Research Note 84-3

MAINTENANCE PERFORMANCE SYSTEM (ORGANIZATIONAL) USER'S REFERENCE MANUAL

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U. S. Army

Research Institute for the Behavioral and Social Sciences

January 1984

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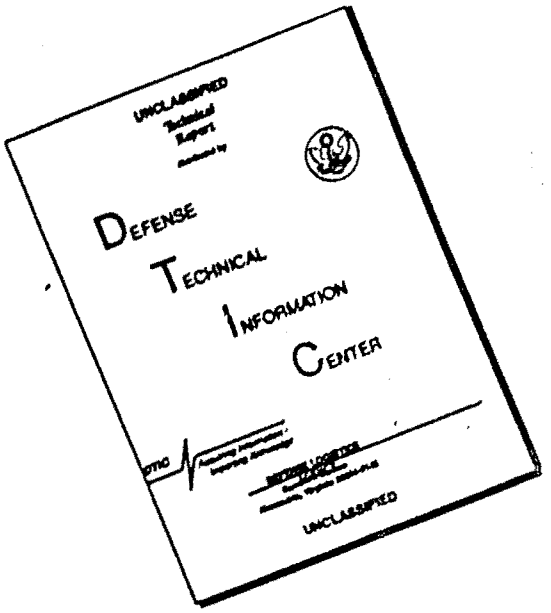

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Research Note 84-3	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Maintenance Performance Systems (Organizational) User's Reference Manual Maintenance Management Information System Division 86		5. TYPE OF REPORT & PERIOD COVERED Contractor Report 6. PERFORMING ORG. REPORT NUMBER TR465-38
7. AUTHOR(s) Richard G. Fuller, Anthony L. Wotkyns, & V. Alan Spiker		8. CONTRACT OR GRANT NUMBER(s) MDA 903-81-C-0032
9. PERFORMING ORGANIZATION NAME AND ADDRESS Anacapa Sciences, Inc. Drawer Q Santa Barbara, CA 93102		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q263743A794
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Research Institute for the Behavioral & Social Sciences 5001 Eisenhower Ave. Alexandria, VA 22333		12. REPORT DATE January 1984 13. NUMBER OF PAGES 80
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

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

18. SUPPLEMENTARY NOTES

This project was monitored technically by Dr. Michael Drillings and Dr. Melissa Berkowitz

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

Maintenance, Management Information System, Maintenance Training

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

The purpose of this effort is to develop the Maintenance Performance System-Organizational (MPS-O) which is an integrated system for measuring maintenance performance, diagnosing performance problems, taking corrective actions, and providing training. This report is the User's Manual for the operation of the MPS-O maintenance management information system (MMIS). The User's Reference Manual describes the MMIS reports, provides guidance on analysis and interpretation of the reports, and describes procedures for the operation of the MMIS.

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TABLE OF CONTENTS

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CHAPTER 1
INTRODUCTION

The Maintenance Management Information System, Division 86 (MMIS-86) is a component of the overall Maintenance Performance System (Organizational) (MPS(O)). MMIS-86 provides unique information on organizational maintenance performance and training. The information is contained in reports distributed to commanders, maintenance and training managers, and maintenance supervisors.

The primary purpose of this manual is to help the report recipients interpret the information contained in the various MMIS-86 reports and suggest possible actions. A summary of MMIS-86 operation is also included.

DEVELOPMENT AND EVALUATION OF MPS(O)

The project to develop MPS(O) is one of several underway as a part of an Army Research Institute (ARI) program to improve maintenance effectiveness. The objective of MPS(O) is to enhance the effectiveness of operator and organizational level maintenance.

Sponsors of this project are the U.S. Army Ordnance Center and School, Aberdeen Proving Ground, Maryland, and the U.S. Army Training Board, Fort Eustis, Virginia. Anacapa Sciences, Inc., Santa Barbara, California, is the contractor responsible for the research and development effort.

When installation and evaluation of the MPS(O) are complete, it will represent an integrated system for measuring maintenance performance, diagnosing problems, prescribing training and providing a basis for taking other corrective actions.

ROLE OF MMIS-86 IN MAINTENANCE PERFORMANCE

The role of MMIS-86 is to provide data on maintenance effectiveness, technical proficiency, and application of resources. Data are collected, stored, and processed to provide output in the form of reports. These reports give information on performance during a specific reporting period and relate it to performance

during prior reporting periods. Data from prior reporting periods are averaged to serve as a comparative yardstick when judging current performance.

MMIS-86 reports are distributed to commanders, maintenance managers, supervisors, and trainers. They can use these reports to review maintenance performance, identify problems, and take corrective action in order to improve maintenance performance. One report is provided to individual mechanics as a record of individual skill development.

Figure 1 graphically shows the flow of maintenance information and the MMIS-86.

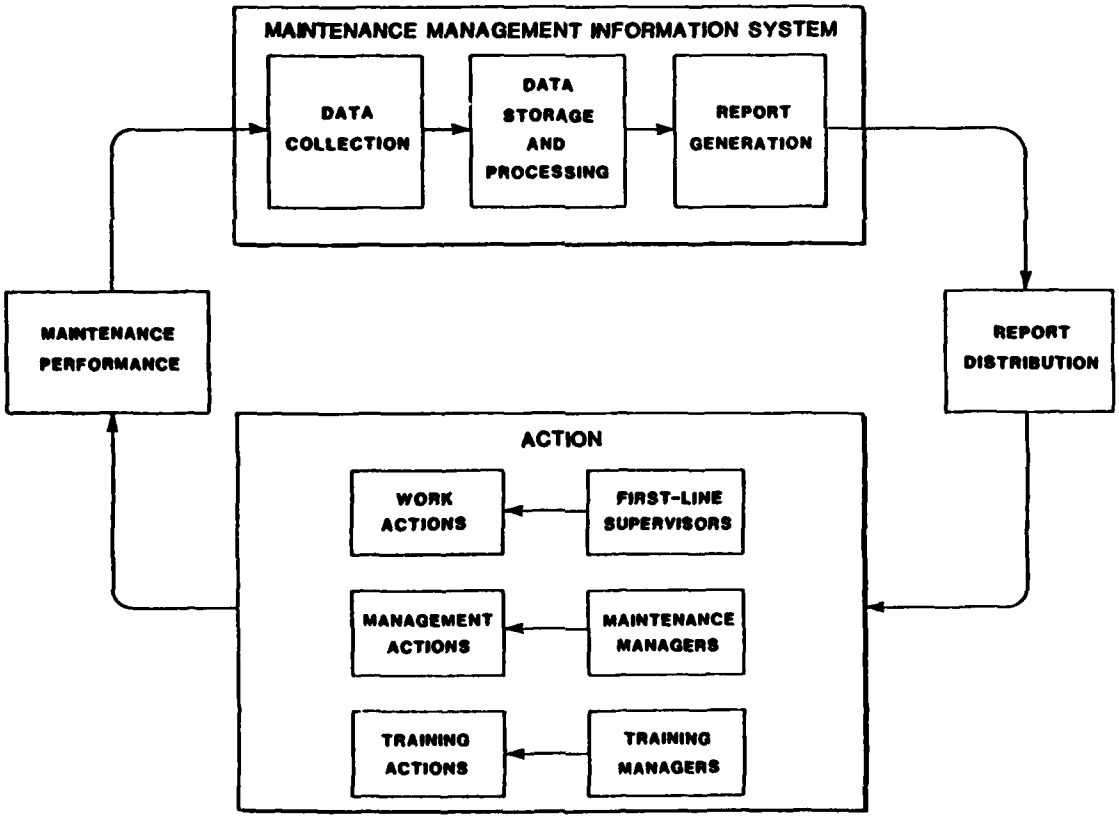

Figure 1. Maintenance information flow in MMIS-86.

MMIS-86 COVERAGE

MMIS-86 covers covers the drivers/crews of tracked vehicles, mechanics, and selected equipment in a combat battalion. A feature of MMIS-86 is that it can be modified to fit changes in MOS of personnel, section designations, equipment type, and maintenance tasks. Procedures for modifying MMIS-86 coverage are in the **Operating Manual, Maintenance Management Information System, Division 86.**

Specific personnel currently included in MMIS-86 are:

- Drivers/crews of M60A1 tanks, AVLB's and M113-Family Carriers
- Tactical Communications Systems Operator/Mechanic, MOS 31V
- M60A1/A3 Tank Turret Mechanic, MOS 45N
- Fighting Vehicle Systems Turret Mechanic, MOS 45T
- Light Wheel Vehicle Mechanic, MOS 63B
- M60A1/A3 Tank System Mechanic, MOS 63N
- Heavy Wheel Vehicle Mechanic, MOS 63S
- Fighting Vehicle Systems Mechanic, MOS 63T

Specific equipments currently covered in MMIS-86 are:

TRACKED VEHICLES:

- M60A1-Series Tank
  - M9, Dozer Tank
- M60A1L-AVLB
- M113A1-Family Armored Personnel Carriers
  - M106A1, 107mm Mortar Carrier
  - M125A1, 81mm Mortar Carrier
  - M132A1, Flame Thrower Carrier
  - M577A1, Command Post Carrier
  - M901, ITV, TOW Carrier
- M88A1-Medium Recovery Vehicle
- M578-Light Recovery Vehicle

WHEELED VEHICLES:

- M151-¼ Ton Truck
- M35-Family 2½ Ton Trucks
- M54-Family 5 Ton Trucks
- Gama Goat Family
  - M561, 1¼ Ton Cargo
  - M792, 1¼ Ton Ambulance

- GOER-Family
  - M520, 8 Ton Cargo
  - M553, 10 Ton Wrecker
  - M559, Fuel Tanker
  - M877, 8 Ton Cargo with Crane

COMMUNICATIONS EQUIPMENT:

- Radios
  - AN/VRC-12, Radio Set, and components
  - AN/VRC 43 through 49, Radio Set, and components
  - AN/VRC 64, Radio Set, and components
- Other Communication Equipment
  - CVC Helmet
  - SB-22 and SB-993 Switchboards
  - TA-1 and TA-312 Telephones
  - KY-57 Communications Security

HOW THIS MANUAL IS ORGANIZED

This manual is divided into four chapters and two appendices. **Chapter 1** provides background information on the development of the system. **Chapters 2 and 3** are addressed specifically to users of MMIS-86 output reports. **Chapter 4** describes the system operation. The **appendices** provide reference information as background for more detailed analysis of the reports.

Chapter 1. Introduction

This chapter defines the purpose of the manual, provides background information on the development of MPS(O), and describes the role of MMIS-86 in MPS(O) and its coverage.

Chapter 2. MMIS-86 Reports

This chapter lists the types of reports provided by MMIS-86, describes report format and content, lists report recipients and frequency of report distribution.

Chapter 3. How To Use MMIS-86 Reports

This chapter provides, for each MMIS-86 report: a description, guidance on report analysis and interpretation, and suggestions on how the information gained from report analysis and interpretation could be used to improve maintenance effectiveness. An example of each report being discussed is provided on a facing page for reader reference.

Chapter 4. MMIS-86 Operation

This chapter provides a system overview and summarizes general procedures for operation of the system.

Appendix A. Data Sources and Data Treatment

This appendix describes, for each report, the sources of data from which the report is derived, and the processing of data by a minicomputer installed in the unit.

Appendix B. Data Collection Forms

This appendix provides an example of the forms used for data collection and input.

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CHAPTER 2

MAINTENANCE MANAGEMENT INFORMATION SYSTEM 86 REPORTS

MMIS-86 reports contain maintenance performance and training information of interest to commanders, maintenance and training managers, supervisors, and individual mechanics. The data are presented in tabular form, supplemented by information to aid interpretation of the reports and a personnel roster.

There are eleven generic tables which present data for the various MOS and equipment covered in MMIS-86. The table title describes the type of information presented. Seven of the tables have different versions. The format is basically the same in each version, but the data presented are MOS, section and/or equipment-specific. The generic table numbers and titles, and the versions by MOS/equipment, with their reference number, are listed below.

Table Number	Table Title	Versions by MOS/Equipment	Reference Number
1	Battalion Maintenance Man-Hour Summary		101
2	Maintenance Man-Hours	31V 45N/T 63B/S 63N/T	201 202 203 204
3	Average Man-Hours Per Maintenance Task	M60 AVLB M113 M88 M578 M151 M35/54 M561/792 GOER Commo	301 302 303 304 305 306 307 308 309 310
4	Combat Vehicle Maintenance Summary	M60	401

Table Number	Table Title	Versions by MOS/Equipment	Reference Number
5	Maintenance Tasks by Vehicle	M60 AVLB M113-Family M88 M578 M151 M35/54 M561/792 GOER	501 502 503 504 505 506 507 508 509
6	Maintenance Task Performance Data	M60 AVLB M113-Family M88 M578 M151 M35/54 M561/792 GOER	601 602 603 604 605 606 607 608 609
7	Certification, Qualification and Experience Summary by Section		701
8	Certification, Qualification, & Experience Summary by Individual	31V 45N/T 63B/S 63N/T	801 802 803 804
9	Qualification & Experience Summary by Task	31V 45N/T 63B/S 63N/T	901 902 903 904
10	Individual Qualification & Experience Profile	31V 45N/T 63B/S 63N/T	1001 1002 1003 1004
11	Qualification and Certification Bulletin		1101
- -	Interpretation Comments Roster		1 2

FORMAT

All reports have a similar format. The header, content, and distribution information begin at the left margin. The header contains the battalion identification, table number and title, and the report period ending date (Julian and Gregorian) as shown in the example below.

1-99 ARMOR BATTALION

TABLE 1: BATTALION MAINTENANCE MAN-HOUR SUMMARY

SIX-MONTH REPORTING PERIOD ENDING: 3083 (4 MAR 83)

The content begins two spaces below the header block. For Tables 1-11, content is cumulative data. For Table 2 and the Interpretation Comments, data content is presented in weekly intervals for the 24 most recent weeks. For these tables, the left-hand column shows the period end dates and a code letter representing the training cycle the unit was in for each week, i.e., 'G' for Green, 'R' for Red, 'A' for Amber cycle, or 'N' for no cycle. The latest period is designated by an *. For Table 2, long-term averages appear at the bottom of the period end date column. An example of this format is shown below.

PERIOD END DATE & CYCLE	
3077	
3084	
3091	
3098	
3105	
3112	
3119	
3126	G
3133	N
3140	A
3147	R
3154	R
3161	R
3168	A
3175*	A
LONG-TERM AVERAGES	

The report reference number and report recipient identifiers are at the bottom of each report, under a dashed line, as shown in the example below.

REF # 901 BN: CDR X0 S3 BMO CO: CDR

CATEGORIES

The 11 tables provide either **maintenance** or **training management** information. Tables 1-6 are of primary interest to maintenance managers and supervisors. Tables 7-11 are for commanders and managers responsible for training and personnel proficiency.

The interpretation comments are used by all recipients when analyzing reports. The roster is primarily an internal operational component of MMIS-86.

CONTENT

The contents of each report type are summarized below. A detailed description and an output example are contained in Chapter 3.

