

(21) AR, DS4 - "E" or "N" for NORS request b. 21.
TM, FM, SP - no "E" or "N" for NORS request.

b. DA 2765 Manual

(1) TM, SP, DS4 - Document Identifier Code (DIC) in b. 1.
AR, FM - no DIC.

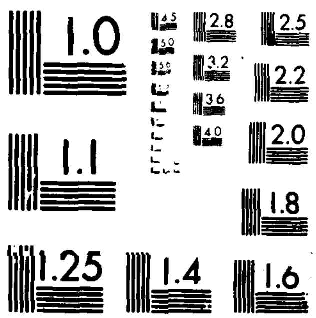
(2) TM, SP, DS4 - "P" for PLL; Blank if not in b. 3.
AR, FM - No.

(3) TM, SP - SUAAC in b. 6.
DS4, AR, FM - No.

(4) TM, SP - Aircraft/missile/blank in b. 6.
DS4, AR, FM - No.

AD-A081 454 HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD F/G 15/5
HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYST--ETC(U)
FEB 80 R L KEESEE, R S CAMDEN, R M POWERS
UNCLASSIFIED HEL-TM-3-80-VOL-2 NL

4 OF 5
AD
A081454



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

(5) AR - Service Code b. 9.
DS4, TM, FM, SP - No Service Code.

(6) TM, SP, DS4 - UAAC in b. 10.
AR, FM - No.

(7) FM - Julian date b. C1.
TM, AR, SP - b. 11&12.

(8) AR - DODAAC in b. 10.
FM - b. 15.
DS4, TM, SP - No DODAAC.

(9) AR, DS4 - "E" or "N" for NORS request b. 21.
TM, FM, SP - No "E" or "N" for NORS request.

(10) TM, AR, SP, DS4 - Advice Code b. 22.
FM - b. 21.

(11) AR - Cost Detail Account b. L.
FM - b. I.
TM, SP, DS4 - No Cost Detail Account.

(12) TM, SP - Supply Unit Code of Supporting DSU b. 23.
DS4, AR, FM - No Supply Unit Code of Supporting DSU.

(13) TM, FM - Quantity b. L.
AR, DS4 - b. O.

(14) TM, FM, SP - Description of item; blank if PLL b. M.
AR, DS4 - b. O.

(15) TM, FM, SP - Organizational parts manual information b. O.
DS4, AR - b. P.

c. <u>DD 1348-6</u>

(1) TM, SP, DS4 - DIC cc 1-3.
AR - No DIC.

(2) TM, SP, DS4 - Demand Code cc 44.
AR - No Demand Code.

(3) AR, DS4 - Project Code, if assigned cc 57-59.
TM, SP - No Project Code.

(4) AR - Required Delivery Date cc 62-64.
TM, SP, DS4 - No Required Delivery Date.

(5) TM, AR, DS4 - Advice Code cc 65-66.
SP - No Advice Code.

(6) TM - Supply Unit Code cc 67.
AR, SP, DS4 - No Supply Unit Code.

(7) TM, AR, DS4 - Publication Information Code cc 70.
SP - No Publication Information Code.

(8) TM, AR, DS4 - Reference Publication cc 71-80.
SP - No Reference Publication.

C. ADDITIONAL PROCEDURES

	AR 710-2	TM 38-L22-15-2	TM 38-L32-11	TM 38-750	FM 29-2	FM 29-30-1	QMS 76D Text	HEL
1. Processing Receipts	2	5	6	-	5	-	6	6
2. Suspense File	5	2	-	-	3	-	3	5
3. Reconciliation Procedures	5	14	16	-	14	-	17	-
4. PLL Change List	-	10	17	-	8	-	10	-
5. Storage Procedures	2	-	-	-	3	-	8	3
6. Inventory Procedures	2	-	-	-	-	-	2	-
7. Demand History	12	-	2	-	-	-	-	13
8. Record of Demands	1	-	-	-	-	-	1	-

D. COMPARISON OF CODE LISTS INCLUDED IN DOCTRINAL MATERIAL

Codes	AR 710-2	TM 38-L22-15-2	TM 38-L32-1 (Test)	TM 38-750	AR 725-50	FM 29-2	FM 29-30-1
1. DIC	I (ref. AR 725-50)	p. A-4 - A-5 (ref. AR 725-50)	A-14		App. B		
2. RIC			A-32		C		
3. MILSTRIP Service Assignment Codes					G		
4. Demand and Suffix Codes		p. A-4 (ref. AR 725-50) p. A-17 (ref. AR 725-50)	A-12		K		
5. Signal Codes			A-33		N		
6. Fund Code			A-16		O		
7. WSDC	H	p. A-24 - A-29	A-50		P		
8. Project Code			A-29		Q		
9. Advice & Status Codes	F		A-4-7 A-34-41		R		
10. Condition Code		A-11	A-21		AB		
11. Media & Status Codes			A-22		D		
12. Distribution Codes			A-13		P		

	AR 710-2	TM 38-L22-15-2	TM 38-L32-1 (Test)	TM 38-750	AR 725-50	FM 29-2	FM 29-30-1
13. Priority Designator	G (ref. AR 725-50)	p. A-7 (ref. 725-50)	A-27		p. 2-4		
14. Recoverability Codes	M (ref. AR 700-82)	p. A-13 (ref. AR 708-1)	A-30				
15. Country Code		p. A-3 (ref. AR 708-1)	A-11		U		
16. Expendability Code		p. A-6 (ref. 725-50)	A-16				
17. A/M Code		p. A-2					
18. Fund Code		Just ref. AR 725-50					
19. Reportable Item Control Codes		P.. A-14 (ref. AR 710-3)	A-30				
20. Stockage List Code		p. A-17					
21. Unit of Issue Code		p. A-18-A-23 (ref. 708-17)	A-46				
22. Echelon of Maintenance Symbol		p. A-6 (ref. AR 700-1)					
23. Control Code			A-8				
24. NORS/ANORS Deployment Code			A-24				

APPENDIX E

QUESTIONNAIRE FORMS

Interviewer: ______________ Time/Date: ______________
Name/Rank: ______________ CO/BN: ______________

QUESTIONS FOR STRUCTURED INTERVIEW - PLL CLERK

1. When did you enter the Army (mon/yr)?
2. When did you first start as a PLL clerk?
3. What is your PMOS? What other MOSs do you have?
4. Do you have any ASIs? Y-N
5. (If not 76D) how did you get this PLL job?
6. Did you have any prior civilian or military experience in supply or repair parts?
7. Have you ever worked or been trained as a mechanic either civilian or military?
8. What formal training have you have had for this job? (Ft.Lee 76D course, other).
9. (If QMS 76D) how long did it take you to complete the course?
10. When you started, did you feel completely prepared for the PLL clerk position or did you feel that you needed more training?
11. Did you receive any OJT or additional training after beginning the job? (specific areas)
12. How many lines are in your PLL?
13. How many of those lines are other than tank/automotive?
14. How many lines are at zero balance?
15. Where is your PLL stored?
16. (If not in a vehicle) have you ever taken the PLL to the field? How often?
17. What people have access to the PLL?
18. From the time someone in your unit decides they need a part, what is the step-by-step procedure that you use for getting that part? (Be specific and use form numbers. Does the motor sergeant approve the need for a part before it is requisitioned by you?)

19. How often do you use preprinted 2765s? For what type of requests? (PLL replenishment, different priorities, etc.)

20. From where do you get the prepunched cards? When do you store them?

21. How often do you doublecheck the mechanic's information for the parts NSN and unit of issue from the TMs?

22. How often do you find the TMs to be inaccurate?

23. Is there a PLL SOP? (Who wrote it? When? May we have a copy of it?)

24. How often do you use the AMDF? (Every request,some requests,etc.)

25. What is the date of your latest AMDF?

26. Do you have your own microfiche reader?

27. What information do you get from the AMDF?

28. What do you do if you can't find an NSN on the AMDF?

29. Do you have an I&S Group File? How often do you use it?

30. What is the date of your latest QSS list? How often do you receive a new one?

31. What is the date of your latest DX list? How often do you receive a new one?

32. Where or from whom do you get the DX and QSS lists?

33. How long do you keep copies of the document register pages?

34. How do you decide that a request is overdue? (Review the document register or suspense file daily for outstanding requests)?

35. Do you have a suspense file? What goes in it? What is the purpose of it?

36. How many cards are in your suspense file?

37. About how many follow-ups do you submit in a week (or month)?

38. How often do you receive the due-out listings? What do you do with them?

39. Do you have any trouble with the DLOGS printouts? Are they useful and easy to understand? (Due-out listing,PLL change list).

40. What do you do with the UAAC Demand Summary List? Does anyone else in your unit use it?

41. When and with whom do you do a reconciliation of your repair parts records?

42. How did you learn to do a reconciliation?

43. Is there a set policy on reconciliation in your Co or Bn?

44. Is the motor sergeant or motor officer involved in the reconciliation?

45. Is any type of reconciliation done with the TAMMS clerk?

46. About how many requests do you submit a week (or day)?

47. About what percentage of your requests are 03? 06?

48. What percentage of the 03 requests do you "walk-through"?

49. About how many requests are rejected a week (or day)?

50. What is the most frequent cause for the rejections?

51. If a request is rejected, how many days does it take to find out that it is rejected?

52. For how many lines do you keep DA 3318s?

53. Do you stock any QSS items? On or off your PLL?

54. How did you decide how many to stock?

55. How many times a day do you go on a parts run?

56. About how much time does a parts run take? How much of that time is spent waiting?

57. Do you usually go by yourself or do you have help on the parts run?

58. About how many times a week do you get parts from a source other than your PLL or the supply system?

59. How often do you inventory your PLL?

60. Is there a TAMMS clerk in your company?

61. Do you get any help from the TAMMS clerk?

62. About how many days does it take to receive an 03 parts?
06 part? 13 part?

63. Do you keep a total of how much money the unit spends on repair parts?

64. How often and to whom do you give this total?

65. Do you ever decide that a part is too expensive and the request ought to be delayed until the unit has more money? (Who decides)?

66. How often does the unit run out of money?

67. When you have a problem with the repair parts supply procedures, where do you go for help?

68. Who acts as your supervisor?

69. About how often does he check your work?

70. On the average, how many hours a day do you work on your PLL duties?

71. Are you excused from duties? (If not, how often do you have extra duty?)

72. What is the biggest problem in doing your job?

73. What do you think is the biggest problem with the repair parts supply system?

74. Do you read PS magazine? Is it helpful to you as a PLL clerk?

Interviewer: ____________ Time/Date: ____________
Name/Rank: ______________ CO/BN: ______________

QUESTIONS FOR STRUCTURED INTERVIEW - MTR SGT/OFCR

1. When did you enter the Army (mon/yr)?

2. What is your PMOS? What other MOSs do you have?

3. Do you have any ASIs? (Y/N)

4. When did you become mtr sgt/ofcr?

5. (Mtr sgt) Have you ever worked as a PLL clerk?

6. What formal training have you had in repair parts supply?

7. Is your PLL clerk a 76D?

8. (If not 76D) How did you select your PLL clerk?

9. (If QMS 76D) How long did it take your PLL clerk to become acceptable in his job?

10. How long does it take new school-trained mechanics to become acceptable in their jobs?

11. What is the MOS of your TAMMS clerk?

12. How many lines are on your PLL?

13. How many lines are Tank-Automotive?

14. How many lines are at zero balance?

15. What people have access to the PLL?

16. Is there a PLL SOP?

17. How much time a week must you spend helping or checking on the PLL clerk?

18. About how many requests does your PLL clerk submit a week?

19. What percentage of your requests are 03? 06?

20. What percentage of your 03 requests are walked-through?

21. How many of your PLL clerk's requests are rejected each week?

22. What is the most frequent cause for the rejections?

23. About what percentage of the parts you need come from a source other than the PLL and the supply system?

24. For how many lines do you have the clerk keep DA 3318s (manual record of demands)?

25. How many parts runs a day do you require your PLL clerk to make?

26. Do you ever decide that a part is too expensive and the request ought to be delayed until the unit has more money? (Who decides)?

27. How often does the unit run out of money?

28. How much do you get involved in the PLL clerk's reconciliation procedure? (time/freq)

29. What references does a PLL clerk need to perform his job?

30. When there is a problem with the repair parts procedures, where do you go for help?

31. Is the PLL clerk excused from duties?

32. How many hours/day does your PLL clerk require to perform his job?

33. How many hours/day do the mechanics require to perform their jobs?

34. What do you think is the biggest problem with the repair parts supply system?

Interviewer: __________ Time/Date: ____________
Name/Rank: ____________ CO/BN: ____________

QUESTIONS FOR STRUCTURED INTERVIEW - BMT

1. When did you enter the Army (mon/yr)?

2. When did you become a WO?

3. What is your PMOS? What other MOSs do you have?

4. What ASIs do you have?

5. What were your duty positions prior to becoming a warrant? (How long in each?)

6. When did you start this present assignment?

7. What formal training have you had in repair parts supply?

8. How many 76Ds are you authorized by TOE/MTOE?

9. How many do you actually have assigned?

10. How many of your PLL clerks are QMS trained 76D's?

11. How many mechanics are you authorized by TOE/MTOE?

12. How many mechanics do you have assigned?

13. How long does it take for new 76D's from the QMS to being to perform satisfactorily on the job?

14. How long does it take for new school trained mechanics to begin to perform satisfactorily?

15. If a PLL clerk position is vacant and no 76D is available, what criteria do you follow to select a person to fill the job?

16. What criteria do you use in selecting a person to be TAMMS clerk?

17. How many PLL lines are there for the Bn?

18. What percentage of the lines are tank-automotive?

19. What percentage of the lines are commo/elect?

20. Is there a PLL SOP?

21. How much of your time each week is spent on repair parts supply?

22. About how many repair parts requests are submitted a week from the Bn?

23. What percentage of your requests are 03? 06?

24. What percentage of your 03 requests are walked-through?

25. What percentage of the requests are rejected?

26. What is the most frequent cause for the rejection?

27. About what percentage of the parts that the Bn needs come from a source other than the PLLs and the supply system?

28. For about how many lines do the clerks keep DA 3318s (Manual Record of Demands)?

29. How many parts runs a day do you require your PLL clerks to make?

30. Do you ever decide that certain parts might be too expensive and that the requests ought to be delayed until the Bn has more money?

31. How often does the Bn run out of money?

32. How much do you get involved in the PLL clerks reconciliations? (time/freq)?

33. What references does a PLL clerk need to perform his job?

34. When there is a problem with the repair parts procedures, where do you go for help?

35. Are the PLL clerks excused from duties?

36. On the average, how many hours a day do the PLL clerks work?

37. How many hours a day do the mechanics work?

38. What do you think is the biggest problem w/the repair parts system?

APPENDIX F

OBJECTIVE DATA SHEETS

Interviewer: ____________ Time/Date: ____________
Name/Rank: ____________ CO/BN: ____________

OBJECTIVE DATA SHEET

PLL DATA ITEMS

A. PLL Situation:

(1) Total lines ________
(2) Tank/Auto ________
(3) Commu/Elect ________
(4) Arms Room ________
(5) NBC ________
(6) Lines Zero Bal ________
(7) Lines on DA 3318 ________
(8) Lines DX ________
(9) Lines QSS ________
(10) Lines not demand supported ________

B. Documents on hand	Date of latest change/issue
AR 710-2	
TC 38-2/TM 38-L22-15-1	
TC 38-2-1/TM 38-L22-15-2	
TC 38-2-2/TM 38-L22-15-3	
TC 38-2-3/TM 38-L22-15-4	
TM 38-750	
Monthly AMDF File	
I&S Index File	
History File	
Code Reference Guide for AMDF	
Code Reference Guide for I&S Index File	
Code Reference Guide for History File	
FM 29-2, Organizational Maintenance Operations	
Soldiers Manual	
DX listing	
QSS listing	
PLL listing	
SOP.	

c. Review document register for # requests submitted for: (Enter "M" for missing document register page and "Ø" if it can be determined that there were no transactions.)

9131 ___	9096 ___	9061 ___	9026 ___	8356 ___	8320 ___
9130 ___	9095 ___	9060 ___	9025 ___	8355 ___	8319 ___
9129 ___	9094 ___	9059 ___	9024 ___	8354 ___	8318 ___
9128 ___	9093 ___	9058 ___	9023 ___	8353 ___	8317 ___
9127 ___	9092 ___	9057 ___	9022 ___	8352 ___	8316 ___
9126 ___	9091 ___	9056 ___	9021 ___	8351 ___	
9125 ___	9090 ___	9055 ___	9020 ___	8350 ___	
9124 ___	9089 ___	9054 ___	9019 ___	8349 ___	
9123 ___	9088 ___	9053 ___	9018 ___	8348 ___	
9122 ___	9087 ___	9052 ___	9017 ___	8347 ___	
9121 ___	9086 ___	9051 ___	9016 ___	8346 ___	
9120 ___	9085 ___	9050 ___	9015 ___	8345 ___	
9119 ___	9084 ___	9049 ___	9014 ___	8344 ___	
9118 ___	9083 ___	9048 ___	9013 ___	8343 ___	
9117 ___	9082 ___	9047 ___	9012 ___	8342 ___	
9116 ___	9081 ___	9046 ___	9011 ___	8341 ___	
9115 ___	9080 ___	9045 ___	9010 ___	8340 ___	
9114 ___	9079 ___	9044 ___	9009 ___	8339 ___	
9113 ___	9078 ___	9043 ___	9008 ___	8338 ___	
9112 ___	9077 ___	9042 ___	9007 ___	8337 ___	
9111 ___	9076 ___	9041 ___	9006 ___	8336 ___	
9110 ___	9075 ___	9040 ___	9005 ___	8335 ___	
9109 ___	9074 ___	9039 ___	9004 ___	8334 ___	
9108 ___	9073 ___	9038 ___	9003 ___	8332 ___	
9107 ___	9072 ___	9037 ___	9002 ___	8331 ___	
9106 ___	9071 ___	9036 ___	9001 ___	8330 ___	
9105 ___	9070 ___	9035 ___	8365 ___	8329 ___	
9104 ___	9069 ___	9034 ___	8364 ___	8328 ___	
9103 ___	9068 ___	9033 ___	8363 ___	8327 ___	
9102 ___	9067 ___	9032 ___	8362 ___	8326 ___	
9101 ___	9066 ___	9031 ___	8361 ___	8325 ___	
9100 ___	9065 ___	9030 ___	8360 ___	8324 ___	
9099 ___	9064 ___	9029 ___	8359 ___	8323 ___	
9098 ___	9063 ___	9028 ___	8358 ___	8322 ___	
9097 ___	9062 ___	9027 ___	8357 ___	8321 ___	

D. Review last ____ days of document register (and other sources such as QSS shopping lists) and record:

JULIAN DATE

Type of request										
PLL										
DX										
Other										
NSN										
Part #										
Cancellation										
Turn-ins										
PRI 03										
PRI 06										
PRI 13										
QSS Requested										
QSS Filed										
Walk Thru's										

E. Review Due Out to Unit Listing for:

Date ____________

items due out to unit ________

E. VEHICLE INFORMATION

TYPE OF VEHICLE	MILEAGE	HOURS	MILES IN LAST 30 DAYS

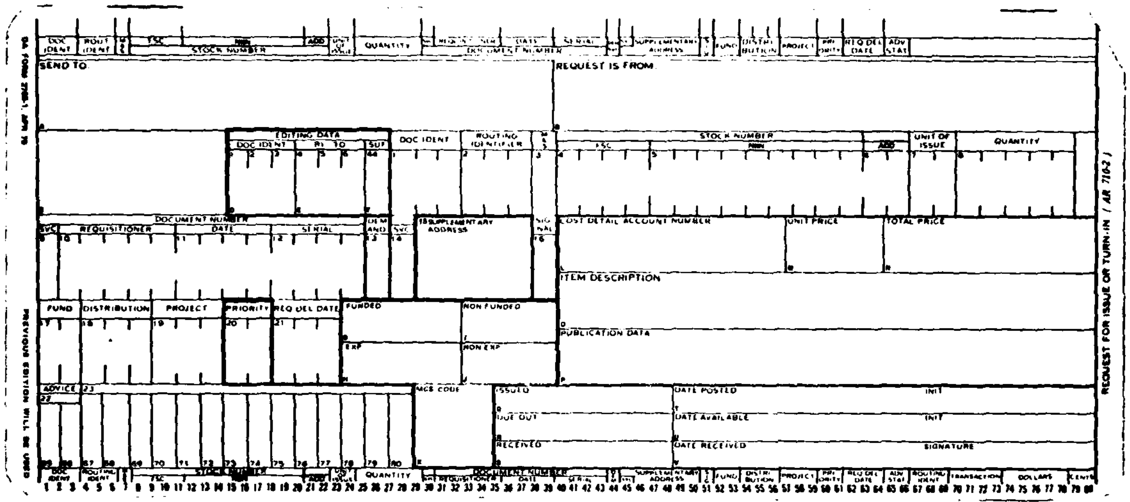
Co/Bn

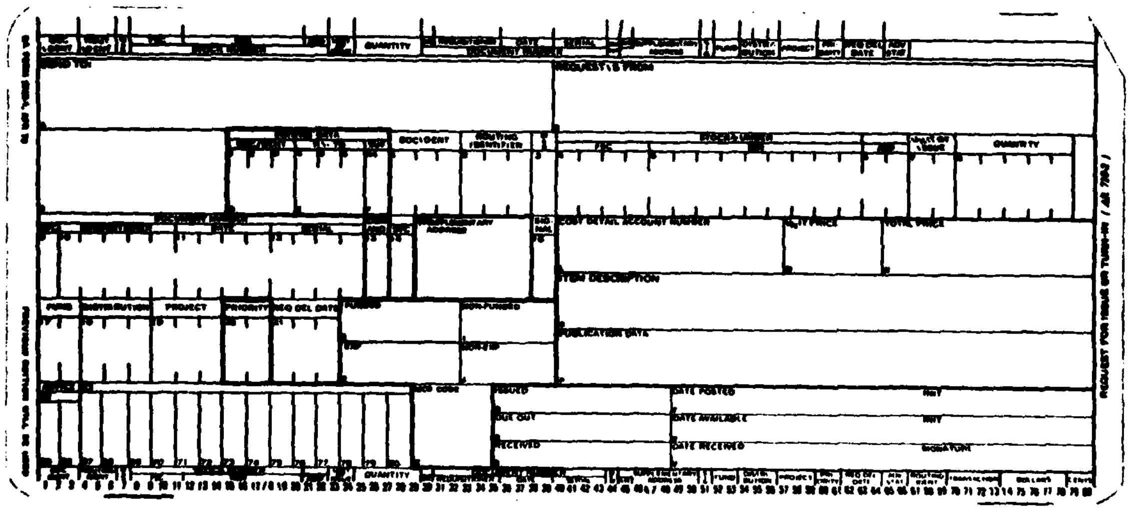
Date

HEL DC

Complete or note variations for combinations of the following:

- DX (additions/initial stock) - PRE-PUNCH
- QSS(?) - ADA - NORS
- PLL - AFI - ANORS
- Hi Pri - ACI - TURN-IN
- Lo Pri - DHA - OTHER





PLL OBJECTIVE DATA

Co/Bn ____________

Date ____________

HEL DC ____________

Complete last 30 of each type (≤2/day):
- PLL replenish
- PLL hi-pri
- Fringe - hi-pri
- Fringe - lo-pri
- DX (?)
- QSS (?)

TYPE				TYPE			
DOC. PRI/DATE	STAT/COMP DATE	STAT	DAYS	DOC PRI/DATE	STAT/COMP DATE	STAT	DAYS

PLL OBJ DATA - CONTINUED

Co/Bn ____________ Date ____________ HEL DC ____________

TYPE ________				TYPE ________			
DOC PRI/DATE	STAT/COMP DATE	STATUS	DAYS	DOC PRI/DATE	STAT/COMP DATE	STATUS	DAYS

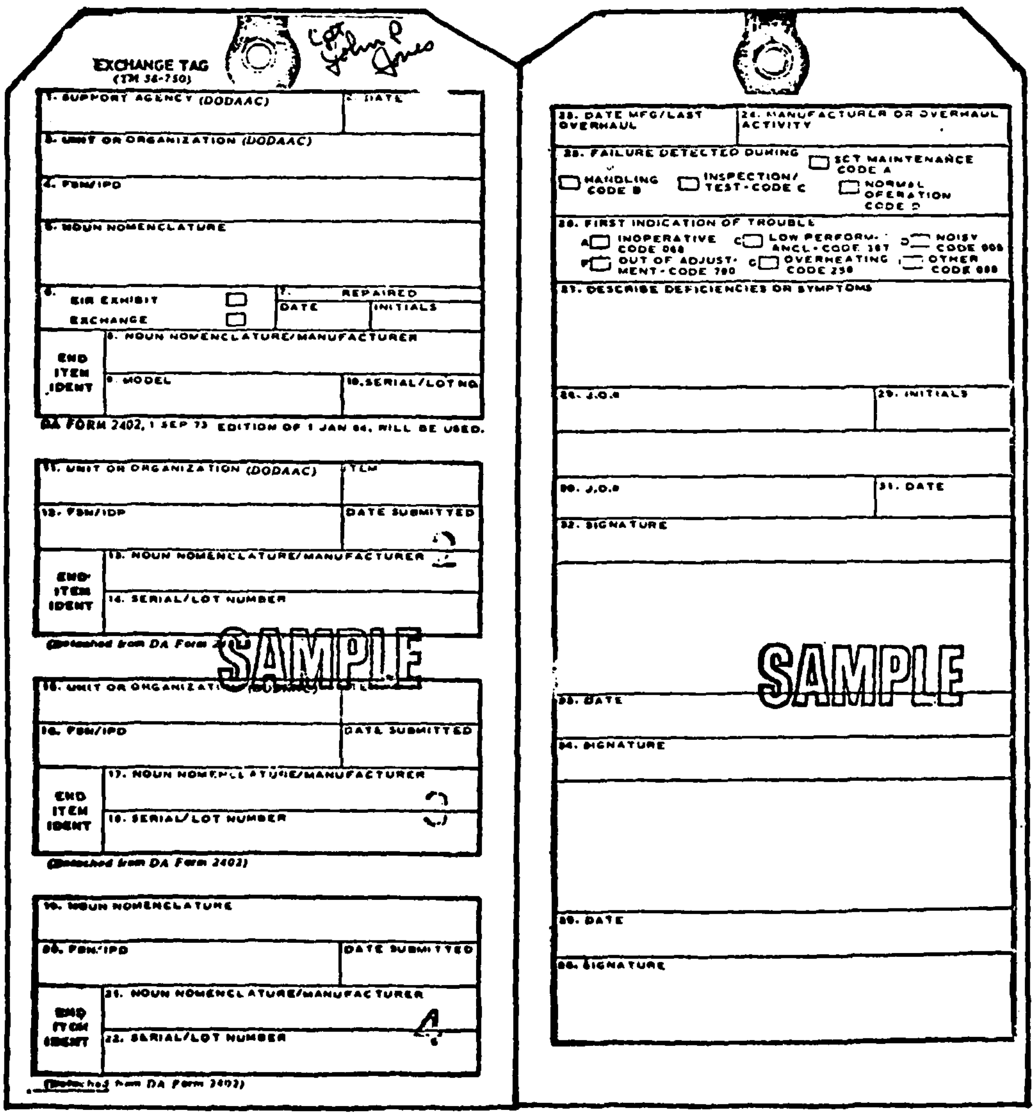
Co/Bn

Date

HEL DC

Complete for combinations of the following (i.e., note variances !):

- PLL replenishment
- NORS
- ANORS
- Hi Pri
- Lo Pri


CPT John P Jones

EXCHANGE TAG (TM 38-750)

1. SUPPORT AGENCY (DODAAC) | 2. DATE

3. UNIT OR ORGANIZATION (DODAAC)

4. FSN/IPD

5. NOUN NOMENCLATURE

6. EIR EXHIBIT ☐ EXCHANGE ☐ | 7. REPAIRED DATE | INITIALS

END ITEM IDENT: 8. NOUN NOMENCLATURE/MANUFACTURER | 9. MODEL | 10. SERIAL/LOT NO.

