



MCTP 3-40E

Maintenance Operations



U.S. Marine Corps

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FOREWORD

Marine Corps Tactical Publication (MCTP) 3-40E, *Maintenance Operations*, provides the commander and staff with the fundamental principles required for the planning and execution of Marine air-ground task force maintenance operations. It provides a practical approach to understanding maintenance operations of ground equipment that can be applied without any significant technical background.

This publication does not address certain aspects of maintenance with the MAGTF. Maintenance policies and procedures for aircraft and other Navy-procured equipment are outlined in the current Chief of Naval Operations Instruction 4790.2J, *The Naval Aviation Maintenance Program (NAMF)*. Class VIII medical and dental equipment have specific maintenance requirements that differ from normal Marine Corps maintenance procedures for ground combat equipment. Marine Corps Order 4400.201, *Management of Property in the Possession of the Marine Corps (vol. 12, Marine Corps Class VIII Management and Sustainment)*, provides maintenance management policies and procedures for Marine Corps medical and dental equipment.

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Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS



W. F. MULLEN III

Major General, U.S. Marine Corps
Commanding General
Training and Education Command

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To Our Reader

CHAPTER 1

MAINTENANCE FUNDAMENTALS

Marine Corps Doctrinal Publication (MCDP) 4, *Logistics*, indicates that “the complexity of the tasks involved in supporting a high technology force also increases as the sophistication of its weapons and equipment increases.” Quite simply, the more advanced the equipment, the harder it is to fix. Along with an ever-increasing tempo and reduced response time over greater distances, maintenance becomes a significant challenge. To meet this challenge and ensure combat readiness, commanders must be maintenance-oriented and have a basic understanding of the Marine Corps’ maintenance system.

Maintenance is one of the functional areas of logistics. It consists of—

- All action, including inspection, testing, servicing, classification as to serviceability, repair, rebuilding, and reclamation taken to retain materiel in a serviceable condition or to restore it to serviceability.
- All supply and repair action taken to keep a force in condition to carry out its mission.
- The routine recurring work required to keep a facility in such a condition that it may be continuously used at its originator-designed capacity and efficiency, for its intended purpose.

The purpose of maintenance is simple and direct—to keep equipment in service. Accordingly, maintenance should be emphasized at every level of command. Ground equipment is incorporated into the Marine Corps maintenance cycle in able to restore or retain materiel in a serviceable or operational condition. Maintenance tasks are grouped into two types, preventive and corrective. Preventive maintenance is the practice of maintaining equipment on a regular schedule, based on elapsed time, usage (e.g., rounds or counter), or other condition or event. Corrective maintenance involves actions that restores deadlined or degraded equipment to a serviceable condition.

MAINTENANCE SUBFUNCTIONS

Actions required to maintain Marine Corps equipment are divided into subfunctions of maintenance. These subfunctions serve as a framework to ensure all equipment is maintained in an efficient and thorough manner. The following subfunctions ensure consistency and serve as a touchstone for all Marine Corps maintenance organizations:

- Inspection and classification.
- Servicing and tuning.
- Testing and calibration.

- Repair.
- Modification.
- Rebuilding and overhauling.
- Reclamation.
- Recovery and evacuation.

Inspection and Classification

Inspection and classification are the first and last tasks that a user and maintenance activity perform on equipment.

Inspection is the checking or testing of a repairable item against established standards. The inspection process determines maintenance requirements and if satisfactory maintenance was performed. It determines if something is wrong with the equipment or if the equipment has been properly corrected to the established standard. Inspections are most effective when the inspector is not the person who performs the maintenance.

Classification is the assignment of an item to a maintenance category based on established procedures and inspection results. The assigned classification determines who repairs the item and where the repairs are to be made.

When an item is evacuated to a higher repair capability, the receiving repair organization also inspects and classifies equipment for serviceability/failure using tools and techniques unavailable to the originating organization. This confirms the results of the originating organization's inspection. The higher repair capability also performs a final inspection and classification before returning the equipment to the originating organization. This confirms that the appropriate repairs were completed. The owning unit's maintenance organization performs the final equipment inspection and classification before placing the item back into service.

Servicing, Adjustment, and Tuning

Servicing and tuning tasks do not have precise definitions. Servicing may include all repairs or maintenance, including adjustment and tuning. Tuning is a process of adjusting equipment to achieve precise functioning. For example, tuning often refers to engine adjustments; however, engines are not the only components that need adjustments. Regardless of precise definitions, the terms have one thing in common: they refer to maintenance performed on operable equipment, including equipment that the maintenance activity has just repaired.

Testing and Calibration

Testing and calibration are terms that apply to the maintenance of precision instruments. These instruments may be components of larger items or they may be standalone maintenance test equipment. Testing compares the accuracy of the instrument to an established tolerance standard. Calibration refers to a set of operations performed in accordance with a defined documented procedure that compares the measurements performed by an instrument to those made by a more accurate instrument or standard for the purpose of detecting, reporting, or eliminating adjustment errors in the instrument being evaluated.

Repair

Repair is the return of an item to serviceable condition through corrective action for a specific failure or unserviceable condition. The repair cycle starts when the maintenance activity removes an unserviceable part or repairable component. It ends when the maintenance activity reinstalls the replacement part or repairable component and places the equipment back in service/operable status.

The *DOD Dictionary of Military and Associated Terms* (hereafter referred to as the *DOD Dictionary*) defines a repairable item as “an item that can be reconditioned or economically repaired for reuse when it becomes unserviceable.” A maintenance activity reconditions or repairs a repairable item after its removal and keeps it in stock for reuse when the same type of component becomes unserviceable on another item of equipment. These are often referred to as “secondary repairable” or “line replacement units.” See chapter 4 for more information on secondary repairable items.

Cannibalization. Cannibalization is the removal of a serviceable secondary repairable, repair part, or component from one unserviceable allowance item for installation purposes on another unserviceable allowance item, return it to an operational status, and without having to use a replacement. Cannibalization does not address the replacement of the removed serviceable repair part/component. Refer to Selective Interchange in the section below for replacement of parts. Per Marine Corps Order (MCO) 4790.25, *Ground Equipment Maintenance Program (GEMP)*, and Marine Corps Users Manual 4000-125, *Retail Supply and Maintenance Execution Procedures*, the approval authority for conducting and reporting cannibalization will reside with Marine Corps Logistics Command (MARCORLOGCOM).

Selective Interchange. Selective interchange is the exchange of selected serviceable parts/components from a deadlined item of equipment for unserviceable repair parts/components from a like item. The maintenance activity is required to immediately requisition the repair parts/components for the donor equipment. Selective interchange can decrease the time it takes to repair an item and return it to service. Selective interchange is commonly recognized as a lesser degree of cannibalization. Approval authority for conducting and reporting selective interchange will be authorized at the battalion/squadron level.

Salvage. Per JP 4-0, salvage is: 1. Property that has some value in excess of its basic material content but is in such condition that it has no reasonable prospect of use for any purpose as a unit and its repair or rehabilitation for use as a unit is clearly impractical. 2. The saving or rescuing of condemned, discarded, or abandoned property, and of materials contained therein, for reuse, refabrication, or scrapping

Modification

A modification changes the design or assembly characteristics of systems, end items, components, assemblies, subassemblies, or parts. The modification’s purpose is to improve equipment functionality, maintainability, or reliability (usually issued as a normal modification), or its safety characteristics (typically seen as urgent modification). Maintenance activities routinely apply normal modifications to upgrade otherwise operable equipment. However, in circumstances that require urgent modification, the item may be placed in an administrative/safety deadline status,

pending application, to prevent possible damage or unsafe conditions. Extensive modifications are submitted via an engineer change proposal for product improvements and are managed separately from modifications.

Rebuilding and Overhauling

Rebuilding restores items to like-new condition. The rebuilt item's appearance, performance, and capabilities are the same as originally manufactured. Overhauling restores items to a serviceable condition under maintenance serviceability standards. Overhauling is the complete disassembly, cleaning, evaluating, and reassembly of an item/assembly (to include all of its components and subcomponents) for the purpose of replacing any parts that are out of tolerance. Rebuilding is a depot-level maintenance function. Rebuilding is the process of restoring an item/assembly to a like new condition. The item/assembly is completely disassembled, cleaned, inspected, remachined, reassembled, aligned/calibrated, and tested to ensure functional operation and conformance to quality standards. Rebuilt items/assemblies are returned to a like-new condition in regard to performance and reliability. Depending on the item, overhauling may be either a depot or intermediate-level maintenance activity function. When rebuilding or overhauling an item, the maintenance activity performs all required modifications that were not previously applied.

Reclamation

Reclamation is the action taken to restore condemned, scrapped, abandoned, or damaged materiel, parts, and components. Reclamation actions include repair, fabrication, or renovation. Reclamation is a depot-level function that returns all reclaimed items to the supply system.

Recovery and Evacuation

Recovery is the process of retrieving or freeing immobile, inoperative, or abandoned materiel. It includes returning it to operation or taking it to a collection point for repair, evacuation, or disposal. Recovery is the responsibility of the owning unit. Evacuation moves materiel from one maintenance activity to another for repair or disposal. It includes moving equipment between the owning unit's maintenance site and the supporting maintenance activity.

LEVELS OF MAINTENANCE

Marine Corps maintenance capability is defined within two levels of maintenance: field and depot. The distinction between field and depot levels of maintenance is based on the maintenance tasks performed within each level.

Field Level of Maintenance

The field level of maintenance is any maintenance that does not require depot-level maintenance capability and is performed by crew/operators and maintainers within Marine Corps organizations and activities and/or by approved commercial/contract sources. Alignment of tasks within the field levels of maintenance is based on supporting/supported relationships and respective capabilities among units. A unit may perform any field-level maintenance tasks for which it is manned, trained, and equipped. Units are not authorized to conduct maintenance tasks outside of

their assigned capabilities. Maintenance tasks performed within the field level of maintenance are categorized as organizational and intermediate:

- *Organizational*. Organizational maintenance tasks are the responsibility of and performed by the owning organization on its assigned equipment. It normally consists of inspecting, servicing, lubricating, and adjusting, as well as the replacing of parts, minor assemblies, and subassemblies. It is not only accomplished by maintenance personnel, but also by equipment operators.
- *Intermediate*. Intermediate maintenance tasks may require a higher level of technical training and specialized tools and/or facilities. It consists of a range of capabilities including modification, replacement, fabrication, overhaul, component/subcomponent/assembly/subassembly repair, calibration and repair of test, measurement, and diagnostic equipment (TMDE), software maintenance, precision machining, welding, evacuation, disposal, salvage, and demilitarization of equipment or materiel.