Table 1: Battalion Maintenance Man-Hour Summary

Table 1 summarizes average man-hours expended per mechanic in each maintenance section, and average maintenance hours expended per tank in each company. For comparison purposes, the hours are averaged on a weekly basis for two periods: the previous twenty weeks, and the current four weeks. Data on this table permit comparison of mechanic man-hours expended by section and identification of effort expended maintaining tanks in the various companies.

Table 2: Maintenance Man-Hours

Table 2 shows total potentially available man-hours and the proportion of these hours devoted to maintenance. It also shows the average maintenance man-hours per man for the reporting period. There are seven versions of this table, by MOS and section.

Table 3: Average Man-Hours per Maintenance Task

Table 3 provides the average number of direct man-hours to perform each maintenance task on each equipment and how many times each task was accomplished for the most current four-week period and for past periods. Tasks are "flagged" when the current man-hour average is significantly higher or lower than the past average. There are ten versions of this table, one for each type equipment.

Table 4: Combat Vehicle Corrective Maintenance Summary

Table 4 shows, by company, the numbers of corrective maintenance tasks performed and man-hours expended by mechanics and crews on each combat vehicle. The table also shows the number of tasks repeated on each vehicle. Totals of repeats, and mechanic and crew task and man-hours per vehicle are shown for the current four weeks. For comparison purposes, the same types of data are shown as a four-week average for the previous twenty weeks.

Table 5: Maintenance Tasks by Vehicle

This table provides a four-week history of all mechanic and crew maintenance tasks on a vehicle-by-vehicle basis. It also identifies when each task was performed and if the task was performed more than once, i.e., repeated. There are nine versions of this table, one for each type vehicle.

Table 6: Maintenance Task Performance Data By Vehicle

This table provides a four-week history of all mechanic and crew maintenance tasks on a vehicle-by-vehicle basis. It also indicates how many PMCS hours were expended per vehicle. For each maintenance task performed, it shows when each task was completed, **who** worked on the task and **how many** man-hours were expended. There are nine versions of this table, one for each type vehicle.

Table 7: Certification, Qualification and Experience Summary by Section

Table 7 summarizes mechanic certification, qualification and experience on maintenance tasks by section and MOS. Certification is a rating of a mechanic's overall ability. Qualification is based on supervisor evaluation of a mechanic's ability to perform a task. Experience relates to numbers of task performances. This table shows, for each MOS in a section, the percentage of the mechanics in

that section who are certified, their average percentage of task qualification and the average percentage of task experience.

Table 8: Certification, Qualification and Experience Summary By Individual

This table summarizes mechanic maintenance certification, qualification, and experience on maintenance tasks by individual. The report indicates if the mechanic has been certified, what percentage of maintenance tasks he has qualified on, and his percentage of task experience, shown both numerically and graphically. Mechanics are listed in order of percent tasks experienced, from highest percent experience to lowest. There are seven versions of this table, one for each section, by MOS.

Table 9: Qualification and Experience Summary By Task

This table summarizes qualification and experience data for all mechanics in a section. Each mechanic is listed by name and indicates either how many times he has performed each task or that he has qualified on the task. There are seven versions of this table, one for each section.

Table 10: Individual Qualification and Experience Profile

This table shows the qualification and experience credits each mechanic has accrued for each of his MOS tasks. The range of experience credits is from 1 to 99.

Table 11: Qualification and Certification Bulletin

This table lists those mechanics that were either task-qualified or certified during the past six weeks.

Interpretation Comments

The interpretation comments highlight local conditions that system users must consider when interpreting MMIS data.

Roster

The roster is a listing of mechanics covered in MMIS-86. Its primary use is as a basis for system man-hour computations. (It also indicates each mechanic's estimated time of departure (ETD), for convenience of unit personnel planners.)

DISTRIBUTION

Recipients

Recipients range in rank from the battalion commander to the individual mechanic. Each person has been assigned an abbreviated duty position identifier as shown in the list below. The identifier appears in the distribution line at the bottom of every table that person is to receive. The distribution line is divided into two sections: one for battalion-level recipients coded **BN**, and a second for company-level recipients, coded **CO**.

Recipients	Distribution Identifier
Battalion Level	BN:
Commander	CDR
Executive Officer	XO
S3	S3
Motor Officer	BMO
Maintenance Technician	BMT
Motor Sergeant	BMS
Section NCOIC	SEC
Mechanic	MECH
Company Level	CO:
Commander	CDR
Executive Officer	XO

Distribution of the various tables is shown in Tables 1 and 2 below.

TABLE 1
RECIPIENTS OF MAINTENANCE MANAGEMENT TABLES

Table Number and Title	Recipient: BATTALION CDR	XO	S3	BMO	BMT	BMS	SEC	MECH	COMPANY CDR	XO
1 Battalion Maintenance Man-Hour Summary	●	●		●					●	
2 Maintenance Man-Hours				●		●	●			
3 Average Man-Hours Per Maintenance Task					●	●				
4 Combat Vehicle Maintenance Summary		●		●					●	
5 Maintenance Tasks by Vehicle					●	●	●*			●
6 Maintenance Task Performance Data by Vehicle					●	●	●*			●

*Recovery Section only (for M88s and M578s).

TABLE 2
RECIPIENTS OF TRAINING MANAGEMENT TABLES

Table Number and Title	Recipient: BATTALION CDR	XO	S3	BMO	BMT	BMS	SEC	MECH
7 Certification, Qualification and Experience Summary by Section	●	●	●	●		●		
8 Certification, Qualification and Experience Summary by Individual				●		●	●	
9 Qualification and Experience Summary by Task						●	●	
10 Individual Qualification and Experience Profile							●	●
11 Qualification and Experience Bulletin	●	●	●	●		●	●	

Frequency

Maintenance management reports are distributed every **four** weeks. Training management reports are distributed every **six** weeks, except Table 11, Qualification and Certification Bulletin, which is distributed every **four** weeks.

CHAPTER 3
HOW TO USE MAINTENANCE MANAGEMENT INFORMATION SYSTEM 86 REPORTS

The purpose of this chapter is to help users understand MMIS-86 reports. These reports are tools for systematic review and analysis of maintenance operations by commanders, maintenance and training managers, and supervisors. They can use these reports to observe trends and identify problems in maintenance operations. Further investigation may be required to determine specific underlying causes of the trends or problems.

The focus of this chapter is on analysis and interpretation of report information and taking actions to improve maintenance effectiveness. Each report is discussed separately. The discussion is presented in a standard format, and includes:

- **Purpose** of the report, or why it is in MMIS-86.
- **Description** of the contents of the report.
- **Analysis and interpretation** guidance, or what to look for.
- **Action** guidance or what to do.
- **Example** report, on a facing page.

The report examples and action guidance are illustrative only, and should not be considered Army doctrine.

For detailed information on sources of data for the reports and data treatment, see **Appendix A: Data Sources/Treatment.**

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TABLE 1: BATTALION MAINTENANCE MAN-HOUR SUMMARY

Purpose. This table summarizes **average man-hours** expended per mechanic in each maintenance section and **average maintenance hours** expended per tank in each company. For comparison purposes, the hours are averaged on a **weekly** basis for two time periods: the previous twenty weeks, and the current four weeks. Data in this table permit comparison of mechanic man-hours expended by section, and average hours expended per tank tanks in the various companies.

Description. For **Maintenance Man-hours per Mechanic per Week,** column headings and their meanings are:

- MOS—Mechanic MOS are listed in sequence.
- PERIOD ON WHICH AVERAGE IS BASED—Periods for which weekly average is computed: the previous twenty weeks and the current four weeks.
- AVERAGE BY SECTION—Weekly average man-hours per mechanic for applicable MOS in each section.

For **Maintenance Hours per Tank per Week,** column headings and their meanings are:

- MOS—Mechanic MOS are listed in sequence with no distinction by type task. Crew listings are divided by type task, i.e., CM (corrective maintenance) and PMCS (preventive maintenance checks and services).
- PERIOD ON WHICH AVERAGE IS BASED—Periods for which weekly average is computed: the previous twenty weeks and the current four weeks.
- OVERALL AVERAGE—Weekly average maintenance hours per tank shown as an overall average for all companies.
- AVERAGE BY COMPANY--Weekly average maintenance hours per tank by company.

Analysis and Interpretation. Maintenance man-hours per mechanic shows, by section, how much time a mechanic spends, on an average, actually performing maintenance. Use the data to assess how well mechanics are being used. In those sections where a mechanic's primary duty is performing maintenance, man-hours per mechanic should be about 20, or about half of his time in a normal, 40-hour work week. In the Service and Recovery sections, where mechanics have other duties in addition to performing maintenance, average man-hours may be less. Look at the highlighted items in the example and note how the current averages for MOS 31V and 63N/T in the track section are much lower than the average for previous periods.

Maintenance hours per tank shows the average time spent maintaining a tank. Use the data to analyze maintenance within a company, and see whether the hours for tank maintenance are increasing or decreasing in the current four weeks compared to the average of previous periods. Compare data across companies to

determine the relative maintenance effort by each company. Also compare the number of mechanic man-hours expended in a company to the number of crew man-hours, and examine the relationship between crew corrective maintenance (CM) and PMCS.

Look at the highlighted examples. Note that the amount of mechanic man-hours expended on A Company tanks is much higher than on the tanks in other companies. Also note that the average crew man-hours, both CM and PMCS, for A Company is much lower than for other companies. The ratio of PMCS to crew CM man-hours is also much lower in A Company.

Action. Use results of your analysis to:

- Correlate with data from **Table 2, Maintenance Man-Hours,** for more detail on mechanic utilization.
- Investigate causes for over- or under-utilization of mechanics.
- Investigate companies which are over- or under-utilizing mechanic and crew maintenance time.
- Identify the relationships between crew PMCS, crew CM and mechanic maintenance time. For example, if PMCS time increases, is corrective maintenance time reduced?

1-99 ARMOR

TABLE 1: BATTALION MAINTENANCE MAN-HOUR SUMMARY

SIX-MONTH REPORTING PERIOD ENDING: 3182 (1 JUL 83)

MAINTENANCE HOURS PER MECHANIC PER WEEK

MOS	PERIOD ON WHICH AVG IS BASED	ALL SEC.	AVERAGE BY SECTION SVC	RVY	WHL	TRK	TRT	COM
31V	PREV 20 WKS	18.4						18.4
	CURR 4 WKS	13.1						13.1
45N/T	PREV 20 WKS	20.0					20.0	
	CURR 4 WKS	21.5					21.5	
63B/S	PREV 20 WKS	17.4	15.4		19.4			
	CURR 4 WKS	13.6	11.2		16.1			
63N/T	PREV 20 WKS	15.5	17.6	9.1		19.8		
	CURR 4 WKS	14.9	18.4	11.1		15.3		

Current utilization much lower than previous average

MAINTENANCE HOURS PER TANK PER WEEK

Mechanic utilization by A Co. much higher than average

MOS	PERIOD ON WHICH AVG IS BASED	ALL CO. AVERAGE	AVERAGE BY COMPANY A	B	C	D	HHC
45N/T	PREV 20 WKS	2.5	3.4	2.3	2.3	2.4	1.9
	CURR 4 WKS	2.7	3.8	2.3	2.4	2.5	2.5
63N/T	PREV 20 WKS	2.1	2.9	2	1.6	2.3	1.7
	CURR 4 WKS	2.3	3.6	2.2	1.9	1.9	1.8
CREW CM	PREV 20 WKS	3.6	2.8	3.7	4.1	3.8	3.6
	CURR 4 WKS	3.6	2.7	3.9	3.8	3.7	4.1
CREW PM	PREV 20 WKS	9.2	6.4	9.8	10.1	9.6	10
	CURR 4 WKS	8.6	3.9	10.1	9.9	9.9	9.4

Crew CM and PMCS in A Co. much lower than average

REF # 101 BN: CDR XO BMO CO: CDR XO

TABLE 2: MAINTENANCE MAN-HOURS

Purpose. This table shows a six-month history of **roster** man-hours, **total** man-hours expended performing maintenance, and the **average** maintenance man-hours per man. Roster man-hours are determined from the number of personnel on the roster based on information furnished by the company/section. The maintenance man-hour data is based on work reported by mechanics performing maintenance.

Description. Column headings and their meanings are:

- PERIOD END DATE & CYCLE--Julian date ending each weekly reporting period (always a Friday) and letter designating the training cycle for the period, either **R**ed, **G**reen, **A**mber, or **N** for no cycle.
- ROSTER MAN-HOURS--Supervisors assess a mechanic's availability as 25, 50, 75 or 100%. Maintenance man-hours potentially available are based on 40 hours per week times this percentage.
- TOTAL MAINT MAN-HRS--The total number of maintenance man-hours spent performing maintenance during the reporting period.
- MAINT MAN-HRS PER MAN--A computation made by dividing total maintenance man-hours by the number of men assigned during the reporting period.
- '^' or 'v' SYMBOL--Shows a '^' if the MAINT MAN-HRS PER MAN is *significantly* **above** the *long term average or a* 'v' *if the man-hours are* significantly **below** the long term average. These provide "flags" for identification of significant variations.

Analysis and Interpretation. Use the data for a detailed analysis of utilization of maintenance manpower on a weekly basis. For mechanics, total maintenance man-hours should be around 50% of the roster man-hours. Maintenance man-hours per man should therefore average about 20 man-hours per period and remain fairly constant over time. Look at the highlighted items in the example and note how changes in personnel availability and utilization stand out.

Action. Use results of your analysis to:

- Investigate causes of high and low mechanic utilization.
- Correlate with unit readiness rate shown on DA Form 2406.

TABLE 2 (31V-ALL): MAINTENANCE MAN-HOURS

ONE-WEEK REPORTING PERIOD ENDING: 3182* (1 JUL 83)

PERIOD END DATE & CYCLE		ROSTER MAN-HRS	TOTAL MAINT MAN-HRS	MAINT MAN-HRS PER MAN	
3021	A	320	158.0	19.7	
3028	N	320	103.5	12.9	
3035	R	320	88.3	11.0	
3042	G	320	77.8	9.7	v
3049	A	320	151.9	19.0	
3056	A	320	154.7	19.3	
3063	A	320	187.6	23.4	^
3070	R	320	107.9	13.5	
3077	G	320	108.3	13.5	
3084	G	320	109.6	13.7	
3091	A	320	132.7	16.9	
3098	A	320	112.8	14.1	
3105	R	320	189.8	23.7	^
3112	R	320	189.3	23.7	^
3119	G	320	187.8	23.5	^
3126	G	320	191.8	24.0	^
3133	A	320	137.8	17.2	
3140	A	360	127.9	14.2	
3147	R	360	147.3	16.4	
3154	R	360	135.5	15.0	
3161	G	400	101.3	10.1	v
3168	A	400	103.9	10.4	v
3175	R	400	93.3	9.3	v
3182*	G	400	106.8	10.7	v
LONG-TERM AVERAGES		338.3	133.5	16.0	

Man-hours per man much higher than average

Man-hours per man much lower than average

Change in personnel availability

^ = Significantly above average
v = Significantly below average

REF # 201 BN: BMO BMS SEC

TABLE 3: AVERAGE MAN-HOURS PER MAINTENANCE TASK

Purpose. This table shows the number of times each corrective maintenance task was performed and the average man-hours required to complete the task. This information is summarized over the previous twenty weeks and for the current four-week reporting period.