DA FORM 2402, 1 SEP 73 EDITION OF 1 JAN 64, WILL BE USED.

11. UNIT OR ORGANIZATION (DODAAC) | TLM

12. FSN/IDP | DATE SUBMITTED

END ITEM IDENT: 13. NOUN NOMENCLATURE/MANUFACTURER | 14. SERIAL/LOT NUMBER

(Detached from DA Form 2402)

SAMPLE

15. UNIT OR ORGANIZATION (DODAAC)

16. FSN/IPD | DATE SUBMITTED

END ITEM IDENT: 17. NOUN NOMENCLATURE/MANUFACTURER | 18. SERIAL/LOT NUMBER

(Detached from DA Form 2402)

19. NOUN NOMENCLATURE

20. FSN/IPD | DATE SUBMITTED

END ITEM IDENT: 21. NOUN NOMENCLATURE/MANUFACTURER | 22. SERIAL/LOT NUMBER

(Detached from DA Form 2402)

23. DATE MFG/LAST OVERHAUL | 24. MANUFACTURER OR OVERHAUL ACTIVITY

25. FAILURE DETECTED DURING: ☐ SCT MAINTENANCE CODE A ☐ HANDLING CODE B ☐ INSPECTION/TEST-CODE C ☐ NORMAL OPERATION CODE D

26. FIRST INDICATION OF TROUBLE: ☐ INOPERATIVE CODE 068 ☐ LOW PERFORM-ANCE-CODE 387 ☐ NOISY CODE 008 ☐ OUT OF ADJUST-MENT-CODE 780 ☐ OVERHEATING CODE 258 ☐ OTHER CODE 888

27. DESCRIBE DEFICIENCIES OR SYMPTOMS

28. J.O.# | 29. INITIALS

30. J.O.# | 31. DATE

32. SIGNATURE

SAMPLE

33. DATE

34. SIGNATURE

35. DATE

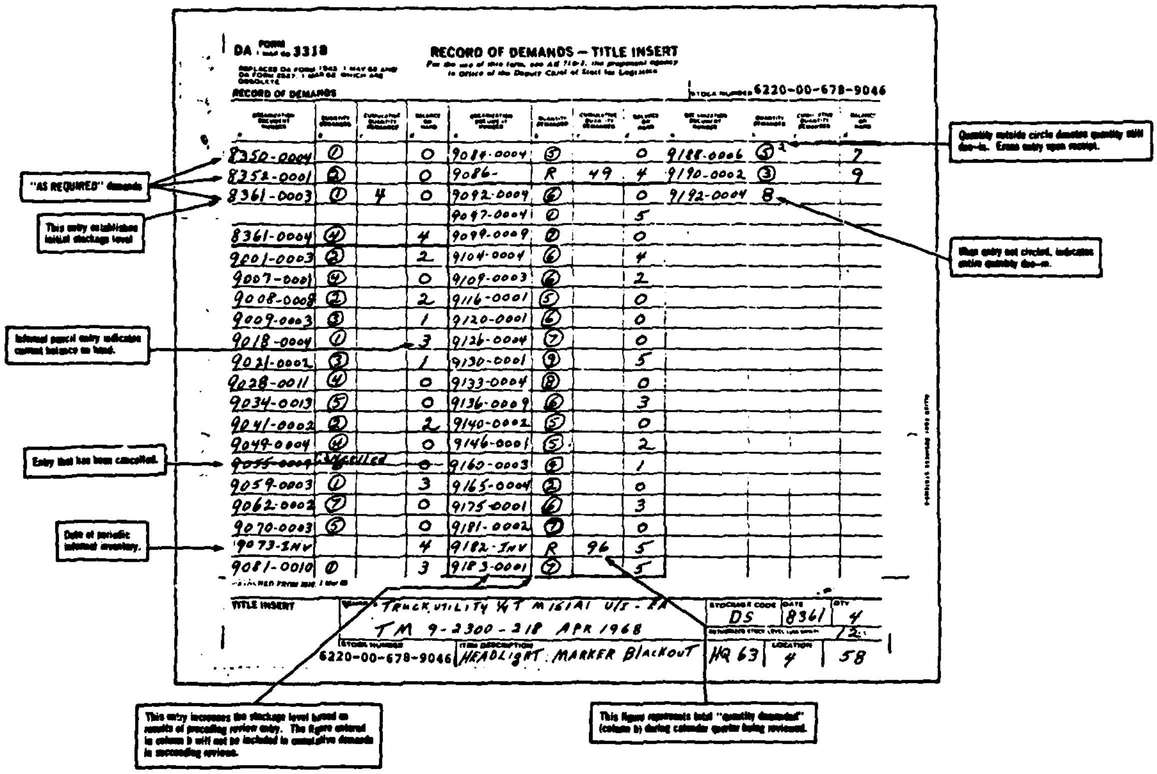
36. SIGNATURE

Co/Bn

Note variations for
- DX
- PLL
- Fringe
- Other

Date

HEL DC



★*Figure 2-27.*
(Detailed instructions follow)

Co/Bn

Date

HEL DC

Complete for combinations of the following:

- DX
- QSS (?)
- PLL
- Other
- Hi Pri
- Lo Pri
- AOA
- AFI
- ACI
- DHA
- Nors
- Anors
- Turn-in

DOCUMENT REGISTER FOR SUPPLY ACTIONS
For use of this form, see AR 735-35; the proponent agency is Office of the Deputy Chief of Staff for Logistics.

ORGANIZATION/ACTIVITY | UNIT IDENTIFICATION CODE | DATES (Day, Month, Year) FROM | TO | PAGE NO.

PRIORITY AND DATE a	DOCUMENT SERIAL NO. b	CONTROL NUMBER c	REMARKS d	SUP SPT ACTIVITY e	QTY REQ f	REC OR TURNED IN g	QTY DUE-IN h	DATE COMPL i	MISC j

APPENDIX G

PLL INTERVIEW SUMMARY

PLL INTERVIEW DATA SUMMARY

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
PMOS			
mechanic	23.26% (10)	20% (5)	22.1% (15)
combat	32.56% (14)	32% (8)	32.3% (22)
76D	41.86% (18)	44% (11)	42.6% (29)
76Y,P	2.32% (1)	4% (1)	3.% (2)
Rank			
E2	11.63% (5)	16% (4)	15.5% (9)
E3	23.26% (10)	16% (4)	24.1% (14)
E4	37.20% (16)	44% (11)	29.3% (17)
E5	25.58% (11)	24% (6)	29.3% (17)
E6	2.32% (1)	(0)	1.7% (1)
Formal training			
Ft. Lee	41.86% (18)	40% (10)	41.2% (28)
Post/theatre course	11.63% (5)	28% (7)	17.6% (12)
None	46.51% (20)	40% (10)	44.1% (30)
		n=25*	n=68
Use preprinted 2765s			
for PLL replenishment	29.27% (12)	13.04% (3)	23.4% (15)
if available	12.20% (5)	(0)	7.8% (5)
never	12.20% (5)	43.48% (10)	23.4% (15)
sometimes	36.59% (15)	39.13% (9)	37.5% (24)
always	9.76% (4)	(0)	6.3% (4)
didn't know what they were	(0)	4.35% (1)	1.6% (1)
How long as PLL clerk?	n=41 $\bar{X}$=14.756 mo. SD=15.317	n=25 $\bar{X}$=12.32 mo. SD=8.634	n=66 $\bar{X}$=13.74 SD=13.08
I&S group file			
do you have one?			
yes	52.38% (22)	66.67% (16)	57.6% (38)
no	23.81% (10)	16.67% (4)	21.2% (14)
didn't know what it was	23.81% (10)	16.67% (4)	21.2% (14)

*multiple answers possible. n=the number of individuals answering the question.

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
I&S group file (con't)			
how often do you use it?			
never	62.5% (10)	44.44% (4)	56% (14)
very seldom	18.75% (3)	22.22% (2)	20% (5)
sometimes	12.5% (2)	33.33% (3)	20% (5)
often	6.25% (1)	(0)	4% (1)
Keep money total			
yes	90.57% (38)	72% (18)	83.6% (56)
no	7.14% (3)	28% (7)	14.9% (10)
mtr sgt does	2.38% (1)	(0)	1.5% (1)
Use AMDF			
every request	69.05% (29)	60% (15)	65.7% (44)
all requests except PLL	4.76% (2)	20% (5)	10.4% (7)
all requests except QSS	9.52% (4)	(0)	6.% (4)
all requests except PLL&QSS	4.76% (2)	(0)	3.% (2)
sometimes	7.14% (3)	8% (2)	7.5% (5)
seldom	(0)	4% (1)	1.5% (1)
no	4.76% (2)	8% (2)	6.% (4)
Suspense file			
know what suspense file is			
yes	78.57% (33)	96% (24)	85.1% (57)
no	21.34% (9)	4% (1)	14.9% (10)
have a suspense file			
yes	95.24% (40)	100% (25)	97.% (65)
no	4.76% (2)	(0)	3.% (2)
Followups submitted/mo			
none	36.59% (15)	(0)	23.1% (15)
less than 10	34.15% (14)	4.17% (1)	23.1% (15)
10-25	14.63% (6)	37.5% (9)	23.1% (15)
26-50	2.44% (1)	12.5% (3)	6.1% (4)
51-100	2.44% (1)	16.67% (4)	7.7% (5)
101-150	2.44% (1)	16.67% (4)	7.7% (5)
doesn't know what AFI is	4.88% (2)	(0)	3.1% (2)
other	2.44% (1)	12.50% (3)	6.1% (4)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Receive due-out/ reconciliation lists (decks)			
every week	46.34% (19)	(0)	29.2% (19)
every 2 weeks	43.90% (18)	(0)	27.7% (18)
7-10 d.	4.88% (2)	(0)	3.1% (2)
every month	4.88% (2)	62.5% (15)	26.2% (17)
every 2 months	(0)	8.33% (2)	3.1% (2)
every 3 months	(0)	4.17% (1)	1.5% (1)
every 6 months	(0)	4.17% (1)	1.5% (1)
irregular	(0)	20.83% (5)	7.7% (5)
# Requests submitted/wk			
less than 25	9.30% (4)	8.33% (2)	9.% (6)
25-49	6.98% (3)	12.5% (3)	9.% (6)
50-74	23.26% (10)	25.% (6)	23.9% (16)
75-100	11.63% (5)	16.67% (4)	13.4% (9)
more than 100	34.88% (15)	25.% (6)	31.3% (21)
too wide range to classify	13.95% (6)	12.5% (3)	13.4% (9)
# Rejects received/wk			
none	15% (6)	8.33% (2)	12.5% (8)
less than 2/wk	20% (8)	8.33% (2)	15.6% (10)
2-3	22.5% (9)	16.67% (4)	20.3% (13)
4-5	17.5% (7)	20.83% (5)	18.7% (12)
6-7	(0)	16.67% (4)	6.2% (4)
10-15	12.5% (5)	16.67% (4)	14.1% (9)
more than 15	2.5% (1)	8.33% (2)	4.7% (3)
few	7.5% (3)	(0)	4.7% (3)
some	2.5% (1)	(0)	1.6% (1)
too wide range to classify	(0)	4.17% (1)	1.6% (1)
# days to learn of reject			
same day	3.03% (1)	15.79% (3)	7.7% (4)
next day	24.24% (8)	21.05% (4)	23.1% (12)
2d	27.27% (9)	36.84% (7)	30.8% (16)
3-4d	18.18% (6)	(0)	11.5% (6)
5-6d	9.09% (3)	(0)	5.7% (3)
week or more	12.12% (4)	15.79% (3)	13.5% (7)
other	6.06 (2)	10.52% (2)	7.7% (4)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Use 3318s			
never use	63.41% (26)	(0)	40.6% (26)
PLL only	(0)	4.35% (1)	1.6% (1)
DX only	31.70% (13)	(0)	20.3% (13)
yes (all PLL, DX, fringe)	(0)	95.65% (22)	34.4% (22)
didn't know what they were	4.88% (2)	(0)	3.1% (2)
PLL inventory			
1/wk	11.63% (5)	4.17% (1)	9.% (6)
every 2 wk	18.6% (8)	20.83% (5)	19.4% (13)
every 3 wk	2.33% (1)	(0)	1.5% (1)
1/mo	48.84 (21)	20.83% (5)	38.3% (26)
every 2 mo	6.98% (3)	4.17% (1)	6.% (4)
every 3 mo	9.3% (4)	33.33% (8)	17.9% (12)
every 6 mo	2.33% (1)	16.67% (4)	7.5% (5)
Stock QSS*			
*USAREUR only			
no	55.6% (10)	50% (7)	53.1% (17)
yes, off PLL	27.8% (5)	28.6% (4)	28.1% (9)
yes, on PLL	11.1% (2)	21.4% (3)	15.6% (5)
yes (didn't specify)	5.5% (1)	(0)	3.1% (1)

Question	Total
have mechanic experience	
yes	39.7%(27)
no	60.3%(41)
PLL storage	
2½T truck	25.7%(17)
1½T trailer	60.6%(40)
6T van	4.5%(3)
conex	18.2%(12)
building	9.1%(6)
	n=66
% 02/03 walk throughs	
all	40%(22)
50% or more	12.7%(7)
less than 50%	25.5%(14)
none	16.3%(9)
only in field	5.5%(3)
Acts as supervisor	
Motor sergeant	38.8%(26)
Motor sergeant & others	16.4%(11)
Others	44.8%(30)
how long have you been in the Army?	n=65 X=38.25 mo. SD=31.24
ASIs	
F9	1.5%(1)
none	97.%(65)
other	1.5%(1)
Prior supply/repair parts experience	
yes	20.6%(14)
no	79.4%(54)
76D Ft. Lee QMS completion time	
5-7 wks	17.2%(5)
8-10 wks	31.0%(9)
11-12 wks	34.5%(10)
longer than 12 wks	17.2%(5)
Felt prepared for job	
yes	25.5%(13)
no	68.6%(35)
other	5.9%(3)

Question	Total	
OJT		
no	20.3%(12)	
yes	11.8%(7)	
1 wk or less	13.5%(8)	
2-3 wks	16.8%(10)	
1 mo.	13.5%(8)	79.7%(47)
2 mo.	5.7%(3)	
3 mo. or longer	18.5%(11)	
doublecheck mechanics info		
never	29.5%(18)	
sometimes	26.2%(16)	
all the time	13.1%(8)	
look at AMDF	16.4%(10)	
only if NSN not on AMDF	11.5%(7)	
mtr sgt & XO check	3.3%(2)	
TMs inaccurate		
no	10%(5)	
yes	18%(9)	
alot	16%(8)	
occasionally	26%(13)	
seldom	8%(4)	
don't use TMs	22%(11)	
Have PLL SOP		
no	22.2%(14)	
yes	73.% (46)	
not sure	4.8%(3)	
Have own microfiche reader		
yes	76.5%(52)	
have 2 readers	5.9%(4)	
have access to one	17.6%(12)	
Keep document register pages		
destroy when completed	14.7%(10)	
less than 1 yr	10.3%(7)	
1 yr or longer	67.6%(46)	
BMT keeps completed pps.	7.4%(5)	
Approximate # cards in suspense file		
100 or less	27.1%(16)	
101-150	22.%(13)	
151-300	22.%(13)	
more than 300	22.8%(17)	

Question	Total
Trouble with Printouts	
no trouble	85.2%(46)
printouts sometimes hard to read	9.2%(5)
QSS indicators meaningless	1.8%(1)
Status codes aren't clear	1.8%(1)
Shows 02s first regardless of RON	1.8%(1)
Change list should have end item	1.8%(1)
Mix UICs in one printout	1.8%(1)
Parts disappear on listing	1.8%(1)
Dues outs come too often	1.8%(1)
	n=54
What do you do with UAAC Demand Summary*	
*USAREUR only	
doesn't get	43.7%(14)
checks demands	40.6%(13)
tells motor sgt/CO he has it	25%(8)
doesn't do anything with it	15.6%(5)
	n=32
Learn reconciliation	
by self	9.5%(6)
written publication or reference	4.8%(3)
school	7.9%(5)
other people	17.5%(11)
OJT	52.4%(33)
other	7.9%(5)
Set policy on reconciliation	
no	57.7%(30)
SSA policy	9.6%(5)
yes, local procedures	25%(13)
doesn't know	7.7%(4)
Motor sgt/officer involved in reconciliation	
no	70.5%(43)
motor sgt	11.4%(7)
motor officer	8.2%(5)
both	3.3%(2)
other answer	6.6%(4)
Reconciliation done with TAMMS clerk	
no	23.8%(15)
yes	57.1%(36)
-14s kept by PLL	14.3%(9)
no TAMMS clerk	4.8%(3)

Question	Total
% 02/03 requests	
10% or less	53.%(35)
11-25%	27.3%(18)
26-50%	10.6%(7)
51-75%	3.%(2)
76-100%	1.5%(1)
wasn't sure	4.5%(3)
% 05/06 requests	
10% or less	43.1%(28)
11-25%	32.3%(21)
26-50%	13.8%(9)
51-75%	6.2%(4)
76-100%	1.5%(1)
wasn't sure	3.1%(2)
Frequent cause for rejections	
DX	10.3%(6)
QSS	39.6%(23)
NSN	32.8%(19)
Class	12.1%(7)
Recoverables	17.2%(10)
Other	24.1%(14)
	n=58
# parts runs	
1/d	41.9%(26)
2/d	41.9%(26)
3/d	3.2%(2)
every 2d	8.1%(5)
2/w	1.6%(1)
4/w	1.6%(1)
only DX runs	1.6%(1)
Time for parts run	
1-30 minutes	28.6%(18)
31-60 minutes	28.6%(18)
61-120 minutes	22.2%(14)
longer than 2 hrs	20.6%(13)
Help on parts runs	
by self	25%(16)
with 1 helper	62.5%(40)
with 2 helpers	9.4%(6)
a parts runner goes	3.1%(2)
Times scrounge	
never	19.3%(12)
seldom	12.9%(8)
sometimes	6.5%(4)
at least daily	25.8%(16)
at least weekly	29.%(18)
at least monthly	6.5%(4)

Question	Total
Have a TAMMS clerk	
yes	89.4%(59)
no	10.6%(7)
Any help from TAMMS clerk	
yes	51.7%(31)
no	48.3%(29)
How often money total submitted*	
*USAREUR only	
every day	28%(7)
weekly	68%(17)
bi-weekly	4%(1)
Who gets money total	
unit CO/XO	21.7%(13)
S4	38.3%(23)
someone in unit maint.	21.7%(13)
other	18.3%(11)
Decides part is too expensive	
PLL clerk decides	25.9%(15)
Motor sergeant	22.4%(13)
XO or Mtr/Mntn Officer	22.4%(13)
Co Cmdr or higher	29.3%(17)
Unit runs out of money	
never	39.1%(25)
sometimes	14.1%(9)
frequently	15.6%(10)
recently	6.3%(4)
not recently	4.7%(3)
doesn't know	20.3%(13)
Where do you go for help?	
other PLL clerks	35.4%(23)
BMT/XO/MO	33.8%(22)
Motor Sgt	16.9%(11)
AR 710-2	9.2%(6)
DMMC	18.5%(12)
SSA	9.2%(6)
other	7.7%(5)

n=65

Question	Total
How often does supervisor check your work?	
never	20.6%(13)
occasionally	19.%(12)
often	9.5%(6)
everyday	33.3%(21)
less often than everyday	17.5%(11)
Hours/day work on PLL duties	
1-2 h	1.5%(1)
3-4 h	7.6%(5)
5-6 h	18.2%(12)
7-8 h	33.3%(22)
9-10 h	19.7%(13)
more than 10 h	16.7%(11)
other	3.%(2)
PLL clerk exempt from duty	
yes	75.%(48)
partly	6.2%(4)
no	17.2%(11)
not sure	1.6%(1)
Do you read PS magazine?	
yes	66.7%(28)
sometimes	23.8%(10)
no	9.5%(4)
Is PS magazine helpful?	
yes	68.6%(24)
sometimes	14.3%(5)
no	17.1%(6)
Have you taken your PLL to the field?	
yes	83.1%(54)
no	15.4%(10)
not sure	1.5%(1)
How often do you take PLL to field?*	
*USAREUR only	
2-3x/y	11.8%(2)
4x/y	23.5%(4)
5-6x/y	47.1%(8)
7-8x/y	11.8%(2)
20x/y	5.9%(1)

Question	Total
Who has access to PLL?	
PLL only	25.4%(16)
PLL & PLL NCOIC	7.9%(5)
PLL & Mtr sgt	28.6%(18)
PLL & unit officer	3.2%(2)
PLL & battalion officer	4.8%(3)
PLL, motor sgt, & other(s)	15.9%(10)
Other	14.3%(9)
What information do you get from the AMDF?	
unit of issue	65.2%(43)
price	92.4%(61)
class of supply	63.6%(42)
NSN	65.2%(43)
nomenclature	37.9%(25)
recoverability code	57.6%(38)
expendability code	7.6%(5)
MATCAT	15.9%(10)
fund code	4.5%(3)
acquisition advice code	4.5%(3)
other	6.0%(4)
	n=66
What do you do if you can't find an NSN on the AMDF?	
use 1348-6	21.5%(14)
check in TMs	13.8%(9)
order by part #	10.8%(7)
use CRL 1/2	13.8%(9)
return to mechanic/TAMMS	7.7%(5)
use 2765/-1; take to TSO	13.8%(9)
ask for assistance	13.8%(9)
other	4.6%(3)
How often do you receive a QSS list?	
every month	9.1%(6)
quarterly	6.1%(4)
every 4 mo.	3.0%(2)
every 6 mo.	7.6%(5)
once/yr	12.1%(8)
not sure	50.0%(33)
other	12.1%(8)

Question	Total
How often do you receive a DX list?	
every month	3.3%(2)
quarterly	11.7%(7)
every 6 mo.	10.0%(6)
once/yr.	6.7%(4)
not sure	56.7%(34)
other	11.7%(7)
Where do you get the QSS/DX lists?	
Division: DMMC	35.9%(14)
TSO	38.5%(15)
FSU	5.1%(2)
Supervisor	12.8%(5)
Not sure	7.7%(3)
Non-Division: Maintenance Co.	91.7%(22)
Squadron Mntn.	8.3%(2)
How do you decide the amount of QSS to stock?*	
*USAREUR only	
PLL decides	13.3%(2)
Motor sergeant/maintenance officer tells him	40.0%(6)
Motor sergeant & PLL	26.7%(4)
Other	20.0%(3)
How do you decide if a request is overdue?	
from due-out printouts	51.6%(33)
wait 7 days	4.7%(3)
wait 30-180 days	10.9%(7)
if don't get status card	4.7%(3)
check document register	20.3%(13)
other	4.7%(3)
not sure	3.1%(2)
What do you like about your job?*	
*CONUS only	
responsibility	54.3%(19)
duty content (i.e., paperwork)	28.6%(10)
physical/social environment	17.1%(6)
keeps busy	11.4%(4)
overall	5.7%(2)
has help to do job	2.9%(1)
doesn't like job	5.7%(2)
	n=35

Question	Total
What do you dislike about your job?*	
*CONUS only	
too much demanded of clerk/too much work	31.4%(11)
physical/social environment	20%(7)
paperwork	8.6%(3)
Army specific problems	8.6%(3)
system doesn't work/frustrating	8.6%(3)
inconsistency/unit unique procedures	5.7%(2)
lack of independence/going through sqd mntn	2.9%(1)
nothing	14.3%(5)
What is the biggest problem in doing your job ?*	
*USAREUR only	
not enough time/need help	34.4%(11)
not enough/conflicting guidance	12.5%(4)
transportation for parts runs	12.5%(4)
DMMC/TSO support	9.4%(3)
within battalion problems	6.3%(2)
RFIs/not getting parts	3.1%(1)
work environment/not enough PLL storage space	6.3%(2)
no problem	25.0%(8)
	n=32
What is the biggest problem with the repair parts system?	
RFIs/getting parts	35.8%(24)
DX/QSS	14.9%(10)
too much paperwork	10.4%(7)
useless/too much/conflicting guidance	7.5%(5)
DMMC/TSO support	7.5%(5)
lack of cooperation	5.9%(4)
losing requests	5.9%(4)
other	25.4%(17)
no problem	8.9%(6)
	n=67

APPENDIX H

Motor Sergeant Interview Summary

MOTOR SERGEANT INTERVIEW SUMMARY

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Rank			
E5	17.8% (5)	(0)	14.7% (5)
E6	42.9% (12)	66.7% (4)	47.1% (16)
E7	28.6% (8) (1 systems sgt)	33.3% (2)	29.4% (10)
E8	3.6% (1)	(0)	2.9% (1)
WO	3.6% (1) (systems warrant)	(0)	2.9% (1)
1 LT	3.6% (1) (acting)	(0)	2.9% (1)
How long have you been in the Army?	n=28 $\bar{X}$=12.51 yr SD=4.99	n=6 $\bar{X}$=13.08 yr SD=6.02	n=34 $\bar{X}$=12.61 yr SD=5.09
PMOS			
CMF 63	80.8% (21)	83.3% (5)	81.3% (26)
24	3.8% (1)	(0)	3.1% (1)
19	7.7% (2)	16.7% (1)	9.4% (3)
11	3.8% (1)	(0)	3.1% (1)
64	3.8% (1)	(0)	3.1% (1)
How long have you been a motor sergeant?	n=27 $\bar{X}$=7.25y SD=5.459	n=6 $\bar{X}$=4.878y SD=5.065	n=33 $\bar{X}$=6.819y SD=5.393
Have you worked as a PLL clerk?			
no	76.9% (20)	33.3% (2)	68.7% (22)
yes	23.1% (6)	66.7% (4)	31.3% (10)
Formal training in repair parts			
none	58.3% (14)	50% (3)	56.7% (17)
yes	41.7% (10)	50% (3)	43.3% (13)
Is your PLL clerk a 76D?			
no	55.2% (16)	71.4% (5)	58.3% (21)
yes	41.4% (12)	28.6% (2)	38.9% (14)
doesn't think so	3.4% (1)	(0)	2.8% (1)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
If a 76D, how long until acceptable?			
less than 1 mo.	17.6%(3)	60%(3)	27.3%(6)
1-3 mo.	41.2%(7)	20%(1)	36.4%(8)
4-9 mo.	17.6%(3)	(0)	13.6%(3)
doesn't know	23.5%(4)	20%(1)	22.7%(5)
How long until mechanic acceptable?			
1½ m or less	4.2%(1)	50%(3)	13.3%(4)
2-5 m	25%(6)	(0)	20%(6)
6-9 m	37.5%(9)	(0)	30%(9)
longer than 9 m	29.2%(7)	33.3%(2)	30%(9)
doesn't know	4.2%(1)	16.7%(1)	6.7%(2)
Your TAMMS clerk MOS			
mechanic	19.2%(5)	33.3%(2)	21.9%(7)
combat	61.5%(16)	33.3%(2)	56.2%(18)
76D	19.2%(5)	33.3%(2)	21.9%(7)
Do you have a PLL SOP?			
no	21.7%(5)	16.7%(1)	20.7%(6)
yes	60.9%(14)	66.7%(4)	62.1%(18)
being rewritten	13.%(3)	(0)	10.3%(3)
mntn SOP	(0)	16.7%(1)	3.4%(1)
yes, from 1966	4.3%(1)	(0)	3.4%(1)
Time spent helping/checking PLL			
none	20%(5)	(0)	16.7%(5)
very little	16%(4)	(0)	13.3%(4)
10h/w or less	36%(9)	60% (3)	40%(12)
11-30h/w	12%(3)	(0)	10%(3)
40-50%	12%(3)	40% (2)	16.7%(5)
frequently	4%(1)	(0)	3.3%(1)
# Requests/week			
less than 50/w	15.4%(4)	(0)	12.9%(4)
50-100	26.9%(7)	60% (3)	32.3%(10)
101-150	42.3%(11)	(0)	35.5%(11)
151-300	11.5%(3)	40% (2)	16.1%(5)
301-350	3.8%(1)	(0)	3.2%(1)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
% 02/03 requests			
1-5%			37.0% (10)
6-10%			11.1% (3)
11-15%			11.1% (3)
20-30%			22.2% (6)
90-100%			14.8% (4)
seldom			3.7% (1)
% 05/06 requests			
1-5%	40% (6)	(0)	37.5% (6)
6-10%	13.3% (2)	100% (1)	18.8% (3)
15-20%	26.7% (4)	(0)	25.% (4)
40%	3.8% (1)	(0)	6.3% (1)
seldom	3.8% (1)	(0)	6.3% (1)
quite a few	3.8% (1)	(0)	6.3% (1)
% 02/03 walked through			
none	6.2% (1)	25% (1)	10% (2)
few	18.7% (3)	25% (1)	20% (4)
5-10%	12.5% (2)	25% (1)	15% (3)
15-20%	(0)	25% (1)	5% (1)
50%	25% (4)	(0)	20% (4)
almost all	25% (4)	(0)	20% (4)
100%	12.5% (2)	(0)	10% (2)
# Requests rejected/ week			
none	(0)	20% (1)	4.5% (1)
few	29.4% (5)	60% (3)	36.4% (8)
5-10 rej	11.8% (2)	(0)	9.1% (2)
11-20 rej	11.8% (2)	(0)	9.1% (2)
less than 10%	11.8% (2)	20% (1)	13.6% (3)
more than 15%	29.4% (5)	(0)	22.7% (5)
doesn't know	5.9% (1)	(0)	4.5% (1)
Frequent cause for rejection			
stock #	35.7% (5)	60% (3)	42.1% (8)
clerk errors	14.2% (2)	40% (2)	21.1% (4)
QSS	28.5% (4)	20% (1)	26.3% (5)
recoverable item	14.2% (2)	(0)	10.5% (2)
unit of issue	14.2% (2)	(0)	10.5% (2)
document #	14.2% (2)	(0)	10.5% (2)
wrong advice code	7.1% (1)	(0)	5.3% (1)
locally fabricate	(0)	20% (1)	5.3% (1)
	n=14*	n=5	n=19

*multiple answers possible. n=the number of individual answering the question.