Alignment of maintenance tasks within the field level of maintenance is established by supporting/supported relationships that define the framework for alignment of organizational and intermediate maintenance tasks. Supporting/supported relationships may be standing/long-term and defined in unit mission statements and supported with capabilities established in tables of organization and equipment (TO&Es) or assigned for specific operations and supported with task-organized capabilities. Supporting/supported relationships will be planned and executed to align and manage the respective maintenance capabilities among units as effectively as possible within given constraints. Flexibility in alignment of maintenance tasks, within the supporting/supported relationship framework, is required to enable commanders to best align maintenance requirements to capabilities. Supporting commanders may perform maintenance tasks that are within supported units' capabilities, including but not limited to, overflow maintenance, contact teams, and organizational tasks required to be performed for equipment to be evacuated to their supporting unit. However, in making these decisions, commanders must consider the impacts of their decisions not only to their own operations and resources, but also on those of their supporting/supported units. Unit commanders should coordinate closely in order to ensure the most effective use of maintenance resources (i.e., time, personnel, repair parts, tools and equipment, facilities, funds, and publications) within their respective capabilities and incorporate local standing operating procedures (SOPs) to facilitate the same.

Depot Level of Maintenance

The depot level of maintenance are actions taken on materiel or software involving the inspection, repair, overhaul, modification, or reclamation (as necessary) of weapons systems, equipment end items, parts, components, assemblies, and subassemblies that are beyond field-level maintenance capabilities, and/or are authorized and directed by Deputy Commandant for Installation and Logistics. Depot maintenance is not defined by location. The Marine Depot Maintenance Command, other Service depots, commercial industrial facilities, original equipment manufacturers, or a combination thereof may perform depot-level maintenance and related activities throughout the logistic framework. In all cases, depot-level maintenance will be specifically authorized and directed by Deputy Commandant for Installation and Logistics, following coordination with Marine Corps Systems Command (MARCORSYSCOM)/Program Executive Office (PEO) and MARCORLOGCOM. Under the total life cycle management process, the depot level of maintenance is an essential part of supporting and extending equipment life cycles and can also be

leveraged to contribute to field maintenance efforts by providing overflow, on-site maintenance services, and technical assistance, as appropriate, to maintain enterprise materiel availability.

MAINTENANCE ENABLERS

Per Department of Defense Directive 4151.18, *Maintenance of Military Materiel*, the Department of Defense (DOD) authorizes and directs Services to employ the full spectrum of maintenance support structures available to sustain military materiel, including commercial sector support and partnering, to meet readiness and sustainability objectives. Use of maintenance capabilities outside of Marine Corps field and depot levels of maintenance may be advantageous or required to support the mission; however, it must be authorized by the appropriate MARCORSYSCOM/PEO program managers in order to ensure that the maintenance being conducted supports the total life cycle management plan for the equipment; is not redundant to maintenance already planned/programmed; and that costs, performance, and reliability data associated with maintaining the end-item or component is captured for use in systems and maintenance engineering. Commands and maintenance activities desiring to use an external maintenance capability will contact MARCORSYSCOM/PEO via the chain of command in order to gain approval for external maintenance.

Warranty

The objective of a warranty is to ensure that contractors design, produce, and deliver a quality product, and it gives the US Government recourse if the product does not perform as contractually agreed to by both parties. The MARCORSYSCOM/PEO program managers have overall responsibility for warranty planning for Marine Corps acquisitions and coordinate with MARCORLOGCOM Weapon System Management Center in the development and execution of warranty programs. The program managers coordinate with MARCORLOGCOM weapon system management teams in the administration/execution of warranties and provide guidance to weapon systems or equipment users for accessing warranty maintenance via published fielding plans.

Contractor Logistic Support

Contractor logistic support maintenance is performed under contract by commercial organizations as authorized by MARCORSYSCOM/PEO. Contractor logistic support is a method of obtaining logistic support for a product or service for a specified period of time, and it may be used to provide service and materiel solutions to the warfighter for sustained operations in order to meet established metrics. Contractor logistic support may include maintenance services and materiel provided under equipment warranty programs, which is determined by the product support strategy. In order to be effective and to provide continued support for items transitioning to organic support, contractor logistic support must be planned and coordinated so that usage data and requirements are tracked, accountability is maintained, readiness is properly reported, and distribution requirements are met while operating in expeditionary or garrison environments. Contractor logistic maintenance support will be integrated and monitored throughout the equipment life cycle for management, performance tracking, and effective process flow throughout the supply and distribution chains.

Inter-Service Support Agreements

Marine Corps activities may request support from DOD activities when organic capabilities do not exist or when support can be obtained more efficiently, or effectively, from existing DOD capabilities. An inter-Service support agreement (ISSA) allows DOD activities to provide requested support when it is in the best interest of the US Government and that capabilities exist to provide support without being detrimental to operations. Marine Corps activities shall ensure ISSAs for maintenance support are in compliance with equipment sustainment strategies and that appropriate maintenance data associated with an ISSA is captured in Marine Corps maintenance automated information technology systems. The ISSA determination may be a prerequisite depending on operational planning, assigned units, or mission set and is ratified by the signing of a support agreement. No further written requirements, beyond an ISSA, are required between DOD activities.

Cannibalization and Selective Interchange

Cannibalization and selective interchange increase equipment operational availability when repair parts are not available through the supply chain or when combat conditions warrant increased equipment availability for mission accomplishment. Requests for cannibalization and selective interchange will be closely scrutinized and authorized when it is necessary for mission accomplishment. These practices double the maintenance effort, degrade the reliability of an asset from established standards, skew life cycle planning functions, and fail to register demand upon the supply chain if not properly recorded. They further complicate the serialized management of materiel metrics and must be authorized, performed, recorded, documented, and reported on a case-by-case basis.

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CHAPTER 2

MAINTENANCE AT THE LEVELS OF WAR

Modern US military theory and practice divides war into three levels: strategic, operational, and tactical. The strategic level is concerned with the art and science of employing national power and leveraging its industrial base. The operational level is concerned with planning and conducting campaigns. It is at this level that military strategy is implemented by assigning missions, tasks, and resources to tactical operations. The tactical level is focused on the battlespace and the required assets necessary to accomplish the assigned mission. The following paragraphs describe maintenance organizations and capabilities as they apply to the three levels of war.

STRATEGIC

The overall policy framework for the accomplishment of DOD maintenance is provided in Department of Defense Directive 4151.18. It does not, however, specifically identify what work should be accomplished at the field or depot levels of maintenance.

It should be noted that while the Office of the Secretary of Defense is responsible for establishing an overarching DOD maintenance policy, the three Service secretaries are ultimately responsible for equipping their forces and maintaining their equipment. It is under this responsibility that the Marine Corps interfaces at the strategic level of war. Although the Marine Corps is very limited in leading acquisition initiatives, this is where the national industrial base and MARCORSYSCOM interact. Additionally, MARCORSYSCOM works closely with the other Services for equipment development, life cycle management, and resource procurement.

OPERATIONAL

The operational level of war links the strategic and tactical levels. Likewise, Marine Corps maintenance at the operational level provides a connection between the strategic and the tactical levels. At the operational level of war, Marine Corps activities may take advantage of ISSAs with other Services when organic capabilities do not exist or when support can be obtained more efficiently or effectively from existing DOD activities.

Depot-level maintenance occurs at the operational level of war and is an essential part of supporting and/or extending equipment service in the total life cycle management process. Depot-level maintenance may cross into the tactical level by contributing to field-level maintenance efforts by

providing overflow maintenance, technical assistance, or on-site maintenance as appropriate to maintain enterprise materiel availability.

Marine Corps Systems Command/Program Executive Office, Land Systems

Marine Corps Systems Command serves as the Department of the Navy's command for Marine Corps ground weapon and information technology system programs in order to equip and sustain Marine Corps forces with full-spectrum, current and future expeditionary and crisis response capabilities. Program Executive Office, Land Systems supports the warfighter's needs by devoting full-time attention to Marine Corps weapon systems acquisition, while partnering with MARCORSYSCOM and other US Services, in order to develop, deliver, and provide life cycle planning for assigned programs.

Original equipment manufacturer and contracted logistic support (e.g., field service representatives, supply chain support, training, warranty, maintenance) are effective means to support Marine Corps equipment under the appropriate conditions as set forth through the acquisitions process. Maintenance is performed under contract by commercial organizations as authorized by MARCORSYSCOM/PEO Land Systems.

Marine Corps Logistics Command

Marine Corps Logistics Command provides worldwide, integrated logistical/supply chain and distribution management; maintenance management; and strategic repositioning capability in support of the operating forces and other supported units in order to maximize their readiness and sustainability and support enterprise and program level total life cycle management. The Marine Depot Maintenance Command falls under MARCORLOGCOM.

TACTICAL

Logistic support is conducted by executing and integrating the six functions of logistics throughout the spectrum of conflict. Tactical-level logistics is not synonymous with combat service support (CSS). Tactical-level logistics is a subset of CSS that is solely focused on supporting combat operations. Combat service support encompasses the essential capabilities, functions, activities, services, materiel, and transportation required to support Marines within the continental United States and outside the continental United States.

All elements across the Marine air-ground task force (MAGTF) possess an organic maintenance capability. Maintenance will be identified and performed by internal organizational maintenance capabilities on respective TO&Es assets before being repaired or evacuated by/to another organization. This procedure provides consistency and economy within the maintenance process and ensures equipment is maintained at the lowest level within the unit's capabilities.

The MAGTF logistics combat element (LCE) provides both general support and direct support maintenance to all elements of the MAGTF. Direct support requires a force to support another force and answers directly to the supported force's maintenance requests. General support is

provided to the supported force as a whole and the supported unit must request maintenance support from the appropriate supporting headquarters. The MAGTF LCE may be a permanent organization or it may be task-organized for a specific mission. Regardless of how the organization is formed, they may be tasked to perform direct support or general support maintenance.

If a permanent maintenance organization is established with a TO&E, their TO&E will establish its structure and mission as well as the quantity and type of authorized equipment to perform its assigned mission. Within the Marine expeditionary force, the Marine logistics group (MLG) is the primary source of intermediate maintenance support.