Description. Column headings and their meanings are:

- MOS/TASK--Mechanic MOS and tasks listed in sequence.
- TIMES DONE (PREV 20 WEEKS)--How many times the task was performed in the previous twenty weeks (prior to the current four-week period).
- AVG MAN-HRS (PREV 20 WEEKS)--An average of man-hours required to complete the task in the previous twenty weeks.
- '^' OR 'v' SYMBOL--Shows a '^' if the CURR AVG MAN-HRS is significantly **above** the PREV 20 WEEK AVG MAN-HRS or a 'v' if the CURR AVG MAN-HRS is significantly **below** the past average. This provides a visual reference for identification of significant variations.
- AVG MAN-HRS (CURR 4 WEEKS)--Average number of man-hours expended to complete the task during the current reporting four-week period.
- TIMES DONE (CURR 4 WEEKS)--How many times the task was performed during the current reporting four-week period.

Analysis and Interpretation. Evaluate maintenance performance by comparing the average for the current period to the past average. If the current average differs significantly from the past, it may indicate a problem. A **high** current average may mean that personnel are not proficient, that unusual conditions existed, or that resources were not available. A current average that is **low** in comparison to the past may indicate that shortcuts were taken in task performance, that the task was not done thoroughly, that task training has taken place in the interim, or that unusually proficient personnel did the task. Look at the highlighted items in the example and note those current averages that are significantly lower or higher than past averages.

Action. Use results of your analysis to:

- Correlate with **Table 6, Maintenance Task Performance Data by Vehicle** to identify who performed tasks differing significantly from the average.
- Plan work, schedule personnel, and control quality.
- Schedule closer supervision and/or training for personnel whose task performance time is significantly above the average.

TABLE 3 (M60): AVERAGE MAN-HOURS PER MAINTENANCE TASK

SIX-MONTH REPORTING PERIOD ENDING: 3182 (1 JUL 83)

MOS/TASK	PREV 20 WEEKS TIMES DONE	PREV 20 WEEKS AVG MAN-HRS	CURR 4 WEEKS AVG MAN-HRS	CURR 4 WEEKS TIMES DONE
45N/T				
A **PERFORM PERIODIC SERVICE(Q,S,A,L)	46	4.5	4.8	8
B PERFORM TECHNICAL INSPECTION	67	1.4	1.3	16
1 REPL SLIP RING INTERFERENCE SWITC				
2 *REPL NU-BAK				
3 REPL BACK DECK CLEARANCE SWITCH				
4 **REPR MAIN GUN FIRING CIRCUIT	6	1.5	1.4	2
5 *REPL STBLZ SYSTEM CON BOX				
6 **REPL STBLZ SYSTEM COMPONENTS				
7 ADJ STBLZ SYSTEM	3	3.2	5.0	1
8 **REPL SUPERELEVATION ACTUAT	7	2.1	3.1	1
9 **REPL SUPERELEVATION ACTUAT CABLE	15	1.4	1.1	1
10 REPL ELEVATION SYSTEM				
11 *BLEED TRT HYDRAULIC SYSTEM	20	.5	.6	5
12 REPL MANUAL ELEVATION PUMP	1	3.2		
13 CHARGE MANUAL ELEVATION SYSTEM	10	1.7 ^	3.5	2
14 REPL ANTI-BACKLASH CYLINDER				
15 ADJ BACKLASH				
16 REPL MAIN ACCUMULATOR	2	1.0		
17 REPL ACCUMULATOR PRESS GAGE	2	1.5		
18 CHARGE MAIN ACCUMULATOR	15	.4	.3	1
19 *REPL TC'S POWER CON HANDLE	12	.7	.6	4
20 REPR GNR'S HANDLE PALM SWITCHES	10	.5		
21 REPR TC'S HANDLE PALM SWITCHES	14	.8 ^	2.0	1
22 REPL GNR'S CON BOX				
23 *REPL/ADJ LOADER'S SAFETY SWITCH				
24 REPL SOLENOID VALVE	9	1.7	1.8	1
25 PERFORM SYNC CHECK-RAMP METHOD	54	1.8	1.6	1
26 PERFORM SYNC CHECK-INDOOR METHOD				
27 *REPL AZIMUTH INDICATOR				
28 REPL M13A2/M13A1D BALLISTIC COMPT				
29 **REPL RANGEFINDER &/OR END HOUSING	23	3.1 v	1.0	1
30 **PURGE & CHARGE SIGHTS	37	.5		

Current average much higher than past average

Current average much lower than past average

^ = Significantly above average
v = Significantly below average

REF# 301 BN: BMT BMS

TABLE 4: COMBAT VEHICLE CORRECTIVE MAINTENANCE SUMMARY

Purpose. This table shows the numbers of corrective maintenance tasks performed and man-hours expended by mechanics and crews on each tank. The table also shows the number of tasks repeated on each vehicle.

Description. Numbers of mechanic and crew task and man-hours per vehicle and totals of repeats are shown for the current four weeks. For comparison purposes, the same types of data are shown as (i.e., twenty weeks). If more than one mechanic MOS works on a given type of vehicle, e.g., MOS 45N and 63N on a task, these tasks and hours are combined.

Column headings and their meanings are:

- BUMPER NUMBER - Vehicles are listed in ascending bumper number order. The letter prefix for the number indicates the company.
- MECHANIC TASKS AND HRS - The number of corrective maintenance tasks performed by mechanics and the hours spent performing the tasks, presented as the four-week average for the previous 20 weeks, and as a total for the current four-week period.
- CREW TASKS AND HOURS - The number of corrective maintenance tasks performed by a crew and the hours spent performing the tasks, that parallel the mechanics tasks and times.
- ALL RPTS - The number of repeated tasks, i.e., the same task performed more than once on a vehicle (by mechanics and/or crew) shown as the four-week average for the previous 20 weeks and as a total for the current four-week period.

Analysis and Interpretation. Use the data to analyze tank maintenance within a company and determine which tanks needed most and least maintenance. Compare the totals for the current period to the average of previous periods to determine whether the amount of maintenance per tank is up or down.

The data show both numbers of tasks and man-hours. A small number of tasks and a large number of man-hours may indicate performance of complex tasks. Conversely, a large number of tasks and few man-hours may indicate time spent correcting minor deficiencies or performing simple tasks. A large number of mechanic tasks may indicate breakdowns or other serious faults. A number of repeated tasks may indicate improper performance of repairs or that there is a more serious undiagnosed fault, i.e., that the basic cause persists.

Compare figures among individual vehicles and with the average for all vehicles. Look at the highlighted items in the example. Many more mechanic tasks are being performed on A11 and A12 in comparison to the other tanks. Further, fewer crew tasks are being performed on these same tanks, compared to others.

The averages below the dashed line show an increase in mechanic tasks during the most recent four weeks, and a decrease in crew tasks, compared to average of previous periods.

Action. Use results of your analysis to:

- Investigate causes for high numbers of tasks and repeats. Look at **Table 5 Maintenance Tasks by Vehicle** to identify types of tasks and specific tasks repeated.
- Identify tanks with excessive maintenance requirements. Compare this with the tank's age and usage.
- Compare amounts of maintenance performed by mechanics and crews with a vehicle's operational readiness rate.

TABLE 4 (M60-A CO): COMBAT VEHICLE CORRECTIVE MAINTENANCE SUMMARY

SIX-MONTH REPORTING PERIOD ENDING

High number of mechanic tasks
Low number of crew tasks

BUMPER NUMBER	4-WK AVERAGE FOR PREVIOUS 20 WEEKS: MECHANIC TSK	MECHANIC HOURS	CREW TSK	CREW HOURS	RPTS*	TOTALS FOR CURRENT 4 WEEKS: MECHANIC TSK	MECHANIC HOURS	CREW TSK	CREW HOURS	RPTS*
A11	16	32.5	7	6.1	5	25	52.9	4	3.5	7
A12	19	38.4	5	4.4	9	30	63.4	5	4.3	9
A13	9	18.2	13	11.4	3	14	30	9	7.8	5
A14	10	20.2	10	8.7	4	16	33.8	6	5.2	5
A21	7	14.2	12	10.5	2	11	22.2	7	6.1	3
A22	8	16.2	15	13.1	3	12	25.4	9	8.7	4
A23	6	12.1	14	12.3	1	9	19	8	2	2
A24	9	18.2	12	10.5	4	15	31.7	7	6.1	6
A31	7	14.2	14	12.3	2	10	21.1	8	6.4	2
A32	10	20.2	10	8.7	3	16	32.8	6	5.2	2
A33	9	18.2	12	10.5	2	14	29.6	7	6.1	3
A34	8	16.2	17	14.9	3	12	25.3	10	8.7	4
AVERAGE	9.8	19.8	11.8	10.3	2.9	15.2	27.2	7.1	6.3	4.4

Number of mechanic tasks up, number of crew tasks down in current period

* RPTS is the total number of tasks repeated on a vehicle.

TABLE 5: MAINTENANCE TASKS BY VEHICLE

Purpose. This table lists maintenance tasks related to each vehicle and "flags" which corrective maintenance tasks have been repeated. It provides a four-week maintenance history on a vehicle-by-vehicle basis.

Description. Column headings and their meanings are:

- VEHICLE BUMPER NUMBER--Identifies each vehicle in ascending bumper number order.
- MAINTENANCE TASK--Lists periodic service and corrective maintenance tasks performed.
- JULIAN DATE--Date task was performed.
- REPEATED TASK FLAG--An 'R' appears in this column if the same corrective maintenance task was performed more than once on the same vehicle in the last four weeks.

Analysis and Interpretation. A large volume of maintenance on a vehicle may indicate heavy operational use, high mileage/hours, or inadequate crew maintenance. A large number of repeated corrective maintenance tasks may indicate incorrect maintenance performance, lack of mechanic and crew training, and/or defective repair parts. Look at the highlighted items in the example. Note the frequency of tasks repeated on vehicle A14. Also note the low number of tasks on A13 in comparison to the other tanks listed.

Action. Use results of your analysis to:

- Investigate reasons for a large volume of tasks on a vehicle in comparison to others in your fleet.
- Investigate possible causes for frequent repeats of the same task.
- Correlate with past and current **Table 6, Maintenance Task Performance Data by Vehicle** to determine how much PMCS was performed, and who performed periodic service and corrective maintenance tasks.
- Correlate with **Table 10, Individual Qualification and Experience Profile** to determine mechanic task experience level.
- Schedule closer supervision, training, and quality control for vehicles and/or personnel as indicated.

TABLE 5 (M60-A CO): MAINTENANCE TASKS BY VEHICLE

FOUR-WEEK REPORTING PERIOD ENDING: 3182 (1 JUL 83)

VEHICLE BUMPER NUMBER	MAINTENANCE TASK	JULIAN DATE	REPEATED TASK FLAG
A 11	ADJ BRAKES,CONS &/OR LINKAGE	3159	
	TROUBLESHOOT ELEC SYSTEM	3164	
	ADJ/TIGHTEN/REPL MINOR COMPONENTS	3164	
	ADJ/RESET FIRE EXT CON VALVES	3166	
	REPL SENDING UNITS OR GAGES	3166	
	REPR MAIN GUN FIRING CIRCUIT	3171	R
	REPL M13A2/M13A1D BALLISTIC COMPT	3175	
	REPR MAIN GUN FIRING CIRCUIT	3179	R
	REPL M32/M36 LIGHT CON SOURCE	3179	
A12	INSTL POWERPACK AFTER OTHER TASKS	3164	R
	INSTL BACK DECK	3164	R
	REM BACK DECK	3165	R
	REM DEFECTIVE/INOP POWERPACK	3168	
	REPR WIRING	3168	
	REM POWERPACK TO DO OTHER TASKS	3171	
	REM BACK DECK	3171	R
	INSTL POWERPACK AFTER OTHER TASKS	3171	R
	INSTL BACK DECK	3171	R
A 13	ADJ/TIGHTEN/REPL MINOR COMPONENTS	3157	
	REPL NO-BAK	3164	
A 14	REPL AIR CLEANER BLOWER MOTOR	3157	R
	REPL BLOWER MOTOR RELAY	3157	R
	REPL AIR CLEANER BLOWER MOTOR	3165	R
	REPL BLOWER MOTOR RELAY	3165	R
	REPR MAIN GUN FIRING CIRCUIT	3168	
	REM BACK DECK	3168	
	REM POWERPACK TO DO OTHER TASKS	3168	
	REPL SUPERELEVATION ACTUATOR	3173	R
	REPR MAIN GUN FIRING CIRCUIT	3173	
	REPL M13A2/M13A1D BALLISTIC COMPT	3175	
	REPL SUPERELEVATION ACTUATOR	3183	R
A 16	REM DEFECTIVE/INOP POWERPACK	3171	
	REM BACK DECK	3171	
	INSTL POWERPACK AFTER OTHER TASKS	3171	
	INSTL BACK DECK	3171	

Short interval between task repeat

Low number of tasks in comparison to other tanks in platoon

High number of tasks repeated frequently

TABLE 6: MAINTENANCE TASK PERFORMANCE DATA BY VEHICLE

Purpose. This table is an expanded version of Table 5. It shows all service and corrective maintenance tasks accomplished on each vehicle during the most recent four-week period, whether these tasks were performed by mechanics or crew, and how much time was spent performing each task. Mechanics who performed tasks are listed by name. Crew tasks show only "CREW." The report also shows the number of PMCS man-hours expended by the crew for the report period.

Description. Column headings and their meanings are:

- VEHICLE BUMPER NUMBER--Identifies each vehicle in ascending bumper number order.
- MAINTENANCE TASK AND PERSONNEL--Lists completed periodic service and corrective maintenance tasks by vehicle and the personnel performing them, either MECHANIC (by name) or CREW. Each mechanic's name is followed by his primary MOS and paygrade. PMCS will always be the last task listed for each vehicle.
- CM MAN-HOURS--Number of corrective maintenance man-hours expended to complete the listed task.
- PM MAN-HOURS--Number of preventive maintenance man-hours to perform each periodic service and total of PMCS man-hours expended on the vehicle during the reporting period.
- JULIAN DATE--Julian date each corrective maintenance and periodic service task was completed.

Analysis and Interpretation. Examine the current maintenance history of each vehicle, who worked on each task, and how long it took to complete it. If repairs have been done incorrectly, identify personnel who need training and/or closer supervision. Also analyze the number of CM tasks and PMCS hours by vehicle. Compare the number of CM tasks to total PMCS man-hours. If number of CM tasks are high, this may indicate not enough time is being devoted to PMCS on that vehicle.

Action. Use results of your analysis to:

- Correlate with **Table 5, Maintenance Tasks by Vehicle,** to determine which personnel worked on tasks that were repeated frequently, and with **Table 10, Individual Experience Profile,** to determine mechanic task experience level.
- Check emphasis on PMCS.
- Audit maintenance performed on each vehicle.
- Improve quality control and training.