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
% of parts from outside supply system			
10% or less			44.8% (13)
25%			3.4% (1)
40-50%			20.7% (6)
more than 50%			13.8% (4)
not much			13.8% (4)
5-10 parts/wk			3.4% (1)
# 3318s kept			
none	54.2% (13)	16.7% (1)	46.7% (14)
DX	12.5% (3)	(0)	10% (3)
all	(0)	83.3% (5)	16.7% (5)
don't know	33.3% (8)	(0)	26.7% (8)
Parts runs/day			
1/d	23.1% (6)	(0)	18.8% (6)
2/d	38.5% (10)	100% (6)	50.% (16)
battalion mntn decides	30.8% (8)	(0)	25.% (8)
not very often	7.7% (2)	(0)	6.2% (2)
do you make expense decisions			
yes	20.8% (5)	83.3% (5)	33.3% (10)
sometimes	16.7% (4)	(0)	13.3% (4)
no	62.5% (15)	16.7% (1)	53.3% (16)
Freq unit runs out of money			
no, doesn't	24% (6)	60% (3)	30% (9)
yes, does	76% (19)	40% (2)	70% (21)
Involvement with PLL reconciliation			
no	45.4% (10)	33.3% (2)	42.9% (12)
little	27.3% (6)	(0)	21.4% (6)
reviews	(0)	16.7% (1)	3.6% (1)
yes	27.3% (6)	50% (3)	32.1% (9)
PLL exempt from duty			
yes	50% (12)	83.3% (5)	56.7% (17)
no	41.7% (10)	16.7% (1)	36.7% (11)
partially	8.3% (2)	(0)	6.7% (2)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Hours/d PLL clerk works			
less than 6	3.8% (1)	(0)	3.1% (1)
6-7	23.1% (6)	(0)	18.8% (6)
8	34.6% (9)	16.7% (1)	31.3% (10)
9-10	30.8% (8)	50% (3)	34.4% (11)
more than 10	7.7% (2)	33.3% (2)	12.5% (4)
Hours/d mechanics work			
less than 6	3.6% (1)	(0)	3.% (1)
6-7	17.9% (5)	(0)	15.2% (5)
8	35.7% (10)	20% (1)	33.3% (11)
9-10	25% (7)	20% (1)	24.2% (8)
more than 10	14.3% (4)	60% (3)	21.2% (7)
varies	3.6% (1)	(0)	3.% (1)
Criteria to pick PLL clerk			
"good worker"	22.2% (2)	100% (3)	41.7% (5)
intelligent	11.1% (1)	(0)	8.3% (1)
education	11.1% (1)	33.3% (1)	16.7% (2)
likes paperwork	(0)	33.3% (1)	8.3% (1)
wants job-volunteer	55.5% (5)	(0)	41.7% (5)
knows parts	(0)	33.3% (1)	8.3% (1)
other	22.2% (2)	33.3% (1)	25% (3)
	n=9	n=3	n=12

descriptions

a) "good worker": common sense
can make judgments
judge his ways
dependable

b) intelligent: high GT scores

c) education: schooling
hi.sch.diploma

d) likes paperwork

e) wants job-volunteered: interested
desire to do job

f) knows parts

g) other: no one else available
data processor
didn't have a specific job
needed someone

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
References needed for PLL to do job			
AR 710-2	44.4% (8)	80% (4)	52.2% (12)
TM 38-750	38.9% (7)	20% (1)	34.8% (8)
AR 725-50	5.6% (1)	(0)	4.3% (1)
TC 38-2-1,2/TM 38	16.7% (3)	(0)	13.% (3)
parts manuals (20ps)	22.2% (4)	40% (2)	26.1% (6)
TSO/DMMC SOPs	11.1% (2)	60% (3)	21.7% (5)
Unit SOPs	5.6% (1)	(0)	4.3% (1)
Div Regs	16.7% (3)	(0)	13.% (3)
QSS/DX list	16.7% (3)	40% (2)	21.7% (5)
AMDF	5.6% (1)	20% (1)	8.7% (2)
others	44.4% (8)	20% (1)	39.1% (9)
	n=18	n=5	n=23

APPENDIX I

BATTALION MAINTENANCE TECHNICIAN INTERVIEW SUMMARY

BATTALION MAINTENANCE TECHNICIAN INTERVIEW SUMMARY

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Rank			
CW4	22.2% (2)	(0)	15.4% (2)
CW2	55.6% (5)	75% (3)	61.5% (8)
WO1	22.2% (2)	25% (1)	23.1% (3)
How long have you been in the Army?			
to the nearest .5 yr	n=9 $\bar{X}$=17.11 yr SD=3.19	n=4 $\bar{X}$=11.25 yr SD=1.32	n=13 $\bar{X}$=15.31 yr SD=3.89
Become WO			
to the nearest .5 yr	n=9 $\bar{X}$=6.16 yr SD=5.66	n=4 $\bar{X}$=3.12 yr SD=2.01	n=13 $\bar{X}$=5.19 yr SD=4.89
PMOS			
63 series	88.9% (8)	75% (3)	84.6% (11)
22 series	11.1% (1)	25% (1)	15.4% (2)
Start this present job	n=9 $\bar{X}$=18.77 mo SD=10.38	n=4 $\bar{X}$=12.75 mo SD=6.29	n=13 $\bar{X}$=16.92 mo SD=9.49
Formal training in repair parts			
none	66.7% (6)	75% (3)	69.2% (9)
NCOES	11.1% (1)	(0)	7.7% (1)
1 wk Vilseck	22.2% (2)	25% (1)	23.1% (3)
touched on it in original MOS	11.1% (1)	(0)	7.7% (1)
some	11.1% (1)	(0)	7.7% (1)
	n=9*	n=4	n=13
# 76D auth			
10	12.5% (1)	(0)	8.3% (1)
7	12.5% (1)	50% (2)	25% (3)
6	12.5% (1)	(0)	8.3% (1)
5	62.5% (5)	25% (1)	50% (6)
2-3	(0)	25% (1)	8.3% (1)

*Multiple answers possible. n=the number of individuals answering the question.

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
# 76D assigned			
at proper strength	22.2% (2)	50% (2)	30.8% (4)
under strength	55.6% (5)	25% (1)	46.2% (6)
over strength	11.1% (1)	(0)	7.7% (1)
doesn't use 76D in assigned duty	11.1% (1)	25% (1)	15.4% (2)
Of 76D, how many QMS trained			
all	57.1% (4)	100% (3)	70% (7)
approx. 84%	14.3% (1)	(0)	10% (1)
33%	14.3% (1)	(0)	10% (1)
20%	14.3% (1)	(0)	10% (1)
mechanics/mechanics authorized/assigned			
at proper strength	11.1% (1)	50% (2)	23.1% (3)
under strength	55.6% (5)	(0)	38.5% (5)
over strength	(0)	25% (1)	7.7% (1)
at strength, short appropriate grades	11.1% (1)	(0)	7.7% (1)
doesn't know	22.1% (2)	25% (1)	23.1% (3)
time for QMS 76D to perform satisfactorily			
less than 1 m	14.3% (1)	(0)	10% (1)
1½-2m	28.6% (2)	(0)	20% (2)
3 m	57.1% (4)	33.3% (1)	50% (5)
1 yr	(0)	33.3% (1)	10% (1)
most never do	(0)	33.3% (1)	10% (1)
time for school trained mechanics to perform satisfactorily			
less than 1 m	(0)	25% (1)	7.7% (1)
1 m	11.1% (1)	(0)	7.7% (1)
2 m	11.1% (1)	(0)	7.7% (1)
3 m	(0)	50% (2)	15.4% (2)
6 m	55.6% (5)	25% (1)	46.2% (6)
1 yr or more	22.2% (2)	(0)	15.4% (2)
Have PLL SOP			
yes	71.4% (5)	50% (2)	63.6% (7)
not sure	(0)	25% (1)	9.1% (1)
a mntn SOP	28.6% (2)	(0)	18.2% (2)
outdated	(0)	25% (1)	9.1% (1)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Time/week spent on repair parts			
10h or less	11.1% (1)	50% (2)	23.1% (3)
11-20h	22.2% (2)	(0)	15.4% (2)
5%	11.1% (1)	(0)	7.7% (1)
20-30%	11.1% (1)	(0)	7.7% (1)
40-50%	11.1% (1)	(0)	15.4% (2)
60-70%	22.2% (2)	25% (1)	23.1% (3)
most	11.1% (1)	(0)	7.7% (1)
# requests for Battalion/wk			
75-150	(0)	50% (2)	16.7% (2)
200-300	37.5% (3)	(0)	25% (3)
400-500	25% (2)	(0)	16.7% (2)
800-1000	12.5% (1)	25% (1)	16.7% (2)
varies widely	25% (2)	25% (1)	25% (3)
# requests 02/03			
5% or less			18.2% (2)
6-10%			18.2% (2)
11-15%			9.1% (1)
20-30%			27.3% (3)
50% or more			18.2% (2)
varies			9.1% (1)
# requests 05/06			
10-15%	40% (2)	33.3% (1)	37.5% (3)
20-30%	20% (1)	33.3% (1)	25% (2)
40%	(0)	33.3% (1)	12.5% (1)
all PLL	20% (1)	(0)	12.5% (1)
varies	20% (1)	(0)	12.5% (1)
% 02/03 walked through			
none	14.3% (1)	33.3% (1)	20% (2)
10% or less	28.6% (2)	33.3% (1)	30% (3)
most	14.3% (1)	(0)	10% (1)
all	28.6% (2)	33.3% (1)	30% (3)
only critical items	14.3% (1)	(0)	10% (1)
% requests rejected			
5% or less	42.8% (3)	33.3% (1)	40% (4)
10-20%	28.6% (2)	66.7% (2)	40% (4)
more than 20%	14.3% (1)	(0)	10% (1)
few	14.3% (1)	(0)	10% (1)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Frequent cause of rejects			
stock #	50% (3)	75% (3)	60% (6)
clerk error	16.7% (1)	25% (1)	20% (2)
QSS	16.7% (1)	(0)	10% (1)
recoverable item	(0)	25% (1)	10% (1)
unit of issue	16.7% (1)	(0)	10% (1)
weapons designator code	16.7% (1)	(0)	10% (1)
excessive qty	16.7% (1)	(0)	10% (1)
J status	16.7% (1)	(0)	10% (1)
	n=6	n=4	n=10
% parts from other than supply system			
less than 10%			27.3% (3)
10%			27.3% (3)
11-30%			36.4% (4)
different for different priorities			9.1% (1)
# 3318s kept			
none	44.4% (4)	(0)	30.8% (4)
DX	44.4% (4)	(0)	30.8% (4)
all lines	(0)	75% (3)	23.1% (3)
don't know	11.1% (1)	25% (1)	15.4% (2)
# parts runs/d			
1/d	37.5% (3)	50% (2)	41.7% (5)
2/d	62.5% (5)	50% (2)	58.3% (7)
You make decision on expense			
yes	55.6% (5)	75% (3)	61.5% (8)
no	44.4% (4)	25% (1)	38.5% (5)
Frequency Battalion runs out of money			
no, doesn't	33.3% (3)	25% (1)	30.8% (4)
yes, does	(0)	25% (1)	7.7% (1)
not often	22.2% (2)	25% (1)	23.1% (3)
constantly	44.4% (4)	(0)	30.8% (4)
don't know	(0)	25% (1)	7.7% (1)

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Involvement with PLL reconciliation			
no	25% (2)	25% (1)	25% (3)
little	37.5% (3)	25% (1)	33.3% (4)
reviews	25% (2)	25% (1)	25% (3)
yes	12.5% (1)	25% (1)	16.7% (2)
Where do you go for help with repair parts procedures?			
DMMC	57.1% (4)	(0)	36.4% (4)
TSO	42.9% (3)	25% (1)	36.4% (4)
S4	(0)	25% (1)	9.1% (1)
MAIT	(0)	50% (2)	18.2% (2)
PLL clerks exempt from duty			
yes	55.6% (5)	50% (2)	53.8% (7)
no	22.2% (2)	25% (1)	23.1% (3)
some	(0)	25% (1)	7.7% (1)
partially	11.1% (1)	(0)	7.7% (1)
not sure	11.1% (1)	(0)	7.7% (1)
Hrs/d PLL clerk works			
3-5h	44.4% (4)	50% (2)	46.2% (6)
6-7h	33.3% (3)	25% (1)	30.8% (4)
8h	11.1% (1)	25% (1)	15.4% (2)
10h	11.1% (1)	(0)	7.7% (1)
Hrs/d mechanic works			
3-5h	37.5% (3)	25% (1)	33.3% (4)
6-7h	50% (4)	50% (2)	50% (6)
8h	12.5% (1)	25% (1)	16.7% (2)
Duty positions prior to WO			
unit level	1 TAMMS/PLL 4 mtr sgt/mech. 1 Nike sect ldr 1 records/repair parts	2 TAMMS/PLL 3 mech.	
DS or higher level	3 shop foreman 2 inspectors 1 Depot Mntn Supv. n=6	1 Plt sgt n=4	

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
Criteria to pick PLL clerk			
"good worker"	40% (4)	75% (3)	50% (7)
intelligent	40% (4)	(0)	28.6% (4)
education	30% (3)	50% (2)	35.7% (5)
know parts	20% (2)	(0)	14.3% (2)
know paper work	50% (5)	(0)	35.7% (5)
wants job-volunteer	60% (6)	50% (2)	57.1% (8)
	n=10	n=4	n=14

Descriptions

a) "good worker": persistent, responsible, self-motivated, reliable, common sense, conscientious

b) intelligent: high GT scores

c) education: read, write, high sch diploma

d) knows parts: a mechanic

e) knows paper work: can work at desk, has had similar experience

f) wants job-volunteer: interested

Question	Division percentage (n)	Non-Division percentage (n)	Total percentage (n)
References needed for PLL to do job			
AR 710-2	66.7% (6)	100% (4)	76.9% (10)
TM 38-750	11.1% (1)	50% (2)	23.1% (3)
AR 725-50	11.1% (1)	25% (1)	15.4% (2)
TC 38-2-1	66.7% (6)	(0)	46.2% (6)
Parts manuals (20ps)	33.3% (3)	25% (1)	30.7% (4)
TSO/DMMC SOP	22.2% (2)	25% (1)	23.1% (3)
Unit SOP	(0)	25% (1)	7.7% (1)
Div/Installation Regs.	11.1% (1)	25% (1)	15.4% (2)
FM 29-2	(0)	25% (1)	7.7% (1)
AMDF	33.3% (3)	(0)	23.1% (3)
others	33.3% (3)	25% (1)	30.7% (4)
	n=9	n=4	n=13

APPENDIX J

PLL TIME STUDY DATA

APPENDIX J. THE PLL TIME STUDY

To understand the printouts of the PLL clerk time study data, an overview of the data collection method is presented.

The purpose of the time study of PLL clerks was to see what the PLL clerk did, and to see how long it took him to do it. The method of recording the time study data was chosen to facilitate the analysis. The method was to have a data collector observe a clerk for most of his working day. When the clerk began an action, the collector recorded the clock time (start) of the action and a code or a few words to identify the action. The term "task" is used to describe the basic data collection unit that consists of those actions which make the task unique, and that can be used by any PLL clerk to carry out his job. The following are examples of tasks: filling out a form, obtaining a signature, talking with supervisor, or taking a break.

To facilitate data collection and subsequent computer processing, task codes were assigned to a standard set of PLL clerk actions. All tasks have a primary task code (PTC) and, in many cases, a secondary task code (STC) which further defines the action.

Three pieces of information define a task: (1) start time, (2) name (task code), and (3) number of episodes. To understand the third, two types of tasks will be defined: (1) a task without repetitive episodes, and (2) a task with one or more repetitive episodes, or simply a nonrepetitive task and a repetitive task.

TALK, WAIT, IDLE are examples of nonrepetitive tasks. They present a block of time in which the PLL clerk is talking about official business, waiting before continuing, or taking a break.

276B AØA, the task code for filling out a request form, is an example of a repetitive task. Its special characteristic is that any number of requests may be completed in a period of time. The important information to be derived from the original data is the time it takes to complete each request. This result is readily realized by recording each request action as a separate task. There are however, two cases where there may be more than one episode per task. The first case, using 276B AØA as an example, occurs when the data collector knows that a request had been completed, but he missed the time the clerk had started filling out a subsequent request. Rather than discarding the task, by recording MISS, he can record that two episodes of completing request forms comprise the task. The task will be longer, but by knowing that two requests are represented, an average time per request can be obtained for the particular task. The second case occurs when the individual episode occurs so rapidly, 10 seconds or less for example, that recording the data for each episode interferes with keeping track of the time the episodes start. Accuracy is enhanced by allowing several episodes to occur and waiting for a pause before recording the task information.

When the data collection phase was completed, the data was prepared for statistical analysis by computer. The first step is to transfer the tasks onto computer cards. A program reads the cards, calculates elapsed times, and creates a file of intermediate results. The method for calculating elapsed time is as follows: subtract the clock time of the task of interest from the clock time of the following task. (A task ends at the beginning of the following task.) The result is the elapsed time of task of interest. A portion of the intermediate results is provided as an example in Figure J-1. To the left of the "< >" in the printouts is the data as the data collector recorded it: clock time, task, number of episodes. The data to the right of the "< >" is identical except that the clock times have been converted to elapsed times (in seconds for this printout only).

A second program reads the intermediate results file and produces the final printout which lists the mean elapsed time in minutes, the standard deviation, N, sum, and sum of squares (SS) by tasks. Two sets of results are produced. The first step is based on the elapsed times just as they appear on the intermediate results printout and is applicable to nonrepetitive tasks. The second set is based on elapsed times that are individually adjusted and is applicable to repetitive tasks. An adjusted elapsed time is one that, prior to statistical analysis, is divided by its associated number of episodes yielding a time per episode figure. If a task has zero number of episodes, then it is not counted in the second set of results.

The arrangement of the statistics can be seen by referring to the example. The results in column one are based on all the tasks recorded. The results in column two are based on those tasks where a number of episodes were specified and the elapsed times adjusted. Column one is applicable to nonrepetitive tasks, column two is applicable to repetitive tasks. The discrepancy

```
133537 FICH AMDF   1<>
133623 FICH AMDF   1<>   46 FICH AMDF   1
133710 FICH AMDF   1<>   47 FICH AMDF   1
133755 FICH AMDF   1<>   45 FICH AMDF   1
 0 0 0 INT         0<>
133840 TM          0<>
 0 0 0 CONT        0<>
134027 FICH AMDF   0<>  107 TM          0
134042 FICH AMDF   1<>   60 FICH AMDF   1
134130 FICH AMDF   1<>   48 FICH AMDF   1
134215 FICH AMDF   1<>   45 FICH AMDF   1
134353 FICH AMDF   1<>   98 FICH AMDF   1
134459 FICH AMDF   1<>   66 FICH AMDF   1
134551 FICH AMDF   1<>   52 FICH AMDF   1
134640 FICH AMDF   1<>   49 FICH AMDF   1
134710 FICH AMDF   1<>   30 FICH AMDF   1
1348 4 FICH AMDF   1<>   54 FICH AMDF   1
134830 FICH AMDF   1<>   26 FICH AMDF   1
134857 FICH AMDF   1<>   27 FICH AMDF   1
134957 FICH AMDF   1<>   60 FICH AMDF   1
135038 FICH AMDF   1<>   41 FICH AMDF   1
135119 FICH AMDF   1<>   41 FICH AMDF   1
135154 FICH AMDF   1<>   35 FICH AMDF   1
1353 2 FICH AMDF   1<>   68 FICH AMDF   1
 0 0 0 MISS        0<>
135429 FICH AMDF   1<>   87 MISS        0
135532 FICH AMDF   1<>   63 FICH AMDF   1
135614 WALK        0<>   42 FICH AMDF   1
135643 LIST QSS    1<>   29 WALK        0
135711 LIST QSS    1<>   28 LIST QSS    1
135741 LIST QSS    1<>   30 LIST QSS    1
135757 LIST QSS    1<>   16 LIST QSS    1
1358 5 LIST QSS    1<>    8 LIST QSS    1
135816 LIST QSS    1<>   11 LIST QSS    1
135831 LIST QSS    1<>   15 LIST QSS    1
135841 LIST QSS    1<>   10 LIST QSS    1
135851 LIST QSS    1<>   10 LIST QSS    1
1359 6 LIST QSS    1<>   15 LIST QSS    1
135917 LIST QSS    1<>   11 LIST QSS    1
135926 LIST QSS    1<>    9 LIST QSS    1
135943 LIST QSS    1<>   17 LIST QSS    1
135949 LIST QSS    1<>    6 LIST QSS    1
135959 LIST QSS    1<>   10 LIST QSS    1
14 011 LIST QSS    1<>   12 LIST QSS    1
14 028 LIST QSS    1<>   17 LIST QSS    1
14 040 LIST QSS    1<>   12 LIST QSS    1
14 1 0 LIST QSS    1<>   20 LIST QSS    1
14 110 LIST QSS    1<>   10 LIST QSS    1
14 120 LIST QSS    1<>   10 LIST QSS    1
14 133 STRA        0<>   13 LIST QSS    1
14 146 PREP        0<>   13 STRA        0
```

Figure 1. Intermediate Results

of the N between the two columns is due to the inability of the data collector to determine the number of episodes for some tasks. An explanation of the data for some of the tasks follows.

REPETITIVE TASKS: Most are this type, hence the data in column two is of most interest as it reflects the time per episode. (Column one indicates the length of the time block the data collector used to collect the information.) One figure in column one is of special interest, this is the sum. It is the total time logged for a particular task. Dividing the sum by the total time (at the end of the printout) gives an indication of what portion of the PLL clerk's time is spent on a particular task. Using FICH AMDF as an example: 100% x 614.1/15529 = 4%. During the observation period, four percent of the PLL clerk's time was spent using the AMDF. From column two it is seen that 1.063 minutes (average) were required to obtain the AMDF data for each NSN.

BNHQ/DMMC/DX/QSS SERV: Column one gives the service time per visit. Column two gives the service time per line procured (note smaller N).

DRIV: Column one gives the driving time per trip. Column two gives the time required to travel one-tenth mile.

RPRT (all STCs): Column one gives the time to make the report. Column two gives the time to report on each line (that is a line of parts).

WALK (all STCs): Column one gives the walking time per trip. Column two gives the time to travel one meter.