Task-organized units use a quantitative and qualitative process to best structure available assets to support a specific mission and concept of operations. The LCE is the MAGTF element that provides task-organized field-level maintenance capability to support requirements beyond the organic capabilities of the MAGTF elements.

Mobile Maintenance Teams

Mobile maintenance teams are used to diagnose problems, fix equipment, route repairs, and replace combat unit equipment as far forward as possible on the battlefield. There are two types of mobile maintenance teams: a maintenance contact team (MCT) and a maintenance support team (MST). Maintenance contact teams come from the organizational maintenance activity of the equipment owner and are located close to combat units. Maintenance support teams usually come from the LCE and perform their duties at forward sites. The MST provides on-site equipment repair, minimizes downtime, and increases equipment availability to the unit when all repair efforts have failed organically or the requisite knowledge, skills, ability, and capability do not exist within the unit. The situation determines the composition of the mobile maintenance team (manpower and equipment). Therefore, mobile maintenance teams are task-organized to fit the particular maintenance effort required.

Maintenance Contact Team. The MCT is a key element of organizational maintenance and has organizational maintenance repairmen with tools, test equipment, technical publications, and limited repair parts. Therefore, the MCT may have communications, engineer, motor transport, or ordnance repair personnel depending on the TO&E. The unit commander determines the exact number of personnel and mix of skills necessary for each MCT.

Maintenance Support Team. The LCE commander may form MSTs from available assets and determines the task organization of the MST. At a minimum, the MST contains intermediate-level maintenance capabilities (i.e., engineer, motor transport, ordnance, communications-electronic, and general support personnel), special tools, and transportation as required. Typically, the LCE commander uses MSTs to support either organizational MCTs within the MAGTF or to augment subordinate LCE capabilities during surge periods.

Combat Service Support Installations

Logistic installations are the source of most CSS for the MAGTF. These installations are physical locations either aboard ship or ashore. The number, location, and specific capabilities of CSS installations are based on the MAGTF's mission, concept of operations, and CSS concept.

The MAGTF's concept of operations must address the requirement to defend and protect these installations and facilities. The following are the major types of CSS installations:

- Main combat service support area (CSSA).
- Forward CSSA.
- Beach support area (BSA).
- Landing zone support area (LZSA).
- Repair and replenishment point.

Main Combat Service Support Area. The LCE establishes a main CSSA in close proximity to a beach, seaport, and/or an airfield. From this location, the main CSSA supports other CSS installations and provides greater support capabilities to the MAGTF than those available at forward installations. All six functional areas of tactical-level logistics, or any combination thereof, are resident within the main CSSA, to include dumps and issue points for rations, fuel, ammunition, and water. Logistics combat element commanders generally divide their recovery assets between the main CSSA and the forward CSSA to achieve a balance between economy and responsiveness.

Forward Combat Service Support Area. The forward CSSA is an installation usually located closer to the unit it is assigned to support. It is designed to extend the reach of the main CSSA by funneling CSS to forward supported units or their LCE detachments. The forward CSSA provides a minimal amount of essential support required in the six functional areas of tactical logistics. Based upon the MAGTF concept of operations, the LCE commander determines the best composition (e.g., dumps, issue points) to support the operation.

Beach Support Area. The BSA is normally one of the first CSS installations established ashore during an amphibious operation. It is established by the landing force support party (LFSP) to facilitate initial throughput requirements. Eventually, the BSA may expand, to include the full spectrum of tactical logistic functions, and evolve into a CSSA. Although, it may eventually be dissolved, become the forward CSSA, or the only CSS installation ashore. Depending on the operational situation, it may be one of several CSS installations established to support the scheme of maneuver. The LCE commander determines the BSA's composition (e.g., functional capabilities, dumps, issue points) based on the MAGTF concept of operations.

Landing Zone Support Area. The LZSA is a CSSA established to support air assault operations. It is normally developed from an existing landing zone (LZ) that was established by a helicopter/tiltrotor support team. A LZSA is established when supplies and materiel buildup is required beyond the air assault unit's basic load of supplies and ammunition or organic logistic support capabilities. When a logistic support buildup begins in an LZ, control of the LZ normally transitions from the air assault unit's helicopter/tiltrotor support team to a designated LCE unit and the LZ is redesignated an LZSA. Although the LZSA can be expanded into a CSSA, it is most often a short-term installation with limited capabilities. Typically, an LZSA only contains dumps for rations, fuel, ammunition, and water.

Repair and Replenishment Point. The LCE normally establishes a temporary repair and replenishment point to support mechanized or rapidly moving units. Repair and replenishment

points are either a pre-established location or a hastily selected point to rearm, refuel, or provide repair services to the supported unit. Depending on the mission, an LCE detachment may establish multiple repair and replenishment points that are normally located in forward areas near the supported unit's logistic trains.

Central Maintenance Shops

The organization of a unit's maintenance activities, personnel, and equipment into a central maintenance shop, if compatible with the unit's mission, is normally preferred over distribution throughout the unit's operating elements. A central maintenance shop increases economy of operations, decreases time required for maintenance, and improves maintenance quality. Although a maintenance shop's organization will vary, most shops consist of a shop office/operations section, administrative section, services section, maintenance section, and an issue point.

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CHAPTER 3

MAINTENANCE MANAGEMENT

Maintenance management is the systematic approach to maintaining organizational equipment. There are four principal concerns in maintenance management: command, resources, production, and information. The ability to plan, organize, staff, direct, and control a command's ground equipment maintenance program is the foundation for sustainment in combat.

COMMAND

Among the four principal concerns of maintenance management, command is the most significant. Command contains four key elements that commanders use to focus and fulfill their responsibilities: interest, organization, policies, and procedures.

Interest

Command interest must reflect the responsibility inherently assigned to the commander for equipment readiness. Commanders are not expected to possess a maintainer's expertise, but they are expected to demonstrate sincere interest in their unit's maintenance program. Their personal interest is essential to a successful ground maintenance program that will intrinsically motivate personnel to maintain a high level of excellence.

Organization

Typically, commands authorized to conduct field-level maintenance, for more than one commodity area, have maintenance management officers. A maintenance management officer is designated to perform the general duties of a special staff officer under the staff cognizance of the G-4/S-4 and is the primary point of contact in maintenance management matters. If a maintenance management officer is not identified in the organizational structure, commanders will assign, in writing, maintenance management officer responsibilities as an additional duty. The maintenance management officer coordinates and integrates command efforts in the maintenance management functional areas as follows:

- Maintenance administration.
- Personnel and training.
- Records and reports.
- Publications control.
- Equipment availability.
- Maintenance scheduling.

- Supply support.
- Maintenance-related programs.

Policies

The MCO 4790.2, *Field-Level Maintenance Management Policy (FLMMP)*, is the foundation document that explains the roles and responsibilities of a unit's maintenance management program. The unit commander must ensure compliance with this policy as well as the other supporting policies (e.g., MCO 4400.201, *Management of Property in the Possession of the Marine Corps - Volume 1-17*) when developing their internal policies.

Standing Operating Procedures, Desktop Procedures, and Turnover Folders

Commanders at major subordinate commands are required to publish a maintenance management SOP. The SOP will not contain all subordinate unit functions; however, it should be applicable at the unit level and adequately detailed to ensure that each subordinate unit can perform its maintenance mission. Commanders at subordinate command levels (including detached or separate commands) authorized to perform field levels of maintenance for more than one commodity area must publish a maintenance management SOP. If maintenance procedures are adequately covered in the major subordinate command's maintenance management SOP, then subordinate commanders are not required to publish one for their unit.

The frequent change of personnel within a unit can result in a lack of expertise and continuity within day-to-day operations. To reduce these effects and increase overall unit efficiency, commanders should emphasize the use of desktop procedures and turnover folders. Desktop procedures are not intended to be inclusive or formalized; they are a simple listing of significant items pertinent to everyday operations within a particular billet, and they should standardize requirements, actions, and recordkeeping.

Turnover folders are folders that provide policy information, status of pending projects, references, management controls, functioning of the section, techniques used to accomplish routine and infrequent tasks, and personnel information. Desktop procedures and turnover folders do not apply to all billets and should be applied in accordance with MCO 4790.2.

RESOURCES

Maintenance resources consist of time, personnel, repair parts, tools and support equipment, facilities, publications, and funds. Commands must have authorization to possess these resources. There are three principal documents that list a command's authorized level of maintenance resources: the table of equipment (T/E), the table of organization (T/O), and the table of authorized materiel (TAM).

A T/E lists the equipment that a unit is required to possess and maintain in order to accomplish its mission. When used with a T/O, it serves as the basis for determining what publications and additional equipment may be required by the unit.

The T/O indicates the maintenance authority of each unit based on its capabilities, personnel, equipment, and wartime mission. The T/O logistical capability statement determines personnel skills and equipment requirements. Its organization paragraph identifies the unit's subordinate elements, source of internal maintenance support, and unit maintenance requirements. The T/O also contains the unit's concept of employment, which is vital to the commander and staff in determining the type of support required and how to obtain the required support.

The TAM is a source document for logistic planning with respect to selected materiel authorized for use by organizations, activities, and detachments of the Marine Corps, both active and reserve. Materiel is listed by subsistence; petroleum, oil, and lubricant items; and type. There are three types of materiel:

- Type I: Required items.
- Type II: Local allowances.
- Type III: Environmental items.

Time

Time must be viewed from two aspects: the equipment and the maintainer. Equipment availability directly corresponds to unit readiness. Every hour that corrective maintenance is being performed on a piece of equipment is time away from training or the battlefield. The same can be said for maintainers; maintenance is affected every hour maintainers spend away from their primary military occupational specialty.

Equipment. The maintenance management officer maximizes equipment availability by establishing an effective preventive maintenance program and by eliminating shortages of maintenance resources that reduce maintenance production. Shortages can include a lack of tools, publications, space, parts, skills, supervision, and funds. When these items are not available at the work site, time is wasted.

Maintainers. Optimally, maintainers should spend most of their time maintaining and repairing equipment to a combat-ready status. Realistically, maintainers could spend a majority of their time on maintenance training, administrative duties, and other miscellaneous requirements. Therefore, effective time management demands that these nonmaintenance requirements be consolidated into blocks, facilitated, and coordinated with the appropriate cognizant staff officers, subordinate commanders, and noncommissioned officers in charge to reduce their impact. Only after a maintainer's productivity has been maximized can the command determine if adequate time has been allocated for equipment maintenance and repair.