TABLE 6 (M60-A CO): MAINTENANCE TASK PERFORMANCE DATA BY VEHICLE

FOUR-WEEK REPORTING PERIOD ENDING: 3182 (1 JUL 83)

VEHICLE BUMPER NUMBER	MAINTENANCE TASK AND PERSONNEL	CM MAN-HRS	PM MAN-HRS	JULIAN DATE
A11	ADJ BRAKES,CONS &/OR LINKAGE			3159
	ANDREWS(63N-E2)	.5		
	TROUBLESHOOT ELEC SYSTEM			3164
	LEE(45N-E5)	1.0		
	ADJ/TIGHTEN/REPL MINOR COMPONENTS			3164
	CREW	2.0		
	ADJ/RESET FIRE EXT CON VALVES			3166
	WILLIAMS(63N-E4)	2.0		
	REPL SENDING UNITS OR GAGES			3166
	WILLIAMS(63N-E4)	4.0		
	REPR MAIN GUN FIRING CIRCUIT			
	ROBERTS(45N-E2)	.6		
	REPL M13A2/M13A1D BALLISTIC COMPT			
	RUSH(45N-E5)	2.0		
	REPR MAIN GUN FIRING CIRCUIT			3179
	RUSH(45N-E5)	1.0		
	REPL M32/M36 LIGHT CON SOURCE			3179
	ROBERTS(45N-E2)	.6		
	PMCS		14.1	
A12	INSTL POWERPACK AFTER OTHER TASKS			3164
	WILLIAMS(63N-E4)	1.5		
	CREW	6.8		
	INSTL BACK DECK			3164
	WILLIAMS(63N-E4)	1.5		
	CREW	4.3		
	REM BACK DECK			3165
	WILLIAMS(63N-E4)	1.2		
	CREW	3.1		

Identification of personnel performing task

Low number of PMCS hours for four weeks

REF# 601 BN: BMT BMS SEC CO: XO

TABLE 7: CERTIFICATION, QUALIFICATION, AND EXPERIENCE SUMMARY BY SECTION

Purpose. This table shows, for each MOS in a section, the percentage of the mechanics in that section who are certified, their average percentage of task qualification and their average percentage of task experience.

A soldier gains experience by performing maintenance tasks. After performing a task three times, he starts getting credit for each performance of that task. Numbers of performances alone, however, is not a sufficient indication of a mechanic's ability. His ability can be indicated by certification or qualification. **Certification** is determined by maintenance supervisors at battalion level. It indicates that a mechanic is able to perform a minimum of 70% of the tasks in his MOS at a certain level of competence. **Qualification** applies to individual tasks. It is a rating of task performance by the first-line supervisor. He may qualify a mechanic on the basis of experience and observation, completion of training or passing a "hands-on" test.

Description. Column headings and their meanings are:

- MOS--Mechanic MOS listed in sequence.
- MEASURE--Indicators of mechanic ability/experience, (explanatory footnotes are shown at bottom of table).
- SECTION--Technical areas related to mechanic's work assignment.

Analysis and Interpretation. Examine the measures across sections to identify the sections with high and low percentages of qualified and experienced mechanics. Also note sections where no qualification or experience growth is occurring.

Action. Use results of your analysis to:

- Identify overall levels of certification, qualification and experience by MOS in unit.
- Allocate qualified, experienced mechanics by section.
- Investigate causes for no growth in qualification or experience.

1-9Y ARMOR

TABLE 7: CERTIFICATION, QUALIFICATION AND EXPERIENCE SUMMARY BY SECTION

SIX-WEEK REPORTING PERIOD ENDING: 5182 (1 JUL 83)

MOS	MEASURE	ALL	SECTION SVL	RVT	WHL	TRK
31V	% MECHANICS CERT.	25				
	% TASKS QUALIFIED*	50 Δ				
	% TASK EXPERIENCE**	50				
45N/T	% MECHANICS CERT.	12				
	% TASKS QUALIFIED	24				
	% TASK EXPERIENCE	37				
63B/S	% MECHANICS CERT.	25	50			
	% TASKS QUALIFIED	44 Δ	66		31	
	% TASK EXPERIENCE	50	81		40	
63N/T	% MECHANICS CERT.	19	50			7
	% TASKS QUALIFIED	36	64	15		29
	% TASK EXPERIENCE	49	78	28		41

No qualification or experience growth

High levels of proficiency and experience

Low levels of qualification and experience

* % TASKS QUALIFIED is the average percentage from all mechanics of all MOS tasks for which a mechanic could be qualified.

** % TASK EXPERIENCE is the average percentage from all mechanics of MOS tasks that a mechanic has performed 3 or more times.

Δ indicates NO qualification or experience growth during the last six weeks.

REF # 701 BN: CDR XO S3 BMO BMS

TABLE 8: CERTIFICATION, QUALIFICATION, AND EXPERIENCE SUMMARY BY INDIVIDUAL

Purpose. This table summarizes the certification, qualification and task experience of mechanics in grades E1-E5 in each MOS, by section. A soldier gains experience by performing maintenance tasks. After performing a task three times, he starts getting credit for each performance of that task. Number of performances alone, however, is not a sufficient indication of a mechanic's ability. His ability can be indicated by certification or qualification. **Certification** is determined by maintenance supervisors at battalion level. It indicates that a mechanic is able to perform a minimum of 70% of the tasks in his MOS at a certain level of competence. **Qualification** applies to individual tasks. It is a rating of task performance by the first-line supervisor. He may qualify a mechanic on the basis of experience and observation, completion of training or passing a "hands-on" test.

Description. Column headings and their meanings are:

- NAME/PAYGRADE--A listing of names, primary MOS, and paygrades of individuals working in the MOS. Names are listed in descending order of percentage tasks experienced. The 'ALL' at the bottom of the list shows the average for all personnel listed.
- MOST RECENT CERT--Shows the most recent certification if a mechanic has been certified. Certification is shown as an 'A' or 'B,' for Level A or B.
- % TASKS QUAL--Lists the percentage of each mechanic's total maintenance tasks on which he has qualified.
- % TASKS EXP'D--A percentage of the soldier's total maintenance task experience (number of performances).
- % TASKS EXPERIENCED GRAPH--A dashed line on the right of the table scaled form 0-100 represents the same percent task experience in graphic form. A '+' appearing at the end of the line indicates the soldier has gained experience on one or more maintenance tasks in the last six weeks. A heavy vertical line represents the average task experience of all the personnel on the report shown as a percentage.

Analysis and Interpretation. Examine the percent task experience of individual mechanics to identify the **most** and **least** experienced. Note personnel without a '+' appearing at the end of the graphic representation of their percent task experience. This shows the personnel have not gained experience on maintenance tasks in the last six weeks.

Action. Use results of your analysis to:

- Assign personnel with a high percent task experience to perform critical/complex tasks and as trainers of less experienced personnel.
- Provide experience and training for personnel with low percent task experience. Identify specific tasks on which additional experience is needed from **Table 10, Individual Qualification and Experience Profile.**
- Rotate work assignments to provide growth by exposing personnel to new tasks, i.e., tasks they have not previously performed.

TABLE 8 (31V-ALL): CERTIFICATION, QUALIFICATION AND EXPERIENCE SUMMARY BY INDIVIDUAL

SIX-WEEK REPORTING PERIOD ENDING: 3182 (1 JUL 83)

Personnel ranked by experience

NAME/PAYGRADE	MOST RECENT CERT	% TASKS QUAL	% TASK EXPER	% TASK EXPERIENCE 0----------50----------100
COLLIER(31V-E6)	B	84	92	
HOLLOWAY(31V-E5)		69	83	
ADAMS(31V-E5)	A	57	71	
JOHNSON(31V-E4)	A	52	63	
MITCHELL(31V-E4)		48*	55	
JONES(31V-E3)		40*	48	
DONOVAN(36K-E4)		25	42	
NASH(05C-E4)		19	39	
ROSS(31V-E2)		6	15	----+
NICHOLS(31V-E2)		0	6	-+
ALL		40	51	

Concentrate training and supervision on personnel below the group average

\# indicates additional certifications
* qualification growth during last six weeks
\+ Experience growth during last six weeks

REF# 801 BN: BMO BMS SEC

TABLE 9: QUALIFICATION AND EXPERIENCE SUMMARY BY TASK

Purpose. This table summarizes qualification and experience data for all mechanics in a section. Each mechanic is listed by name and indication of either how many times he has performed each task or that he has qualified on the task.

Description. Column headings and their meanings are:

- EQUIPMENT/TASK--Lists each type equipment which that MOS works on. Maintenance tasks for each equipment are listed below the equipment designation.
- NAME--Abbreviated names of mechanics in the section, listed alphabetically. Number of times each task performed, or task qualification shown by 'Q,' listed under name.

Analysis and Interpretation. Use this table to compare task performance by and among individuals. Identify those personnel **most experienced** or **qualified** to perform a task and those **least experienced.** The training goal is to get mechanics qualified on tasks. A high number of performances (experience) without qualification may indicate that the mechanic is performing the task incorrectly and can't become qualified. It may also mean that you are not checking the performance of your personnel and qualifying them for tasks on which they are proficient.

Action. Use results of your analysis to:

- Guide work assignment. If repair completion is urgent, assign your most experienced personnel to the task. For routine repairs, assign personnel who need to gain experience on that task and supervise them closely.
- Guide training. Concentrate training on those tasks where experience and repair frequency are low.

TABLE 9 (63B/S-SVC): QUALIFICATION AND EXPERIENCE SUMMARY BY TASK

SIX-WEEK REPORTING PERIOD ENDING: 3182 (1 JUL 83)

		NAME/TIMES DONE		
			LEADER	NEW WORKER
	EQUIPMENT/TASK	A	B	R
	M151			
	====			
A	PERFORM PERIODIC SERVICE(Q,S,A,L)	1	Q	2
B	PERFORM TECHNICAL INSPECTION	0	Q	2
1	**ADJ VALVES	1	Q	5
2	*ADJ CLUTCH PEDAL FREE TRAVEL	0	Q	2
3	REPL CLUTCH,PRESS PLATE&THROW BRG	0	7	2
4	*REPL CARBURETOR	0	6	4
5	REPL FUEL LINES&VENT TUBES	5	Q	9
6	REPL FUEL FILTER(S)	7	Q	15
7	**REPL FUEL PUMP	1	Q	10
8	REPL FUEL TANK	0	Q	4
9	REPL EXHAUST GASKETS	2	Q	17
10	REPL MUFFLER &/OR TAIL PIPE	3	Q	11
11	REPL RADIATOR	1	Q	7
12	REPL COOLANT HOSES&CLAMPS	5	Q	Q
13	REPL BELTS &/OR PULLEYS	1	Q	Q
14	ADJ BELTS	7	Q	Q
15	REPL GENERATOR	1	Q	5
16	REPL STARTER	0	Q	4
17	REPL IGNITION DISTRIBUTOR	0	Q	6
18	REPL CAPAC,CNTC PTS,SPK PLUGS	-	Q	Q
19	ADJ CNTC PTS	1	Q	Q
20	*ADJ IGNITION TIMING	0	Q	Q
21	REPL &/OR ADJ ELECTRONIC IGNITION	0	Q	2
22	REPR WIRING	1	Q	Q
23	REPL BATTERIES,CABLES &/OR CLAMPS	3	Q	Q
24	REPL CIRCUIT BREAKERS	1	Q	Q
25	REPL LIGHT BULBS&WIRES	6	Q	Q
26	REPL SENDING UNITS OR GAGES	0	Q	6
27	REPL UNIVERSAL JOINTS	0	5	3

Provide training and job exposure where individual experience is low

Use most experienced personnel on critical and complex tasks

* Level A task
** Level B task

REF# 903 DN: RMS SEC

TABLE 10: INDIVIDUAL QUALIFICATION AND EXPERIENCE PROFILE

Purpose. This table summarizes the qualification and experience credits each soldier has received for each of his MOS tasks, and provide a skill profile. The report is produced for each mechanic.

Description. Column headings and their meanings are:

- EQUIPMENT/TASK--Lists the type of equipment and related maintenance tasks.
- QUAL--A 'Q' will appear if the mechanic has been qualified as proficient on the task by his supervisor.
- NO. TIMES DONE--Shows the number of times the soldier has performed the task to a maximum of 99 in the numerical column, and to a maximum of 20 on the graph (because of space limitations). A '+' appearing at the end of a line indicates the soldier has performed that task during the past six weeks. Look at the example, and note the gaps in experience on the various tasks.

Analysis and Interpretation. This table can help determine the specific tasks on which an individual requires experience or training. Note the tasks that have been performed infrequently or not at all.

Action. Individuals and their immediate supervisors should use information in this table to:

- Supplement the Job Book as a record of individual experience.
- Supervisors should use it to guide work planning and individual task assignment. Individuals should request/assign work on tasks where their experience is lacking.
- Assist in preparing for an SQT. Identification of task experience or lack of it should serve as a guide for self-study and group training.

TABLE 10 (63N-ALL): INDIVIDUAL QUALIFICATION AND EXPERIENCE PROFILE

SIX-WEEK REPORTING PERIOD ENDING: 3182 (1 JUL 83)

NAME: WEAVER,S.(63N-E2)

EQUIPMENT/TASK		NO.	NO. TIMES DONE
M60 FAMILY - CORRECTIVE MAINTENANCE	QUAL	TIMES	0 5 10 15 +L 29
1 REM DEFECTIVE/INOP POWERPACK		6	------+
2 GROUND HOP POWERPACK		2	--
3 INSTL REPAIRED POWERPACK		6	------+
4 REM POWERPACK TO DO OTHER TASKS		4	----
5 INSTL POWERPACK AFTER OTHER TASKS		3	---
6 REM BACK DECK	Q	17	----------------+
7 INSTL BACK DECK	Q	17	----------------+
8 REPL FUEL LINES &/OR FITTINGS		4	----
9 REPL FUEL FILTERS	Q	11	----------+
10 REPL OIL COOLER		2	--
11 REPL OIL FILTERS		9	---------
12 REPL OIL COOLER LINES		1	-
13 ADJ ACCEL,THROTTLE CON/LINKAGE	Q	19	------------------+
14 REPL ACCEL,THROTTLE CON/LINKAGE		6	------
15 TROUBLESHOOT ELEC SYSTEM		2	--
16 REPR WIRING		0	
17 REPL SENDING UNITS OR GAUGES		5	----+
18 REPL CIRCUIT BREAKERS		1	+
19 REPL BATTERIES,CABLES,CLAMPS	Q	31	------------------------
20 REPL VOLTAGE REGULATOR		9	---------
21 REPL STARTER		11	----------+
22 REPL GENERATOR &/OR SEAL		14	--------------
23 REPL AIR CLEANER BLOWER MOTOR		2	--
24 REPL BLOWER MOTOR RELAY		1	-
25 REPL FAN TOWER SEAL		5	----+
26 ADJ XMSN LINKAGE		4	----
27 ADJ XMSN SHIFTING CON ASSY		3	---
28 REPL FINAL DRV		10	----------
29 REPL FINAL DRV SEALS		3	---
30 REPL MASTER OR SLAVE CYLINDER		9	---------+
31 REPL MAIN BRAKE LINE		4	----
32 BLEED BRAKE LINES	Q	27	------------------------
33 ADJ BRAKES,CONS &/OR LINKAGE		11	----------
34 REPL PARKING BRAKE CABLE		6	------
35 ADJ SERVO BANDS		2	--

Supervisor has qualified mechanic on six tasks

Experience growth in last six weeks

No experience on this task

+ Experience growth during last six weeks

REF# 1001 BN: SEC MECH

TABLE 11: QUALIFICATION AND CERTIFICATION BULLETIN

Purpose. This table lists all mechanics who have qualified on tasks or been certified during the previous six weeks.