TASK CODE

MEAN	MEAN
STANDARD DEVIATION	STANDARD DEVIATION
N	N
SUM	SUM
SUM OF SQUARES	SUM OF SQUARES
(COLUMN ONE)	(COLUMN TWO)

(TIME IN MINUTES FOR BOTH COLUMNS)

Figure 2. Arrangement of Statistics

APHO OFF		
	1.225	
	.897	
	34	
	41.667	
	77.598	
APHO OTH		
	1.139	
	.944	
	21	
	23.917	
	45.046	
APHO		
	.517	
	0.000	
	1	
	.517	
	.267	
BNHQ SERV		
	1.822	1.013
	2.171	.253
	6	2
	10.933	2.025
	43.498	2.115
BNHQ WAIT		
	8.733	
	8.697	
	2	
	17.467	
	228.187	
CALC		
	1.645	.396
	5.758	.238
	53	37
	87.167	14.650
	1867.404	7.846
CARD ANOT		
	.639	.439
	2.406	.242
	185	184
	118.300	80.704
	1140.535	46.076
CARD DSTR		
	.188	.176
	.108	.095
	16	16
	3.000	2.808
	.739	.[illegible]27

CARD FILE

.623	.366
1.452	.335
45	44
28.033	16.097
110.207	10.714

CARD ORDR

4.101	.152
7.037	.268
36	28
147.633	4.249
2338.504	2.588

CARD SCAN

.999	.205
1.092	.387
33	19
32.983	3.888
71.104	3.486

CARD SORT

24.567	.696
34.200	0.000
2	1
49.133	.696
2376.709	.485

CLIS

1.189	.832
1.437	.573
76	60
90.367	49.908
262.351	60.908

DMMC SERV

1.657	1.013
1.595	2.153
10	7
16.567	7.089
50.342	34.990

DMMC WAIT

1.017
0.000
1
1.017
1.034

107=	DRIV		
108=		8.144	.772
109=		12.742	.621
110=		59	58
111=		480.467	44.750
112=		13328.975	56.482
113=			
114=	DR AC1		
115=		.739	.616
116=		.424	.364
117=		17	17
118=		12.567	10.464
119=		12.161	8.557
120=			
121=	DR AE1		
122=		.523	.503
123=		.384	.387
124=		15	15
125=		7.850	7.550
126=		6.170	5.900
127=			
128=	DR AF1		
129=		4.183	4.183
130=		0.000	0.000
131=		1	1
132=		4.183	4.183
133=		17.500	17.500
134=			
135=	DR ANOT		
136=		.848	.389
137=		.346	.282
138=		22	22
139=		18.667	8.556
140=		18.346	5.002
141=			
142=	DR AN		
143=		1.237	1.237
144=		1.247	1.247
145=		27	27
146=		33.400	33.400
147=		81.721	81.721
148=			
149=	DR A0A		
150=		1.454	1.077
151=		2.052	.604
152=		370	367
153=		537.917	395.239
154=		2335.821	559.238
155=			
156=	DR A5A		
157=		1.037	.984
158=		.81[illegible]	.744
159=		12[illegible]	127
160=		[illegible]	125.[illegible]16
[illegible]			[illegible]

DR CA		
	.667	[illegible]
	.561	.561
	5	5
	4.333	4.333
	5.014	5.014
DR DX		
	.837	.766
	.439	.398
	21	20
	17.567	15.317
	18.556	14.744
DR D6Z		
	2.582	.873
	6.325	.446
	15	15
	38.733	13.088
	660.075	14.203
DR SCAN		
	1.094	.343
	.975	.419
	52	10
	56.883	3.433
	110.700	2.759
DSTA DR		
	1.244	1.186
	1.035	1.025
	16	16
	19.900	18.983
	40.808	38.287
DX SERV		
	5.384	1.898
	6.424	1.250
	31	10
	166.900	18.985
	2136.440	50.105
DX WAIT		
	4.194	
	4.587	
	11	
	46.133	
	403.897	
FICH AMDF		
	1.066	1.063
	.663	.664
	576	575
	614.100	611.483
	907.589	903.661

FICH CRL1		
	.[illegible]7	.[illegible]
	.1Ø4	.1[illegible]
	3	3
	2.ØØØ	2.ØØØ
	1.355	1.355
FICH		
	.765	.765
	.347	.347
	8	8
	6.117	6.117
	5.521	5.521
HEL INTV		
	57.671	
	32.377	
	3Ø	
	173Ø.117	
	13Ø177.ØØ5	
HEL		
	3.Ø5Ø	
	8.414	
	293	
	893.617	
	23399.538	
IDLE		
	3.277	
	8.127	
	4ØØ	
	131Ø.817	
	3Ø649.451	
INSP		
	.883	.639
	.328	.482
	3	3
	2.65Ø	1.917
	2.556	1.689
INV		
	.298	.293
	.365	.366
	179	179
	53.3ØØ	52.458
	39.637	39.155
ISSU		
	.987	.891
	.875	.993
	29	22
	28.617	19.6ØØ
	49.695	38.179

JOB		
	2.457	.618
	6.234	.764
	474	158
	1164.783	97.644
	21247.255	151.950
KNT		
	.910	.040
	.771	.016
	49	13
	44.567	.521
	69.052	.024
LIST DX		
	.928	.979
	.381	.120
	9	4
	8.350	3.917
	8.906	3.878
LIST QSS		
	.514	.369
	.539	.279
	242	204
	124.450	75.212
	134.061	43.479
MISS		
	3.272	
	2.753	
	85	
	278.133	
	1546.606	
NONP		
	3.014	1.483
	7.299	1.080
	201	101
	605.883	149.775
	12481.048	338.771
PART LABL		
	.661	.499
	1.079	.429
	82	81
	54.167	40.381
	130.119	34.830

PART LOAD		
	1.500	.632
	1.765	1.202
	50	48
	74.983	30.360
	265.150	87.097
PART LOOK		
	.666	.466
	.531	.387
	29	24
	19.317	11.188
	20.761	8.656
PART REAR		
	.886	.260
	1.472	.251
	88	77
	77.933	20.019
	257.644	10.002
PART SEAR		
	1.012	.821
	.779	.251
	10	4
	10.117	3.283
	15.690	2.885
PART STOR		
	1.016	.445
	1.101	.404
	44	38
	44.717	16.899
	97.525	13.540
PART UNLO		
	1.623	.488
	1.445	.458
	46	40
	74.667	19.524
	215.166	17.711
PDAM		
	2.450	2.450
	0.000	0.000
	1	1
	2.450	2.450
	6.003	6.003

373=	PHON OFF	
374=	1.[illegible]	
375=	1.779	
376=	45	
377=	87.400	
378=	309.008	
379=		
380=	PHON PER	
381=	4.283	
382=	1.512	
383=	3	
384=	12.850	
385=	59.611	
386=		
387=	PREP	
388=	1.059	
389=	1.081	
390=	576	
391=	610.100	
392=	1317.884	
393=		
394=	PRNT AMND	
395=	1.038	.924
396=	.669	.493
397=	42	39
398=	43.583	36.036
399=	63.596	42.542
400=		
401=	PRNT LEVL	
402=	.679	.679
403=	.450	.450
404=	4	4
405=	2.717	2.717
406=	2.452	2.452
407=		
408=	PRNT SCAN	
409=	1.449	
410=	1.014	
411=	15	
412=	21.733	
413=	45.889	
414=		
415=	QSS SCAN	
416=	2.483	
417=	1.626	
418=	2	
419=	4.967	
420=	14.979	
421=		
422=	QSS SERV	
423=	2.610	.248
424=	3.295	.268
425=	5	2
426=	13.050	.496
427=	77.485	.195
428=		

RCON DOUT		
	[illegible]	[illegible]
	1.211	.846
	309	309
	308.350	185.735
	759.143	332.870
RCON STAT		
	1.100	.514
	1.232	.556
	184	184
	202.333	94.557
	500.147	105.064
RCON 3318		
	.616	.608
	.693	.693
	61	61
	37.600	37.117
	52.002	51.391
READ PROF		
	1.114	
	.925	
	64	
	71.300	
	133.324	
READ		
	.746	
	.660	
	95	
	70.883	
	93.805	
RPRT COLX		
	4.412	.471
	6.472	.167
	22	12
	97.067	5.656
	1307.801	2.973
RPRT ZBAL		
	.511	.433
	.531	.401
	6	2
	3.067	.867
	2.977	.536
RPRT		
	2.022	.969
	3.357	2.365
	77	58
	155.683	56.191
	1171.331	373.167

[illegible]		
	.775	.4[illegible]
	.475	.349
	59	57
	45.750	39.793
	48.560	34.616
SIGN		
	5.040	2.106
	5.686	3.959
	21	8
	105.833	16.850
	1179.965	145.225
SPEC ANOT		
	.356	.336
	.230	.210
	18	18
	6.417	6.050
	3.189	2.785
SPEC AØA		
	2.359	2.359
	1.167	1.167
	27	27
	63.700	63.700
	185.721	185.721
SPLY		
	1.493	
	1.615	
	40	
	59.717	
	190.920	
STAT DSTR		
	.842	.281
	1.454	.262
	70	68
	58.950	19.075
	195.600	9.933
STAT FILE		
	1.572	.406
	2.278	.267
	17	17
	26.717	6.894
	125.041	3.936
STAT ORDR		
	1.802	.358
	2.176	.418
	43	40
	77.483	14.300
	338.450	11.917

[illegible]		
	[illegible]	[illegible]
	1.226	0.000
	2	1
	2.333	.102
	4.224	.010
STMP		
	.475	.238
	.692	.200
	58	56
	27.533	13.352
	40.403	5.375
STRA		
	1.487	
	2.501	
	341	
	507.000	
	2880.979	
TALK MECH		
	1.018	
	1.061	
	237	
	241.317	
	511.316	
TALK PLL		
	1.142	
	1.148	
	203	
	231.733	
	530.540	
TALK SUPV		
	1.271	
	2.167	
	344	
	437.367	
	2167.398	
TALK TAMM		
	.779	
	.745	
	112	
	87.267	
	129.608	
TALK		
	1.317	
	1.449	
	35	
	46.100	
	132.096	

597=	TECH SERV	
598=	[illegible]	[illegible]
599=	3.196	1.135
600=	35	17
601=	91.733	15.541
602=	587.743	34.813
603=		
604=	TECH WAIT	
605=	2.232	
606=	4.046	
607=	18	
608=	40.183	
609=	367.973	
610=		
611=	TM	
612=	1.779	2.381
613=	1.324	1.888
614=	28	6
615=	49.800	14.283
616=	135.895	51.830
617=		
618=	WAIT	
619=	2.283	
620=	2.796	
621=	41	
622=	93.617	
623=	526.536	
624=		
625=	WALK PARK	
626=	1.397	.182
627=	1.133	.218
628=	19	17
629=	26.550	3.096
630=	60.224	1.325
631=		
632=	WALK PLL	
633=	1.464	.047
634=	1.773	.057
635=	123	104
636=	180.067	4.876
637=	647.329	.565
638=		
639=	WALK TRAI	
640=	1.146	.126
641=	1.205	.177
642=	27	22
643=	30.933	2.773
644=	73.214	1.005
645=		
646=	WALK VEH	
647=	.574	.032
648=	.462	.021
649=	25	13
650=	14.350	.412
651=	13.353	.018

WALK		
	1.200	.073
	1.949	.155
	313	267
	375.517	19.509
	1635.251	7.821
XTAG ANOT		
	.707	.707
	.244	.244
	12	12
	8.483	8.483
	6.652	6.652
XTAG ATCH		
	1.279	.748
	1.788	.384
	8	7
	10.233	5.233
	35.465	4.798
XTAG FILL		
	3.987	3.517
	2.681	2.103
	35	35
	139.550	123.111
	800.768	583.391
XTAG SCAN		
	.583	.583
	0.000	0.000
	1	1
	.583	.583
	.340	.340
1348 D6Z		
	3.061	3.061
	.369	.369
	3	3
	9.183	9.183
	28.383	28.383
1348 TURN		
	2.967	2.967
	0.000	0.000
	1	1
	2.967	2.967
	8.801	8.801

276B AC1

1.742	1.742
.288	.288
4	4
6.967	6.967
12.382	12.382

276B ANOT

.629	.334
.172	.261
4	4
2.517	1.334
1.672	.649

276B A0A

1.987	1.929
1.305	1.350
227	225
451.100	434.048
1281.272	1245.862

276B D6Z

.583	.583
0.000	0.000
2	2
1.167	1.167
.681	.681

276P AF1

1.826	1.525
1.268	1.038
11	11
20.083	16.777
52.756	36.355

276P A0A

2.145	2.145
1.767	1.767
40	40
85.800	85.800
305.853	305.853

276W AF1

2.783	2.783
0.000	0.000
1	1
2.783	2.783
7.747	7.747

276W ANOT		
	.374	.363
	.186	.181
	26	26
	9.733	9.442
	4.507	4.252
276W A0A		
	2.262	2.243
	1.494	1.502
	180	178
	407.167	399.256
	1320.699	1294.898
276W DHA		
	1.256	1.256
	.577	.577
	8	8
	10.050	10.050
	14.959	14.959
276W D6Z		
	1.606	1.606
	1.095	1.095
	11	11
	17.667	17.667
	40.361	40.361
276W PLA		
	1.037	1.037
	.534	.534
	5	5
	5.183	5.183
	6.514	6.514
3318 AMND		
	.883	.248
	.330	.044
	2	2
	1.767	.496
	1.669	.125
3318 ANOT		
	2.967	2.967
	.519	.519
	2	2
	5.933	5.933
	17.871	17.871

800=	3318		
801=		1.166	.91[illegible]
802=		.957	.724
803=		160	159
804=		186.600	145.385
805=		363.168	215.848
806=			
807=	TOTAL TIME: 15529.000		

APPENDIX K. AN EXAMPLE OF PROGRAMMED INSTRUCTION: "A SELF-STUDY COURSE" MATERIEL SUPPLYMAN 76D, LESSON 1

PREFACE

To illustrate the differences between the QMS text for the 76D AIT self-paced course and the format expected in a programmed instruction text, the first lesson of the 76D course was rewritten and is presented here as an example. The QMS text is pages K-2 through K-11, and the revised text is K-12 through K-30.

PROGRAMMED TEXT

LESSON 1

QMS 50.450 PT

FEBRUARY 1978

"A SELF-STUDY COURSE"

MATERIEL SUPPLYMAN

76D

DIVISION LOGISTICS SYSTEM

(DLOGS)

REQUEST FOR REPAIR PARTS

(E-11)

ENLISTED SUPPLY DEPARTMENT
U.S. ARMY QUARTERMASTER SCHOOL
FORT LEE, VIRGINIA 23801

LESSON 1

UNIT REQUEST FOR REPAIR PARTS

INTRODUCTION

Each Army unit has a Table of Organization and Equipment (TOE) that gives the unit, the people and equipment necessary to accomplish the unit's military mission. In order to maintain the equipment, each unit is authorized to have certain repair parts on hand at all times. These repair parts are described on the unit's Prescribed Load List (PLL). Repair parts are stored in depots around the world, and are shipped to a unit when the unit itself requests them. This lesson will show you how to request repair parts for your unit.

LEARNING OBJECTIVES FOR THIS LESSON

a. Given an extract of TC 38-2-1, AR 710-2 w/changes, a blank and/or prepunched/ preprinted DA Form 2765, correctly prepare the DA Form2765 as a request for issue.

b. Given a completed DA Form 2765 and a blank DA Form 2064 (Document Register), correctly prepare the heading of the DA Form 2064 and correctly post the 2765 to the Document Register (DA Form 2064).

LEARNING AIDS: Before you begin working on this lesson, be sure you have in front of you the following items:

a. TC 38-2-1.

b. AR 710-2 with changes 1 thru 4.

c. Pen and pencil.

REPAIR PARTS REQUEST

1. There are several ways to request repair parts. However, as a unit PLL clerk using DLOGS, you will request repair parts most often using a DA Form 2765 or a DA Form 2765-1. These two forms are very much alike. You can see the differences for yourself by comparing figures 1 and 2 on the next page. Take the time right now to look over these two forms.

DA FORM 2765

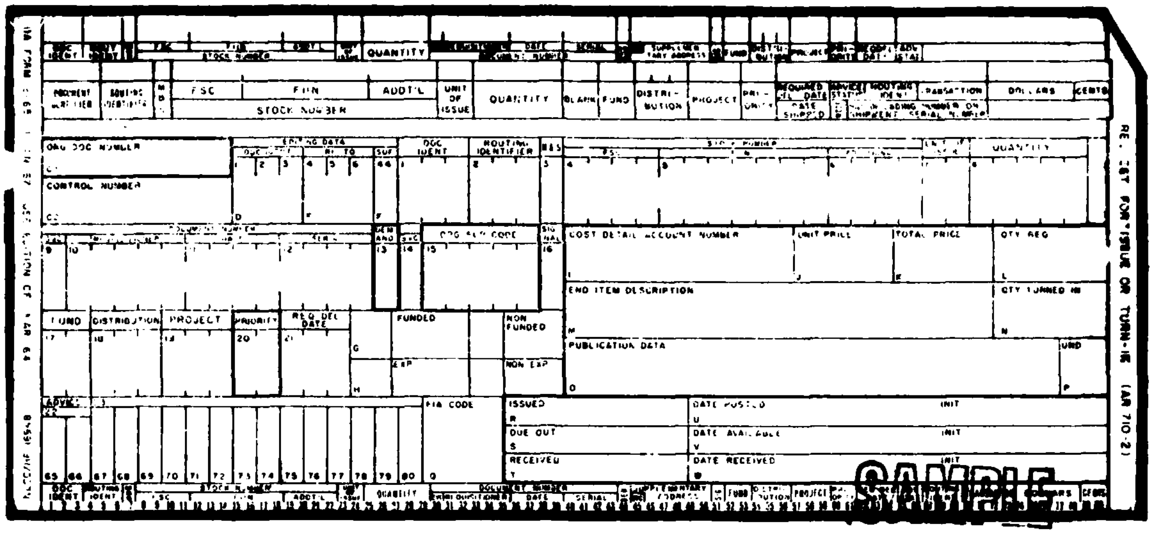


FIGURE 1

Figure 2 shows a DA Form 2765-1. The two forms have the same information. The difference is that the DA Form 2765-1 has a space for the "TO" and "FROM" address.

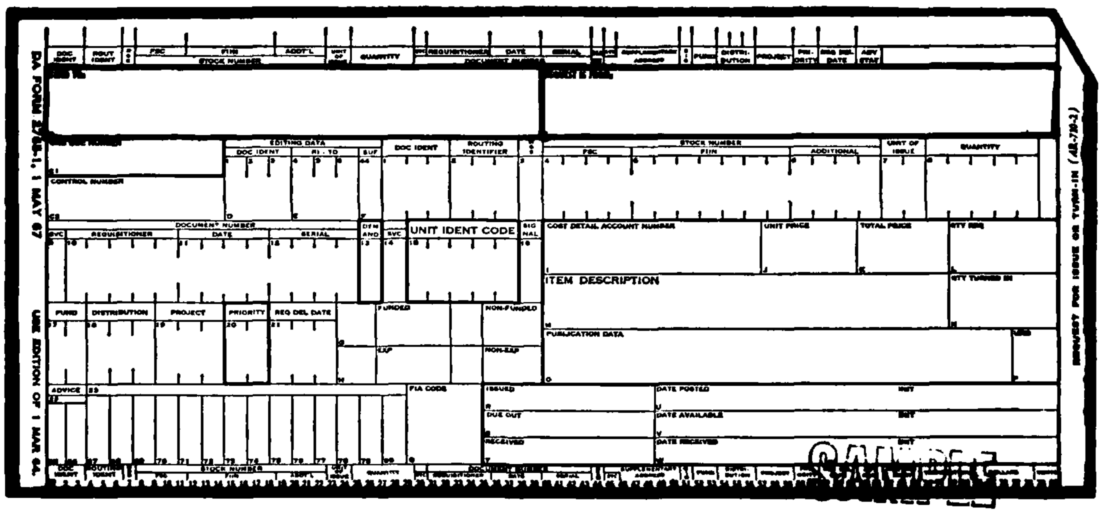


FIGURE 2

<u>NOTE:</u> Since these forms are so much alike, we'll use only one of them for this lesson: DA Form 2765. But remember, on the job, you can use either the DA Form 2765 <u>or</u> DA Form 2765-1.

PRESCRIBED LOAD LIST

2. Before we prepare a request for issue, we need to take a look at the PLL list. Your unit's Prescribed Load List (PLL) is a list of the repair parts and maintenance related items which will be on hand or on order at all times to support your unit's mission. Figure 3 shows a sample PLL. The list is explained in the outline which follows Figure 3.

CLASS IX REPAIR PARTS
PRESCRIBED LOAD LIST
77 JAN 25 PAGE NO 1

UAAC WK4F9C

A NSN	B NOUN	C A/M	D U/I	E AUTH	F EXP CODE	G LIST CODE	H END ITEM	I UNIT PRICE	J EXTENDED UNIT PRICE
2910 000100284	HOSE FUE		EA	002	X	1	TRUCK	$ 2.70	$ 5.40
1650 000110922	SERV CYC	M	EA	001	N	7		$ 52.00	$ 52.00
2920 006529925	MAG IGN		EA	001	N	3	TRUCK	$ 28.75	$ 28.75
2910 007368643	CARBURET		EA	001	N	3	TRUCK	$ 20.50	$ 20.50
2610 008532622	TIRE PNU		EA	010	X	1	TRUCK	$ 28.00	$ 280.00
2910 009332824	KIT PART		EA	002	X	1	TRUCK	$ 8.25	$ 16.50

NUMBER PLL ITEMS - 6 TOTAL EXTENDED UNIT PRICE $ 403.15

FIGURE 3

(Circled entries on the above Prescribed Load List correspond to explanations below).

A. "NSN - The National Stock Numbers are Listed in National Item Identification Number (NIIN) sequence. (The NIIN is the last 9 digits of the National Stock Number. Example: NSN 2910000100279 has a NIIN of 000100279).

B. "NOUN"- Nomenclature/Name of the item.

C. "A/M" - If the part is used for an aircraft, an"A" will be placed in this column. If the part is used for a missile, an "M" is used. If the part is not for an aircraft or a missile, this column will be left blank.

D. "U/I" - Unit of Issue

E. "AUTH" - This is the quantity you are actually authorized to have on hand.

F. "EXPCODE" - Expendability Code. Most PLL items will be expendable which means the items will be thrown away when they become unserviceable. The code for all expendable items is "X". The exp code "N" is for all non expendable items and they are normally turned in for "direct exchange" when they become unserviceable through normal use.

PRESCRIBED LOAD LIST (continued)

G. "DIST STOCK" - Distribution of Stockage Code. This is a term found in the heading of a Prescribed Load List (PLL). Each repair part has a stockage code. This code shows whether or not the item is part of the Authorized Stockage List (ASL), whether or not the item is repairable at the Direct Support Unit, etc. The following is a list of codes you are most likely to see and what they mean.

CODE 1 - The item is on the ASL at your Direct Support Unit.

CODE 3 - The item is on the Direct Exchange list.

CODE 7 - The repair part is repairable at Direct Support Unit.

CODE 8 - The repair part is repairable at DSU or is to be returned to depot.

CODE 9 - This item is a High Dollar Value Repair Part, subject to special handling.

H. "END ITEM" - End item for the repair part.

I. "UNIT PRICE" - Price per item.

J. "EXTENDED UNIT PRICE" - The price of an item times the quantity of items authorized by your PLL. Example: Line 1 on the PLL (Figure 3) shows 002 hoses authorized, and a unit price of $2.70 each. Two (Auth) x $2.70 = Extended Unit Price of $5.40.

3. Your responsibility, as a PLL Repair Parts Clerk (DLOGS), is to see that the prescribed load of repair parts is on hand or on order at all times. To insure that this is done you must maintain accurate repair parts records. The first record we will look at is the request for issue using a DA Form 2765.

SAMPLE REQUEST FOR REPAIR PARTS (DA FORM 2765)

4. If the item you need is on your units PLL, you will normally have on hand a prepunched/preprinted DA Form 2765. Figure 4 on the next page, shows a prepunched/preprinted 2765.

PREPUNCHED/PREPRINTED DA FORM 2765

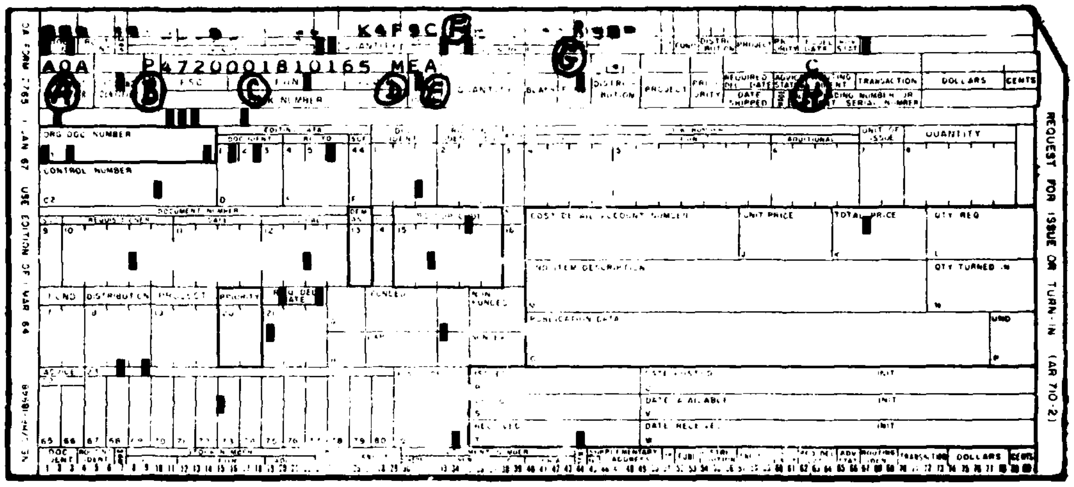


FIGURE 4

The blocks outlined on the 2765 above are the blocks that will be preprinted on the form when you receive it. These blocks are explained below. (Circled letter corresponds to the outline).

A. "AOA" - Indentifies the card as a request for issue.

B. "P" - Indicates the item is PLL. It also signals the DSU to keypunch a replacement card.

C. "NSN" - The National Stock Number of the item being requested.

D. When "A" is used it indicates aircraft item. When "M" is used it indicates missile item. When left blank, it indicates all other kinds.

E. "EA" - The unit of issue.

F. "K4F9C" - The 5 digit UAAC (Unit Address Activity Code) of "A" Company 123d Infantry Battalion.

G. When "R" is used in this block, it shows a recurring demand. When "N" is used in this block, it shows a Non-recurring demand.

H. "C" - Identifies the DSU to which you submit your request. In this case it is "C" Company of the Maintenance Battalion.

PREPUNCHED/PREPRINTED DA FORM 2765 (continued)

5. Figure 5 shows the same preprinted 2765. The blocks outlined in Figure 5 are the blocks you will use in making a routine request for a repair part.

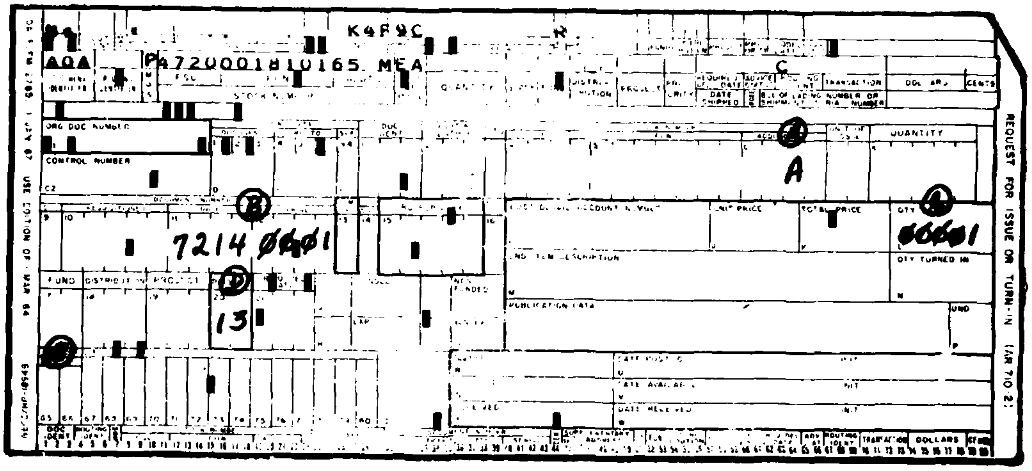


FIGURE 5

(The outline below corresponds to the lettered blocks on the 2765 above).

Follow these steps:

A. Enter the sub-unit activity address code in Block 6 (cc 21).

NOTE: The Sub-Unit Activity Address Code (SUAAC) is a one letter code (A, B, etc.) assigned by the DSU to IDENTIFY OTHER USERS within your company. For Example: Although your motor pool will request most of the repair parts, your Company supply section will also have requests to prepare, so will your Company arms room and other sections. Each sub-unit will be given a one letter address code (SUAAC) of "A", "B", etc. Throughout these lessons your SUAAC will be "A". This SUAAC must be placed on all types of supply transactions (Requests for issue, follow up, cancellation etc).

B. Enter the four digit Julian Date and the four digit Document Serial Number.

The example below shows different sequences of document serial numbers.

SERIAL NO	SECTION
0001 thru 0999	"A" Company Motor Pool
1000 thru 1999	"B" Company Motor Pool
2000 thru 2999	"C" Company Motor Pool

NOTE ONE: What is series sequence?

Notice that each unit (DODAAC) has its own sequence or series of numbers. As a PLL clerk you will be using only one sequence of numbers. For example: 0001 thru 0999. You will use only the block of serial numbers assigned to your company.

NOTE TWO: HOW TO DETERMINE DOCUMENT NUMBERS:

JULIAN DATE

1. When you assign a document number to a request, begin with the four digit Julian Date. Always use the date the request is prepared. If you prepare the request on Julian Date 7214, begin with 7214. Julian date calendar can be fou l on page A-10 TC 38-2-1.

SERIES SEQUENCE

2. Next, add to the Julian Date, the four digits from the series sequence assigned to your company. The first request for each day will be ØØØ1. The second request for the day will bw ØØØ2, etc. (OR 1ØØ1, 1ØØ2, depending upon your companies assigned series of numbers).

DOCUMENT NUMBER

3. When you add the four digits from the series sequence to the four digit Julian Date, you have a document number, EXAMPLE: 7214ØØØ1 (Julian Date plus Series Number). This will show you that the item requested using this number was the first item requested on Julian Date 7214.