Personnel

The success of a unit's maintenance effort is heavily influenced by the quantity and quality of its personnel. The maintenance management officer coordinates an annual review of the T/O by equipment commodity and recommends changes to the commanding officer and G-1/S-1. Additionally, the T/O should be reviewed whenever the logistical capabilities statement, concepts of employment, or capability statements change.

The maintenance management officer ensures that maintenance and maintenance management training requirements are included in the unit's annual training plan. The annual training plan must address mission and military occupational specialty training as well as operator and supervisor training.

Personnel safety is a constant concern. Continuous vigilance by all maintenance personnel is required to ensure that operating procedures and work methods do not increase risk or expose personnel to injury.

Repair Parts

Repair parts refer to consumable repair parts and secondary reparable. Commanders must ensure that repair parts and maintenance-related supplies are requisitioned when required, properly accounted for, and safe-guarded from loss or degradation.

Requisitioning. Repair parts must be requisitioned, utilizing the current automated information system, as soon as possible after the requirement is identified. The requisition classification must be consistent with the urgency and submission standards stated in MCO 4400.16H, *Uniform Material Movement and Issue Priority System (UMMIPS)*. Reconciliation (i.e., review the requisition status of repair parts) between the maintenance section and its supply source is vital and must occur at least every 2 weeks.

Demand-Supported Items Stock List. Demand-supported items ensure adequate stocking levels of fast-moving items, thereby resulting in an across the counter issue rather than a back order. Demand-supported items can save commanders time and money and maintain readiness. See MCO 4400.201 for specific guidance on establishing and maintaining direct stock list.

Tools and Support Equipment

Tools and support equipment refer to tool sets, kits, chests, hoists, jacks, stands, and TMDE. Loss of tools slows maintenance and increases costs. Therefore, proper inventory procedures and effective tool control measures must be employed to reduce loss. Defective tools and support equipment are also a safety hazard and are detrimental to the unit's equipment readiness.

The unit maintenance management officer establishes tool control and calibration control programs for the unit. These programs ensure tool and support equipment accountability and serviceability. When establishing these programs, there must be a balance between tool access for productivity and the safeguard requirement of reducing tool and equipment loss. Specific tool inventory requirements are found in MCO 4400.201.

Facilities

The maintenance management officer has the primary staff responsibility for allocating maintenance capabilities, coordinating maintenance facilities, and facilitating capacity among commodity areas (i.e., grouping similar characteristics and applications) to enhance similar logistical management methods and economy of efforts. Staff functioning affects site selection, shop layout, and shop organization. See chapter 6 for more information.

Publications

The Marine Corps establishes maintenance policies and guidelines so commanders can comply with procurement regulations and perform required equipment maintenance. These instructions and guidelines are set forth in publications (e.g., manuals, orders, messages) that establish maintenance goals and requirements. It is essential that all commanders and their staffs be aware of directives and key policies that apply to their organization.

The Publications Library Management System provides a list of current Marine Corps publications (e.g., MCOs, stock lists, technical instructions, technical manuals [TMs]) and is updated monthly. Publications that control system operations are normally managed by a directive control point. A directive control point is responsible for maintaining the unit's publication listing. For additional information on publication management, reference the *Publications Library Management System Version 3: Users Guide and MCO 5600.31A, Marine Corps Printing and Publishing Regulations*.

Funds

Funds are not directly seen by the maintenance management officer or maintenance sections. Therefore, the supply officer and maintenance management officer must work together in order to establish a budget and control fund flow, which takes into consideration the commander's priority of effort. They must focus on forecasting the appropriate amount to fund maintenance equipment and repair parts.

The maintenance management officer's first task in the budgeting process is to collect and evaluate previous expenditure information. The maintenance management officer uses automated information systems to obtain expenditure information. A review of the historical expenditure information must include a check for correctness and consider expenses that are not covered on automated information system reports. Past expenditures will not indicate future needs unless the past expenditure is compared to future operations, logistic commitments, and new equipment receipts. Once all information is gathered, the maintenance management officer can assist commodity and maintenance sections in forecasting funding requirements.

Funds must be controlled once they are allocated. The maintenance management officer provides staff advice on internal allocation of money, ensures that funds obligated for maintenance resources are applied in the best manner, and ensures periodic fiscal reviews are conducted. The maintenance management officer provides control by coordinating with supply and fiscal officers, presents the commander with the information needed to determine reallocation of funds, cancels unnecessary requisitions, or requests additional funds. Additionally, the maintenance management officer, in conjunction with the unit's supply and fiscal officer, and in coordination with the command's comptroller, develops a unit's job order number structure. This structure allows easier information collection and sound decision-making practices because expenditures are listed by maintenance commodity (e.g., motor transport, engineer).

PRODUCTION

Production is the physical performance of various maintenance functions. These functions include preventive maintenance checks and services (PMCS), corrective maintenance, modification, calibration, and fabrication. Some of the functions are generally performed only by depots, while others are performed by field units. Actions related to maintenance production are also discussed in the following subparagraphs.

Maintenance Phases

The maintenance process consists of five maintenance phases. These phases include the identification of fault or failure, acceptance of equipment, equipment induction, active maintenance, and maintenance closeout.

Fault or Failure Identification Phase. The fault or failure identification phase is the initial step of the maintenance process. Maintenance actions include the active assessment of equipment conducted during operations and the deliberate pre- and/or post-operations inspection conducted by crew/operators, as well as actions taken by maintainers within maintenance activities. Maintenance production is a continuous process. The recovery process may be included in this phase if the deadlined equipment is operationally employed.

Acceptance of Equipment Phase. This phase consists of an acceptance inspection, scheduling, and assignment. The purpose of the acceptance inspection is to verify that equipment is complete and prepared for the required maintenance service (e.g., operator maintenance was performed and equipment was cleaned). Equipment that is incomplete (missing equipment parts or records) or not properly prepared by the unit or activity requesting maintenance should not be accepted into the maintenance cycle until discrepancies are corrected. Also, the acceptance inspection acts as a verification for the using-units diagnosis of the equipment problem.

Once equipment is accepted, it is given a work priority based on the service request priority, operational requirements, and available maintenance resources. Based on the assigned priority, the equipment is then scheduled to arrive at the maintenance facility at, or immediately before, the time maintenance resources are available. The equipment is held by the owning unit in a status known as “unit recall” until facilities/personnel are available to conduct the required maintenance actions. By allowing operationally safe equipment to be located with the using unit, maintenance sites can avoid congestions and the using unit can maximize the use of their equipment while it is in a pending work status. The assignment of equipment to a specific maintenance shop within the maintenance section occurs upon completion of the acceptance inspection and scheduling process.

Equipment Induction Phase. Induction is the physical submission of a service request and its associated equipment to an appropriate level maintenance activity. Delivery of the equipment from the using unit is requested once the maintenance shop is capable and ready to perform maintenance actions. This request should be given to the using unit or appropriate coordinator as soon as possible. Induction of equipment into a specific shop is determined by the priority assigned during the equipment acceptance phase, in accordance with the priority requested by the using unit.

Active Maintenance Phase. Production actions performed following induction of the service request and its associated equipment into a maintenance shop constitute the active maintenance phase and the beginning of the repair process. This phase is performed in a sequence of logical steps designed to ensure that the required services are conducted in an efficient and effective manner. Continual emphasis is placed on the quality control of the actions and tasks performed. The frequency of quality control inspections depends on the skill and experience of the individual technicians or maintainers and the overall complexity of the actions. The following steps are conducted during active maintenance:

- *Inspection of equipment.* The initial step involves a detailed inspection of equipment by maintenance personnel. This inspection is the foundation of the maintenance process and includes locating and identifying equipment malfunctions, inventorying the equipment and its contents, and verifying that all equipment records associated with the required service are prepared in accordance with current publications.
- *Preparation for maintenance actions.* Preparation for maintenance actions includes the assembly of the appropriate technical publications and other associated information, support equipment, and TMDE to perform the required services. Adequate preparation reduces the actual time required to perform the repairs and avoids initiating maintenance actions if resources are not available.
- *Performance of maintenance.* Performance of all maintenance actions is conducted per the appropriate technical publication in the maintenance area. Maintenance actions include performance of PMCS, corrective maintenance, application of modifications, and calibration. Once maintenance actions are completed, the equipment is given final adjustments. Bringing the equipment performance to within specified tolerances is a positive indication that the action has been successfully completed.
- *Quality control.* Quality control requires a complete equipment check to determine proper completion of maintenance actions and that equipment records are completed per TM 4700-15/1H, *Ground Equipment Record Procedures*, and per UM 4000-125. Equipment not performing satisfactorily is rejected and recommendations are made for further maintenance actions. Acceptable performance results in the completion of the active maintenance phase and the movement of the equipment to the closeout phase. Quality control should be performed by experienced maintenance personnel since this is the last opportunity to catch any deficiencies before equipment is returned to the using unit for operation.
- *Cleanup of maintenance area.* Time and resources must be allocated to clean up the maintenance area. Support TMDE (including tools) must be cleaned, serviced, and inventoried to facilitate future maintenance actions. Technical publications must be returned to their proper locations. Defective parts and other residue must be removed from the maintenance area using proper disposal procedures.

Maintenance Closeout Phase. The closeout phase of the maintenance process commences when equipment has been repaired and the serviceable item is returned to the using/owning unit or when a decision has been made to evacuate or dispose of the equipment. Maintenance personnel must ensure that the closeout process is accurate, complete, and coordinated. This includes ensuring that the service request and equipment records are correctly completed. The closeout phase requires close coordination with using/owning unit personnel to ensure they are notified as soon

as the equipment is ready for pickup. This reduces vehicle congestion at the maintenance facility and allows the using/owning unit to employ all of its assets. The using/owning unit must make every effort to pick up their repaired equipment promptly. Any special packaging, preservation, transportation, and shipping requirements are addressed during this phase.

Preventive Maintenance Checks and Services

Preventive maintenance checks and services is a systematic program consisting of inspecting, cleaning, servicing, lubricating, and adjusting. This program is the key to maintaining equipment readiness because it helps prevent early breakdown or failure of equipment. An effective PMCS program reduces the number of costly, complex, and time-consuming repairs and allows the optimum use of maintenance resources through early detection of defects. The unit owning or using the equipment is responsible for scheduling and ensuring the completion of equipment PMCS. Typically, PMCS are a function of field-level maintenance. There are two types of PMCS: scheduled and unscheduled.