Description. Column headings and their meanings are:

- MECHANIC--Listing of mechanics by name who have either been qualified or certified within the previous six-week period.
- NUMBER OF NEW TASKS QUALIFIED--Listing of total number of tasks on which mechanic has newly qualified.
- CERTIFICATION--Shows aera and level of certification if mechanic has been certified.

Analysis and Interpretation. Review the table to identify mechanics newly qualified or certified.

Action. Use Table 11 to:

- Provide recognition to mechanics newly qualified or certifed.
- Post on unit bulletin boards as an announcement of mechanic achievements.
- Release information to news media publicizing mechanic achievements.
- Correlate with **Table 7: Certification, Qualification and Experience Summary by Section,** and compare numbers of new qualifications or certifications to levels of proficiency and experience.
- Investigate reasons for low numbers of new qualifications or certifications, particularly if Table 7 shows low overall levels of proficiency.

TABLE 11: QUALIFICATION AND CERTIFICATION BULLETIN

SIX-WEEK REPORTING PERIOD ENDING: 3182 (1 JUL 83)

THESE MECHANICS WERE EITHER TASK-QUALIFIED OR CERTIFIED DURING THE PAST SIX WEEKS:

MECHANIC	NUMBER OF NEW TASKS QUALIFIED	CERTIFICATION AREA/LEVEL
DAVIS(63N-E4)		TRACK/A
CONROY(63N-E5)		TRACK/B
KURTZ(63N-E4)	3	
SAMSON(63N-E4)	4	

REF# 1101 BN: CDR XO S3 BMO BMS SEC

INTERPRETATION COMMENTS

Purpose. This report contains descriptive information highlighting local conditions that may have influenced data on other MMIS-86 reports.

Description. Comments are listed by reporting period.

Analysis and Interpretation. Examine the comments to see how they relate to maintenance performance. For example, preparation for, and recovery from, field training should be periods of intense maintenance activity. Similarly, the level of maintenance activity may be reduced during Christmas holidays.

Action. Use interpretation comments when analyzing MMIS-86 reports.

INTERPRETATION COMMENTS

SIX-MONTH REPORTING PERIOD ENDING: 3182* (1 JUL 83)

PERIOD END DATE & CYCLE		COMMENT
3021	A	<SUPPORT NATIONAL GUARD>
3028	R	<AFTER-OPERATION MAINTENANCE>
3035	R	<UNIT HOLIDAY>
3042	G	<PAYDAY ACTIVITIES>
3049	A	<ADC(S) INSPECTION>
3056	A	<TRAINING HOLIDAY>
3063	A	<PREPARATION FOR DOWNRANGE>
3070	G	<TRAINING DOWNRANGE BEGINS>
3077	G	<TACTICAL TRAINING DOWNRANGE>
3084	G	
3091	A	<RETURN FROM DOWNRANGE>
3098	A	<POST-OPERATION MAINTENANCE WEEK>
3105	R	<TRAINING HOLIDAY>
3112	R	<PREPARATION FOR BDE CHANGE OF COMMAND>
3119	G	<CHANGE OF COMMAND CEREMONY>
3126	G	<TRAINING HOLIDAY>
3133	A	<DIVISION ACTIVITIES WEEK>
3140	A	<Q SERVICES>
3147	R	<PREPARATION FOR TANK GUNNERY>
3154	G	<TANK GUNNERY>
3161	G	<TANK GUNNERY>
3168	A	<AFTER-OPERATIONS MAINTENANCE>
3175	R	<TRAINING HOLIDAY>
3182*	G	<PAY DAY ACTIVITIES>

Activities that may reduce maintenance performance

Activities that may increase maintenance performance

REF# 1 BN: CDR XO S3 BNO BNS CO: CDR XO

ROSTER

Purpose. The roster primarily provides a basis for maintenance man-hour computations. It has a secondary use as a listing of personnel covered in MMIS-86 and how much time each has remaining in the unit.

Description. The roster is a listing of unit personnel working in a mechanic MOS covered by MMIS-86. For each person, the roster shows:

- MOS--Duty MOS.
- NAME--Name, followed by primary MOS and paygrade in parentheses.
- CODE #--Unique number used as an identifier for system data entry and processing.
- %--The percentage of time spent working in the MOS, i.e., 25, 50, 75 or 100 (full-time).
- HIST--Indication whether or not a task experience history has been entered. A blank indicates a history has been entered, and an 'N' in the column indicates that it has not.
- START DATE--The earlier of when a person joined the unit or was covered in MMIS-86.
- ETD DATE--Estimated time of departure from unit.
- DAYS LEFT--Days left from end of report period to ETD date. Two asterisks mark those persons with 45 or less days remaining.

Analysis and Interpretation. Analysis of the roster can identify:

- Personnel working outside their primary MOS.
- Personnel with no Task Experience History entered in the system.
- Personnel with limited time remaining in the Army.

Action. Results of roster analysis may be used to:

- Schedule training and award of secondary MOS for personnel working outside their primary MOS.
- Follow up on Task Experience History completion.
- Check on status of replacements for departing personnel.

1-99 ARMOR PAGE 1

ROSTER

REPORTING PERIOD ENDING: 3182 (1 JUL 83)

Check on statu of replacement

MOS	NAME	CODE#	% IN MOS	HIST	STRT DATE	ETD DATE	DAYS LEFT	
31V	ALL SECTIONS							
	BEAUMONT,J(05B-E4)	100	50		3144	4014	197	
	DEGASPERIS,R(31V-E6)	103	100		3129	3212	30	**
	HALE,C(31V-E7)	101	100		3129	4015	198	
	KELLER,V(05C-E3)	102	50		3129	5057	606	
45N/T	ALL SECTIONS							
	BURGETT,W(45N-E3)	105	100	N	3129	4327	510	
	HARRIS,J(45N-E4)	104	100		3129	4015	198	
	WOODALL,R(45N-E2)	106	100		3168	3365	183	
63B/S	SERVICE SECTION							
	GARFIELD,G(63B-E2)	107	100		3129	5314	863	
	KANUTH,J(63B-E5)	108	100		3129	4093	276	
	KELLEY,H(63B-E4)	109	100		3129	4237	420	
	WHEELS SECTION							
	ELLINGER,G(63B-E3)	111	100		3129	5327	876	
	HINDIN,R(63B-E4)	112	100		3129	4020	203	
	LINDSAY,J(63B-E3)	110	100		3129	5058	607	
63N/T	SERVICE SECTION							
	BAKER,D(63T-E3)	113	100		3129	6278	1192	
	CHRISTENSON,K(63N-E4)	114	100		3129	9077	2087	
	FIGUEROA,A(63T-E5)	115	100		3129	6285	1199	
	RECOVERY SECTION							
	DICKEY,A(63N-E5)	116	100		3129	7004	1283	
	DIMEO,A(63N-E2)	117	100		3129	5116	665	
	TRACK SECTION							
	DOUGLAS,R(63N-E4)	118	100		3129	4062	241	
	ERHART,B(63N-E3)	119	100		3129	4025	208	
	HAGGERTY,F(63N-E4)	120	100		3129	8286	1350	
	HANKS,,(63N-E6)	121	100	N	3129	3260	28	
	LUKER,W(63N-E5)	122	100		3129	4264	447	
	ST/MARTIN,T(63N-E2)	123	100		3129	6256	1175	

Person working outside primary MOS

Task experience history not on file

** 45 DAYS OR LESS REMAINING

REF# 2 BN: BMS CO: MTR 1SG

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CHAPTER 4
MAINTENANCE MANAGEMENT INFORMATION SYSTEM 86 OPERATION

This chapter provides an overview of MMIS-86 operation and refers the reader to other sources for more detailed information.

MMIS-86 operation involves collection of data on maintenance performance, entering, storing, and processing these data in a computer, and producing a series of output reports for distribution to users. The system operates with minimum interference to normal unit operations, and uses existing information sources where possible.

Detailed information on system operation is in the **Operating Manual, Maintenance Management Information System, Division 86.**

PERSONNEL

Operating MMIS-86 requires a trained **system operator.** Duties of the operator are to collect and check data, enter the data in the computer, print and distribute the required reports and interact with information providers and users.

Other personnel needs are minimal. Members of combat vehicle crews, **mechanics,** and **supervisors** must make entries on specific MMIS-86 forms as a part of their daily maintenance routine.

EQUIPMENT

The MMIS-86 operates with an IBM 5120 computing system, consisting of an IBM 5110 Model 3 computer and an IBM 5103 printer. The computing system requires both an MMIS program diskette and a data storage diskette.

Other equipment needs are a chair and a desk/table for the system operator, and a file cabinet or drawers for storing the data forms, reports and other support materials.

SUPPLIES

Operation of MMIS-86 requires special data collection forms and blank diskettes. Use of the forms and diskettes is covered in the **Operating Manual, Maintenance Management Information System, Division 86.**

FACILITIES

An adequate work area is the only facility required for operation of the MMIS-86. The area must have space for a desk, chair, table, and files.

FORM COMPLETION

Operation of MMIS-86 requires completion of various special forms. Some of these forms require entries by personnel with maintenance responsibilities, i.e., drivers/crews, mechanics, and supervisors. Other forms are completed by the system operator. Table 3 lists the MMIS-86 forms and the persons making entries on the various forms.

TABLE 3
PERSONS MAKING FORM ENTRIES BY TYPE FORM

		Persons Making Form Entries			
#	MMIS-86 Form Title	Driver/ Crew	Mechanic	System Operator	Supervisor
1	Crew Maintenance	X			
2	Mechanic Maintenance		X		
3	Maintenance Task Experience History (by MOS)		X		
4	Interpretation Comments			X	
5	Training Cycle Definition			X	
6	Roster Update			X	
7	Vehicle Bumper Number			X	
8	Mechanic Certification or Task Qualification				X

DATA COLLECTION

Completed forms are collected from the various personnel by the system operator. Forms are collected from a central point in each company, and in battalion maintenance and battalion communications platoons. The system operator checks the collected forms for completeness and validity of the data. Immediate action must be taken to correct incomplete entries and resolve questions of validity/ accuracy.

DATA ENTRY

The data collection forms are designed for entry of the data into the computer without additional annotation. The data on the completed forms is entered into the computer by the system operator. When the appropriate program has been selected, the information from each form can be entered in the computer.

REPORT GENERATION AND DISTRIBUTION

The computer stores and processes the raw data entered from the forms. At specified intervals the system operator has the computer generate and print reports showing the results from the processed data. After the reports are printed they are assembled in sets for each user. The report sets are then distributed to the appropriate recipients by the system operator.

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APPENDIX A

DATA SOURCES/TREATMENT

This appendix describes, for each of the 11 MMIS-86 reports, the sources of data that generate the report and the computing algorithms processed by the system computer. Examples of the eight input data forms are provided in Appendix B.

TABLE 1: BATTALION MAINTENANCE MAN-HOUR SUMMARY

Only one version of this table is produced for a given battalion. For the top portion of the table, Maintenance Hours Per Mechanic Per Week, input data are obtained from Form 2, Mechanic Maintenance. For each MOS and section, two weekly averages are given. The top line gives the number of maintenance hours worked per mechanic per week, averaged over the previous 20 weeks (excluding the most recent 4 weeks). This weekly average is defined by the formula:

$$\frac{\sum_{i=1}^{N} \sum_{j=1}^{20} M_{ij}}{20N},$$

where M_{ij} is the number of maintenance hours worked by mechanic$_i$ during previous week$_j$, and N is the number of mechanics with the appropriate MOS for the section. Similarly, the weekly per mechanic maintenance hour average during the current four-week period is defined by:

$$\frac{\sum_{i=1}^{N} \sum_{k=1}^{4} M_{ik}}{4N},$$

where M_{ik} is the number of maintenance hours worked by mechanic$_i$ during the current week$_j$, and N is defined as above.

For each MOS, the maintenance hour average under the ALL column is based on a **weighted** average of the sections having visible entries. Computationally, this weighted section average is defined as:

$$\frac{\sum_{j=1}^{S} A_j m_j}{T},$$

where A_j is the weekly per mechanic maintenance hour average for section j, m_j is the number of mechanics in section j, S is the number of sections with visible entries for that MOS, and T is the total number of mechanics working in the MOS, i.e.,

$$T = \sum_{j=1}^{S} n_j \quad .$$

The ALL column averages are calculated the same way for both the previous 20-week average and the current 4-week average.

The bottom portion of Table 1, Maintenance Hours per Tank per Week, is derived from input data obtained from Form 1, Crew Maintenance; Form 2, Mechanic Maintenance; and Form 7, Vehicle Bumper Number. For each MOS and company, two weekly per tank averages are given. The top line gives the number of maintenance hours expended per tank per week, averaged over the previous 20 weeks (excluding the most recent 4 weeks). This weekly average is defined by the formula:

$$\frac{\sum_{i=1}^{N} \sum_{j=1}^{20} T_{ij}}{20N} \quad ,$$

where T_{ij} is the number of maintenance hours expended on $Tank_i$ during the jth previous week, and N is the number of tanks in the company. Similarly, the weekly company per tank maintenance hour average during the current four-week period is defined as:

$$\frac{\sum_{i=1}^{N} \sum_{k=1}^{4} T_{ik}}{4N} \quad ,$$

where T_{ik} is the number of maintenance hours expended on $Tank_i$ during current week k, and N is defined as above.

For each MOS, the weekly maintenance hour average under the OVERALL AVERAGE column is based on a **weighted** average of the companies having visible entries. Computationally, this weighted company average is defined as:

$$\frac{\sum_{j=1}^{S} A_j t_j}{T},$$

where A_j is the weekly per tank maintenance hour average for $company_j$, t_j is the number of tanks in $company_j$, S is the number of companies with visible entries (usually S=5), and T is the total number of tanks in the battalion. The OVERALL AVERAGE is computed the same way for both the previous 20-week and current four-week periods.

TABLE 2: MAINTENANCE MAN-HOURS

This table will be produced for each mechanic MOS. Input data are obtained from:

- Form 2, Mechanic Maintenance
- Form 6, Roster Update

ROSTER MAN-HRS, obtained from Form 6, is the weighted sum of the man-hours available to the unit for a given week. The "weight" is given by the proportion of time (1/4, 1/2, or 3/4) the man spends in the particular MOS. A 40-hour work week is assumed. For example, suppose a unit has three men in the MOS who are active on the roster for the week in question. If these men spend 1/4, 3/4, and 1/2 of their time, respectively, in that MOS, then the ROSTER MAN-HRS for that week will be: (1/4) (40) + (3/4) (40) + (1/2) (40) = 60 man-hours.