REMEMBER: JULIAN DATE + SERIES SEQUENCE = DOCUMENT NUMBER

C. Enter the Quantity Requested in Block C.

NOTE ONE Block C consists of 5 card card columns. Enter the quantity in the FAR RIGHT HAND COLUMN. Then complete the block by posting zeros in the remaining card columns.

EXAMPLE: ØØØØ1, ØØØ11, ØØ171, etc.

NOTE TWO: Run a slash through the zeros so the key punch operator will read them as zeros and not letter O's. This is a good place to point out that all zeros entered on automated documents and forms should be slashed.

D. Enter the Priority Designator in Block 20.

NOTE: A Priority Designator is a two digit number which you assign to a request. The priority you assign will be based upon two things. As long as you know these two things, you will be able to determine the correct Priority Designator (PD) for any item you will ever request for issue. These Two Things Are:

(1) Your Units FORCE ACTIVITY DESIGNATOR (FAD)

(2) Your URGENCY OF NEED For The Item Requested

PRIORITY DESIGNATOR

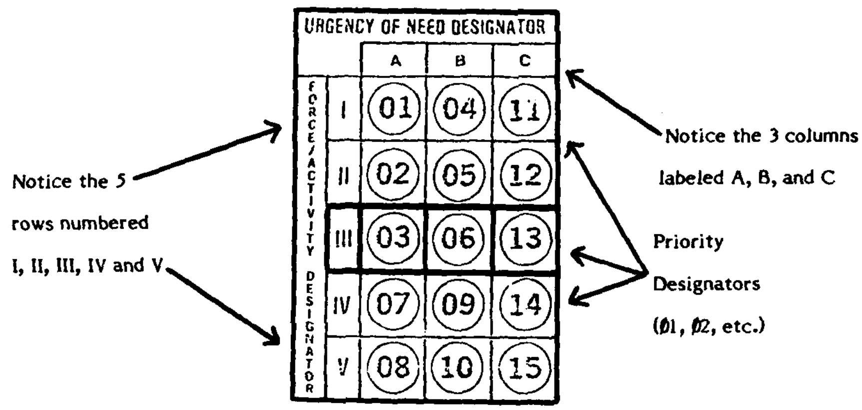


FIGURE 6

6. Let's take a minute to review Priority Designators, they're very important to you. The chart shown in Figure 6 above shows the FIFTEEN Priority Designators used by the Army. You will be able to determine your Priority for every request by using this chart as explained. (You can also find this information on page A-9 in TC 38-2-1).

FAD — a. Your unit will have a permanent Force Actvity Designator (FAD). You will be told this FAD when you report to your unit.

UND — b. The reason for requesting the item will tell you whether your Urgency of Need Designator(UND) will be: "A", "B", or "C". (More on this in a minute)

PRIORITY — c. To determine which Priority Designator (PD) to assign to a request for issue:

(2) Move across the row to the UND column which fits your situation.

(3) The Priority Designator in that column will be the correct priority to show on your request for issue.

EXAMPLE: Your unit has an FAD of III. Your situation fits in column C. Your Priority is 13.

REMEMBER: FAD plus UND = PRIORITY

NOTE ONE: HOW TO DETERMINE URGENCY OF NEED DESIGNATOR (UND)

Column A. This Urgency of Need Designator (UND) column is used with all high priority requests for items ordered for use on "deadlined" equipment. When equipment is "deadlined" because a needed repair part is not on-hand, it is called: Not Operationally Ready, Supply (NORS). For example, you may have a vehicle that is not operational because it has a broken part and you do not have the needed repair part on-hand.

When you are asked to request an item for a NORS deadlined vehicle, you know the item must reach you as soon as possible. All NORS requests are high priority and are given an Urgency of Need Designator under Column A.

Column B. This Urgency of Need Designator (UND) column is also used with high priority requests. You may find that you do not need the repair part right now, but you do not have any on-hand either. This situation is called "zero balance" and your need is to restore or replenish the PLL item to the authorized level. Your need is not as urgent as it would be for a NORS request, but you must replace your stock as soon as possible. This situation will cause you to make a high priority request under the Urgency of Need Designator Column B.

REMEMBER: PLL replenishment when at zero balance is always UND "B".

Column C. When your unit is authorized to have a given number of items on-hand, and your stock falls below that number, but not to zero balance, you will submit a low priority request under UND Column "C". This is called a ROUTINE replenishment request.

7. There is only one other thing you must do to complete your DA Form 2765 as a request for issue. ENTER the 2 Digit Advice Code in Block 22, but only when needed.

NOTE: Advice Codes are shown in AR 710-2, Appendix F, pages F-1 and F-2.

8. Take a minute and review lesson 1 to this point. When you feel you understand what information you will include on a request for issue using a prepunched/preprinted DA Form 2765, go on to the practice situation.

LESSON 1

UNIT REQUEST FOR REPAIR PARTS

Learning Aids. Before you begin working on this lesson, be sure to have in front of you:

a. TM 38-L22-15-2, Using Unit Procedures for Class IX (Repair Parts) Supply System.

b. AR 710-2 with Changes 1-5, Materiel Management for Using Units, Support Units, and Installations.

c. Pen and pencil.

1. Instructions. This lesson is a "self-study" lesson. You will move at your own rate. It does not matter how fast you go as long as you understand what you are learning. The lesson is divided into "frames"; each frame is numbered and contains some material for you to learn. You go through the lesson by reading the frame, answering the question by filling in the blank or circling the correct answer. Then check your answer in the next frame. If, by some chance, your answer is not the same as the one written, go on to the next frame. If you have any questions, your instructors are there to help you.

---

2. Introduction.

Each Army unit has a Table of Organization and Equipment (TOE) that gives the people and the equipment needed to do the unit's military mission. In order to keep the equipment ready for use, each unit is allowed to have some repair parts on hand at all times. The repair parts the unit is allowed to have on hand are listed on the unit's Prescribed Load List (PLL).

The PLL is a list of r _ _ _ _ _ p _ _ _ _ a unit is allowed to have on hand.

2A r e p a i r p a r t s

---

3. Each unit has a P _ _ _ _ _ _ _ _ _ L _ _ _ L _ _ _, called the PLL, that lists the repair parts a unit is allowed to have in order to keep its equipment ready to use.

3A P r e s c r i b e d L o a d L i s t

---

4. Repair parts are stored in very large warehouses, called depots, around the world, and are shipped to a unit when the unit asks for them.

The job of asking for, also called requesting, repair parts is done by the PLL (P _ _ _ _ _ _ _ _ _ L _ _ _ L _ _ _) Clerk. The PLL Clerk does many things, but in this lesson you will learn how to request repair parts for your unit.

4A Prescribed Load List

---

5. Learning Objective for this Lesson.

a. Know what a Prescribed Load List is and what information is on it.

b. Given the Using Unit Procedures manual, TM 38-L22-15-2, and AR 710-2 with changes, correctly prepare the DA Form 2765 as a request for issue on a prepunched or blank card.

c. Given a completed DA Form 2765, a r _ _ _ _ _ _ for i _ _ _ _, correctly fill in the heading of a blank Document Register page (DA Form 2064) and correctly post the 2765 to the Document Register.

5A request for issue

Prescribed Load List

6. Your unit's Prescribed Load List is a list of the repair parts and maintenance related items that will be on hand or on order at all times to support your unit's mission.

Repair parts and m _ _ _ _ _ _ _ _ _ _ related items are listed on the PLL.

6A maintenance

---

7. These parts will be on hand or on order at _ _ _ _ _ _ _ _.

7A all times

CLASS IX REPAIR PARTS
PRESCRIBED LOAD LIST

77 JAN 25 PAGE NO 1

UAAC WK4F9C

A NSN	B NOUN	C A/M	D U/I	E AUTH	F EXP CODE	G DIST CODE	H END ITEM	I UNIT PRICE	J EXTENDED UNIT PRICE
2910 000100284	HOSE FUE		EA	002	X	1	TRUCK	$ 2.70	$ 5.40
1650 000110922	SERV CYC	M	EA	001	N	7		$ 52.00	$ 52.00
2920 006529925	MAG IGN		EA	001	N	3	TRUCK	$ 28.75	$ 28.75
2910 007368643	CARBURET		EA	001	N	3	TRUCK	$ 20.50	$ 20.50
2610 008532622	TIRE PNU		EA	010	X	1	TRUCK	$ 28.00	$ 280.00
2910 009332824	KIT PART		EA	002	X	1	TRUCK	$ 8.25	$ 16.50

NUMBER PLL ITEMS - 6 TOTAL EXTENDED UNIT PRICE $ 403.15

Figure 1. Sample Prescribed Load List

---

8. Figure 1 shows a sample P _ _ _ _ _ _ _ _ _ _ L _ _ _ L _ _ _.

8A Prescribed Load List

---

9. The column under A lists the National Stock Number (NSN) in National Item Identification Number (NIIN) sequence.

The NIIN is the last 9 numbers of the NSN. For example, the NSN 2910-00-010-0279 has a _ _ _ _ of 00-010-0279.

9A NIIN

---

10. The NSN 1650-00-011-0922 has an NIIN of _ _ - _ _ _ - _ _ _ _.

10A 00-011-0922

---

11. Column B is the "Noun." Other words meaning the same thing are nomenclature or name.

Nomenclature, noun, and _ _ _ _ all mean the same thing, listed in Column B.

11A name

---

12. In Column C, if the part is used for an aircraft, an "A" will be placed in this column. If the part is used for a missile, an "M" is used. If the part is not for an aircraft or a missile, this column will be left blank.

If an "A" is in Column C, that part is used for __ ________.

12A an aircraft

---

13. If there is an "M," then that part is used for a ______.

13A missile

---

14. If the part is not aircraft or missile, then Column C will be ______.

14A blank

---

15. Column D lists the unit of issue (U/I) for each part.

---

16. So the __________ _____ List gives the NSN in _ _ _ _ sequence in the first column, and the name of the item, also called the _ _ _ _ _, in the second column.

16A Prescribed Load

N I I N

n o u n

---

17. In the column headed A/M, a part that is used for an ________ or m______ is noted.

17A aircraft missile

---

18. Column E, headed "AUTH," lists the quantity you are actually authorized to have on hand. This amount should be on hand or some on order at ___ _____.

18A all times

19. "EXPCODE" in Column F is the expendability code. Most PLL items will be expendable. This means the items will be thrown away when they become unserviceable.

The code for all expendable items, those that will be ______ ____ when unserviceable, is "X".

19A
thrown away

20. The expendability code "N" is for all non-expendables.

Non-expendable items with the code "_" are normally turned in for "direct exchange" when they become unserviceable.

20A "N"

21. "DIST STOCK" is the heading on Column G. This lists the Distribution of Stockage Code. Every repair part has a stockage code and they are listed in the column with "DIST STOCK" as the heading.

The stockage code shows whether or not the item is part of the Authorized Stockage List (ASL) - the repair parts stocked at the Direct Support Unit. The s _ _ _ _ _ _ _ c _ _ _ would also show whether or not the item is repairable at the Direct Support Unit, etc.

21A s t o c k a g e c o d e

22. This is a list of codes you are most likely to see and what they mean:

Code 1 The item is on the ASL at your Direct Support Unit.

Code 3 The item is on the Direct Exchange List.

Code 7 The repair part is repairable at Direct Support Unit.

Code 8 The repair part is repairable at DSU or is to be returned to depot.

Code 9 This item is a High Dollar Value Repair Part, subject to special handling.

For example, in our sample PLL, the part with an NIIN of 00-736-8643 has a stockage code of __ which means it is ______ ________.

22A 3
Direct Exchange

---

23. Column H lists the end item for the repair part.

---

24. UNIT PRICE in Column I lists the cost of each item.

---

25. Column J lists the extended unit price. The unit price is the ____ of the item. The extended unit price is the cost of the item times the number of items authorized by your PLL.

25A cost

---

26. The number of items authorized by your PLL is found in the column under the heading of "____". The cost of the item is found in the column under the heading of "____ _____".

26A "AUTH"
"UNIT PRICE"

---

27. The Unit Price times the Authorized number gives you the ________ ____ _____.

27A extended unit price

---

28. On the sample PLL, the NIIN __________ gives 10 items authorized and a unit price of $28.00 each. 10 (Auth) X $28.00 each gives you $280.00, called the ________ ____ _____.

28A 00-853-2622

extended unit price

---

29. Now you know what all the information on a Prescribed ____ ____ is. Your job as a PLL clerk is to make sure that the amount of repair parts on this list are on ____ or on _____ at all times.

29A

Load List

hand order

Repair Parts Request Forms

30. There are several ways to request repair parts. As a unit PLL clerk, you will request repair parts most often using a DA Form 2765 or a DA Form 2765-1. Both the 2765 and the 2765-1 can be used to r______ r_____ p____.

30A request repair parts

---

31. These forms are also called cards because they are in the shape of computer cards. They both have blocks and spaces to write information needed to request a part.

All the information written on the _____, another name for these DA forms, is later keypunched at your supply support activity so the computer can read your request.

31A cards

---

32. When writing your request, it is important to write it so other people can read it. It is also important to put the information in the correct spaces. After it is keypunched, the computer can only read the information if it is in the correct spaces.

The two important things to do when writing a request for a part are to ______________________ and ____________________ ______.

32A write so it can be read write in the correct spaces

---

33. The 2765 and the ______ are very much alike. The only difference is that the 2765-1 has space for "TO:" and "FROM:" addresses. They also differ because a 2765-1 has carbon copies attached while the 2765 is just a single card.

33A 2765-1

---

34. As you can see by comparing the cards in Figure 2, the only difference is the ______ has spaces for _________ while the 2765 does not.

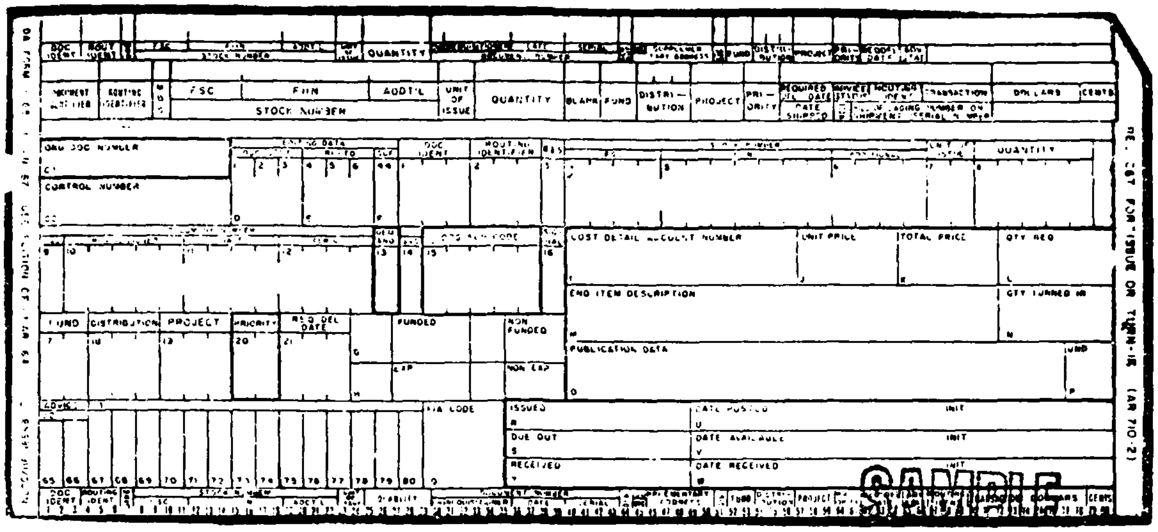
Another difference is the 2765-1 has _____________ and the ____ does not.

34A 2765-1 addresses
carbon copies
2765

---

35. Both of these cards have the same information. They both can be used to _______ repair parts. Since they are so much alike, we'll only use the 2765 for this lesson. But on the job you can use either the ____ or the ______.

35A request
2765 2765-1



FUND | DISTRIBUTION | PROJECT | PRIORITY | REQ DEL DATE | FUNDED | NON FUNDED

COST DETAIL ACCOUNT NUMBER | UNIT PRICE | TOTAL PRICE | QTY REQ

END ITEM DESCRIPTION | QTY TURNED IN

PUBLICATION DATA

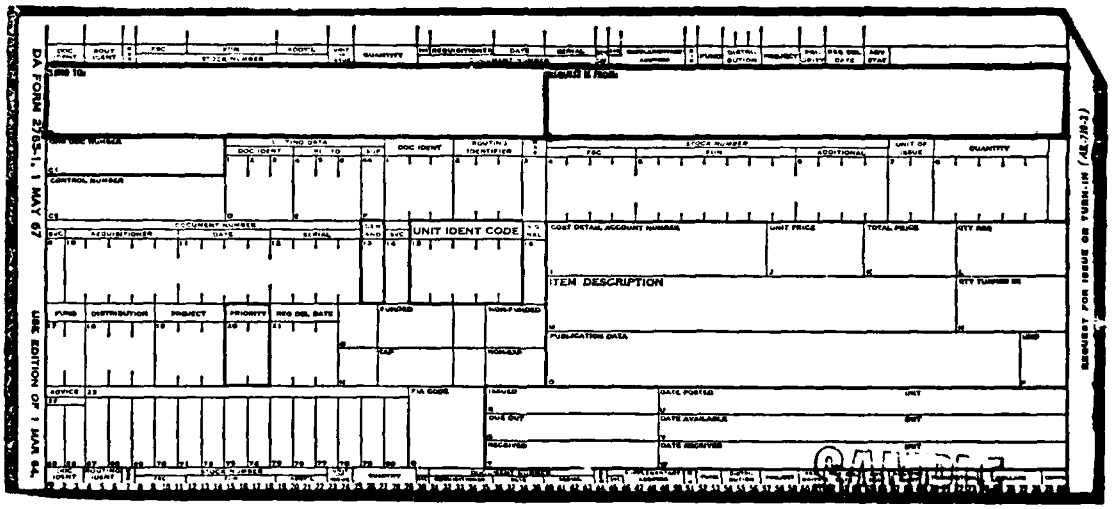
ISSUED | DATE POSTED | INIT

DUE OUT | DATE AVAILABLE | INIT

RECEIVED | DATE RECEIVED | INIT

SAMPLE

DA Form 2765



DA FORM 2765-1, 1 MAY 67

UNIT IDENT CODE

ITEM DESCRIPTION

SAMPLE

DA Form 2765-1

Figure 2

36. In addition to 2 forms, there are 2 ways to submit a request for repair parts. One is to write in all the needed information on a request form. This is called filling out a manual request.

The other way is to use a prepunched card. You get these from your supply support activity. They already have some information keypunched on them, so you have less information to write in.

The two ways to fill out a request for parts would be using a ______________ or a ______ _______.

36A prepunched card manual request

---

37. The prepunched card is better to use because it saves you time and it is easier. You have less information to _____.

It also saves time because some of the information is already __________ so the computer can read it.

37A
write
keypunched

---

38. You now know the 2 forms used for requests, the ___________ and the ______, and you know the 2 ways to submit a request, on a __________ ____ or as a ______ request.

38A. DA Form 2765
2765-1
prepunched card manual

---

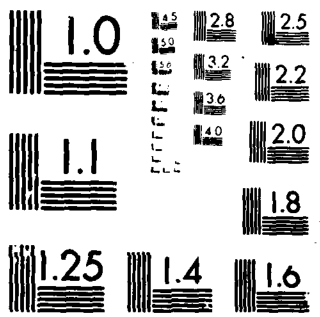
39. Next you will learn what information is needed to request a part and where is the correct place to put it on the request form.

AD-A081 454 HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD F/G 15/5
HUMAN PERFORMANCE REVIEW OF THE RETAIL REPAIR PARTS SUPPLY SYST--ETC(U)
FEB 80 R L KEESEE, R S CAMDEN, R M POWERS

UNCLASSIFIED HEL-TM-3-80-VOL-2 NL

5 OF 5

END
DATE
FILMED
4-80
DTIC



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

Prepunched/Preprinted DA Form 2765

40. As you already know, prepunched/preprinted (both mean the same thing) cards already have some information __________ on them.

40A keypunched

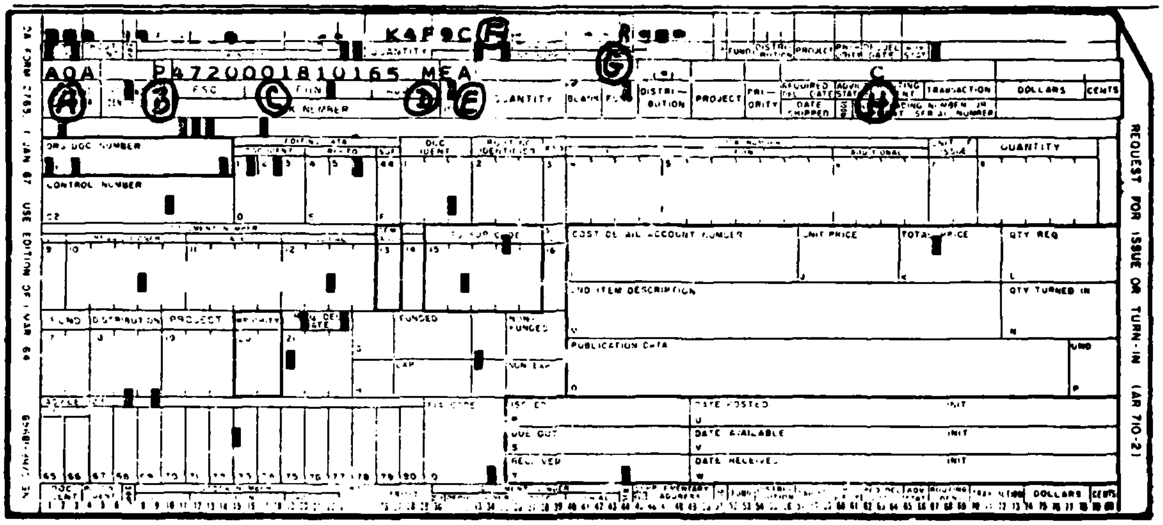


Figure 3. Prepunched DA Form 2765

41. An example of a prepunched card is shown in Figure 3 . You can see the information already on them. It is explained below. The letters identifying the information correspond to the outline.

A. The AØA is the document identifier code. This identifies the card as a request for issue of a part.

The Document Identifier Code (DIC) showing a request for issue is ___.

41A AØA

---

42. B. The P shows the item is on your PLL. It also tells your supply support activity to keypunch another prepunched card to replace this one.

The P stands for ___ and for __________.

42A PLL prepunched

---

43. C. The NSN of the item being requested is printed here. The NSN is the N______ S____ N_____.

43A National Stock Number

---

44. D. As on the PLL, an "A" in this space shows that this part is used on aircraft. When an "M" is used, it shows a part is for a missile. When it is left blank, it is for all other kinds of parts.

This is the same as on the Prescribed Load List where an "A" shows the part is used for an ________ and the "M" shows a part for a _______. A blank means _______________.

44A. aircraft
missile all other parts

---

45. E. "EA" is the unit of issue for this part. A part's unit of issue, U/I, also appears on the PLL list.

---

46. F. K4F9C This is the 5-digit UAAC (Unit Activity Address Code) of "A" Company of 123rd Infantry Battalion. This is the UAAC of your unit.

---

47. G. When "R" is shown in this block, it shows a recurring demand--a demand you have again and again. "N" would show a nonrecurring, or one-time, demand.

All PLL requests have an "R" in this block. That means that all PLL parts are demanded _______________.

47A again and again

---

48. H. This letter identifies the DSU to which you submit your request. On this example, you submit your request to "C" Company of the Maintenance Battalion.

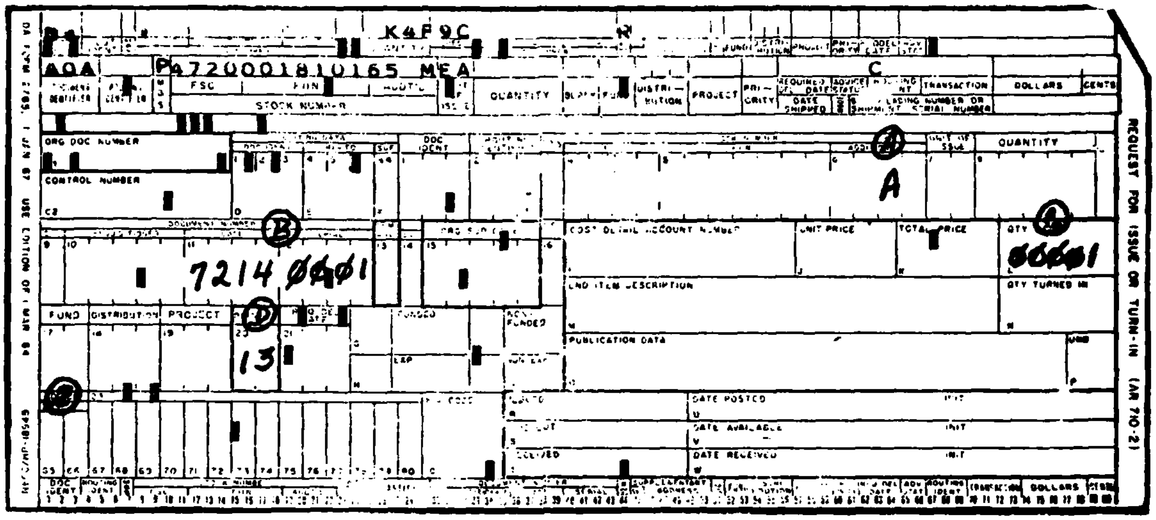


Figure 4. Completed Prepunched DA Form 2765

---

49. Figure 4 shows the same prepunched card. This time the blocks that you will fill in when making a routine request for a part are identified by letters. Again, the outline corresponds to the lettered blocks.

A. Enter the subunit activity address code (SUAAC) in block 6 (cc21). The SUAAC is a one-letter code that is assigned by the DSU to identify other users within your own company. For example, the motor pool will request most of the parts, your Company supply section will have requests, so will your Company arms room. Each subunit will be given their own _ _ _ _ _.

49A SUAAC

---

50. The SUAAC is placed on all types of supply transactions--not only requests for issue, but followups, cancellations, etc.

Throughout these lessons, your SUAAC will be "A".

---

51. B. Enter the four-digit Julian date and the four-digit document serial number. Together these 8 digits are the Document Number. This number can identify this request from any other request.

---

52. The ________ ______ is made of the Julian date and the document serial number. The Julian date calendar can be found on pg A-10, TM 38-L22-15-2. When using a ______ date for your document number, always use the date the request is prepared.

52A document number

Julian

---

53. After the Julian date, you need the document serial number to make a ________ ______.

53A document number

---

54. Each unit has its own sequence or series of numbers to use on requests.

Examples of different series sequences are shown:

Serial No	Section
ØØØ1 thru Ø999	"A" Company Motor Pool
1ØØØ thru 1999	"B" Company Motor Pool
2ØØØ thru 2999	"C" Company Motor Pool

As a PLL clerk you will be using only one sequence of numbers. For example, ØØØ1 thru Ø999. You will use only the block of serial numbers assigned to your company.

---

55. To make a document number, add to the Julian date the four digits from the series sequence assigned to your company.

The ______ ____ + the _______ ________ = the document number.

55A Julian date series sequence (or serial number)

---

56. The first request for each day will have the serial number ØØØ1. The second request for the day will be ØØØ2, etc. (or 1ØØ1, 1ØØ2 depending upon your company's assigned series sequence).

The document number combines the ______ ____ plus the _____________. An example is 7214ØØØ1; 7214 is the ______ ____ and ØØØ1 is the ______ ______. This will show you that the item requested using this document number was the first item requested on Julian date 7214.

56A. Julian date serial number Julian date serial number

---

57. C. The quantity you would like to request is entered in Block C. Block C has 5 spaces in it. The quantity is entered in the far right-hand column. Then the spaces remaining are filled with zeros. Examples: ØØØØ1, ØØØ52, ØØ170, Ø1234.