Scheduled Preventative Maintenance Checks and Services. Scheduled PMCS are required maintenance tasks to be planned, performed, and documented. The equipment using/owning unit is responsible for scheduled PMCS.

Operator/Crew PMCS. The operator or crew will perform a scheduled PMCS when it is within their authorized level of maintenance. There are certain items that, due to technological advances, use different criteria for scheduling PMCS. The equipment's technical publication is the basic guide for performing PMCS and should be referenced before any work is initiated. Typically, operators or crews are primarily responsible for daily and monthly PMCS.

Equipment operated infrequently or intermittently normally does not require daily PMCS. Daily PMCS are divided into before, during, and after operation services.

- *Before.* Before-operation PMCS are performed on equipment to determine if the equipment is operational. A wide range of events can occur between service checks, (e.g., physical damage from handling; corrosion of electrical connections; or leakage of lubricants, coolants, operating fluids, and gases). If equipment is found to be unserviceable or requires corrective maintenance, personnel must promptly report the deficiency so that the appropriate maintenance actions can be taken.
- *During.* During operation, the operator or crew must be alert to any unusual noises, odors, abnormal instrument readings, or any other irregularities that might indicate equipment malfunction. Every operation must be considered a test, and all unusual or unsatisfactory performance must be noted. All deficiencies noted during operation must be investigated, corrected, reported, or determined if mission is impacted by unserviceable equipment and mitigating actions initiated.
- *After.* After-operation PMCS are performed to ensure equipment is ready to operate for the next mission. The operator or crew inspects the equipment thoroughly to detect any deficiencies that may have developed during operation. Assemblies requiring inspection or service, while still at operating temperature, must be inspected as soon as possible after equipment operation has ceased. All defects and irregularities that occur during operation must be corrected or reported to the level of maintenance that can take corrective action.

Monthly PMCS reinforce daily PMCS. Generally, it consists of the same checks performed during the daily PMCS, but in greater depth (e.g., daily PMCS may require the operator to simply check the emergency brake for operation, but monthly PMCS may require cleaning and lubrication of the brake's moving parts). Management can also use monthly PMCS to evaluate an operator's daily PMCS performance. As with all PMCS, supervision and inspection by qualified supervisory personnel should be stressed.

Field-level PMCS. Organizational-level maintainers are responsible for the performance of field-level PMCS. The using/owning unit schedules field-level PMCS, preferably on a staggered basis, when possible, to ensure maximum equipment availability. Therefore, there must be constant coordination between the maintenance facility and the using/owning unit for the performance of field-level PMCS. If feasible, the operator or crew should assist organizational level-maintainers with the performance of their equipment's field-level PMCS. This involvement helps operators gain a better working knowledge of their equipment and increases maintenance productivity.

If a unit is operating under adverse climatic or terrain conditions, commanders are authorized to conduct field-level PMCS actions more frequently than scheduled. Additionally, PMCS may be deferred, or intervals extended, if equipment is placed in an administrative storage program or equipment is placed on administrative deadline (see MCO 4790.2 for specific criteria). There are certain items that, due to technological advances, use different criteria for scheduling field-level PMCS (see the appropriate technical publication for PMCS requirements). The different classifications of field-level PMCS are as follows:

- *Quarterly PMCS.* The normal interval for quarterly PMCS is 3 months. Economy of operation demands that, within sound practices of safety and reliability, maximum useful life is obtained from materiel resources if conducted quarterly. Worn parts and materials are typically replaced during PMCS, based on the availability of resources. The operator or crew of the equipment should provide maintenance personnel with firsthand information on irregularities or indications of equipment malfunction.
- *Semiannual PMCS.* The normal interval for semiannual PMCS is 6 months. Equipment technical publications provide the requirements for semiannual PMCS and other less frequent PMCS. Economy of operation demands that, within sound practices of safety and reliability, maintenance personnel extract the maximum useful life from materiel resources if conducted semiannually. Worn parts and materials are replaced during PMCS only when it is determined, after considering life expectancy and the nature of anticipated operation, that they cannot be expected to provide safe, reliable service until the next scheduled PMCS. Again, operators or crews of the equipment should provide maintenance personnel with firsthand information on irregularities or indications of equipment malfunction. Semiannual PMCS fill the requirement of one of the quarterly PMCS since the procedure duplicates the process.
- *Annual PMCS.* The normal interval for annual PMCS is 12 months, but it may be advanced when the operating criteria specified in equipment technical publications are achieved earlier. Equipment technical publications provide the requirements for annual PMCS and other less frequent PMCS. Annual PMCS are greater in scope than semiannual PMCS and additional time is required to accomplish annual PMCS requirements. The operator or crew of the equipment should provide maintenance personnel with firsthand information on irregularities or indications of equipment malfunction.

- *Biennial PMCS.* The normal interval for biennial PMCS is 24 months, but it may be advanced when the operating criteria specified in the equipment's technical publications are achieved earlier. Equipment technical publications provide the requirements for biennial PMCS and other less frequent PMCS. Biennial PMCS are greater in scope than annual PMCS and additional time is required to accomplish the maintenance requirements. The biennial PMCS replace the annual PMCS on the years that they are required. Typically, scheduled field-level PMCS (i.e., quarterly, semiannual, annual, and biennial), conducted by the organizational maintainers, will not exceed four times a year unless corrective action is required or circumstances dictate an unscheduled PMCS.

Unscheduled Preventative Maintenance Checks and Services. Another function of maintenance production is unscheduled PMCS. These are maintenance tasks that may occur when equipment has been exposed to harsh conditions or excessive usage, to correct a defective item, when additional modifications are needed, or when items need to be calibrated to ensure quality performance.

Special PMCS. Special PMCS procedures are necessary when equipment has been exposed to harsh environments (e.g., salt water, fresh water, loose sand, mud). Equipment exposed to harsh conditions should be checked thoroughly for contamination, washed thoroughly with fresh water, and have appropriate services performed per the applicable technical publications. In most instances, a special PMCS will resemble a semiannual, annual, or biennial service. The commander may authorize the modification of the PMCS schedule to reflect the special PMCS performed and delay the next scheduled PMCS.

Usage-based PMCS. The equipment operating time code sets the conditions for identifying the optimal opportunity to preform required preventive maintenance. This shifts equipment maintenance from a reactive approach to a more proactive and prognostic approach.

Corrective maintenance. Corrective maintenance actions are performed to restore a defective item to a specified condition. The detection of defective equipment may occur during routine PMCS or through operational failure of the equipment. Corrective maintenance is a very time-consuming process and, therefore, requires close coordination of the maintenance workload and available resources.

If a required piece of equipment is unusable due to a failed part or safety condition, then the equipment must be repaired. However, corrective maintenance is time consuming and the urgency of repair is relative to the unit's mission. To repair equipment that requires an elevated type of maintenance, higher than authorized at the using/owning unit, it must be evacuated to the support activity authorized to perform the maintenance. Excessive delays in evacuation postpone corrective action and, therefore, must be avoided.

There are three basic stages of corrective maintenance. They are—

- *Isolating equipment malfunctions.* During this stage, maintenance personnel attempt to isolate the equipment's malfunction so that corrective action can begin. Personnel use the appropriate support equipment, TMDE, and the proper step-by-step procedures described in the applicable technical publication to isolate the cause of equipment malfunctions. Once the cause is isolated and fault diagnosis confirmed, personnel estimate the cost of the required maintenance and

determine if the equipment is economically repairable. If the equipment is determined not economically repairable, personnel stop active maintenance and request disposition instructions.

- *Obtaining required repair parts.* The requisition of repair parts must be accurate to ensure the receipt of intended items in a timely manner. Inaccurate requisition procedures (i.e., using outdated publications, or improperly completed forms) results in receipt of unneeded repair parts, delays in maintenance production, and wasted maintenance funds. Demand-supported items, when used and properly maintained, will ensure that selected items are readily available.
- *Correcting equipment faults.* Fault correction is the goal of all corrective maintenance actions. Proper maintenance techniques are employed to ensure that repair parts are installed correctly. Reassembly is accomplished in sequence, including the proper servicing and the use of test and measurement devices at the appropriate stages of equipment reassembly. Major completed maintenance actions are recorded on the service request; this provides information for future management decisions and appropriate entries on equipment records.

Modification

Equipment modifications are maintenance actions performed to change the configuration of equipment systems, end items, components, assemblies, subassemblies, or parts to improve equipment functioning, maintainability, reliability, and/or safety characteristics. Primary sources of modification requirements are manufacturer's engineering change proposals and comments and suggestions made by using units via the product quality deficiency report. Complaints regarding equipment malfunction or poor design should be channeled to agencies responsible for procurement/development of Marine Corps equipment.

Modification Responsibility. It is the responsibility of the equipment owner to determine which modifications have been issued for their assigned equipment and to take the necessary action for compliance. The modification instruction identifies the resources, skills (to include level of maintenance), and time necessary to perform the modification. If the application is to be applied by the unit, it is scheduled and performed at that level. For modifications at a higher level of maintenance, the using unit must arrange to evacuate the equipment to the appropriate service provider.

Modification Control. Equipment modifications must be controlled to ensure safe equipment operations. Technical Manual 4700-15/1H outlines unit responsibilities in establishing a modification control program. It also provides instructions for the completion and disposition of records maintained by the unit. The maintenance management officer prepares periodic unit modification control program reports for the commander. There are two classifications of modifications: normal and urgent.

- *Normal modification.* Normal modifications are accomplished according to a planned schedule, which involves the alteration of an item to correct or improve its design, functioning, and maintainability. Normal modification instructions establish an effective date from which an activity has 1 year to complete the modification. Normal modification requirements generally do not debilitate the operating conditions of the item of equipment.
- *Urgent modification.* Urgent modifications are those required to prevent death or serious injury to personnel, prevent major damage to equipment, or make changes which are considered so essential to equipment usage that their application must be accomplished at the earliest time

possible. Urgent modification instructions specify a required completion date and may contain restrictive operating conditions. Instructions restricting operation conditions may be disseminated by message.

Calibration

Calibration is the process of adjusting items so that they measure within a standard deviation. This applies to equipment submitted for repair, maintenance tools and equipment, and TMDE. Test, measurement, and diagnostic equipment are identified with labels that classify their category of calibration by verifying the national stock number in Federal Logistics Data, or FedLog, to determine if the item requires calibration.