TOTAL MAINT MAN-HRS is the sum of all maintenance hours recorded during the week on Form 2 by personnel with the specific MOS. Assistance man-hours are not included in the TOTAL MAINT MAN-HRS figure.

MAINT MAN-HRS PER MAN is based on the ratio:

$$\frac{\text{TOTAL MAINT MAN-HRS}}{\text{(ROSTER MAN-HRS)/40}} .$$

The denominator of this expression, ROSTER MAN-HRS/40, gives the fractional number of men that are available during the week. For example, if 200 roster hours were listed for the week and 15 total maintenance man-hours recorded, the number of maintenance man-hours per man would be: 15/(200)/40 = 3.0.

The average for each of the three measures discussed above appear as LONG-TERM AVERAGES at the bottom of each Table 2. This average is based on the first 23 weeks of data in the table; data for the last week are not used to compute the average. By a convention that applies to all MMIS-86 tables, only those weeks for which data were recorded are included in the average. For example, if only three weeks of TOTAL MAINT MAN-HRS data appeared in the table, with values 5, 8, and 5, then the LONG-TERM AVERAGE would be (5 + 8 + 5)/3 = 6.0. This same rule applies to TOTAL MAINT MAN-HRS. The LONG-TERM AVERAGE for MAINT MAN-HRS PER MAN is equal to:

$$\frac{\text{LONG-TERM AVERAGE OF TOTAL MAINT MAN-HRS}}{\text{LONG-TERM AVERAGE OF ROSTER MAN-HRS/40}} .$$

The carets that occasionally appear to the right of MAINT MAN-HRS PER MAN indicate those weeks when the measure is substantially above (^) or below (v) its LONG-TERM AVERAGE. Carets are assigned according to the following rules:

If MAINT MAN-HRS PER MAN > (LONG-TERM AVERAGE + $1.5\sqrt{\text{LONG-TERM AVERAGE}}$), assign ^ .

If MAINT MAN-HRS PER MAN < (LONG-TERM AVERAGE - $1.5\sqrt{\text{LONG-TERM AVERAGE}}$), assign v .

This algorithm is based on the convention for forming a statistical confidence interval, assuming that maintenance hours follow an exponential distribution.[1]

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[1] Miller, I., & Freund, J. E. **Probability and statistics for engineers.** Englewood Cliffs, New Jersey: Prentice-Hall, 1965.

TABLE 3: AVERAGE MAN-HOURS PER CORRECTIVE MAINTENANCE TASK

This table is generated from data on: Form 1, Crew Maintenance and Form 2, Mechanic Maintenance. The two left-hand columns are based on data recorded before the **beginning** of the four-week reporting period. TIMES DONE is the number of times a particular task was performed by the specific MOS before the report period started. PAST AVG is the average number of total man-hours expended on the task over the same period.

In the two right-hand columns, CURR AVG and TIMES DONE are calculated the same way as their counterparts in the left-hand columns, except that they cover data collected during the most recent four-week reporting period. The upright and inverted carets that occasionally appear to the right of the CURR AVG number are designed to flag man-hour averages that deviate substantially from the previous average. The carets are generated according to the algorithm:

If CURR AVG > 2 (PAST AVG), then print $\wedge$

If CURR AVG < 1/2 (PAST AVG), then print $\vee$.

TABLE 4: COMBAT VEHICLE CORRECTIVE MAINTENANCE SUMMARY

Five versions of this table are produced, one for each company. Input data are obtained from:

- Form 1, Crew Maintenance
- Form 2, Mechanic Maintenance
- Form 7, Vehicle Bumper Number

The left-hand side of the table pertains to data collected during the 20 weeks prior to the current four-week period. Each row of this sub-table indicates the number of mechanic tasks, number of mechanic hours, number of crew tasks, number of crew hours, and number of tank-specific repeated tasks, averaged over the current four weeks. Computationally, these averages are defined as:

$$\frac{\sum_{i=1}^{N} M_{ij}}{5} ,$$

where M_{ij} refers to one of these five measures on the ith data Forms 1 or 2 for $Tank_j$, and N is the number of such forms collected during the 20-week period. The AVERAGE line corresponds to the arithmetic average of all **visible** entries above the line. For a given measure, then, AVERAGE is defined as:

$$\sum_{j=1}^{N} A_{j/N} \quad ,$$

where A_j is the average for $Tank_j$, and N is the number of tanks with visible entries.

The right-hand subtable provides a summary of the same five measures over the current four-week period. In this case, the entries correspond to four-week totals, not averages, as defined by:

$$\sum_{i=1}^{N} M_{ij} \quad ,$$

where M_{ij} refers to the measure on the ith Form 1 or 2 for $Tank_j$, and N is the number of such forms obtained during the four-week period. As above, the AVERAGE line corresponds to the arithmetic average of all visible entries above the line.

TABLE 5: MAINTENANCE TASKS BY VEHICLE

Table 5 is generated from data on:

- Form 1, Crew Maintenance
- Form 2, Mechanic Maintenance
- Form 7, Vehicle Bumper Number

Table 5 lists in chronological order the maintenance tasks performed on each vehicle. For a given vehicle, maintenance tasks that appear more than once in the list are flagged with an "R" in one of the right-hand columns. Both the initial and subsequent occurrence(s) of the task are flagged. To facilitate visual identification of specific repeated tasks and the determination of the time interval

between repeats, the position of the "R" shifts one column to the right each time a different repeated task is found in a vehicle's history. Repeat flags are also generated if a task was performed by different MOSs over time, such as removal of the M60 powerpack (MOS 63N/T and crew). Note that only repeat corrective maintenance tasks are flagged with an "R"; periodic services will not be flagged.

TABLE 6: MAINTENANCE TASK PERFORMANCE DATA

Table 6 is generated from:

- Form 1, Crew Maintenance
- Form 2, Mechanic Maintenance
- Form 7, Vehicle Bumper Number

All preventive and corrective maintenance tasks performed on each vehicle during the past 28 days are listed in the order they were performed. For corrective maintenance tasks, the names and man-hours for each of the mechanics participating in the repair are listed under the CM MAN-HOURS column to right. Only man-hour data are shown for tasks peformed by crews. Mechanic data come from Form 2 and crew data come from Form 1.

For periodic services, the names of the mechanics participating in the work are derived from Form 2 data and appear under the appropriate task description. Hours attributed to each individual do **not** appear in the PM MAN-HOURS COLUMN to the right. Rather, the total number of man-hours expended on the task is displayed to the right of the task name under the PM MAN-HOURS column.

For PMCS, the names and man-hours associated with the individual participants are not displayed. Instead, the total number of man-hours expended on PMCS for the vehicle during the reporting period is indicated under the PM man-hours column. Since this figure is usually accumulated over a number of days, a Julian date is not indicated. PMCS is always the last task displayed for a given vehicle.

TABLE 7: CERTIFICATION, QUALIFICATION AND EXPERIENCE SUMMARY BY SECTION

One version of this table is generated for a battalion. Input data are obtained from:

- Form 2, Mechanic Maintenance

- Form 3, Maintenance Task Experience History
- Form 6, Roster Update
- Form 8, Mechanic Certification or Task Qualification.

For each MOS and relevant maintenance section, three measures are displayed. % MECHANICS CERT. is the percentage of mechanics working in the section who have earned either an A or B level certification in any technical area. Computationally, this percentage is defined by the ratio M/N, where M is the number of mechanics with any type of certification and N is the number of mechanics in the section having the appropriate MOS.

% TASKS QUALIFIED is the average percentage from all mechanics on all MOS tasks for which a mechanic could be qualified. Computationally, this percentage is defined as:

$$\frac{\sum_{i=1}^{N} Q_i}{NT},$$

where Q_i is the number of tasks on which the ith mechanic is qualified, N is the number of mechanics with the appropriate MOS in that section, and T is the total number of tasks for which the mechanic could be qualified. This number varies across the MOSs as follows:

- 31V, T = 33
- 45N/T, T = 71
- 63B/S, T = 152
- 63N/T, T = 370.

% TASK EXPERIENCE is the average percentage from all mechanics of MOS tasks that a mechanic has performed three or more times. Computationally, this percentage is defined as:

$$\frac{\sum_{i=1}^{N} E_i}{NT},$$

where E_i is the number of tasks that the ith mechanic has performed three or more times, and N and T are defined the same way as above.

The ALL column refers to, for each MOS and measure, the weighted average percentage of the maintenance sections containing that MOS. ALL is defined as:

$$\frac{\sum_{i=1}^{S} P_i n_i}{N} ,$$

where P_i is the percentage displayed for the ith section, n_i is the number of mechanics with the appropirate MOS in the ith section, and N is the total number of mechanics with the appropriate MOS in all the sections--i.e.,

$$N = \sum_{i=1}^{S} n_i .$$

TABLE 8: CERTIFICATION, QUALIFICATION, AND EXPERIENCE SUMMARY BY INDIVIDUAL

This table will be produced for each mechanic MOS. Input data are obtained from:

- Form 2, Mechanic Maintenance
- Form 3, Maintenance Task Experience History
- Form 6, Roster Update
- Form 8, Mechanic Certification or Task Qualification

The MOST RECENT CERT column displays, for each mechanic, the technical area and proficiency level of his most recent certification (if any). Mechanics having multiple certifications are denoted by a '#.' The % TASKS QUAL and % TASKS EXPER measures are computed in the same way as in Table 7.

Values of % TASKS EXPER are depicted graphically directly to the right. The dotted lines display the experience percentage in 3% increments. The vertical

line corresponds to the overall average displayed on the ALL line. The "+" to the right of the graph indicates that the man has performed a PM or CM task (i.e., turned in a Form 2) within the previous 42 days.

Each measure is summarized by the ALL line at the bottom of the table. Under the MOST RECENT CERT column, ALL refers to the total number of mechanics who have received any type of certification. With respect to the % TASKS QUAL and % TASKS EXPER measures, the ALL line displays the arithmetic average of all **visible** entries above the line.

Since the task history information in Form 3 is used to derive the experience measure, a mechanic must fill out a Form 3 to be included in Table 8. Those individuals not having a Form 3 record in the system will be omitted from Table 8 even though they have performed maintenance in the unit and have turned in data on Form 2.

TABLE 9: QUALIFICATION AND EXPERIENCE SUMMARY BY TASK

Input data for this table come from:

- Form 2, Mechanic Maintenance
- Form 3, Maintenance Task Experience History
- Form 6, Roster Update
- Form 7, Vehicle Bumper Number
- Form 8, Mechanic Certification and Qualification

The NO. TIMES column gives the total number of times the man has performed the task since entering the service. This number is obtained by adding, for each task, the number of experiences recorded on the man's Form 3 history to the number of task experiences accrued since he has been covered under the system. If a mechanic had qualified in a particular task, as indicated on Form 8, then a Q will appear instead of NO. TIMES.

TABLE 10: INDIVIDUAL QUALIFICATION AND EXPERIENCE PROFILE

This table is produced for every mechanic that has performed work on, or has a history of maintenance on, a given vehicle type. Input data come from Forms 2, 3, 6, and 8. Under the QUAL column, a Q is placed next to each task on which

the mechanic has qualified, as indicated on Form 8. NO. TIMES is defined in the same was as Table 9. NO. TIMES is also graphed in the right-hand part of the table. Values are plotted, in increments of 1, from 0 to 20. A '+' is placed at the end of the dotted line for each task that the man performed one or more times during the past 42 days.

TABLE 11: QUALIFICATION AND CERTIFICATION BULLETIN

Only one version of this report is generated for a battalion. Input data are obtained from:

- Form 2, Mechanic Maintenance
- Form 6, Roster Update
- Form 8, Mechanic Certification or Task Qualification

Table 11 lists, in alphabetical order, the names of every mechanic from all maintenance sections who either qualified on one or more tasks or received a technical area certification in the previous 42 days. With respect to task qualifications, the middle column of the table indicates the total number of tasks from all vehicles for which the man received a qualification, as determined by the Form 8 data base.

Regarding certification, the right-hand column shows the technical area and proficiency level for which a man has been certified. If a man has received more than one certification during the preceding 42 days, these additional certifications will also be displayed.

APPENDIX B

EXAMPLES OF MMIS-86 FORMS

This appendix contains examples of each data collection form used in MMIS-86. For detailed information and instructions on use of each form, refer to the **Operating Manual, Maintenance Management Information System, Division 86.**

1 CREW MAINTENANCE

(For completion instructions see reverse side)

1. ⌊_____⌋ Julian date

2. M60 ☐ 1 AVLB ☐ 2 M113 ☐ 3 Equipment Type

3. ⌊_____⌋ Vehicle bumper number

4. Task Numbers ☐☐☐☐

5. Names & Man-Hours

2 MECHANIC MAINTENANCE

(For completion instructions see reverse side)

1. ⌊_____⌋ Julian date

2. M60 ☐ 1 AVLB ☐ 2 M113 ☐ 3 M88 ☐ 4 M578 ☐ 5 M151 ☐ 6 M35/M54 ☐ 7 M561/M792 ☐ 8 GOER ☐ 9 COMMO ☐ 10

3. ⌊_____⌋ Vehicle bumper number

4. 31V ☐ 1 45N/T ☐ 2 63B/S ☐ 3 63N/T ☐ 4 MOS

5. Task Numbers ☐☐☐☐

6. Names & Man-Hours

_____ ☐☐☐☐

_____ ☐☐☐☐

_____ ☐☐☐☐

7. Assistance Man-Hrs (Operators/Crew) ☐☐☐☐

3 MAINTENANCE TASK EXPERIENCE HISTORY (31V)

HOW TO COMPLETE THIS FORM

- *Check the MOS shown in ( ) at the end of the form title above to be sure it matches your* ***duty*** *MOS.*
- *Print your name, primary MOS, and paygrade below.*

NAME _____ *PRIMARY MOS* _____ *PAYGRADE* _____

- *Make the estimates requested below.* ***THIS IS NOT A TEST*** *so please be honest.*
- *Look at the first task on the list.*
- *Estimate how many times you have done this task since you completed AIT or OSUT.*
- *Enter the number in the space for that task. If you have never done the task, leave the space blank.*
- *Continue with the task estimates. Read down each column.*

COMMUNICATIONS EQUIPMENT MAINTENANCE TASK LIST

1. _____ Replace antenna element, AT-1095 OR AS-1730
2. _____ Replace antenna matching unit, MX-6707
3. _____ Replace RF cable, CG-1773
4. _____ Replace cable, CX-4722/4723
5. _____ Test receiver/transmitter, RT-246 OR RT-524
6. _____ Test receiver, R-442
7. _____ Replace amplifier, AM-2060
8. _____ Replace mounting, MT-1029 or MT-1898
9. _____ Replace audio frequency amplifier, AM-1780
10. _____ Replace intercom control set, C-2296/7/8
11. _____ Replace radio control set, C-2299
12. _____ Replace frequency select control, C-2742
13. _____ Replace power cable, CX-4655 (VRC-64)
14. _____ Replace suppressor, MX-7778A
15. _____ Test/repair helmet, CVC
16. _____ Test/repair switchboard, SB-22 OR SB-993
17. _____ Test/repair telephone, TA-312 OR TA-1