The quantity needed is written in Block C in the far _____ column.

57A. right

---

58. You should also run a slash through all the zeros so the keypunch operator will read them as zeros and not letter O's. All zeros entered on automated documents and forms should be _______.

58A. slashed

FORCE/ACTIVITY DESIGNATOR	URGENCY OF NEED DESIGNATOR A	B	C
I	01	04	11
II	02	05	12
III	03	06	13
IV	07	09	14
V	08	10	15

Figure 5. UND X FAD Chart Priority Designators

---

59. D. The Priority Designator is entered in Block 20. A Priority Designator (PD) is a two-digit number which you assign to a request. This priority is determined by:

(1) Your unit's force activity designator (FAD).

(2) Your Urgency of Need (UND) for the item requested. (See Figure 5).

The two-digit number assigned to a request is called the P_______ D_________.

A Priority Designator is determined by the F____ Ac______ D_________ and the U______ of N___ Designator.

59A
Priority Designator

Force Activity
Designator Urgency of Need

---

60. To determine the PD from Figure 5 to assign to a request for issue:

(1) Move across the row to the UND column which fits your situation.

(2) The Priority Designator in that column that lines up with your unit's FAD will be the correct priority to show on your request for issue.

---

61. Your unit will have a permanent Force Activity Designator. You will be told this FAD when you report to your unit.

---

62. The reason for requesting the item will tell you whether your Urgency of Need Designator (UND) will be "A", "B", or "C".

---

63. The ___ is permanent to your unit and you will be told it when you report.

The ___ is determined by the reason you are requesting each item.

63A FAD
UND

---

64. The UND is divided into 3 columns, A, B, and C.

Column A is used with all high-priority requests for items ordered for use on "deadlined" or not operational equipment. When equipment is "deadlined" because a needed repair part is not on hand, it is called Not Operationally Ready, Supply (NORS). For example, you may have a truck that is not working because it has a broken part and you do not have the needed repair part on hand.

For a request for a part that will be used on a piece of deadlined equipment, the UND column used is _.

64A A

---

65. When equipment is deadlined because a repair part is not on hand, it is called ____ (Not Operationally Ready, Supply).

65A. NORS

---

66. To request a part for a NORS vehicle, you would use a UND in column A and your unit's _ _ _ to determine the PD.

66A. F A D

---

67. Remember, the two things you need to determine the priority designator of a request are the ___ and the ___.

67A FAD UND

---

68. The UND column B is also used with high-priority requests. You may find you do not need the repair part right now but you don't have any on hand either. This situation is called <u>zero balance</u> and you need to restore or replenish the PLL item to the authorized level.

____ _______ is when you don't need the item right now but there are none on hand either.

For this situation you use UND column _.

68A. Zero balance A

---

69. Both UND columns _ and _ are used for high-priority requests.

69A. A B

---

70. In Column B, your need is not as urgent as it would be for a NORS request, but you must replace your stock as soon as possible.

PLL replenishment when at z___ b______ is always UND B.

70A. zero balance

---

71. When your unit is authorized to have a certain number of items on hand, stocked in your PLL, and your stock falls below that number, but not to zero balance, you will submit a low-priority request under UND column C. This is called a routine replenishment request.

A request for a PLL item that has less than authorized on hand, but not zero balance is called a _______ _____________ request and uses UND _.

71A routine replenishment C

---

72. Requests for NORS equipment are (high) (low) priority and use a UND of _.

72A high
A

---

73. PLL replenishment when at zero balance is a (high) (low) priority request and is always UND _.

73A high
B

---

74. Routine replenishment is a (high) (low) priority request and uses UND _.

74A low
C

---

75. The P_______ D_________ of a request is written in Block 20 and is determined by using your unit's ___ and the ___ of the request.

75A Priority Designator FAD UND

---

76. E. There is only one more thing you must do to complete your prepunched 2765 as a request for issue. Enter the 2 Digit Advice Code in Block 22, but only when needed. Advice codes are shown in AR 710-2, Appendix F, pages F-1 and F-2.

APPENDIX L

IMPLICATIONS OF FEMALE PERFORMANCE RESEARCH ON FEMALE SOLDIER APTITUDE FOR WORK IN THE REPAIR PARTS SYSTEM: A REVIEW AND CRITICAL EVALUATION OF THE LITERATURE

LETTER REPORT

IMPLICATIONS OF FEMALE PERFORMANCE RESEARCH ON FEMALE SOLDIER APTITUDE FOR WORK IN THE REPAIR PARTS SYSTEM: A REVIEW AND CRITICAL EVALUATION OF THE LITERATURE

Gerald A. Hudgens

March 1979

Female Soldier Performance
of Military Tasks
Behavioral Research Directorate
Aberdeen Proving Ground, MD 21005

US ARMY HUMAN ENGINEERING LABORATORY

CONTENTS

ABSTRACT

As a part of the HEL Study of Repair Parts Logistics, the question "Might women repair parts personnel perform better than men?" was considered by conducting a search of the literature relating to female performance of clerical tasks. No evidence was found to indicate that either men or women are likely to perform PLL clerk tasks better than the other. However, recommendations were made which could allow for more certainty on this issue in the future. It was concluded that consideration should be given to placing more women in PLL clerk jobs, because women entering the Army are better educated and will be able to learn the job faster than men and because past social conditioning may make it more likely that women will accept assignment to such a position and that they will perform better and over a longer time than men in that position.

INTRODUCTION

HEL Study of Repair Parts Logistics Initiated

In early CY1978, ODCSLOG, HQDA, conducted a review of the retail repair parts supply system to identify problem areas. This review was in response to field commanders' concerns about the ability of the system to provide adequate wartime support to combat or combat support units. In this review, the area of human performance was named as the area with the greatest potential for problems.

Through its Supply and Maintenance Division, ODCSLOG asked the US Army Human Engineering Laboratory to undertake a study to validate the repair parts system in terms of human capability or performance and to make recommendations for solving any problems specifically identified. The study began 5 July 1978 and is to be completed by 1 October 1979.

Special Concern Shown for Considering Relative Abilities of Men and Women to Perform as Repair Parts Personnel

The initiating documents included, as one of several specific objectives used to show the scope and detail of the study, one reading: "Might women repair parts personnel perform better than men?" This question has attracted the special attention of the Study Advisory Group and is addressed here.

Unfortunately, the level of effort funded in the study precludes any human factors experimentation to answer such a question. Further, the plan for collecting human performance data from field units was designed to emphasize unit and geographic factors and has too many fundamental variables under study to allow valid and reliable answers to other questions, especially a question as sensitive as female soldier performance. In any case, the empirical data to be collected would be confounded on this male-female soldier question since the study concentrates on combat and combat support units, units from which women soldiers are currently excluded by regulation even though the units contain certain MOSs to which women have been admitted.

HEL Resident Expert on Female Performance to Review and Critique Relevant Research Literature

Since a critical review of the pertinent research literature would help answer the question, one was initiated and is reported here. The specific objective of the literature review was to determine the performance improvement expected with the addition of women to the repair parts positions in combat and combat support units.

The results of this literature review will be used along with the analytical results of the empirical data collection dealing with content of the repair parts clerk job in using units, to make recommendations in the final study report about inclusion of women in the repair parts system in using units.

The remainder of this report is devoted to: a description of the criteria currently in use for determining which soldiers should be assigned the Materiel Supply Specialist MOS (76D); a review of research literature concerning these and other related performance criteria; and a critique of those research findings and recommendations based on both the findings and their judged merit within the context of the question at hand "Would the human performance element of the Army repair parts supply system (for combat units in particular) be improved significantly by increasing (from zero in combat units) the numbers of female soldiers in PLL (Prescribed Load List) clerk jobs?".

SELECTION CRITERIA AND PROCEDURES

Description of Qualifying Criteria for Career Management Field 76 (Supply)

AR 611-201 describes the basic mental, physical, and occupational qualifications common to most MOSs in the Career Management Field for Supply which includes MOS 76D.

Basic mental qualifications: Attentiveness, initiative, dependability, perceptual speed, number facility, and verbal ability.

Physical qualifications: Good near vision, color vision, ability to lift and carry loads of various weights and dimensions, hand-eye coordination, finger dexterity, and ability to walk and stand for prolonged periods when w .ing with supplies.

Occupational type qualifications: Knowledge of: standard supply records and clerical procedures, standard quantity measurements, color codes used to identify supplies, supply catalogs for identification of supply items, safety precautions involved in moving and storing supplies, and operation of office machines and repair equipment.

Specific Qualifications for MOS 76D (Materiel Supply Specialist)

Mental ability: Must demonstrate aptitude in the clerical (CL) area of the Army Services Vocational Aptitude Battery (ASVAB).

Physical ability: Normal color vision and a physical profile of 222332 are required.

Test Batteries Provide Primary Measures of Mental Aptitude for Various MOSs

The Armed Forces Qualification Test (AFQT), the Army Qualification Battery (AQB), and the Army Classification Battery (ACB) provided the Army with information on the aptitudes or trainability of personnel entering the service through 1976. Most of the following information is derived from Maier and Fuchs (1972b). Table 1 (Table B-1, Maier and Fuchs, 1972b) indicates for each test the aptitudes measured, where the tests are given and the test time required. Table 2 lists Maier and Fuchs' nine MOS groupings and the major jobs relating to each group. And Table 3 shows aptitude area composites of aptitude subtests for each of the MOS groupings.

The AFQT. This test is used to determine those persons who are untrainable and unqualified for service. The bottom 10% are rejected. Those scoring between the 10th and the 30th percentile take the AQB.

The AQB. This test is a shortened version of the ACB designed for quick screening at the AFEES. Non-high school graduates in the lower half of Category IV (AFQT 10-15) must obtain a score of 90 or better on at least two of the seven aptitude area subtests of the AQB, and those in the upper half of Category IV (AFQT 16-30) must have a 90 or better on at least one subtest in order to qualify for service.

The ACB. This test provides the Army with information on an individual's aptitudes. Assignment of an MOS to the individual involves matching the individual's aptitudes with the Army's need for capable persons in each MOS so that the Army uses its talent to the best advantage. (Maier and Fuchs, 1972a, give a full account of the development of the most recent version of this test).

The ASVAB. The ASVAB is a test battery developed by the Behavior and Systems Research Laboratory (Bayroff and Fuchs, 1970) and designed to be used by the Army, Air Force and Navy rather than the batteries developed by each service for the screening and classification of enlisted men for military training and jobs. The Army has used the ASVAB since 1976. The original version of this battery was standardized on 3,050 male Selective Service registrants at 11 AFEES across the country. Binkin and Bach (1977), in a Brookings Institute study on Women and the Military, discussed the military services selection and assignment uses for the ASVAB. An index of General Aptitude is derived from a composite of Word Knowledge, Arithmetic Reasoning, and Space Perception for men and from Word Knowledge and Arithmetic Reasoning for women. According to Binkin and Bach the principal use of the test is to differentiate between Mental Categories I and II (percentiles 65-100, above average), III (31-64, average), and IV-V (0-30, below average). Prospective entrants below the 30th percentile are considered to need additional training and generally present more disciplinary problems than those above that level. The tests are used in a similar manner by the services, but different combinations of subtests are used to fit the particular requirements of each service. Men can qualify for enlistment into the Army either by having a high school diploma (or the GED equivalent), scoring at or above the 16th percentile in General Aptitude and 90 or higher on at least one aptitude area,

Table 1

COMPOSITION OF NEW ACB AND AQB

TEST		TIME REQUIRED
A. AFQT (yields Word Knowledge, Arithmetic Reasoning, and Pattern Analysis scores used in the AQB; given at AFEES)		1 hour
B. AQB (given at AFEES) or ACB (given at reception stations)		
1. Automotive Information (AI)		
2. Classification Inventory (CI)		
a. Combat (CC)		
b. Attentiveness (CA)		
c. Electronics (CE)		
d. Maintenance (CM)		
3. Electronics Information (EI)		
4. General Information (GI)		
5. Trade Information (TI)		
6. Science Knowledge (SK)		
7. Attention-to-Detail (AD)	Total	2 hours
C. ACB (given at reception stations)		
1. Mechanical Comprehension (MC)		
2. Arithmetic Reasoning (AR)		
3. Word Knowledge (WK)		
4. Mathematics Knowledge (MK)		
5. Pattern Analysis (PA)		
6. Auditory Perception (AP)	Total	3 hours
	Grand Total	6 hours

Table 2

COMPOSITION OF MOS GROUPS

MOS GROUP	MAJOR JOBS IN EACH MOS GROUP
CO (Combat)	Infantry, Armor, Combat Engineer
FA (Field Artillery)	Field Cannon and Rocket Artillery
EL (Electronics Repair)	Missiles Repair, Air Defense Repair, Tactical Electronic Repair, Fixed Plant Communications Repair
OF (Operators and Food)	Missiles Crewman, Air Defense Crewman, Driver, Food Services
SC (Surveillance and Communications)	Target Acquisition and Combat Surveillance, Communication Operations
MM (Mechanical Maintenance)	Mechanical and Air Maintenance, Rails
GM (General Maintenance)	Construction and Utilities, Chemical, Marine, Petroleum
CL (Clerical)	Administrative, Finance, Supply
ST (Skilled Technical)	Medical, Military Policeman, Intelligence, Data Processing, Air Control, Topography and Printing, Information and Audio Visual

Table 3

NEW APTITUDE AREA COMPOSITES

TEST		APTITUDE AREA COMPOSITES*									
General Ability Tests		CO	FA	EL	OF	SC	MM	GM	CL	ST	GT[a]
Arithmetic Reasoning	(AR)	AR	AR	AR		AR		AR	AR	AR	AR
General Information	(GI)		GI		GI						
Mathematics Knowledge	(MK)		MK				MK			MK	
Word Knowledge	(WK)					WK			WK		WK
Science Knowledge	(SK)							SK		SK	
Mechanical Ability Tests											
Trade Information	(TI)	TI		TI			TI				
Electronics Information	(EI)		EI	EI			EI				
Mechanical Comprehension	(MC)			MC		MC		MC			
Automotive Information	(AI)				AI		AI	AI			
Perceptual Ability											
Pattern Analysis	(PA)	PA				PA					
Attention-to-Detail	(AD)	AD							AD		
Auditory Perception	(AP)					AP					
Classification Inventory											
Combat Scale	(CC)	CC									
Attentiveness Scale	(CA)		CA		CA				CA		
Electronics Scale	(CE)			CE							
Maintenance Scale	(CM)						CM				

*Symbols: Aptitude Area Composites:

CO = Combat
FA = Field Artillery
EL = Electronics Repair
OF = Operators and Food
SC = Surveillance and Communications
MM = Mechanical Maintenance
GM = General Maintenance
CL = Clerical
ST = Skilled Technical

[a]GT used only to determine who is qualified to take additional tests such as the Officer Candidate Test.

or by scoring at or above the 31st percentile in General Aptitude and 90 or above on at least two aptitude areas for those without diplomas. Women, however, must be high school graduates (or have a GED equivalent), score at or above the 59th percentile on the General Aptitude composite, and at or above 90 in at least one aptitude area. The proportion of men in service who were high school graduates ranged from 58 to 68% during the period 1971-1976. From 91 to 95% of the women in service were graduates during that same period. The following subtests are included in the ASVAB: Word Knowledge, Arithmetic Reasoning, Space Perception, General Information, Numerical Operations, Attention to Detail, Mathematics Knowledge, Electronics Information, Mechanical Comprehension, General Science, Shop Information, and a Classification Inventory. These thirteen subtests are combined into various composites designed to predict training success for clusters of military occupations.

A deficiency common to the AFQT, AQB, ACB and ASVAB: All four tests, which are or have been routinely administered to all men and women entering the Army, share at least one glaring deficiency: all of the information used to develop the tests was derived from men (Maier and Fuchs, 1972b; Binkin and Bach, 1977). The tests, or more likely some of the subtest aptitude areas, may not provide valid or reliable measures of women's aptitudes for certain jobs.

Literature Review to Cover Some ASVAB Aptitude Areas and Others

The literature review in the next section covers the available literature on a number of mental and physical aptitude areas which appear to the reviewer to be relevant to the objective of determining if women repair parts personnel might perform their job better than men. The aptitude areas of the ASVAB are included to the extent that information was available. Other aptitude areas are included because they appear to the reviewer to be relevant for consideration, and because of the possibility that they might prove integral to the development of any test including information derived from a population of women.

LITERATURE REVIEW

There are five categories of behavioral tests which provide information on the relative abilities of men and women to perform as repair parts persons:

1. Tests of general intelligence which measure a broad range of cognitive areas.

2. Tests of specific cognitive abilities -- these may be subtests of general intelligence tests.

3. Tests of motor abilities.

4. Tests of motivation to perform various tasks or jobs usually referred to as clerical in nature — may also be called tests of interest in clerical duties.

5. Tests which are specifically designed and purported to measure clerical aptitude.

The literature on tests in each of these areas has been searched to determine the relative abilities of men and women in each area and to determine if these tests will help answer whether women or men make better repair parts persons.

General Intelligence Tests

From the description of qualifying criteria given in an earlier section for the Career Management Field 76 (Supply), it is apparent that the repair parts position is sufficiently complex that a more intelligent person might have at least an initial advantage in the position over a person of lesser intelligence. If either sex were superior to the other in general intelligence, as measured by general intelligence tests, then persons of that sex would be better qualified for the 76D, repair parts, MOS (and for most other MOSs as well, it might be noted).

Mixed results found for sexual superiority in intelligence. Most of the following is summarized from Kipnis (1976). Data obtained prior to World War II generally indicated that women were superior to men in general intelligence. This was indicated in the normative data for the Wechsler-Bellevue I (an individually administered IQ test for adults; Wechsler, 1939) and for a group of New England children and adults in the early 1930's with the Army Alpha (a group IQ test developed in World War I; Conrad, Jones, and Hsiano, 1933).

Following World War II, the differences disappeared. Again using the Wechsler-Bellevue I, Wechsler (1958) and Bayley (1957), found no differences between groups of men and women; nor did Miele (1958) between men and women on the Wechsler Adult Intelligence Scale (WAIS) or between boys and girls on the Wechsler Intelligence Scale for Children (WISC).

More recent data (Bradway and Thompson, 1962; Kagan and Moss, 1962) suggest even greater increases in measured intelligence for males than for females.

A probable answer: Educational level. Kipnis (1976) pointed out that prior to World War II women averaged more years of education than men. Following World War II, however, probably because of increased emphasis on education, an increasingly technological society, and because of increased opportunity for men to get educated using the GI Bill funds, men caught up and surpassed women's level of education.

Because most general intelligence tests, particularly the individual tests, are designed to minimize sex differences but become more difficult as age increases, the measured IQ for a person at any given age will be influenced by the amount of education that person has received.

It has generally been concluded that, with level of education held constant, no significant difference in general intelligence exists between the sexes (Kipnis, 1976; Sherman, 1978). Maccoby and Jacklin (1974) reviewed 46 studies of general intelligence with males and females from infancy into adulthood and concluded: "It is still a reliable generalization that the sexes do not differ consistently in tests of total (or composite) abilities through most of the age range studied" (p. 65).

Specific Cognitive Abilities

Male and female performance on the WISC and WAIS subtests. Gainer (1962) reported no overall difference between 100 boys and 100 girls on the WISC, but did find the boys superior on the Comprehension subtest (practical knowledge and social judgment) and the girls superior on the Coding subtest (speed of learning and writing symbols). The superiority of girls on the Coding subtest of the WISC was confirmed by Lyle and Johnson (1974); and McGuinness (1976) summarized a review of such works by concluding the Coding and Digit Substitution subtests of the WISC and WAIS are consistently performed better by females. Miele (1958), while finding no sex difference on general intelligence for the standardization group of either the WAIS or WISC, did find several differences on various subtests. Males were superior to females on Block Design at all but the youngest and oldest ages, on Vocabulary at 8-15 years, on Arithmetic in adulthood, on Comprehension and Mazes at all ages in childhood, on Picture Completion and Object Assembly in childhood after 7 years, and on Picture Completion and Information in adulthood. Females were superior to males on the Vocabulary subtest in adulthood, on Digit Symbol at all ages without exception, and on Similarities in adulthood. Shaw (1965) obtained WAIS subtest scores for 50 men and 50 women and found men superior on the Information, Arithmetic, Block Design, and Picture Arrangement subtests, and women markedly superior on the Digit Symbol subtest. There was no difference in general intelligence.

Performance on Wechsler-Bellevue subtests. Norman (1953) tested a group of young adults of superior intelligence (120+) on the Wechsler-Bellevue. The sexes were matched on full scale IQ. Males were superior to females on Arithmetic, Information, and Digit Span. Females were superior on Vocabulary, Digit Symbol, Picture Arrangement, and Block Design.

Performance on a color-word interference task. Peretti (1969 and 1971) tested school-age subjects on a task where they were to name the actual color and ignore the word name for different colored word names on a list where the color and name may or may not match. In the earlier study (Peretti, 1969), boys and girls of elementary, high school and college age were tested. Although the girls were consistently better than the boys, the difference was not significant. However, in the later study (Peretti, 1971), college women were significantly faster than college men on the task.

Performance on tests of field dependency. Male, female, and pre-operative male transsexual adults were tested by LaTorre, Gossmann, and Piper (1976) on the Embedded-figures Test. It was found that the males were more field independent than females, and that the transsexuals were as field dependent as the females. In this case the male transsexuals behaved like the female group in accordance with their gender identity, whereas, on a finger-tapping task, they behaved like their biological sex (male). Parlee and Rajagopal (1974) also reported the superior performance of males on the Embedded-figures Test, for subjects from both the United States and India. This suggests that field dependency in women could be a general and possibly a universal trait.

Employing the Rod-and-Frame Test, another test of field dependency, Hayes and Venables (1974) found that female subjects made significantly greater errors than males and that this was due to a greater tendency to report the upright prematurely. Morell (1976) also found in 11-, 14-, and 18-year old subjects that females were inferior to males in performance, and that practice had no effect on this difference.

From these representative findings it can be concluded here, as it has elsewhere (e.g. McGuiness, 1976; Teitelbaum, 1976; and Maccoby and Jacklin, 1974), that males excel over females in spatial ability because they are less field dependent.

Performance on tests of memory. In one experiment by Ernest and Paivio (1971), 66 college men and women were shown lists of item-color combinations where half the items were represented by words and half by pictures. The items were all highly concrete and high in image-evoking capacity. In a free-recall situation the women recalled more items than the men. In a second experiment, 72 men and women were divided into high- and low-imagery groups based on prior tests of imagery. They were shown at three different sessions, one of three lists of 72 pictures, their concrete noun labels, or 72 abstract words. In a subsequent item recognition test, the women who were high in imagery recalled more items than low-imagery women and more than either high- or low-imagery males.

In a similar series of experiments by Marks (1973) college men and women who differed in their verbal reports of visual image vividness were tested for recall where colored photos served as stimuli. Subjects who reported vivid visual imagery recalled more accurately than those with poor visual imagery, and females recalled more accurately than males in two of the three experiments. It was concluded that visual imagery facilitates recall and that females may use this facility more than males.

Sommer (1958) compared men and women in a group of 156 hospital patients in the US, a group of 96 US college students, and a group of 154 Canadian college students on memory for quantitative and nonquantitative information. The first two groups were given items from the Wechsler-Bellevue Information subtest (distance from New York to Paris, population of the US, number of pints in a quart, number of teaspoons in a tablespoon and population of college town where located). The material given the Canadian students was similar but "new" material presented shortly before testing. They found the men did better on the population and distance items, and the women did better on the pints and teaspoon items. They also found that the men did better at retaining new quantitative information in an immediate recall test, but that men and women were equivalent in remembering nonquantitative material. It might be concluded that sex differences in memory ability is confounded by the nature of the material to be remembered.

Performance in the areas of mathematics and verbal ability. Two recent books (Maccoby and Jacklin, 1974; McGuinness, 1976) have reviewed the relative abilities of males and females in the areas of mathematics and verbal ability and have reached the same conclusion: males excel in mathematics and females excel in verbal ability, particularly in reading skills.

Motor Abilities

Listed among the physical qualifications for the 76D MOS are hand-eye coordination and finger dexterity. Because of the possibility of male/female ability differences on these and related motor skills, a limited number of motor ability areas are reviewed in this section.

Hand-eye coordination. While this term may apply to any of several motor abilities, it is generally associated with hand steadiness, that is, the ability to hold the hand, or an object in the hand, steady with respect to a fixed reference object or place. Hudgens, Billingsley and Fatkin (1979), have recently completed an experimental investigation of hand steadiness in men and women. The task was to hold a pencil-like stylus in each of nine holes, from 3mm to 13 mm in diameter, in a metal stand at slightly less than arm's reach from the seated subject. The number of times the stylus touched the side of the hole during each 20 sec trial was recorded as errors. In populations of college students and of men and women new to the Army, it was found that women were much steadier than men, and that both men and women were steadier with their preferred hands than their nonpreferred hands. The sex difference was so pronounced that the women were as steady with their nonpreferred hands as men were with their preferred hands.

Another type of task involving hand-eye coordination is that where subjects are asked to trace within maze patterns, or more regular patterns such as star shapes, either while looking directly at the original pattern, or while looking at its mirror image. Darden and Shappell (1972) found no differences in the ability of men and women to trace within a star pattern when looking at its true image, but that women were superior on the mirror tracing task.

Finger dexterity. Here, again, there is a problem in determining what is meant by finger dexterity. Tiffin and Asher (1948) developed the well-known Purdue Pegboard test, which they claimed requires "tip-of-the-finger" dexterity for an assembly task and more gross arm, hand and finger dexterity for a task of putting pegs in holes. In comparisons between groups of college men and women and industrial men and women, it was found that women consistently outperformed men on the assembly task and for the right-hand, left-hand, and both-hand portions of the peg-in-hole task. However, no tests of significance were performed, and the size of the standard deviations given seem to indicate the differences may be of little practical importance.

Finger dexterity is often measured by speed of finger tapping. Husband and Ludden (1931) used a Speed-of-Tapping measure, defined as the number of taps on a telegraph key in five seconds, on groups of 30 college men and 40 college women in one of their tests of motor skills. They found that men were definitely superior to women on this test of finger dexterity. In another finger-tapping study, Wolff and Hurwitz (1976) found that girls (6-10 years old) were more accurate than boys in keeping the beat of a variable rate metronome, and that girls (ages 6-12) were also better at maintaining a steady beat after the metronome stopped.

Manual dexterity. None of the literature reviewed offered a clear-cut distinction between manual dexterity, finger dexterity, and hand-eye coordination. There appears to be a considerable overlap of tasks included in the categories. Garai and Scheinfeld (1968) include the Purdue Pegboard test, the O'Conner Finger Dexterity Test, and the O'Conner Tweezer Dexterity Test in the manual dexterity category. The latter tests involve placing pegs in holes either with the fingers, as in the Purdue Pegboard test, or with the use of tweezers. They conclude that the norms for women are consistently higher than for men on these tests.

On what was termed a test of manual speed, Annett (1970) found that girls were superior to boys over all ages tested (3-15 years) when required to shift a peg along a series of holes on a board as rapidly as possible.

Droege (1967) compared the scores of 20,541 boys and girls (ages 14-17) who had taken the General Aptitude Battery (US Employment Service, 1958). The girls were better on finger dexterity, but no was found for manual dexterity. In discussing this finding Maccoby and Jacklin (1974) stated that it "...underlines the importance of the distinction between large-muscle and small-muscle movements, or fine vs. relatively gross movements."