The four categories of calibration are as follows:

- *Calibrated.* Calibrated applies to instruments with all ranges and functions tested and found within applicable tolerances.
- *Special calibration.* Special calibration applies to instruments with only a portion of the ranges and functions tested and found within applicable tolerances. The calibration label indicates the limitations (e.g., clockwise).
- *Inactive.* Inactive applies to instruments that will not be used in the foreseeable future. Equipment is not allowed to be in an inactive status for more than 3 years at a time. If equipment is inactive for 3 years, the unit should reevaluate the need for the equipment during the unit's annual calibration review. If the equipment is still required, personnel should request a new active/inactive label from the supporting calibration laboratory.
- *Calibration not required.* The calibration not required designator applies to instruments that are used to make measurements of a noncritical nature or for instructional purposes. However, some instructional equipment will require calibration or special calibration. To classify an item as calibration not required, evacuate the asset to the local calibration laboratory. Once the item is determined calibration not required, the local calibration laboratory will affix a calibration sticker to the item with the letters "CNR" and the date of the certification.

Fabrication

Fabrication is the process of constructing or manufacturing parts or components that are not readily available through the normal supply system. It should not be used to circumvent the normal supply system. Fabrication is primarily performed at the intermediate maintenance activity. However, units may find themselves in situations where it is necessary to perform fabrication. Fabrication is generally accepted when it is within the unit's authorized level of maintenance. Once a decision to fabricate an item is made, the unit must consider equipment and personnel safety, installation requirements, and potential damage to equipment. Fabricated items are intended to replace a like item, not create a new item. Fabricated items that change the performance of equipment or require changes in structure (e.g., drilling additional holes) are not authorized.

INFORMATION

Maintenance information provides the basis for managing a unit's equipment maintenance program. Maintenance information is comprised of records, reports, and an automated information system. Proper upkeep and use of maintenance information are invaluable tools for analyzing and evaluating maintenance performance. Maintenance performance analysis and evaluation are generally expressed in the form of equipment readiness.

Records

Preparing and maintaining records consumes both personnel and materiel resources. Therefore, records must be kept to the minimum consistent with required Marine Corps directives and publications. Commanders should ensure that records originating within the unit are not prepared and used in lieu of, or in addition to, those required by Marine Corps directives and publications. Maintenance records are classified as equipment, resource, and local records.

Equipment Records. Equipment records are maintained for a specific item of equipment. Equipment records are an integral part of the equipment because they contain historical data concerning repairs performed, maintenance schedules, and modifications. To ensure this information is available to maintenance personnel, equipment records should accompany equipment when it is evacuated for maintenance, transferred, or temporarily loaned to another unit. Depending on the situation, temporary records could be produced and accompany the subject equipment.

Resource Records. Resource records document the unit's maintenance efforts (e.g., modifications, PMCS, calibration). These records contain historical information and provide the basis for evaluation of past performance and planning for future efforts or requirements.

Local Records. Local records are discouraged. Local records should not be initiated unless a definite requirement has been established and it has been determined that records required by higher headquarters will not satisfy the requirement.

Reports

Maintenance reports contain information that commanders use to determine policy, plan, establish controls, evaluate operations and performances, and to prepare other reports. They are generally summarized and may be transmitted on a recurring, one time, or occasional basis. Maintenance reports fall into one of the following classifications that reflects who generated the request.

Headquarters, United States Marine Corps Reports. Reports submitted to Headquarters, United States Marine Corps (HQMC) include maintenance reports required by both Marine Corps directives and other forms of communication. They may be produced by either manual or automated means and normally contain a report control symbol.

Field Reports. Field reports list a unit's special field requirements that HQMC reports do not address. Using these reports should be kept to a minimum so that units are not overburdened with administrative work. Whenever a requirement for a field-originated report is established on a

recurring basis, it must be forwarded to the Commandant of the Marine Corps for nomination to a standard report.

External Agency Reports. At times, a unit may be required to submit reports to an activity outside of the Marine Corps. Requests for reports considered invalid should be referred to the next senior unit in the administrative chain of command.

Automated Information Systems

Automated information systems were developed to assist the field user by automating manual administrative work. These systems provide commanders, at all levels, with excellent up-to-date information and management tools. The current automated system for the maintenance field is discussed in appendix A.

Readiness Reporting

As prescribed in MCO 3000.11E, *Ground Equipment Condition and Supply Materiel Readiness Reporting (MRR) Policy*, commanders are required to report the level and condition of Marine Corps readiness reportable ground equipment as identified in Marine Corps Bulletin (MCBul) 3000, *Marine Corps Readiness Reportable Ground Equipment*. Equipment included in this bulletin must be a principal end item (PEI) that is 85-percent fielded Marine Corps-wide (including the reserves), nominated by either the field commands or HQMC, and accepted for inclusion by the Deputy Commandant for Installation and Logistics. Readiness reporting for Marine Corps supplies and equipment has three components: mission-essential equipment, T/E deficiencies, and equipment deadlines. Table 3-1 identifies categories of ground equipment readiness.

Table 3-1. Categories of Ground Equipment Readiness.

Category	Operationally-Ready, Mission-Essential Equipment (percentage)
C-1	90-100
C-2	70-89
C-3	60-69
C-4	0-59
<p>NOTES</p> <ol style="list-style-type: none"> 1. MCBul 3000 lists mission-essential equipment and provides a measure of equipment readiness for the operating forces. 2. Operationally-ready equipment is a term used to describe an item that is fully capable of conducting its mission in a safe and reliable manner. 	

Mission-Essential Equipment. Mission-essential equipment is governed by MCBul 3000. This bulletin lists selected items of mission-essential equipment required to be reported to higher headquarters. The items that appear in this bulletin do not represent a complete list of equipment normally considered mission essential at the battalion level (e.g., M16A4/M4 rifles are not included due to their high density). However, the list is sufficiently representative to provide an adequate measure of the equipment readiness of the operating forces.

Table of Equipment Deficiencies. Table of equipment deficiencies are items that are authorized but not on-hand. To remain a force-in-readiness, the Marine Corps plans, programs, and budgets annually for the modernization of its equipment and capabilities. The modernization of mission-essential equipment could have a substantial effect on Marine Corps readiness reportable ground equipment reporting. Accordingly, a replacement item and the item it is replacing may be excluded from Marine Corps Readiness reportable ground equipment reporting during the modernization (phase in/phase out) of equipment.

Equipment Deadlines. Equipment deadlines are items that are not capable of performing their designed combat missions due to their need for critical repairs. Ground equipment readiness reporting begins at maintenance shops with the determination of deadline status. Table 3-1 identifies categories of ground equipment readiness. Deadline status is entered into the current automated information system at the maintenance shop level via the service request input. Deadline status is normally determined by the maintainer. However, final authority for determining whether or not a piece of equipment is capable of performing its assigned combat mission rests with the commander. Excessive delays in evacuation postpone corrective action and, therefore, must be avoided.

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CHAPTER 4

MAINTENANCE-RELATED PROGRAMS

The Marine Corps has implemented several maintenance-related logistic programs to assist commands with enhancing equipment readiness. This chapter discusses some of the more important maintenance-related programs with which commanders should be familiar.

SECONDARY REPARABLE PROGRAM

The secondary reparable program enables enhanced readiness through asset availability by the direct exchange of unserviceable reparable items (e.g., circuit cards, transmissions, differentials) for like serviceable reparable items from a pool of assets. Secondary reparable items, which are end items and expendable reparable items other than PEIs, are positioned at issue points (also referred to as floats) maintained by the reparable issue point. The reparable issue point may also operate subfloats and position them where they can provide immediate service to customers. Secondary reparable items can be categorized as secondary line replaceable units and secondary repairable units. Secondary line replaceable units are major assemblies or components of principle end items. Secondary repairable units are subassemblies or components of line replaceable units that are repaired by intermediate maintenance activities. The secondary reparable item candidates are identified by the source, maintenance, and recoverability codes in the stock list-4, TMs, and parts manuals. General steps included in the secondary reparable process are as follows:

- *Removal.* The defective item is removed from the end item and taken to the supporting float by the owning or intermediate maintenance unit. Removal of any item is accompanied by turn-in documentation required by the issue point.
- *Turn-in.* The defective item is checked for completeness and configuration and is exchanged for an on-hand, serviceable item. If an exchange item is not on-hand, the issue point accepts the defective item and provides the customer with a backorder receipt. Once the issue point receives the required item from its source, the item is issued to the customer. If several units have placed demands on the issue point for like items, the issue point establishes a priority for issues based on the age and precedent of the requisitions. Priorities are assigned to all supply transactions in accordance with the guidelines contained in MCO 4400.16H.
- *Repair.* Defective items turned into the issue point are sent to the intermediate maintenance activity for repair and subsequently returned to the issue point's stock.

ENTERPRISE GROUND EQUIPMENT MANAGEMENT

MARADMIN [Marine Administrative Message] 193/15, *Initiating Directive for Enterprise Ground Equipment Management*, established the Enterprise Ground Equipment Management (EGEM) initiative. The intent of the EGEM program is to improve the overall equipment availability and readiness of the operating forces. The EGEM program process is the Marine Corps' collaborative and iterative approach to planning and executing depot-level maintenance in support of total life cycle management. The EGEM program establishes the coordination and communication framework within the total productive maintenance strategy that integrates input from all of the relevant Marine Corps stakeholders (i.e., HQMC; Deputy Commandant for Installation and Logistics; Deputy Commandant for Combat Development and Integration; Deputy Commandant for Plans, Policies and Operations; MARCORLOGCOM; MARCORSSCOM; and Marine Corps operating forces).

RECOVERABLE ITEM PROGRAM

A recoverable item is an item not consumed in use and is subject to return for repair or disposal. Such equipment is not included in the EGEM program, and it is disposed of through the recoverable item program, also known as the recoverable item report program. This program is outlined in MCO 4400.201 Vol.6, *Dispositions, Exchanges, and Returns of Marine Corps Property*. The recoverable items report program provides for the recovering, reporting, and managing of equipment that cannot be repaired within the resources of the field commander and for the disposal of items that are beyond economical repair. Commanders replace unserviceable items through the supply system.