COMMUNICATIONS EQUIPMENT (Continued)

18. _____ Test loudspeaker
19. _____ Test microphone or handset
20. _____ Service wire, WD-1 and/or reel, DR-8
21. _____ Test/replace KY-57
22. _____ Test antenna element, AT-1095 OR AS-1730
23. _____ Test antenna matching unit, MX-6707
24. _____ Test RF cable, CG-1773
25. _____ Test cable, CX-4722/4723
26. _____ Test amplifier, AM-2060
27. _____ Test mounting, MT-1029 or MT-1898
28. _____ Test audio frequency amplifier, AM-1780
29. _____ Test intercom control set, C-2296/7/8
30. _____ Test radio control set, C-2299
31. _____ Test frequency select control, C-2742
32. _____ Test power cable, CX-4655 (VRC-64)
33. _____ Test suppressor, MX-7778A

A. _____ Perform periodic service
B. _____ Perform technical inspection

3 MAINTENANCE TASK EXPERIENCE HISTORY (45N/T)

HOW TO COMPLETE THIS FORM

- *Check the MOS shown in ( ) at the end of the form title above to be sure it matches your* **duty** *MOS.*
- *Print your name, primary MOS, and paygrade below.*

NAME _____ *PRIMARY MOS* _____ *PAYGRADE* _____

- *Make the estimates requested below.* ***THIS IS NOT A TEST*** *so please be honest.*
- *Look at the first task on the list.*
- *Estimate how many times you have done this task since you completed AIT or OSUT.*
- *Enter the number in the space for that task. If you have never done the task, leave the space blank.*
- *Continue with the task estimates. Read down each column.*

M60A1 TANK
MAINTENANCE TASK LIST

1. _____ Replace slip ring interference switch
2. _____ Replace no-bak
3. _____ Replace back deck clearance switch
4. _____ Repair main gun firing circuit
5. _____ Replace stabilization system control box
6. _____ Replace stabilization system components
7. _____ Adjust stabilization system
8. _____ Replace superelevation actuator
9. _____ Replace superelevation actuator cable
10. _____ Replace elevation system
11. _____ Bleed turret hydraulic system
12. _____ Replace manual elevation pump
13. _____ Charge manual elevation system
14. _____ Replace anti-backlash cylinder
15. _____ Adjust backlash
16. _____ Replace main accumulator
17. _____ Replace accumulator pressure gauge
18. _____ Charge main accumulator

M60A1 TANK (Continued)

19. _____ Replace TC's power control handle
20. _____ Repair gunner's handle palm switches
21. _____ Repair TC's handle palm switches
22. _____ Replace gunner's control box
23. _____ Replace/adjust loader's safety switch
24. _____ Replace solenoid valve
25. _____ Perform synchronization check - ramp method
26. _____ Perform synchronization check - indoor method
27 _____ Replace azimuth indicator
28. _____ Replace M13A2/M13A1D ballistic computer
29. _____ Replace rangefinder and/or end housing
30. _____ Purge and charge sights
31. _____ Replace M32/M36 light control source
32. _____ Replace turret power distribution box
33. _____ Adjust cupola cradle assembly

M60A1 TANK (Continued)

34. _____ Replace/repair cradle jack screw assembly
35. _____ Troubleshoot turret electrical system
36. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M901 ITV
MAINTENANCE TASK LIST

1. _____ Replace hydraulic filter
2. _____ Service hydraulic accumulator
3. _____ Service hydraulic system
4. _____ Bleed-down hydraulic pressure
5. _____ Remove or install access covers
6. _____ Repair launcher guide rails
7. _____ Repair missile latch manual control handle
8. _____ Repair missile latch actuator straight shaft
9. _____ Remove/install elevation cylinder
10. _____ Remove/install erection arm cover
11. _____ Remove/install erection drive motor
12. _____ Remove/install load position stop
13. _____ Remove/install stow position stop
14. _____ Remove/install high stowage erection arm stop
15. _____ Remove/install chains
16. _____ Adjust deceleration linkage
17. _____ Remove/install azimuth pointer and light
18. _____ Remove/install MGS box assembly
19. _____ Remove/install azimuth drive motor
20. _____ Remove/install azimuth brakes

M901 ITV (Continued)

21. _____ Remove/install hydraulic accumulator
22. _____ Remove/install safety relief valve
23. _____ Remove/install pressure relief valve
24. _____ Purge ITA
25. _____ Purge squad leader's periscope
26. _____ Remove/install fire interrupt/intercom assembly
27. _____ Remove/install azimuth switch assembly
28. _____ Adjust azimuth switch assembly
29. _____ Remove/install azimuth cam
30. _____ Remove/install driver's/gunner's level indicator lamp assembly

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

3 MAINTENANCE TASK EXPERIENCE HISTORY (63B/S)

HOW TO COMPLETE THIS FORM

- ***Check*** *the MOS shown in ( ) at the end of the form title above to be sure it matches your* ***duty*** *MOS.*
- ***Print*** *your name, primary MOS, and paygrade below.*

NAME _____ *PRIMARY MOS* _____ *PAYGRADE* _____

- ***Make*** *the estimates requested below.* ***THIS IS NOT A TEST*** *so please be honest.*
- ***Look*** *at the first task on the list.*
- ***Estimate*** *how many times you have done this task since you completed AIT or OSUT.*
- ***Enter*** *the number in the space for that task. If you have never done the task, leave the space blank.*
- ***Continue*** *with the task estimates. Read down each column.*

M151 ¼ TON TRUCK
MAINTENANCE TASK LIST

1. _____ Adjust valves
2. _____ Adjust clutch pedal free travel
3. _____ Replace clutch, pressure plate and throwout bearing
4. _____ Replace carburetor
5. _____ Replace fuel lines and vent tubes
6. _____ Replace fuel filters
7. _____ Replace fuel pump
8. _____ Replace fuel tank
9. _____ Replace exhaust gaskets
10. _____ Replace muffler and/or tail pipe
11. _____ Replace radiator
12. _____ Replace coolant hoses and clamps
13. _____ Replace belts and/or pulleys
14. _____ Adjust belts
15. _____ Replace generator
16. _____ Replace starter
17. _____ Replace ignition distributor
18. _____ Replace capacitor, rotor contact points and/or spark plugs
19. _____ Adjust contact points
20. _____ Adjust ignition timing

M151 ¼ TON TRUCK (Continued)

21. _____ Replace and/or adjust electronic ignition
22. _____ Repair wiring
23. _____ Replace batteries, cables and/or clamps
24. _____ Replace circuit breakers
25. _____ Replace light bulbs and wires
26. _____ Replace sending units or gages
27. _____ Replace universal joints
28. _____ Replace differential, front or rear
29. _____ Replace differential seal
30. _____ Replace transmission seals
31. _____ Replace sleeve, shaft and cross wheel drive seals, flange _____ and spindle
32. _____ Replace wheel bearing
33. _____ Adjust wheel bearing
34. _____ Adjust service brakes
35. _____ Adjust parking brakes
36. _____ Replace service brakes
37. _____ Replace service brake lines and hoses
38. _____ Replace master cylinder
39. _____ Replace wheel cylinder
40. _____ Replace parking brakes

M151 ¼ TON TRUCK (Continued)

41. _____ Adjust toe in
42. _____ Replace upper and lower ball joints
43. _____ Replace upper and lower suspension arms
44. _____ Replace springs
45. _____ Replace shock absorbers
46. _____ Replace front shock bushings
47. _____ Replace or repair tires
48. _____ Replace windshield wiper motor
49. _____ Replace windshield wiper arm and blade
50. _____ Replace windshield
51. _____ Replace personnel heater assembly
52. _____ Troubleshoot electrical system
53. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M35/M54 2½/5 TON TRUCK MAINTENANCE TASK LIST

1. _____ Adjust clutch controls and linkage
2. _____ Replace clutch controls and linkage
3. _____ Replace electrical intank fuel pump
4. _____ Tighten fuel lines and fittings
5. _____ Adjust/replace accelerator controls and linkage
6. _____ Replace fuel or oil filters
7. _____ Replace exhaust gaskets
8. _____ Replace air cleaner
9. _____ Replace radiator
10. _____ Replace radiator hose and clamps
11. _____ Replace water pump
12. _____ Adjust fan belt
13. _____ Replace fan belt
14. _____ Replace starter
15. _____ Replace battery, cables and/or clamps
16. _____ Replace 25 amp voltage regulator
17. _____ Replace generator/alternator
18. _____ Replace lights and switches
19. _____ Replace sending units or gages
20. _____ Repair wiring/cables

M35/M54 2½/5 TON TRUCK (Continued)

21. _____ Replace horn and/or wiring
22. _____ Replace emergency warning buzzer
23. _____ Replace universal joint
24. _____ Adjust service brakes
25. _____ Replace hand brake shoe
26. _____ Replace service brake shoe
27. _____ Replace master cylinder
28. _____ Replace wheel cylinder
29. _____ Replace brake lines, fittings or hoses
30. _____ Replace hydraulic cylinder (hydro-vac)
31. _____ Repair air system lines and fittings
32. _____ Replace air compressor
33. _____ Replace air compressor drive belt
34. _____ Replace/repack wheel bearings and outer seals
35. _____ Replace inner axle seals
36. _____ Replace/repair tires
37. _____ Replace/tighten lug studs and nuts
38. _____ Adjust steering gear
39. _____ Replace pitman arm
40. _____ Replace drag link components
41. _____ Replace steering knuckle boot
42. _____ Replace spring shackles and bolts
43. _____ Replace windshield wiper motor
44. _____ Replace windows, doors, or mirrors
45. _____ Replace or repair winch cables, shear pin, or drive shaft
46. _____ Troubleshoot electrical system
47. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M561/M792 1¼ TON TRUCK MAINTENANCE TASK LIST

1. _____ Replace oil filter element
2. _____ Replace air box drain tube
3. _____ Adjust accelerator linkage

M561/M792 1¼ TON TRUCK (Continued)

4. _____ Adjust engine stop cable
5. _____ Replace air cleaner element

6. _____ Replace exhaust gaskets
7. _____ Replace muffler and/or tailpipe
8. _____ Adjust belts
9. _____ Replace belts
10. _____ Replace radiator

11. _____ Replace starter motor
12. _____ Repair wiring
13. _____ Replace batteries, cables and/or clamps
14. _____ Replace lights
15. _____ Replace horn assembly

16. _____ Adjust transmission control and linkage
17. _____ Replace universal joint
18. _____ Adjust parking brake handle and linkage
19. _____ Replace master cylinder
20. _____ Adjust and bleed service brakes

21. _____ Replace front or rear steering gear box
22. _____ Replace tractor and carrier steering knuckle
23. _____ Replace tractor and carrier tie rod assemblies
24. _____ Repair tractor front torque tube bearing
25. _____ Replace tractor front and carrier shock absorbers

26. _____ Replace inner and outer central axle shock absorbers
27. _____ Replace steering wheel
28. _____ Replace windshield wiper motor
29. _____ Replace personnel heater
30. _____ Replace bilge pump

31. _____ Replace watertight seals
32. _____ Troubleshoot electrical system
33. _____ Adjust, tighten or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

FOR 63S ONLY

GOER FAMILY
MAINTENANCE TASK LIST

1. ___ ___ Replace generator
2. _____ Replace and/or adjust belts
3. _____ Replace starter
4. _____ Repair wiring
5. _____ Replace primary fuel filter element

6. _____ Replace secondary fuel filter element
7. _____ Adjust service brakes
8. _____ Replace king pins
9. _____ Replace/repair horn
10. _____ Troubleshoot electrical system

11. _____ Adjust, tighten or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

3 MAINTENANCE TASK EXPERIENCE HISTORY (63N/T)

HOW TO COMPLETE THIS FORM

- *Check the MOS shown in ( ) at the end of the form title above to be sure it matches your duty MOS.*
- *Print your name, primary MOS, and paygrade below.*

NAME _____ *PRIMARY MOS* _____ *PAYGRADE* _____

- *Make the estimates requested below. THIS IS NOT A TEST so please be honest.*
- *Look at the first task on the list.*
- *Estimate how many times you have done this task since you completed AIT or OSUT.*
- *Enter the number in the space for that task. If you have never done the task, leave the space blank.*
- *Continue with the task estimates. Read down each column.*

M60A1 TANK/AVLB
MAINTENANCE TASK LIST

1. _____ Remove defective/inoperative powerpack
2. _____ Ground hop powerpack
3. _____ Install repaired powerpack
4. _____ Remove powerpack to do other task(s)
5. _____ Install powerpack after completing other task(s)
6. _____ Remove back deck
7. _____ Install back deck
8. _____ Replace fuel lines and/or fittings
9. _____ Replace fuel filters
10. _____ Replace oil cooler
11. _____ Replace oil filters
12. _____ Replace oil cooler lines
13. _____ Adjust accelerator, throttle controls, and linkage
14. _____ Replace accelerator, throttle controls, and/or linkage
15. _____ Troubleshoot electrical system
16. _____ Repair wiring
17. _____ Replace sending units or gages
18. _____ Replace circuit breakers
19. _____ Replace batteries, cables, and/or clamps
20. _____ Replace voltage regulator

M60A1/AVLB (Continued)

21. _____ Replace starter
22. _____ Replace generator and/or seal
23. _____ Replace air cleaner blower motor
24. _____ Replace blower motor relay
25. _____ Replace fan tower seal
26. _____ Adjust transmission linkage
27. _____ Replace transmission shifting control assembly
28. _____ Replace final drive
29. _____ Replace final drive seals
30. _____ Replace master or slave cylinder
31. _____ Replace main brake line
32. _____ Bleed brake lines
33. _____ Adjust brakes, controls, and/or linkage
34. _____ Replace parking brake and/or cable
35. _____ Adjust servo bands
36. _____ Adjust steering controls and linkage
37. _____ Replace fixed fire extinguishers
38. _____ Adjust/reset fixed fire extinguisher control valves

M60A1/AVLB (Continued)

39. _____ Replace road wheel/support roller bearings and seals
40. _____ Replace shock absorber
41. _____ Replace shock absorber bushings
42. _____ Adjust, tighten, or replace minor components

AVLB ONLY

43. _____ Replace or adjust bridge stow locks
44. _____ Replace hydraulic control valve
45. _____ Bleed hydraulic system
46. _____ Replace hydraulic lift cylinder
47. _____ Replace hydraulic lines and fittings
48. _____ Replace hydraulic pump
49. _____ Replace hydraulic pressure gage

M60A1/AVLB

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M113 CARRIER FAMILY MAINTENANCE TASK LIST

1. _____ Remove defective/inoperative power plant
2. _____ Install repaired power plant
3. _____ Remove power plant to do other task(s)
4. _____ Install power plant after completing other task(s)
5. _____ Replace fuel filters
6. _____ Replace fuel pump
7. _____ Replace fuel pressure sending unit
8. _____ Replace fuel tank
9. _____ Replace hand throttle control
10. _____ Replace fuel shutoff control
11. _____ Replace cooling fan tower
12. _____ Replace radiator
13. _____ Replace radiator hose
14. _____ Replace coolant pump
15. _____ Replace starter