Reaction time. Two kinds of reaction time were studied by Fairweather and Hutt (1972), and two quite different findings resulted. In their first experiment, children in three age groups (6-7, 8-9, 10-11 years) were tested for simple reaction time. They were told to press a key with a certain finger as soon as they saw a light come on. At 6-7 years the girls were faster than boys. At 8-9 years a crossover effect occurred, so that by 10-11 years the boys were significantly faster than girls. In the other experiment a group of new subjects in the same age groups was tested for serial choice reaction time. In this case subjects were to respond to one of 2, 4, or 8 stimuli by pressing the correct key out of 2, 4, or 8 keys corresponding to the stimulus. They found that girls were superior at all ages on this task, and that girls' superiority increased as the information load increased. In a discussion of this study, McGuinness (1976) pointed out that many clerical tasks, such as typing, are choice reaction time tasks, and that this should be taken into account when assessing those kinds of tasks which favor women.

Garai and Scheinfeld (1968) reviewed a number of simple reaction time studies for subjects ranging in age from late childhood through old age and concluded, as did Fairweather and Hutt (1972), that males are faster than females in responding to visual and auditory stimulation.

Reaction time (time from onset of stimulus to onset of reaction) was considered separately from movement time (the speed of response once initiated) by Hodgkins (1963). It was found, in 930 subjects from 6 to 84 years of age, that males were faster than females in both reaction and movement time, and that peak speed was maintained longer by males in movement and longer by females in reaction.

More complex tasks involving motor abilities. Ammons, Alprin and Ammons (1955) studied 350 boys and girls in grades 3, 6, 9, 11 and 12. The subjects were to track a target on a turntable surface moving at 60 rpm with a hinged stylus. They found that the boys' superiority over the girls became quite apparent around grade 9 where the girls' performance began to drop while the boys' continued to rise sharply.

Adult males were found to be superior to females on two other complex motor tasks. The Toronto Complex Coordinator (TCC) was used by Shephard, Abbey, and Humphries (1962) to study 420 males and females at seven age levels from 5-70 years. Subjects were to use an airplane-type stick control to move a green disk in vertical or horizontal directions into red circles which would appear in random locations on a display panel. Superior performance by the males was displayed in the middle age range (20-50 years). Noble and Hays (1966) used the US Air Force Discrimination Reaction Timer (DRT) to study 681 college students. Subjects were to snap the correct one of four toggle switches in response to the lighting of a pair of green and red signal lamps. Men were greatly superior to women on this task. Husband and Ludden (1931) also found men superior to women on a pursuit rotor task but inferior on a serial discrimination task (pressing the correct one of four keys in response to a number, 1-4, on a screen). It should be noted that Darden and Shappell (1972) found no difference between 240 male and female college students on a pursuit rotor task performed normally, but they found that women tracked better than men when looking at the target in a mirror.

Tests of Clerical Aptitude

Clerical tests. According to Anastasi (1954), clerical aptitude tests typically place emphasis on perceptual speed. Probably the best-known example is the Minnesota Clerical Test which has two separately timed subtests: Number Comparison and Name Comparison. The first has 200 pairs of numbers from 3 to 12 digits. The task is to place a check between all identical pairs. The task is the same for Name Comparison where proper names are used instead of numbers. Schneidler and Paterson (1942) found that this test has yielded large and consistent sex differences in favor of women from childhood into adulthood. Anastasi also noted that, while this test measures speed and accuracy for only one aspect of clerical aptitude, these attributes, along with a minimum of manual dexterity, would probably suffice for most clerical positions.

Anastasi (1954) also described a composite test of clerical aptitude, the General Clerical Test (GCT), published by the Psychological Corporation, which combines perceptual speed and accuracy with other abilities required for clerical work. Nine subtests yield clerical, numerical, verbal and total scores. The Checking and Alphabetizing subtests measure speed and accuracy in routine clerical tasks. Arithmetic Computation, Error Location and Arithmetic Reasoning provide the numerical score. And Spelling, Reading Comprehension, Vocabulary, and Grammar combine for the verbal subscore. Garai and Scheinfeld (1968) pointed out that the superiority of women on such clerical aptitude tests was also found on the Clerical Speed and Accuracy Test of the Differential Aptitude Test (DAT).

Hay (1954) checked the validities of several clerical tests by comparing test scores with ratings by department heads of 24 clerical workers (23 women, 1 man). The tests compared were: the LOMA No. 2A, which is available only to insurance companies, and which yields time and error scores for six parts (Checking, Direction, Same-Opposites, Proverbs, Arithmetic, and Spelling); the Wonderlic Personnel test consisting of a variety of verbal and numerical problems; the SRA Clerical test with Vocabulary, Arithmetic and Checking (Coding) tests;

and the Hay Clerical Battery which has three 4-minute tests (Number Perception -- check pairs of identical 3-6 digit numbers, Name Finding -- remember a name well enough to pick it from four similar names on another page, and Number Series -- completing of number series). Hay found that the best tests for efficiently predicting success in low-level routine clerical work were those which were based on speed of perception and by those which were the shortest. The best combination of subtests for prediction of success were the Name Finding and Number Perception tests from the Hay Clerical Battery. Hay concluded that large batteries of tests are not necessary for good prediction of low-level clerical performance.

Other tests of clerical skills. Archer and Bourne (1956) tested 84 college students on an inverted-alphabet printing task and found that women printed more inverted letters per trial than men, and that this was because they traveled faster between letters, not because they printed faster. Karlins and Lamm (1965), however, found no differences between men and women in their speed of filling circles with X's. Garai and Scheinfeld (1968) stated that women excel in such tasks as "...typing, filing, checking lists for accuracy, and other clerical skills," but they provided no data to substantiate the contention. They also stated, incorrectly, that Karlins and Lamm (1965) had found women superior to men on the filling of circles with X's task.

The Armed Services Vocational Aptitude Battery (ASVAB)

Binkin and Bach (1977) reviewed a study in which Wilfong, et al (1974) administered one version of the ASVAB to a large number of high school boys and girls during the 1973-74 school year. The boys were superior on all eight subtests and four of five composites. Girls were slightly higher ($\overline{X}$ = 31.95, SD = 7.67) than boys ($\overline{X}$ = 29.76, SD = 7.58) only on the Clerical composite. The only large differences were on the General Mechanical (boys $\overline{X}$ = 44.94, SD = 12.77; girls $\overline{X}$ = 29.60, SD = 11.27), the Electronics (boys $\overline{X}$ = 43.75, SD = 13.55; girls $\overline{X}$ = 28.32, SD = 11.20), and the Motor Mechanics (boys $\overline{X}$ = 44.61, SD = 12.53; girls $\overline{X}$ = 28.97, SD = 9.50) composites. It was pointed out that using present aptitude standards and measurements (employing tests standardized on men only) will allow only a small proportion of women to qualify for industrial positions. They said, "...familiarity with male-oriented subjects is needed to pass at least one-third of the subtests in the ASVAB." For this reason, and because no relationship has yet been established between test performance and actual job performance, "...it would be premature to deny to women opportunities to enter nontraditional occupational areas solely on the basis of aptitude scores."

Studies of Women in the Military

The following represent a sampling of major military studies conducted by the military services to determine: whether or not women are capable of the physical demands of training, whether or not they can perform actual job requirements when integrated into operational units, and the effects of including women on the overall performance of the units.

The Navy's experience on the USS Santuary. Fifty-three enlisted women (about 12.5% of all enlisted personnel on the ship) were assigned to jobs in seven departments (hospital, 21; deck, 9; supply, 4; operations, 3; resale, 10; administration, 5; and engineer, 1) on the USS Santuary, a Navy hospital ship, for 13 months. An evaluation by the ship's commanding officer concluded that morale was high, that no serious problems were encountered, and that the women performed every function as well as the men did. It was noted by Binkin and Bach (1977), who reviewed the study, that the women in the study were selected and may have been more highly qualified than the average of Navy personnel, and that the ship was actually under way only 42 days of the 13 months.

US Army Military Police School Training Center Study. The Army conducted a study to evaluate the relative abilities of over 800 men and 800 women to meet the standards of basic combat training previously given only to males. The program included hand grenade instruction, strenuous physical training, familiarization with a variety of weapons, and individual tactical training in addition to the usual women's basic program. It was found that the program, with only minor changes in physical training, was acceptable as an initial entry program for women.

United States Military Academy "Project 60" Study. Prior to accepting women into the Academy for the school year 1976-1977, a study was conducted with about 60 volunteer women, 16-18 years old, from nearby high schools, to determine the physical capabilities and limitations of average women in that age range. It was found that the women were often more physically proficient than a review of the literature would have indicated, and that, on many tasks, even the best women performed below the average level for male cadets. It was concluded that the Academy should attempt to attract female cadets of above-average physical ability in order to avoid lowering standards or having separate standards for men and women (Peterson, Vogel, Koval and Tomasi, 1976).

The MAX-WAC Test. In 1976 the US Army Research Institute initiated a study with the purpose of assessing "...the effects of varying the percentages of female soldiers assigned to representative types of category II and III TOE Units on the capability of a unit to perform its TOE mission under field conditions." A total of 110 combat support and combat service support companies were tested. Of these there were eight each of Medical, Maintenance, Military Police, Transportation and Signal companies. The companies included 0%, 15% or 35% enlisted women. They were tested for performance on a 3-day field exercise, the Army Training and Evaluation Program (ARTEP). No significant differences in company performance were found relating to percentage of women included. It was concluded that there was no decrement in unit performance due to including women up to the percentages used in the study, that the women were highly motivated and performed all jobs well, and that physically difficult jobs were accomplished by using leverage or peer assistance. It was noted that the test was for a 72-hour exercise only and that no evaluation could be made for extended field duty (Army Research Institute, 1977).

CRITICAL EVALUATION

Before summary and concluding remarks are made, it should be of value for the reviewer to present some of the considerations which were applied to the findings previously reviewed and which led to the conclusions offered.

Weaknesses of Past Research

Much of the following discussion is derived from Sherman (1978).

The null hypothesis. Many, if not most, experiments of sex differences are tests of the null hypothesis; that is, they test statistically the assumption of no difference between males and females on the variable in question. The problem is encountered in situations where large numbers of subjects are employed, and statistically significant differences are obtained. Often in such cases, the differences are so small that they are of no practical or meaningful significance in spite of their statistical significance. It is easy to see how this could happen with military tests which are often administered to thousands of personnel at a time. Small, statistically significant, but otherwise meaningless, differences between scores of men and women could be obtained, and could be used to justify discriminatory assignment actions against all the members of one of the sexes.

Tendency to form false dichotomies. At is applies here, this is the tendency to see males and females as having performance characteristics which are opposite of each other rather than as having characteristics with differing mean performance levels along a continuum and with possibly largely overlapping distributions over a large portion of the continuum. Such dichotomies are seen in the tendency of many to see men as strong and women as weak or men as rational and women as intuitive.

Incorrect inferences about one sex from data on the other sex. This is the tendency to apply logic in the absence of information, as when one assumes that women cannot do a task because men cannot, or as when one assumes women's patience will allow them to perform well in a monotonous or exacting task that men fail.

Incorrect inferences from age-related data. Much data derived from experiments with pre-adults will apply to adults as well, but one should avoid such an inference because many developmental, hormonal and cultural changes occur around puberty which can have quite different effects on the later behavior of members of the two sex groups.

Sex interactions. Much data on sex differences is suspect because of failure to control for an experimenter effect. Often, men and women will perform differently in a test situation just because of the sex of the person testing them. In a military setting it is possible that male subjects receiving test instructions from a female experimenter would view the situation as taking orders from a woman, whereas females subjects might see the female experimenter in a more positive manner, as a role-model for instance.

Biased samples. Because the criteria for entry into the service are more stringent for women than for men, it is quite likely that military women will form a much different sample than that formed by men. As selection criteria change, any conclusions drawn from studies on these groups of military will be of questionable validity.

Failure to control for the effects of past experience. Failure to control for the effects of past experience in experiments with men and women can lead to very poor decisions based on the outcomes of those experiments. For instance, if one did not take into account the fact that young men generally receive more experience than women with rifles prior to entering the service, and one tested the marksmanship of entering men and women, one might conclude that women have very poor ability to fire a rifle effectively. On the other hand, with a modest amount of practice, and possibly with other factors in their favor, such as the ability to hold a weapon steadier than men, the conclusion might be that women have the capacity to be better marksmen than men.

Lack of validity determinations for military test batteries. One of the biggest faults with present military test batteries is that performance on the tests has not been correlated with actual job performance. While these test batteries may appear to be valid (have "face validity"), their true worth will not be known until their validity is checked against job performance.

Sex bias in test batteries. Most military tests were developed for use with men and were standardized on populations of men. Many of the tests and test items are male-oriented. Women are placed at a distinct disadvantage when competing with men on these tasks.

Ignoring the sex variable in performance research. Another related and serious problem is that much basic and applied research dealing with military human factors problems does not include measures on both men and women. The importance of this consideration is more obvious when one considers that this research could involve performance measures on men and women in actual job, or job-simulating, situations, performing tasks relevant to those jobs, and using equipment actually integral to their performance. Hudgens and Billingsley (1978) considered this problem in more detail.

Political Considerations

Official policy. Within the military environment it is particularly true that much is determined by official policy or what is perceived as official policy. Official policy is those ideas and procedures (written or otherwise) that are seen as an integral part of the institution from which they are issued. It is important to realize and remember that such a policy can influence decisions regarding criteria for entering into the service and for job assignment, and that even the composition of tests used in such determinations can be biased by actual or perceived policy.

Prejudice. Prejudice, too, can have its influence in a variety of ways. If the prejudice is at a high level it can affect policy and exert its influence as described above. If it exists in a researcher, it can influence the design or outcome of an experiment or the construction of a test battery. If it exists in a test administrator, it can influence the performance of those being tested. It can be either favorable or unfavorable with respect to a particular group. For instance, there are some persons whose position is that women should not, and indeed cannot, adequately perform as soldiers. Conversely, there are others who say women can do anything a man can do. Both positions are extreme and, like most extreme positions, are out of touch with reality. Truth usually lies somewhere between two or more extreme positions. In this case, the truth appears to be that men are better than women at some things and women are better at others. What is important is that the truth be determined objectively so that the best interests of the military and its personnel can be served.

Dynamic Nature of Differences Between the Sexes

It is quite evident that the present age is an age of change. It is a time when ideas, social customs, technologies, practically everything around us is changing. While it may not be as apparent as some other changes, it is also true that the differences between the sexes and the way they perform relative to each other are changing. A number of factors are operating to cause changes: changes in social customs, the influence of women's interest groups, new opportunities for women and men for nontraditional jobs, the overcoming of some prejudices, changes in laws, and so on. With prejudices, social pressures and expectations, and discriminatory practices either removed or changed, women and men are showing they can perform well in many areas previously in the domain of the other sex only. What this means is that many of the sex differences in abilities that existed in the past, or which exist today, may not exist in the future. Whether it is because of more and better training, changing interests, higher motivation, or merely because they are given a chance to show what they can do, men and women are demonstrating, and will continue to demonstrate, that they are capable of performing well in nontraditional jobs.

SUMMARY AND CONCLUSIONS

Review of Literature on Aptitude Tests

Several kinds of aptitude tests, all of which purport to measure performance skills which may be related to clerical ability, were reviewed. The question to be answered here is, "Do any of these aptitude tests reveal anything about men or women that would suggest that members of one sex would make better PLL clerks than members of the other sex?"

General intelligence tests. While some investigators have found one sex or the other to have a slight advantage over the other at times, the overwhelming conclusions of investigators, reviewers and authorities in psychometrics is that no general intelligence difference exists. Moreover, most current general intelligence tests are deliberately constructed to minimize such a difference.

Tests of specific cognitive abilities. Some subtests of general intelligence test batteries, and other tests of specific cognitive abilities have yielded significant and, in some cases, consistent sex differences. Generally, men have been found to be superior in such areas as arithmetic, space perception, and information while women have been found superior in areas such as vocabulary, coding, and memory. These findings, however, do not lead to any clear-cut advantage of one sex over the other, since the differences obtained, while significant statistically, were often so small as to be meaningless in any practical application, and since men and women were both found superior in some, and inferior in others, of several skill areas relating to clerical ability.

Tests of motor skills. The same comments apply here as to the tests of specific cognitive abilities above.

Tests of clerical aptitude. It is on these tests, of all those reviewed, that the most clear-cut and consistent advantage in favor of one sex was found. Women generally, though not always significantly, performed better than men on tests designed to measure clerical ability specifically. Caution must be exercised again for several reasons, however, in the use of these findings. First of all, it is quite likely that these tests are female biased; that is, since most clerical people are women, it is likely that some or all tests were chosen because they are ones that women do well on, rather than because they are tests that clerical people do well on. Secondly, many of the tests have not been validated against job performance with men and women; such validation would tend to eliminate the first reason as well.

Finally, since most of these tests are tests of speed, they are particularly likely to be affected by motivation level which, in turn can be affected by sex of the experimenter, socially imposed expectations of success or failure, task interest, etc.

Conclusion. No convincing evidence was obtained from the literature on ability tests which would predict any significantly greater chance of success for either men or women in the PLL clerk position. There might be, however, other considerations from the review which could serve as guidance in this regard.

Other Considerations

Studies of women in the military. Several studies of women in the military, including some at the HEL, have shown that women are capable of almost all military tasks except those that are some of the most physically demanding. It appears, therefore, that there exists no evidence of any task required of PLL clerks that women are not generally capable of performing.

Effects of social conditioning. Kipnis (1976) argued that our society encourages men to aspire to high-status jobs, and, at the same time, society perceives high-status jobs as inherently inappropriate for women and discourages women from seeking them. Women are encouraged to seek lower-status jobs and not to compete with men for better positions. They are conditioned to accept this situation as normal in our society. Following on this argument, to the extent that clerical positions are considered low-status positions, it is likely that few men and more women will aspire to attain those positions and to be satisfied with them. This may well be the case today, but since sex roles and customs are changing rapidly in our society, it is very likely that this situation will prove unreliable in the near future.

Educational backgrounds of men and women entering military service. Two characteristics of the PLL clerk job as it applies to units being studied by the HEL are that the job involves several elements which might prove to be mentally challenging during the learning phase and that it also involves many elements which might prove to be quite boring once they are learned and become routine (personal communication with Dr Keesee of the HEL Repair Parts Study). The fact that all women entering the Army must have graduated from high school, or have the GED equivalent, while men need not and often do not meet this requirement, means that a much greater percentage of women than men entering the Army will have the educational background which will help them meet the mental challenge of learning the PLL job quickly and well.

Recommendations

The following recommendations are offered:

1. Determine which mental and motor abilities are actually required to perform the PLL clerk job and restructure the selection criteria accordingly.

2. Restandardize all military screening tests, particularly those relating to the PLL clerk job, using both male and female soldiers.

3. Validate those tests against actual job performance.

4. Support more good basic and applied research to determine the true capabilities of women relative to men, and continue this research to keep up with changing social influences.

5. Consideration should be given to placing more female soldiers in PLL clerk positions now, not because women are inherently better at any particular clerical or physical skills, but because female recruits are required to have a high school diploma, they are generally better educated than their male counterparts. In addition, to the extent that clerical positions are perceived as low status jobs, female soldiers are more likely to accept initial assignment and be more satisfied because of prior social conditioning.

REFERENCES

Ammons, R. B., Alprin, S. I., & Ammons, C. H. Rotary pursuit performance as related to sex and age of pre-adult subjects. Journal of Experimental Psychology, 1955, 49, 127-133.

Anastasi, A. Psychological testing. New York: Macmillan, 1954.

Annett, M. The growth of manual preference and speed. British Journal of Psychology, 1970, 61, 545-558.

Archer, E. J., & Bourne, L. E., Jr. Inverted-alphabet printing as a function of intertrial rest and sex. Journal of Experimental Psychology, 1956, 52, 322-328.

Army Research Institute. Women Content in Units Force Development Test: MAX WAC (Executive Summary). Arlington, VA: US Army Research Institute for the Behavioral and Social Sciences, 3 October 1977.

Bayley, N. Data on the growth of intelligence between 16 and 21 years as measured by the Wechsler-Bellevue Scale. Journal of Genetic Psychology, 1957, 90, 3-15.

Bayroff, A. G., & Fuchs, E. F. The Armed Services Vocational Aptitude Battery. Technical Research Report 1161, Behavior and Systems Research Laboratory, Arlington, VA, February 1970.

Binkin, M., & Bach, S. J. Women and the military (Studies in defense policy). Washington, DC: The Brookings Institution, 1977.

Bradway, K. P., & Thompson, C. W. Intelligence at adulthood: A twenty-five year follow up. Journal of Educational Psychology, 1962, 53, 1-14.

Conrad, H. S., Jones, H. E., & Hsiao, H. H. Sex differences in mental growth and decline. Journal of Educational Psychology, 1933, 24, 161-169.

Darden, E., & Shappell, R. T. Performance by males and females on three motor tasks under standard and mirror reversal conditions. Research Quarterly, 1972, 43, 460-467.

Droege, R. C. Sex differences in aptitude maturation during high school. Journal of Counseling Psychology, 1967, 14, 407-411.

Ernest, C. H., & Paivio, A. Imagery and sex differences in incidental recall. British Journal of Psychology, 1971, 62, 67-72.

Fairweather, H., & Hutt, S. J. Gender differences in a perceptual motor skill in children. In C. Ounsted & D. C. Taylor (Eds.), Gender differences: Their ontogeny and significance. London: Churchill Livingstone, 1972.

Gainer, W. L. The ability of the WISC subtests to discriminate between boys and girls of average intelligence. California Journal of Educational Research, 1962, 13, 9-16.

Garai, J. E., & Scheinfeld, A. Sex differences in mental and behavioral traits. Genetic Psychology Monographs, 1968, 77, 169-299.

Hay, E. N. Comparative validities in clerical testing. Journal of Applied Psychology, 1954, 38, 299-301.

Hayes, R. W., & Venables, P. H. Sex differences in undershoot with extended exposure time in the Rod-and-Frame test. Perceptual and Motor Skills, 1974, 38, 543-546.

Hodgkins, J. Reaction time and speed of movement in males and females of various ages. Research Quarterly, 1963, 34, 335-343.

Hudgens, G. A., & Billingsley, P. A. Sex: The missing variable in human factors research. Human Factors, 1978, 20, 245-250.

Hudgens, G. A., Billingsley, P. A., & Fatkin, L. L. Hand steadiness in young men and women. Unpublished manuscript, 1979.

Husband, R. W., & Ludden, M. J. Sex differences in motor skills. Journal of Experimental Psychology, 1931, 14, 414-422.

Kagan, J., & Moss, H. A. Birth to maturity. New York: Wiley and Sons, 1962.

Karlins, M., & Lamm, H. Sex differences and motor task performance. Perceptual and Motor Skills, 1965, 20, 430.

Kipnis, D. M. Intelligence, occupational status, and achievement orientation. In B. Lloyd & J. Archer (Eds.), Exploring sex differences. New York: Academic Press, 1976.

LaTorre, R. A., Gossmann, I., & Piper, W. E. Cognitive style, hemispheric specialization, and tested abilities of transsexuals and nontranssexuals. Perceptual and Motor Skills, 1976, 43, 719-722.

Lloyd, B., & Archer, J. (Eds.). Exploring sex differences. New York: Academic Press, 1976.

Lyle, J. G., & Johnson, E. G. Analysis of WISC coding: 5. Prediction of coding performance. Perceptual and Motor Skills, 1974, 39, 111-114.

Maccoby, E. E., & Jacklin, C. N. The psychology of sex differences. Stanford: Stanford University Press, 1974.

Maier, M. H., & Fuchs, E. F. Development and evaluation of a new ACB and Aptitude Area System. Technical Research Note 239. Behavior and Systems Research Laboratory, Arlington, VA, February 1972a.

Maier, M. H., & Fuchs, E. F. An improved differential Army Classification System. Technical Research Report 1177. Behavior and Systems Research Laboratory, Arlington, VA, April 1972b.

Marks, D. F. Visual imagery differences in the recall of pictures. British Journal of Psychology, 1973, 64, 17-24.

McGuinness, D. Sex differences in the organization of perception and cognition. In B. Lloyd & J. Archer, Exploring sex differences. New York: Academic Press, 1976.

Miele, J. A. Sex differences in intelligence: The relationship of sex to intelligence as measured by the Wechsler Adult Intelligence Scale and the Wechsler Intelligence Scale for Children. Dissertation Abstracts, 1958, 18, 2213. (University Microfilms No. 58-2129, 189)

Morell, J. A. Age, sex, training, and the measurement of field dependence. Journal of Experimental Child Psychology, 1976, 22, 100-112.

Noble, C. E., & Hays, J. R. Discrimination reaction performance as a function of anxiety and sex parameters. Perceptual and Motor Skills, 1966, 23, 1267-1278.

Norman, R. D. Sex differences and other aspects of young superior adult performance on the Wechsler-Bellevue. Journal of Consulting Psychology, 1953, 17, 411-418.

Ounsted, C., & Taylor, D. C. (Eds.). Gender differences: Their ontogeny and significance. London: Churchill Livingston, 1972.
Parlee, M. B., & Rajagopal, J. Sex differences on the Embedded-Figures Test: A cross-cultural comparison of college students in India and in the United States. Perceptual and Motor Skills, 1974, 39, 1311-1314.
Peretti, P. O. Cross-sex and cross-educational level performance in a color-word interference task. Psychonomic Science, 1969, 16, 321-323.
Peretti, P. O. Effects of noncompetitive, competitive instructions, and sex on performance in a color-word interference task. Journal of Psychology, 1971, 79, 67-70.
Peterson, J. A., Kowal, D. M., & Vogel, J. A. Project 60: A comparison of two types of physical training programs on the performance of 16-18 year old women (Summary Report). West Point, NY: United States Military Academy, 1976.
Schneidler, G. R., & Paterson, D. G. Sex differences in clerical aptitude. Journal of Educational Psychology, 1942, 33, 303-309.
Shaw, D. J. Sexual bias in the WAIS. Journal of Consulting Psychology, 1965, 29, 590-591.
Shephard, A. H., Abbey, D. S., & Humphries, M. Age and sex in relation to perceptual-motor performance on several control-display relations on the TCC. Perceptual and Motor Skills, 1962, 14, 103-118.
Sherman, J. A. Sex-related cognitive differences: An essay on theory and evidence. Springfield, IL: Charles C. Thomas, 1978.
Sommer, R. Sex differences in the retention of quantitative information. Journal of Educational Psychology, 1958, 49, 187-192.
Teitelbaum, M. S. (Ed.). Sex differences: Social and biological perspectives. Garden City, NY: Anchor Press/Doubleday, 1976.
Tiffin, J., & Asher, E. J. The Purdue Pegboard: Norms and studies of reliability and validity. Journal of Applied Psychology, 1948, 32, 234-247.
Wechsler, D. The measurement of adult intelligence. Baltimore: Williams and Wilkins, 1939.
Wechsler, D. The measurement and appraisal of adult intelligence (4th ed.). Baltimore: Williams and Wilkins, 1958.
Wolff, P. H., & Hurwitz, I. Sex differences in finger tapping: A developmental study. Neuropsychologia, 1976, 14, 35-41.

Appendix M

Draft Revision, Chapter 3, Section XV,
AR 710-2, C5, Direct Exchange

Section XV Direct Exchange

3-111 General

a. Reparable items are normally supplied to using units through a direct exchange activity (DXA). Using units deliver unserviceable items to the DXA and exchange them on a one-for-one basis for serviceable items. The DXA will be located near the maintenance shops to expedite repair and return to stock. The need for one-stop customer service should be a strong consideration in DXA location. A DXA will be operated without regard to the availability of a DXA at a higher or lower echelon.

b. ARNG DX stocks will be located as directed by the USPFO. Duplicate stockage will not be maintained in the USPFO warehouse. Stockage levels shall be computed in accordance with NGB Pamphlet 700-24.

c. Refer to TB 380-41 for instructions on COMSEC Direct Exchange procedures.

d. DSU/GSU/Installation DXA will be the responsibility of the commander of the maintenance unit/activity; however, items handled through the DXA will continue to be part of the support unit's authorized stockage list (ASL).