CORROSION PREVENTION AND CONTROL PROGRAM

Marine Corps equipment is particularly susceptible to corrosion and other types of moisture damage due to their material composition and assigned missions in moisture-laden environments. Compounding the problem is the fact that a significant portion of Marine Corps equipment is stored outdoors without shelter and subject to the direct corrosive effects of the environment. The Corrosion Prevention and Control Program was established to extend the useful life of Marine Corps equipment. Its intent is to reduce maintenance requirements and associated costs through the identification, implementation, and development of corrosion prevention procedures and corrective corrosion control. The Corrosion Prevention and Control Program seeks ways to use technologies and processes that will repair existing corrosion damage and prevent, or retard, future corrosion damage to Marine Corps equipment. MCO 4790.18C, *Corrosion Prevention and Control (CPAC) Program*; TM 4795-OR/1, *Organizational Corrosion Prevention and Control Procedures for USMC Ground Combat Equipment*; and TM 4750-OD/1, *Paint, Coating, Underbody and Registration Marking for Marine Combat and Tactical Equipment*, address the Corrosion Prevention and Control Program in detail.

Preventive Corrosion Control

The Marine Corps corrosion prevention program starts at acquisition. Corrosion prevention focuses on identifying, developing, and implementing state-of-the-art technologies and processes that directly prevent the corrosion, not just its symptoms. If preventive corrosion measures are successful, then corrective maintenance resources are conserved and equipment service life is significantly extended.

Corrective Corrosion Control

Corrective corrosion control identifies, develops, and implements technologies and processes that correct current equipment deficiencies resulting from corrosion and moisture damage.

ADMINISTRATIVE STORAGE AND ADMINISTRATIVE DEADLINE PROGRAMS

Administrative storage and administrative deadline programs are the voluntary removal of serviceable equipment from operational use. These programs serve as options for the commander to conserve equipment or maintenance resources when resources are not sufficient to meet readiness. When a unit's operational or training tempo does not require the constant use of equipment on-hand, administrative storage and deadline programs should be considered. Additional information and criteria for the program are found in MCO 4790.2.

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CHAPTER 5

MAINTENANCE PLANNING

As stated in MCDP 4, common to all logistic systems are a distribution system and command and control. The distribution system is made up of bases (sources sized and located in accordance with need and capability) and distribution procedures (means, parameters, and criteria to distribute). Command and control provides the ability to administer, monitor, and adjust the distribution system as required. Therefore, planning efforts must focus on developing a distribution system with the command and control appropriate to the mission and scheme of maneuver.

Planning expeditionary maintenance to support MAGTF operations must start early and be adjusted, as necessary, with the receipt of the initiating directives and other planning documents, such as Annex D (Logistics) of the operations order. Supported and supporting units must know each other's responsibilities if a unit commander is to receive timely and appropriate CSS. While supply, maintenance, and distribution are separate functions, maintenance support planning must parallel and interface with supply and distribution planning efforts. It is also essential to make maximum use of the LCE's major base/installation facilities main CSSA to prepare equipment prior to deployment.

SUPPORTED UNIT RESPONSIBILITIES

Supported unit commanders, through the coordinated efforts of the G-3s/S-3s and G-4s/S-4s, initiate CSS detailed planning. Combat service support planning begins by determining support requirements, assigning priorities, and allocating resources.

Determining Support Requirements

Supported unit commanders must determine and identify CSS mission requirements that are beyond their organic capabilities. To accurately determine the type and amount of external service support, the supported commander's staff must calculate an estimate of quantities for needed supply categories. The following factors should be considered when calculating need:

- MAGTF mission.
- Characteristics of the objective area, including available resources, climate, weather, and terrain.
- Enemy capabilities.
- Characteristics of operations to be supported.
- Duration of the operation.
- Capability and dependability of the transportation distribution system (outside and inside the objective area).

- Tasks requiring special training, supplies, and equipment.
- Lessons learned.

Assigning Priorities

Units determine and assign priorities based on their assigned force/activity designator and urgency of need designators as outlined in MCO 4400.16H. Units upgrade force/activity designators based on changes to the unit's mission. Commanders must be keenly aware of their force/activity designator and when it changes. A unit's force/activity designator directly translates to whose equipment is fixed first. The assignment of priorities affects the supporting LCE's concept of CSS and must be coordinated by the supported unit and the LCE to ensure that adequate CSS is available during the early stages of an operation. Ultimately, the MAGTF commander oversees assignment of priorities.

Allocating Resources

Supported unit commanders allocate available organic logistic resources, including the assets they retain as a reserve, to subordinate elements within their organization. These allocations must support and complement the MAGTF's concept of operations and reflect previous decisions concerning requirements and priorities. Like supported unit commanders' assignment of priorities, their allocation of CSS resources also affects the supporting LCE's concept of CSS.

SUPPORTING UNIT RESPONSIBILITIES

The supporting LCE planner can be an important asset to the supported unit. The supporting LCE planner can advise and assist the unit in refining requirements, procuring the resources to meet those requirements, and planning for the distribution of assets to support the mission and concept of operations.

Determining Requirements

Requirements are based on the supported commander's concept of operations, environment, and the situation. The identified requirements must address each logistic functional support area. The LCE must know the requirements early in the planning phase and be informed of changes as they occur. Close coordination and integration between the supporting LCE and the supported unit prevents support shortfalls.

Procuring Assets

The supporting LCE procures assets based on the requirements needed to sustain the supported unit. To prevent unnecessary logistical burdens, the LCE planner carefully reviews requirements to avoid overestimating requirements.

Distributing Assets

The distribution of assets is the actual performance of the supported service. The distribution of assets has the most critical impact on responsiveness, flexibility, and economy of CSS consequently impacting end item readiness. In effect, time and space of supply, maintenance, and distribution infrastructure to enable reachback capabilities must be considered. Assets distribution can be

successfully achieved only by coordinated predeployment planning and training, which anticipates and provides for unexpected replenishment opportunities, surge requirements, and alternate delivery means.

MAINTENANCE PLANNING REFERENCES

Early planning is a must for optimal maintenance support. Certain planning references must be addressed first to establish requirements and provide a framework from which to operate.

Table of Authorized Materiel

The TAM provides general information and instruction on the supply system; specific information on classes of supply; and replacement factors needed to project anticipated losses or consumption rates. This source document is the one most used by Marine Corps personnel with regards to logistic planning.

Mechanized Allowance List and Table of Equipment

The mechanized allowance list and T/E identify the equipment that a unit rates and the total of what it has on hand or on order. The T/E is primarily concerned with Class VII items. It also assists in the determination of Class V items because it identifies the number and type of weapon systems a unit possesses. The T/E listing of vehicles/equipment is also very helpful in determining Class III and IX requirements.

Table of Organization

The T/O contains the composition of the unit and a listing of the unit's authorized personnel allocations. The T/O is useful to the maintenance planner because it describes the logistical capabilities of the unit, maintenance personnel assigned, and assists in the determination of Class III, VII, and IX items.

MAINTENANCE SITE (FACILITIES) PLANNING CONSIDERATIONS

Since the basic functions and tasks of a maintenance shop are the same, its organization is fairly standard, regardless of shop size or maintenance authorized. The difference among shops is mainly associated with the types of supported equipment, category of maintenance authorized, and authorized maintenance resources. For more information on maintenance site planning, see MCO 4790.2, which specifically addresses establishment of a basic maintenance shop applicable to a wide range of scenarios.

Maintenance site selections are mission dependent. The most important planning considerations when selecting a maintenance site are location (e.g., proximity to supported units, distribution networks, and defensibility), and how that location will be organized.

Site Selection

Basic considerations that pertain to maintenance site selection are common to any maintenance activity. Those considerations are explained in the following paragraphs.

Space Requirements. Space limitations in a maintenance area can cause congestion that could impair maintenance efficiency and safety. A maintenance area should be large enough to provide for the adequate dispersal of equipment and maintenance activities.

Terrain Features. Ideally, the terrain should offer concealment; facilitate local security; have a hardstand for vehicles and equipment; and be accessible to road, water, and air routes for evacuation and resupply.

Access Routes. Access routes should avoid congested areas and be convenient to users of the maintenance facility. A maintenance area of support should be located along the main supply route to provide easy access to supported units and allow for the evacuation of equipment.

Proximity to Supported Units. The maintenance area should be positioned to allow each maintenance section to effectively perform its mission. A maintenance unit should be located far enough from combat elements to allow continuity of maintenance operations, yet close enough to support timely capabilities.

Proximity to Other Logistical Elements. The maintenance area should be located in close proximity to the unit's other logistical elements. This provides better use of common facilities and services, as well as maximizing supply and distribution integration.

Organization of the Maintenance Area

The S-4 or the maintenance operations section (also referred to as MOS) advises the maintenance battalion commander on the assignment of facilities, placement of organic maintenance areas, distribution of asset utility, and priority of effort within the maintenance area. Proper maintenance area layout is essential for efficient and effective support.

Maintenance Shop Layout. After the maintenance area site is selected, then the shop layout must be planned. Shop layout involves the organization of equipment and space assigned to a particular shop for the conduct of maintenance operations. Shop layout provides an efficient workflow, safety to personnel, and economic use of support and test equipment.

Other Site Considerations. Other site requirements to be considered to support a maintenance activity may include—

- Engineer requirements.
- Communication requirements.
- Force protection requirements.
- Distribution network.

MAINTENANCE EQUIPMENT CONSIDERATIONS

The need for tools, chests, sets, kits, and TMDE must be considered during maintenance support planning. The following factors determine the need for maintenance equipment:

- Types of equipment to be supported.
- Density of equipment supported.
- Mobility required.
- Environmental conditions.
- Maintenance tasks to be performed.
- Scheme of maneuver.

PERSONNEL CONSIDERATIONS

Maintenance planning must include every level of mechanic, technician, and operator required to support MAGTF equipment. When determining troops to task in terms of maintenance, the ratio of mechanics to the density of equipment to be supported must be estimated during the planning. To estimate the appropriate personnel to equipment ratio, the commander calculates the estimate by the following variables: scheme of maneuver, experience, training, qualifications/certifications, and required operators. The number and composition of MCTs and MSTs must also be planned to support the MAGTF's scheme of maneuver.

SAFETY CONSIDERATIONS

All commanders must address the safety of personnel during expeditionary maintenance operations. Personnel safety must be a primary concern. Lack of effective safety measures can result in tragedy. The following safety issues should be addressed at all levels of command during the planning phase and while operations are underway:

- Are personnel properly trained for the tasks and procedures they are performing?
- Is the operation adequately staffed and supervised by personnel qualified in their position?
- Has the operational tempo increased to the point where haste, fatigue, and personnel availability are causing common safety practices, procedures, and regulations to be violated?
- Are the facilities and/or maintenance area adequate for the maintenance tasks to be performed?