M113 CARRIER FAMILY (Continued)

16. _____ Replace starter solenoid
17. _____ Replace generator
18. _____ Replace belts and/or pulleys
19. _____ Adjust belts
20. _____ Troubleshoot electrical system
21. _____ Repair wiring
22. _____ Replace sending units or gages
23. _____ Replace batteries, cables, and/or clamps
24. _____ Replace voltage regulator
25. _____ Adjust voltage regulator
26. _____ Adjust transmission linkage
27. _____ Replace transmission cross shaft
28. _____ Replace oil filters
29. _____ Replace oil cooler
30. _____ Replace oil cooler hose and fittings
31. _____ Replace final drive
32. _____ Adjust laterals (steering control)
33. _____ Replace pivot steer assembly
34. _____ Replace fixed fire extinguisher
35. _____ Replace road wheel arm and hub
36. _____ Replace road wheel bearings
37. _____ Replace idler wheel arm and spindle
38. _____ Replace U-joint
39. _____ Replace exhaust gaskets or other exhaust components
40. _____ Replace personnel heater
41. _____ Replace bilge pump
42. _____ Replace watertight seals
43. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M88 MEDIUM RECOVERY VEHICLE MAINTENANCE TASK LIST

1. _____ Remove defective/inoperative power plant
2. _____ Ground hop power plant
3. _____ Install repaired power plant

M88 MEDIUM RECOVERY VEHICLE (Continued)

4. _____ Remove power plant to do other task(s)
5. _____ Install power plant after completing other task(s)

6. _____ Remove back deck
7. _____ Install back deck
8. _____ Replace or repair front motor mount assembly
9. _____ Replace fuel lines and/or fittings
10. _____ Replace fuel filters

11. _____ Repair fuel shutoff control valve
12. _____ Adjust accelerator, throttle controls and linkage
13. _____ Replace accelerator, throttle controls and/or linkage
14. _____ Replace oil cooler
15. _____ Replace oil filters

16. _____ Replace oil lines
17. _____ Troubleshoot electrical system
18. _____ Repair wiring
19. _____ Replace sending units or gages
20. _____ Replace circuit breakers

21. _____ Replace batteries, cables and/or clamps
22. _____ Replace electrical fuel shutoff
23. _____ Replace voltage regulator
24. _____ Replace main engine starter
25. _____ Replace starter relay and housing assembly

26. _____ Replace main engine generator
27. _____ Replace APU assembly
28. _____ Replace APU generator starter
29. _____ Replace APU fuel pump and/or filter
30. _____ Adjust transmission linkage

31. _____ Replace transmission shifting control assembly
32. _____ Replace or repair hydraulic lines and fittings
33. _____ Replace final drive

M88 MEDIUM RECOVERY VEHICLE (Continued)

34. _____ Replace final drive seals (O rings)
35. _____ Adjust brakes, controls and/or linkage

36. _____ Adjust steering controls and linkage
37. _____ Replace fixed fire extinguishers
38. _____ Adjust/reset fire extinguisher heads
39. _____ Replace track adjusting arm
40. _____ Adjust track tension

41. _____ Replace track assembly or track block
42. _____ Replace end connector and/or center guides
43. _____ Replace road wheel or bearings/seals
44. _____ Replace road wheel arm
45. _____ Replace support roller or bearings and seals

46. _____ Replace shock absorber or bushings
47. _____ Replace drive sprocket
48. _____ Replace or repair hoist cables
49. _____ Replace or repair winch cables
50. _____ Replace spade release cables

51. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M578 LIGHT RECOVERY VEHICLE MAINTENANCE TASK LIST

1. _____ Remove defective/inoperative power plant
2. _____ Install repaired power plant
3. _____ Remove power plant to do other task(s)
4. _____ Install power plant after completing other task(s)
5. _____ Replace air cleaner blower assembly

M578 LIGHT RECOVERY VEHICLE (Continued)

6. _____ Replace fuel filters
7. _____ Replace fuel low pressure lines and/or fittings
8. _____ Replace oil filters
9. _____ Replace radiator
10. _____ Replace water hoses and pipes

11. _____ Replace fan
12. _____ Replace fan belts
13. _____ Troubleshoot electrical system
14. _____ Repair wiring
15. _____ Replace sending units or gages

16. _____ Replace batteries, cables, and/or clamps
17. _____ Replace voltage regulator
18. _____ Replace generator
19. _____ Replace final drive
20. _____ Adjust shifting controls and linkage

21. _____ Adjust mechanical brake controls and linkage
22. _____ Replace fixed fire extinguishers
23. _____ Replace road wheel arm and hub
24. _____ Replace road wheel
25. _____ Replace idler arm and hub

26. _____ Replace drive sprocket hub
27. _____ Adjust track tension
28. _____ Replace track assembly
29. _____ Replace track shoes (pads)
30. _____ Adjust steering control and linkage

31. _____ Replace lockout cylinder assembly
32. _____ Replace boom cable
33. _____ Replace boom hydraulic cylinder
34. _____ Replace hydraulic lines and fittings
35. _____ Replace personnel heater assembly

M578 LIGHT RECOVERY VEHICLE (Continued)

36. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M151 ¼ TON TRUCK MAINTENANCE TASK LIST

1. _____ Adjust valves
2. _____ Adjust clutch pedal free travel
3. _____ Replace clutch, pressure plate and throwout bearing
4. _____ Replace carburetor
5. _____ Replace fuel lines and vent tubes

6. _____ Replace fuel filters
7. _____ Replace fuel pump
8. _____ Replace fuel tank
9. _____ Replace exhaust gaskets
10. _____ Replace muffler and/or tail pipe

11. _____ Replace radiator
12. _____ Replace coolant hoses and clamps
13. _____ Replace belts and/or pulleys
14. _____ Adjust belts
15. _____ Replace generator

16. _____ Replace starter
17. _____ Replace ignition distributor
18. _____ Replace capacitor, rotor contact points and/or spark plugs
19. _____ Adjust contact points
20. _____ Adjust ignition timing

21. _____ Replace and/or adjust electronic ignition
22. _____ Repair wiring
23. _____ Replace batteries, cables and/or clamps
24. _____ Replace circuit breakers
25. _____ Replace light bulbs and wires

M151 ¼ TON TRUCK (Continued)

26. _____ Replace sending units or gages
27. _____ Replace universal joints
28. _____ Replace differential, front or rear
29. _____ Replace differential seal
30. _____ Replace transmission seals
31. _____ Replace sleeve, shaft and cross wheel drive seals, flange _____ and spindle
32. _____ Replace wheel bearing
33. _____ Adjust wheel bearing
34. _____ Adjust service brakes
35. _____ Adjust parking brakes
36. _____ Replace service brakes
37. _____ Replace service brake lines and hoses
38. _____ Replace master cylinder
39. _____ Replace wheel cylinder
40. _____ Replace parking brakes
41. _____ Adjust toe in
42. _____ Replace upper and lower ball joints
43. _____ Replace upper and lower suspension arms
44. _____ Replace springs
45. _____ Replace shock absorbers
46. _____ Replace front shock bushings
47. _____ Replace or repair tires
48. _____ Replace windshield wiper motor
49. _____ Replace windshield wiper arm and blade
50. _____ Replace windshield
51. _____ Replace personnel heater assembly
52. _____ Troubleshoot electrical system
53. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M35/M54 2½/5 TON TRUCK MAINTENANCE TASK LIST

1. _____ Adjust clutch controls and linkage
2. _____ Replace clutch controls and linkage
3. _____ Replace electrical intank fuel pump
4. _____ Tighten fuel lines and fittings
5. _____ Adjust/replace accelerator controls and linkage
6. _____ Replace fuel or oil filters
7. _____ Replace exhaust gaskets
8. _____ Replace air cleaner
9. _____ Replace radiator
10. _____ Replace radiator hose and clamps
11. _____ Replace water pump
12. _____ Adjust fan belt
13. _____ Replace fan belt
14. _____ Replace starter
15. _____ Replace battery, cables and/or clamps
16. _____ Replace 25 amp voltage regulator
17. _____ Replace generator/alternator
18. _____ Replace lights and switches
19. _____ Replace sending units or gages
20. _____ Repair wiring/cables
21. _____ Replace horn and/or wiring
22. _____ Replace emergency warning buzzer
23. _____ Replace universal joint
24. _____ Adjust service brakes
25. _____ Replace hand brake shoe
26. _____ Replace service brake shoe
27. _____ Replace master cylinder
28. _____ Replace wheel cylinder
29. _____ Replace brake lines, fittings or hoses
30. _____ Replace hydraulic cylinder (hydro-vac)
31. _____ Repair air system lines and fittings
32. _____ Replace air compressor
33. _____ Replace air compressor drive belt

M35/M54 2½/5 TON TRUCK (Continued)

34. _____ Replace/repack wheel bearings and outer seals
35. _____ Replace inner axle seals

36. _____ Replace/repair tires
37. _____ Replace/tighten lug studs and nuts
38. _____ Adjust steering gear
39. _____ Replace pitman arm
40. _____ Replace drag link components

41. _____ Replace steering knuckle boot
42. _____ Replace spring shackles and bolts
43. _____ Replace windshield wiper motor
44. _____ Replace windows, doors, or mirrors
45. _____ Replace or repair winch cables, shear pin, or drive shaft

46. _____ Troubleshoot electrical system
47. _____ Adjust, tighten, or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

M561/M792 1¼ TON TRUCK MAINTENANCE TASK LIST

1. _____ Replace oil filter element
2. _____ Replace air box drain tube
3. _____ Adjust accelerator linkage
4. _____ Adjust engine stop cable
5. _____ Replace air cleaner element

6. _____ Replace exhaust gaskets
7. _____ Replace muffler and/or tailpipe
8. _____ Adjust belts
9. _____ Replace b lts
10. _____ Replace radiator

11. _____ Replace starter motor
12. _____ Repair wiring
13. _____ Replace batteries, cables and/or clamps
14. _____ Replace lights
15. _____ Replace horn assembly

M561/M792 1¼ TON TRUCK (Continued)

16. _____ Adjust transmission control and linkage
17. _____ Replace universal joint
18. _____ Adjust parking brake handle and linkage
19. _____ Replace master cylinder
20. _____ Adjust and bleed service brakes

21. _____ Replace front or rear steering gear box
22. _____ Replace tractor and carrier steering knuckle
23. _____ Replace tractor and carrier tie rod assemblies
24. _____ Repair tractor front torque tube bearing
25. _____ Replace tractor front and carrier shock absorbers

26. _____ Replace inner and outer central axle shock absorbers
27. _____ Replace steering wheel
28. _____ Replace windshield wiper motor
29. _____ Replace personnel heater
30. _____ Replace bilge pump

31. _____ Replace watertight seals
32. _____ Troubleshoot electrical system
33. _____ Adjust, tighten or replace minor components

A. _____ Perform periodic service (Q, S, A or L)
B. _____ Perform technical inspection

4 INTERPRETATION COMMENTS

Julian Date	Comment
⌊_⌋⌊_⌋⌊_⌋	_____
	_____
	_____
⌊_⌋⌊_⌋⌊_⌋	_____
	_____
	_____
⌊_⌋⌊_⌋⌊_⌋	_____
	_____
	_____
⌊_⌋⌊_⌋⌊_⌋	_____
	_____
	_____
⌊_⌋⌊_⌋⌊_⌋	_____
	_____
	_____

5 TRAINING CYCLE DEFINITION

Week ending Julian date	Training cycle	Week ending Julian date	Training cycle
1. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋	5. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋
2. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋	6. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋
3. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋	7. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋
4. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋	8. ⌊_⌋⌊_⌋⌊_⌋	⌊_⌋

ROSTER UPDATE

ADD name

1. 31V ☐ 45N/T ☐ 63B/S ☐ 63N/T ☐ MOS
   1 2 3 4

2. _____ (_____)
   Name (Primary MOS-paygrade)

3. SVC ☐ RCVRY ☐ TRACK ☐ WHEEL ☐ TURR ☐ COMMO ☐ Section
   1 2 3 4 5 6

4. 25 ☐ 50 ☐ 75 ☐ 100 ☐ % of time working in MOS
   1 2 3 4

5. ⌊__⌋⌊__⌋⌊__⌋ Start date

6. ⌊__⌋⌊__⌋⌊__⌋ ETD date

DELETE

	Code#	Effective Julian date	Name
1.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
2.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
3.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
4.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
5.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
6.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____

MODIFY

	Code#	Effective Julian date	Change
1.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
2.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
3.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
4.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
5.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____
6.	⌊__⌋	⌊__⌋⌊__⌋⌊__⌋	_____

7 VEHICLE BUMPER NUMBER

ADD Bumper number

	M60	AVLB	M113	M88	M578	M151	M35/M54	M561/M792	GOER	
1.	☐	☐	☐	☐	☐	☐	☐	☐	☐	Vehicle Type
	1	2	3	4	5	6	7	8	9	

	Date	Bumper #
2.	⌊_____⌋	⌊_____⌋
3.	⌊_____⌋	⌊_____⌋
4.	⌊_____⌋	⌊_____⌋
5.	⌊_____⌋	⌊_____⌋
6.	⌊_____⌋	⌊_____⌋
7.	⌊_____⌋	⌊_____⌋
8.	⌊_____⌋	⌊_____⌋
9.	⌊_____⌋	⌊_____⌋

MODIFY Bumper number

	M60	AVLB	M113	M88	M578	M151	M35/M54	M561/M792	GOER	
1.	☐	☐	☐	☐	☐	☐	☐	☐	☐	Vehicle Type
	1	2	3	4	5	6	7	8	9	

2. ⌊_____⌋ Old #

⌊_____⌋ New #

DELETE Bumper number

	M60	AVLB	M113	M88	M578	M151	M35/M54	M561/M792	GOER	
1.	☐	☐	☐	☐	☐	☐	☐	☐	☐	Vehicle type
	1	2	3	4	5	6	7	8	9	

	Date	Bumper #
2.	⌊_____⌋	⌊_____⌋

8 MECHANIC CERTIFICATION OR TASK QUALIFICATION

1. ☐☐☐ Julian date

2. 31V ☐ 45N/T ☐ 63B/S ☐ 63N/T ☐ MOS
   1 2 3 4

3. _____ Mechanic's name

If CERTIFICATION, enter:

4. TRACK ☐ WHEEL ☐ TURR ☐ COMMO ☐ Tech Area
   1 2 3 4

5. A ☐ B ☐ Certification Level

If TASK QUALIFICATION, enter:

6. M60 ☐ AVLB ☐ M113 ☐ M88 ☐ M578 ☐ M151 ☐ M35/M54 ☐ M561/M792 ☐ GOER ☐ COMMO ☐ Equipment Type
   1 2 3 4 5 6 7 8 9 10

7. ☐☐☐☐☐☐☐☐ Task Number

8. _____ Authorizer's Signature

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