3-112 Selection and Retention

a. Maintenance and supply personnel will select items for direct exchange handling through a joint and coordinated effort. Placement of a reparable item in the direct exchange is optional. Items handled by the DXA will not be stocked elsewhere within the support unit.

c. Items selected for stockage in DXAs must satisfy all of the following requirements, except as noted in para 3-112c:

1. Be authorized for removal and replacement at the support maintenance or lower level as prescribed by the maintenance allocation charts (MAC).

2. Be within the authorized repair (and/or removal and replacement) capability of the respective support maintenance activity or local contractor support.

3. Require repair at least six times per year for addition and three times per year for retention.

4. The capability to make repairs (and/or remove and replace) must exist at the respective support maintenance facility or local contractor.

c. The following are exceptions to the selection and retention criteria:

1. Director support (DS) DXAs may stock selected non-reparable items for control purposes when authorized by the MACOM.

2. DS DXAs may stock a limited number of selected GSU/Installation DX items; however general support level repair will not be performed at the DS level except where a single maintenance activity performs both a DS and GS mission. The MACOM will insure that DS DXAs do not duplicate the purpose of the GSU/Installation DXA.

3. DS DXAs may stock repair parts for newly adopted equipment if the DX item is anticipated to require repair at least six times per year.

d. Reparable items not handled by the DXA will be delivered by the using unit to the maintenance shop on a DA Form 2407, Maintenance Request, for repair and return to the user. Refer to para 3-7 to 3-12, TM 38-750 for use of this form. Items not reparable at the DSU/GSU/installation or by local contract will be turned in by the user to the supply support activity (SSA) for disposition. A request for replacement of these items will be submitted to the SSA on a DA Form 2765/2765-1 at the same time as the turn-in transaction.

e. DXA stockage will be reviewed and stockage levels computed quarterly. A DX listing of all items handled by the DXA, containing NSN, item description, end item, recoverability code, and authorized stockage level, will be prepared by the DXA. The DX list will be submitted for review and approval to the commander of the maintenance activity responsibility for DXA. The approved list will be distributed to all units and activities authorized to use these stocks.

3-113 Stock Accounting Records and Files

a. The SSA will transfer stock and stock accounting responsibility to the DXA for items selected for DXA stockage.

The SSA will retain stock accounting forms for the item, annotated to show that the item is a DX item.

b. This regulation describes manual record keeping. However, when the capability is available, DX record keeping should be automated.

c. DA Form 3029-R, DX Accounting Record, will be used to record on-hand balances, repair rates, resupply rates, repair cycle time and order and shipping time information. Reproduce DA Form 3029-R locally on 8 x 8 inch paper. A DA Form 3029-R will be prepared for each line item on the DX stockage list, and filed in a visible file index in National Item Identification Number (NIIN) sequence.

d. DA Form 1297, Title Insert (Formal Accountability) will be used in the visible file for each item. It will be marked to show NSN, item description, unit price, storage location, and recoverability code.

e. The DA Form 3029-R is kept in the visible file index until it is completely filled. When a new form is started, transfer the monthly summaries to the new card. Filled cards will be kept on file for one year.

f. The DXA shall maintain a document register (DA Form 2064) to record all supply transactions. It is used as a reference for the status of requests and in the monthly reconciliation with the SSA.

g. The DXA shall maintain the following files:

1. Due out file, consisting of part 3 of DA Form 2402, Exchange Tag.

2. Due in file, consisting of status cards for open entries on the document register and part 2, DA Form 2402 for items due in from the GS DXA.

3. Open Maintenance Request file, consisting of copy 1 of DA Form 2407 for items not yet repaired.

4. Closed Maintenance Request file, consisting of copy 4 of the DA Form 2407 for job orders that are complete.

5. Document Register file consisting of completed DA Form 2064, Document Register pages.

6. Exchange Tag file, consisting of part 4, DA Form 2402, Exchange tags for completed exchanges.

3-114 Exchange Procedures

a. The DXA will publish and distribute an external standard operating procedure (SOP) for customer units. This SOP may be part of the maintenance unit SOP or may be a separate publication.

b. Using units exchanging an unserviceable DX item will attach a DA Form 2402 (Exchange Tag) to the item for exchange. Refer to para 3-2, TM 38-750 for instructions on the use of this tag. Units will submit a nonrecurring request for issue, DA Form 2765/2765-1 to the SSA for additions or increases of DX items to the PLL or when an unserviceable item is not available for exchange. Requests for DX items on a DA Form 2765/2765-1 will include a statement explaining the reason for no exchange item and the commander's signature.

c. When preferred or substitute items are not available to fill the requested quantity, the DXA will file part 3 of the DA Form 2402 (Exchange Tag) in the due-out file. Part 4 of the tag is returned to the using unit as a due-out. As serviceable stock becomes available, the DXA will fill the due-outs in IPD sequence, high priority, earliest dated due-outs first.

d. Items which are determined by the DXA to be unserviceable through other than fair wear and tear will be accepted for exchange if evidence is provided by the unit commander that appropriate action is being taken IAW AR 735-11.

e. Unserviceable items received by the DXA will be sent within one working day to the maintenance shop for repair with a DA Form 2407, Maintenance Request. See paragraph 3-7 through 3-12, TM 38-750, for use of this form. The maintenance facility will return nonreparable items to the DXA for disposition. The DXA will turn in nonreparables to the SSA.

f. Unserviceable items received by the DXA which are stocked IAW para 3-112c will be sent to the appropriate repair facility within one working day. Use DA Form 2402, Exchange Tag, for this purpose. Maintain separate due-in files for each repair facility or local contractor.

g. DXA will reconcile its due-in records monthly with DS, GS, and contractor maintenance facilities and the SSA. Due-out records to using units will be reconciled monthly.

3-115 Stock Accounting Procedures

Figure 3-36 shows various entries for direct exchange transactions kept on the DA Form 3029-R. The transaction numbers are circled in the "Document Number" columns for reference. (Note that DA Form 3029-R is divided into two sections - serviceable and unserviceable. A supply action may use either or both sides of the form, depending upon the action.)

1. Transaction 1 . Balance brought forward from previous record, including the accumulated washouts (items not repairable) since the last replenishment request.

2. Transaction 2. Four serviceable items are exchanged for four unserviceable items. Loss of four serviceable items.

3. Transaction 3. DA Form 2407, Maintenance Request, is submitted to the maintenance shop for repair of the four unserviceable items gained in Transaction 2. Gain four unserviceable items.

4. Transaction 4. A unit has exchanged one item which was sent for repair on Maintenance Request number 031246. A due-out was given to the unit because the serviceable balance is zero.

5. Transaction 5. Maintenance Request number 031245 is completed. Two items were repaired and returned to stock. Gain two serviceable items and lose two unserviceable items.

6. Transaction 6. Two items on maintenance request number 031245 were not repairable (washouts). These two items were returned to the DXA by the maintenance facility. Transaction 6 shows a turn-in of these two items to the SSA and the recording of two washouts. Lost two unserviceable items.

7. Transaction 7. One item is issued to fill the due-out given on 9153. Lose one serviceable item.

8. Transaction 8. The accumulated washouts are equal to RO-ROP (22-17 = 5), so a replenishment request is submitted to the SSA for five items.

9. Transaction 9. A direct exchange between the DXA and a forward support company, Co. C. Lose one serviceable item.

Stock No. 2910-00-628-0453 Widget								Stock No. 2910-00-628-0453						
Service Stock								UNSERVICEABLE						
Date	Document No.	Maintenance Request No.	Demands On Ext Source	Rec from Maint on DA Form 2407	Gain	Loss	Balance On Hand	Date	Document No.	Maintenance Request No.	Gain	Loss	Balance On Hand	Wash outs
JUN	1	Balance brought forward					4						12	3
9152	DX 2					4	0	9152	3	031245	4		16	
9166	8	031245		2	2		2	9153	4	031246	1		17	
9166	Due out issued 7					1	1	9166	5	031245		2	15	
9166	9166 0001 (?)		5				1	9166	9166 0002 6	Turn-in		2	13	2
9170	DX-GC 9					1	0	9170		031247	1		14	
9172		031246		1	1		1	9172		031246		1	13	
9175		031247		1	1		2	9175		031247		1	12	
9178	9166 0001 10				5		7							
JUN	SUM		5	4										
9182	DX					3	4	9182		031248	3		15	
									BALANCE CARRIED FORWARD					

Operating level 5
OST+SL 8
Repair cycle level 9

SUMMARY OF DEMANDS

REPAIR CYCLE TIME 25 days RESUPPLY CYCLE TIME 21 days AUTH LEVEL 22

Review Period	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN						
External Source	4	4	8	4	8	4	5	5	10	5	10	5						
Number Repairs	13	11	5	9	7	8	10	9	11	13	8	4						

DA Form 3029-R, 1 Feb 66 Replaces DA Form 3029-R, 1 Aug 65 which is obsolete DX ACCOUNTING RECORD

Note 1. Repair time for maintenance request number 031245 is determined by subtracting the submission date (9152) from the completion date (9166) for a repair time of 14 days.

Note 2. Supply order and shipping time (OST) is determined by subtracting the request submission date (9166) from the date of receipt of materiel (9178) for an OST of 12 days.

Fig. 3-36. Example of DA Form 3029-R.

10. Transaction 10. The five items requested on 9166 are received. Gain five serviceable items.

11. At the end of each month, summarize the transactions by drawing a line under the last entry for the month. Total the "Demands on Ext Source" and "rel from Maint on DA Form 2407" columns. Draw a line under the "Sum" line entry. Transfer this summary data to the "Summary of Demands" portion of the card as shown in Figure 3-36.

3-115.1 Stockage Level Computation

a. The requisitioning objective (RO) for DX items, illustrated in Fig. 3-XX, is the sum of:

1. Repair cycle level*

2. Supply OST level

3. Safety level

4. Operating level

The reorder point (ROP) for DX items is the sum of repair cycle level, supply OST, and safety level.

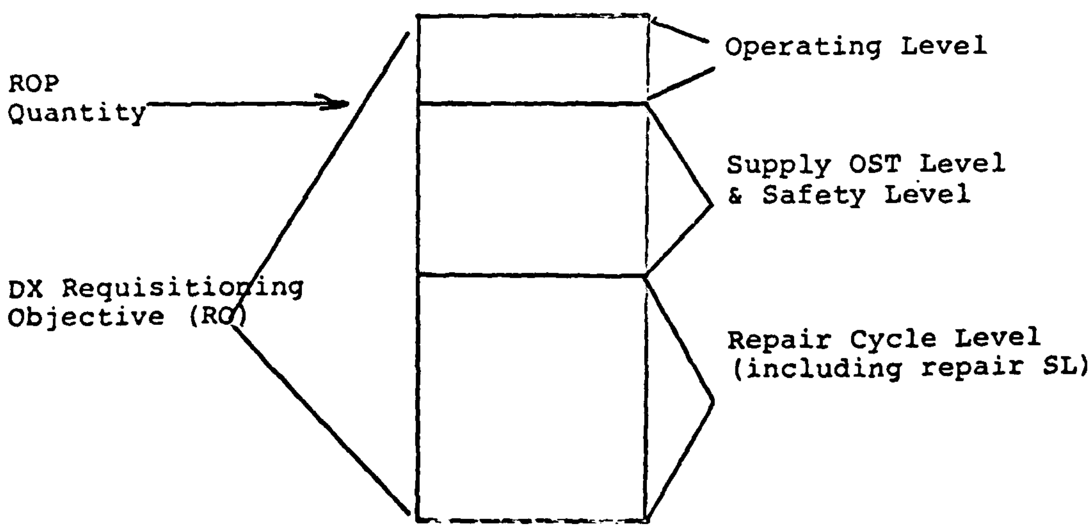


Fig. 3-XX. Components of DX Stockage Level

*Note. For nonreparable items stocked for control purposes or for GSU repair, the repair cycle level is not included in the authorized stockage level computation.

b. To compute the DX stockage level, gather the following preliminary information:

1. Monthly repair rate. Using the most recent 12 months, average the total repairs per month using data from the Summary of Demands blocks on the DA Form 3029-R.

2. Repair cycle time (days). Determine the average repair cycle time required for the maintenance shop to complete job orders for the item. The date that each work request was submitted and completed is recorded on the DA Form 3029-R. Average at least the six most recent repair cycle times, omitting repair transactions that have very unusual, clearly one-time delays.

3. Quantity of supply demands. Total the External Demands from the Summary of Demands portion of the DA Form 3029-R for the past 12 months. If less than 12 months of data is available, adjust the total to project the yearly quantity demanded.

4. Supply OST. OST can be taken from the DA Form 3029-R by determining the number of days between submission of a supply request and receipt of the item. Use the six most recent replenishment requests and average the OSTs. Do not include a replenishment OST that has a very unusual, clearly one-time delay.

5. Unit price. Unit price is found in the monthly Army Master Data File (AMDF).

c. The various levels of supply are computed as follows:

1. Repair cycle level. Use Table 3-8, Direct Exchange Stockage Table. Enter the row with monthly repair rate and the column with repair cycle time. The intersection of the appropriate row and column is the repair cycle requirement, including a 25% repair cycle safety level.

2. Supply Order Ship Time Level and Safety Level. These two levels are combined into a single table. Use Table 3-46 for CONUS and Table 3-47 for OCONUS. Enter the row with the average OST and the column with the annual quantity demanded. The intersection is the combined OST level and supply safety level.

3. Supply Operating level. Use Table 3-45, Economic Order Quantities at DSUs. Enter the two with annual quantity demanded and enter the column with the unit price. The intersection is the operating level using the EOQ method of computation.

d. Sum the repair cycle level and the supply OST and safety levels to determine the ROP. Add the supply operating level to get the RO. Mark DA Form 3029-R with the stockage levels as shown in Figure 3-36.

3-115.2 Replenishment and Adjustment Procedures

a. Replenishment requests are submitted to the SSA whenever the asset balance falls below the reorder point (ROP). In DX accounting, which combines supply action and repair action, it is not always easy to determine the current asset balance. The asset balance can be indirectly determined by the number of accumulated washouts. A replenishment request is submitted whenever the number of washouts equals or exceeds the operating level quantity (OL) which is the difference between the RO and the ROP.

b. Following the quarterly stockage level review and computation of the new RO and ROP, it is necessary to determine what adjustment action, if any, must be taken. This procedure is vital to maintaining an accurate stockage level. Review the DA Form 3029-R and take the following steps:

1. Determine the present asset position (AP) as shown:

serviceable on hand

\+ unserviceable on hand

\+ demands on ext source still due in

\- due out to units

= asset position

2. Compare the asset position (AP) to the item requisitioning objective (RO) and take the following action:

a. If AP is less than RO, submit a replenishment request for the amount RO-AP. Submit subsequent replenishment when the number of washouts equals or exceeds the operating level (OL).

b. If AP is greater than RO, take no immediate action. This means that stockage is above the authorized level. Ignore the next AP-RO washouts, then submit a replenishment requisition when the number of washouts exceeds or equals the OL.

3-115.3 Inventory

The DXA will inventory the DX stockage quarterly. Storage locations will be marked on the DA Form 1297, Title Insert (Formal Accountability).

3-115.4 Substitutions

For substitute DX items, mark the Title Insert with the preferred stock number. Input for computation of stockage levels for preferred DX lines will include totals from all substitute lines for that item.

3-115.5 Excess Stock

Excess direct exchange stock resulting from a recomputation of levels may be retained by the DXA and reduced to the authorized level by attrition within 90 days. Retention level for stocks on hand is two times the RO (except for SIMS items). Stocks in excess of the retention level and all stocks of items deleted from direct exchange lists will be turned in or reported to the supporting supply activity for disposition.

3-115.6 Direct Exchange Within Divisions

a. The maintenance battalion commander may authorize the forward support companies (FSCs) to be "annexes" to the central DXA; however, all repair of DX items will remain centralized and controlled by the DXA.

b. Forward support companies may stock selected lines from the DX list. Portions of the DXA stockage will be apportioned to the FSC based upon the demands from their supported units, as recorded on the DA Form 3029-R at the DXA. Stocks will be issued to the FSC on DA Form 2062, Hand Receipt. The maintenance battalion commander will approve range and depth of stockage at each FSC; however, total stockage within the division will not exceed the authorized DXA stockage objective computed IAW para 3-116.

c. The DX annex at a FSC provides one-stop customer service for DX items. FSCs exchange with customer units and replenish their stock at the main DXA. For DX items not stocked at the FSC, a due-out is given to the customer. The FSC then exchanges the unserviceable at the DXA for a serviceable and fills the due-out. No formal DX records are required at the FSC except due-in and due-out files and the DX item hand receipts.

APPENDIX N - Glossary of Abbreviations and Acronyms

APPENDIX N - Glossary of Abbreviations and Acronyms

ABF	Asset Balance File
ACB	Army Classification Battery
ACSAC	Assistant Chief of Staff for Automation and Communications
AD	Attention to Detail (AQB)
ADA	Air Defense Artillery
ADPE/ADP	Automatic Data Processing Equipment
AFEES	Armed Forces Entrance Examination Station
AFQT	Armed Forces Qualification Test
AIM	Armor, Infantry, Mechanized
AIT	Advanced Individual Training
AMDF	Army Master Data File
ANORS	Anticipated Not Operationally Ready-Supply
AP	Asset Position
APC	Armored Personnel Carrier
AQB	Army Qualification Battery
AR	Arithmetic Reasoning (ACB)
ARI	Army Research Institute
ARMS	Army Master Data File Reader Microfilm System
ARNG	Army Reserve National Guard
ARTEP	Army Training and Evaluation Program
ASI	Additional Skill Identifier
ASL	Authorized Stockage List
ASVAB	Armed Services Vocational Aptitude Battery
ASVCB	Armed Services Vocational Classification Battery
BMT	Battalion Maintenance Technician
BN	Battalion
CA	Classification Attentiveness (AQB)
CAMUS	Commitment Accounting and Management of Unit Supplies
CDA	Catalog Data Agency
CL	Clerical
Cmdr	Commander
CMF	Career Management Field
CO	Commanding Officer
COBOL 68/74	Common Business Oriented Language - a computer programming language
COLEX	(USAREUR) Control of Logistics Expense
Commo/Elect	Communications/Electronics
COMSEC	Communications Security
CONUS	Continental U.S.
COSCOM	CORPS Support Command

DA Cir	Department of the Army Circular
DALO-SMS	ODCSLOG Supply Policy Division Office symbol
DARCOM	Development and Readiness Command
DAS3	Decentralized Service Support System
DAT	Differential Aptitude Test
DC&E	Document Control & Editing
DDC	Division Data Center
DEC	Digital Equipment Corporation
DFs	Disposition Form
DIC	Document Identifier Code
DISCOM	Division Support Command
DIV Regs	Division Regulations
DLDED	Division Level Data Entry Device
DLOGS	Division Logistics System
DMA	Doctrinal Material Analysis
DMMC	Division Materiel Management Center
DODAAC	Department of Defense Activity Address Code
DRT	Discrimination Reaction Timer
DS	Direct Support
DSU	Direct Support Unit
DS4	Direct Support Unit Standard Supply System
DX	Direct Exchange
DXA	Direct Exchange Activity
EM	Enlisted men
EOQ	Economic Order Quantity
Ext	External
FAD	Force Activity Designator
FASCO	Forward Area Support Coordinating Officer
FM	Field Manual
FORSCOM	US Army Forces Command
FSC	Forward Support Company
FSCM	Federal Supply Code for Manufacturers
FSU	Forward Support Unit
GCT	General Clerical Test
GED	General Education Diploma
GS	General Support
G-Staff	General Officer Staff
HEL	Human Engineering Laboratory
Hi/Lo Pri	High/Low Priority
hi sch	high school
HLM	Headquarters and Light Maintenance Company
HQDA	Headquarters, Department of the Army
HumRRO	Human Resources Research Organization

IAR	Inventory Adjustment Report
IAW	In accordance with
IBM	International Business Machines
ICC	Inventory Control Center
IG	Inspector General
IPG	Issue Priority Group
IQ	Intelligence Quotient
I&S	Interchangeability and Substitutibility
LOGC	Logistics Center
LOGMARS	Logistics Marking and Reading System
LOMA No.2A	a clerical aptitude test used by insurance companies
LSL	Location Survey List
LT	Lieutenant
MAC	Maintenance Allocation Chart
MACOM	Major Command
MAIT	Maintenance Assistance and Instruction Team
MCRL-1	Master Cross Reference List - Part 1 (Part # to NSN conversion)
MIR	Master Inventory Record
MILSTRIP	Military Standard Requisitioning and Issue Procedures
MILVANS	Military Vans
MNTN BN HQs	Maintenance Battalion Headquarters
MO	Motor Officer
mon	month
MOS	Military Occupational Speciality
MPN	Manufacturer's Part Number
MRO	Materiel Release Order
MTOE	Modified Table of Organization & Equipment
mtr/mntn	motor/maintenance
mtr sgt/ofcr	motor sergeant or officer
N	number of events or participants
NBC	Nuclear, Biological, Chemical
NCO	Noncommissioned Officer
NCOES	Noncommissioned Officer Education System
NCOIC	Noncommissioned Officer in charge
NGB	National Guard Bureau
NICP	National Inventory Control Point
NIIN	National Item Identification Number
NORS	Not Operationally Ready - Supply
NSINI	Not Specifically Included, but not incompatible (App C)
NSN	National Stock Number

OASA (IL&FM)	Office of the Assistant Secretary of the Army (Installations, Logistics & Financial Management)
ODCSLOG	Office of the Deputy Chief of Staff for Logistics
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans
ODCSPER	Office of the Deputy Chief of Staff for Personnel
ODUSA(OR)	Office of the Deputy Under Secretary of the Army for Operations Research
OJT	On-the-job training
OL	Operating Level
OST	Order-ship time
PAED	Program Analysis and Evaluation Directorate, Office of Chief of Staff
PCS	Permanent Change of Station
PD	Priority Designator
PDP8/PDP11	Models of computer equipment produced by DEC
PI	Programmed Instruction
PLL	Prescribed Load List
PLT-HQ	Platoon Headquarters
PMOS	Primary Military Occupational Speciality
PN	Part Number
PS Mag	PS - The Preventive Maintenance Monthly
PTC	Primary Task Code
QMS	Quartermaster's School
QSS	Quick Supply Store
QTY	Quantity
R&D	Research & Development
REF	reference
RFI	Released for Issue
RGL	Reading Grade Level
RO	Requisitioning Objective
RON	Requisition Order Number
ROP	Re-order point
SAG	Study Advisory Group
SAILS	Standard Army Intermediate Level Supply Subsystem
SL	Safety Level
SLC	Stock Locator Cards
SOP	Standard Operating Procedure
SQT	Skill Qualification Test

SSA	Supply Support Activity
SSI	Special Skill Identifier
SSSC	Self-service Supply Center
STANFINS	Standard Finance System
STC	Secondary Task Code
SUAAC	Sub Unit Activity Address Code
T	Ton
TAG	The Adjutant General
TAMMS	The Army Maintenance Management System
TC	Training Circular
TFMO	Tank Forces Management Office
TM	Technical Manual
TOE	Table of Organization and Equipment
TOT	Total
TRADOC	Training and Doctrine Command
TSO	Technical Supply Office
TUFMIS	Tactical Unit Financial Management Information System
UAAC	Unit Activity Address Code
U/I	Unit of Issue
UICs	Unit Identifier Code
UND	Urgency of Need Designator
USAOCC&S	U.S. Army Ordnance and Chemical Center & School
USAR	U.S. Army Reserve
USAREUR	U.S. Army - Europe
WAIS	Wechsler Adult Intelligence Seal
WISC	Wechsler Intelligence Scale for Children
wk	week
WK	Word Knowledge (ACB)
WSDC	Weapons System Designator Code
XO	Executive Officer
yr	year
Zero bal	zero balance
-14S	DA Form 2408-14 Uncorrected Fault Record

APPENDIX O

SUMMARY OF RECOMMENDATIONS BY PHASES

PHASED RECOMMENDATIONS BY CATEGORY

	PHASE I	PHASE II	PHASE III
PLL DOCUMENTS & PROCEDURES	- Monthly PLL review	- Automate DX	
	- Monthly PLL Change List	- PLL transaction listing	
	- Revised Document Register to include PRICE	- Integrate stock and financial accounting	
	- All Class IX publications to AR or TM status, esp. microfiches	- Establish DA guidance on monetary turn-in credit	
	- Delete suspense file	- Combine all PLL doctrine in one publication	
	- DX and QSS on combined list in NIIN sequence	- Develop commander's guide for PLL	
	- Encourage separate PLLs	- Immediate feedback to PLL clerk via DLDED or similar device	
MOTOR SERGEANTS	- Include repair parts supervision in AR 611-201 for MOS 63/B/C, 30 & 40 levels.		
	- Develop exportable training	- Advanced NCO course - include 40 hr on repair parts	
MOTOR OFFICERS	- Develop exportable training (same as motor sergeants')		
	- Modify Motor Officer course to include 40 hr on repair parts	- provide Motor Officer with monthly info on his/her PLLs	

	PHASE I	PHASE II	PHASE III
TSO ORGANIZATION & PROCEDURES	- Adopt proposed Maintenance BN TOEs and include a Quality Control section - Substitute 76V in receiving storage & issuance, and 76P in QSS & DX, for 76D	- OIC/NCOICs to have DS4 SSI/ASIs - Raise OIC from LT to CPT - Develop DS4 capability for multiple locations - Provide integrated and consistent doctrine - Improve MRO, inventory & location card, etc, information and coding.	- Develop & implement integrated automated warehouse management system - Automate receiving section
DMMC ORGANIZATION	- Perform task analyses of jobs; develop TOEs that are job-organized; develop job aids - Supply keypunch machine(s) for managers - Authorize technical edit for MPNs - Establish focal point for command unique programs	- Local purchase/fabrication arrangements done by SSA - Increase automated support for IARs - Automate MPN to NSN conversions - Develop standard edit - Develop post edit for SAILS input	- Realign stock accounting and supply operations - Increase automated support that is human oriented; esp. dedicated support like DAS3 and DLDED
QSS	- Eliminate QSS or implement constrained QSS - Rationalized QSS request routing through multiple DSUs		

	PHASE I	PHASE II	PHASE III
WARRANT OFFICERS		- Basic WO course - include 40 hrs on repair parts - Professional Automated Supply Course for WOs and E8s	
AIT TRAINING	- Rewrite 76D AIT to conform with programmed instruction principles - Practical exercise with DS4 simulator - Investigate training media alternatives		
SELECTION & TRAINING	- Selection criterion for PLL clerk at least as high as 76Y - Off line management of NCO/WO/Officer trained in DS4 - At least 30% 76D/P AIT graduates attend DS4 course	- Automate personnel accounting system (ASIs & SSIs) - Advanced DS4 training for E5-7, 01-3 - Personnel assignment by highest percentage vacant instead of highest numbers.	-Develop MOS selection procedure or instrument with a validity coefficient of at least .65.
MOBILITY	- Develop PLL storage shelter - ASL mobility goals met with Repair Parts Vans or MILVANS with modification kits		

	PHASE I	PHASE II	PHASE III
DX	- Move DX stock accounting to DMMC CL IX section - Encourage MACOM adherence to DA DX policy - Simplify DX stockage computations - Establish DX operating level	- Automate DX stock accounting and stock computation	
FSCs	- Establish supply performance goals for FSCs - Give FSCs equal visibility to Main		
SUPPLY PERFORMANCE	- Standardize supply performance indicators. - Delete QSS adjustment factor.	- Validate performance goals - Establish daily MIS for managers in DMMC and warehouse	

FIL

4–