ENVIRONMENTAL MANAGEMENT CONSIDERATIONS

Environmental management considerations include all environmental-related conditions, media, resources, programs, or effects that either directly impact or are affected by the training, planning, and execution of military operations. Factors include, but are not limited to, extreme climate and terrain conditions and the transporting, storing, handling, and disposing of all regulated and/or hazardous property in accordance with applicable environmental, safety, and other pertinent laws and regulations. For additional hazardous materials information, review MCO 4450.12A, *Storage and Handling of Hazardous Materials*.

SUPPLY, MAINTENANCE, AND DISTRIBUTION INTERFACE

Supply and distribution systems provide the MAGTF with the right materiel/material at the right time that it is needed to support unit operations. The needs of the supported unit must be the basis of all supply and distribution efforts. The using-unit level is where the supply cycle begins and ends. Therefore, supply- and distribution-related limitations that affect maintenance support operations must be minimized. Tailoring repair parts blocks to support a MAGTF's maintenance effort, collocating issue points and maintenance facilities, warehousing to support anticipated maintenance, and using logistical automated information systems are all part of the supply, maintenance, and distribution interface. The goal is to provide the using unit with sufficient expeditionary maintenance capabilities to support the scheme of maneuver without overtaxing embarkation/lift constraints.

Repair Parts Block (Class IX Block) Composition

Class IX blocks are the prepackaged repair parts and components for equipment maintenance. Repair parts may be further categorized by appropriate MCOs. Policy directs the level of inventory authorized to be held by a unit.

Requirements for Class IX inventory blocks are calculated based on historical usage data from a MAGTF's intermediate supply activity for repair items. The Class IX allowances are tailored to support the units in a MAGTF. The MAGTF's equipment density list is used by the intermediate supply activity to calculate an estimate of repair part requirements. Because the intermediate supply activity's estimate does not consider specific factors (e.g., operating climates), this estimate should only be used as a starting point to develop and refine the Class IX block inventory. To further refine the estimate, commanders must also consider the experience captured in lessons learned from previous operations and the input provided by their maintenance personnel. The following factors should be considered during repair parts block inventory determination:

- Type and density of equipment to be used.
- Maintenance tasks to be performed by the maintenance elements.
- MAGTF objective and scheme of maneuver.
- Environmental factors.

- Projected length of operation.
- Other resources in the MAGTF area of operation (e.g., joint support, host-nation support).
- After action reports of MAGTFs deployed to the same region.
- High demand national stock number/national item identification number reporting.
- Embarkation and lift limitations.
- The availability of on hand allowances from the commands or MAGTF approved and authorized demand supportive items.

Repair Parts Issue Point

Ideally, the LCE commander locates the repair parts issue point near the intermediate maintenance area. At each forward issue point, the LCE maintains a block of repair parts (i.e., Class IX) tailored to the anticipated needs of the supported/supporting units.

The majority of Class IX blocks arrive in the area of responsibility with the assault follow-on echelon. When they arrive, the LCE expands the primary issue point in the force CSSA.

Forward issue points stock only those Class IX repair parts necessary to maintain combat-essential equipment. The MAGTF commander establishes the stockage objective for forward issue points based on the LCE commander's recommendation. The composition of the issue point is determined by the MAGTF scheme of maneuver and the supported/supporting unit's type and density of equipment.

Information Systems Support

Within the MAGTF, commanders down to the battalion and company level have organic, automated information systems to manage their manpower, supply, maintenance, embarkation, and disbursing. Logistical automated information systems provide the MAGTF commander with timely and accurate information concerning the status of equipment undergoing repair and the repair parts required to effect repairs. Planning for deployed maintenance reporting must include considerations of communications requirements (e.g., description of available transmission mediums such as a message editing processing system, electronic mail system, and satellite communications).

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CHAPTER 6

MAINTENANCE EXECUTION

The Marine Corps demands that its maintenance plan is well directed, organized, staffed with sufficient materiel and trained personnel, and executed with its focus on the supported unit mission and the commander's intent. This chapter addresses the impact of maintenance execution in the organization, embarkation, transit, offload, and employment of personnel and materiel.

GROUND MAINTENANCE CONTROL AND EXECUTION OPTIONS

Commanders may centralize or decentralize control and execution of their maintenance operations. For example, during an amphibious assault, the LFSP has limited maintenance capabilities. The LFSP commander normally centralizes both control and execution of maintenance operations at the BSA or LZSA. Once the LCE comes ashore, maintenance capabilities increase. This permits a shift to centralized control and decentralized execution of certain maintenance tasks.

Note: Some maintenance tasks are always centralized because the LCE has limited resources.

MCDP 1, *Warfighting*, says, "to aspire to train Marines the way Marines fight," while MCDP 4 indicates that successful logistics requires both effectiveness and efficiency, hence that is not always possible. For example, while it is inherently better from a training perspective to use nothing but tactical communications means for daily operations, the cost of batteries for tactical communications devices necessitate the use of the base telephone system in garrison. To perform maintenance as far forward as possible, commanders must decentralize execution of essential tasks. As a general rule, the goal in combat should be centralized control with decentralized execution, unless the tactical circumstances or resources demand a different configuration. Similarly, the peacetime goal is centralized control with centralized execution because this increases effectiveness and efficiency.

FIELD-LEVEL MAINTENANCE ORGANIZATION AND OPERATING PRINCIPLE

Field level of maintenance is any maintenance that does not require depot-level maintenance capability and is performed by crew/operators and maintainers within Marine Corps organizations and activities, and/or by approved commercial/contract sources. Maintenance tasks performed within the field level of maintenance are categorized as organizational and intermediate.

Organizational Maintenance

All battalions and regiments have organizational maintenance capabilities. Proper employment of these elements is essential to sustain combat operations. Organizational maintenance is the responsibility of, and performed by, a using organization on its assigned equipment. Its phases normally consist of inspecting, servicing, lubricating, adjusting, and replacing of parts, minor assemblies, and subassemblies.

The MCT is the key element of organizational maintenance in combat. Maintenance contact teams are essential to a successful recovery, evacuation, and repair program; they determine whether an item is repairable at the recovery site. If so, the MCT fixes it immediately or obtains parts, additional personnel, and tools from the rear; if the equipment is not repairable at or near the recovery site, they supervise evacuation of the equipment.

Maintenance contact teams consist of organizational maintenance repairmen with tools, test equipment, and limited repair parts to inspect, diagnose, classify, and repair equipment at forward sites. Depending on the organization, MCTs can be composed of communications, engineer, motor transport, and/or ordnance repair personnel. The commander determines the exact number of personnel and mix of skills in an MCT. Positioning of MCTs depends largely on the support train option selected. Trains are any grouping of personnel, vehicles, and equipment organized to provide CSS and/or tactical logistic support at team and battalion level. Unit trains consist of all battalion logistic assets, including team assets, and any supporting assets from higher headquarters. Combat trains are organized at company and battalion levels to support combat operations. Unit trains are common in assembly areas and during extended tactical marches. Once combat operations begin, the battalion commander, based on the tactical situation, will either keep all logistic assets in one location as a unit train or echelon logistics forward. When combat trains are used, MCTs are forward, where they are more responsive to the tactical units they support. When unit trains are used, MCTs are positioned further to the rear. This placement can create situations in which contact teams are not as readily available to inspect, classify, or repair damaged or inoperable items.

Intermediate Maintenance

Intermediate maintenance tasks may require a higher level of technical training, specialized tools, and/or facilities than organizational maintenance. There are three elements in the intermediate maintenance concept: the LCE maintenance element, the forward support maintenance detachment, and the MST.

Logistics Combat Element Maintenance Element. The MLG task-organizes to support the deploying force. It can task-organize the LCE as a combat logistic battalion or combat logistic company.

The MLG is organized into regimental, battalion, or company size elements. These elements can be task-organized to meet mission requirements. The LCE conducts maintenance operations from a central maintenance capability in the forward CSSA because it performs the more complex and time-consuming maintenance. Commanders have the assets to provide a central maintenance capability in addition to maintenance detachments and MSTs. These assets can support either organizational MCTs or augment subordinate CSS detachment capabilities during surge periods. Maintenance support teams are usually kept on-call in the forward CSSA, rather than with either the supported unit or with subordinate CSS detachments.

Forward Support Maintenance Detachment. The forward support maintenance detachment is an LCE maintenance activity. It operates the maintenance facilities and maintenance collection points in the CSSA. Its role is to evacuate inoperable equipment from the supported units' collection points and perform intermediate maintenance within its capabilities. The detachment also provides the repairmen, tools, and test equipment for an MST, which may assist organizational maintenance elements.

Maintenance Support Team. Maintenance support teams consist of intermediate maintenance repairmen, tools, test equipment, and repair parts. An MST inspects, diagnoses, classifies, and repairs equipment at forward sites. Since the MST comes from the LCE, the commander of the maintenance unit will form the MST from available intermediate maintenance assets. Unlike MCTs, MSTs are not routinely forward with the tactical units. They usually work on equipment in the CSSA until sent forward to repair a specific item of equipment. This permits better use of maintenance and transportation assets while also permitting the maintenance team to draw and bring with them the needed repair parts.

The LCE commander may position MSTs forward; however, this is usually only done when the commander anticipates that the team will have enough work to justify this option. If the commander sends the team forward, a repair parts block may also be required. When dispatched, the team remains forward for a short duration until the work is completed. Once the work is completed, they return to the CSSA where they are accessible for further missions. Combat service support detachments always have MST capabilities.

MAINTENANCE SUPPORT OPERATIONS

Full spectrum operations require continuous and simultaneous combinations of amphibious, offensive, defensive, civil support, humanitarian relief, or disaster relief tasks. Planning for maintenance support during these operations requires thorough mission analysis, careful identification of the force supported, and an understanding of the commander's intent. This paragraph discusses the nature and conduct of maintenance-related activities that depend on the operational environment associated with either contiguous or noncontiguous battlespace.

Maintenance Afloat

The MAGTF unit commander embarked aboard ship outlines, in coordination with ship personnel, the procedures for equipment maintenance afloat. Due to space restrictions, the maintenance capabilities of embarked MAGTF units may be very limited. Only maintenance procedures or repairs that are approved by ship personnel and can be accomplished safely are performed. Prior planning ensures that parts and materials are readily available to conduct planned maintenance.

The MAGTF equipment maintenance operations afloat differ slightly from garrison or ashore expeditionary maintenance procedures. Safety regulations may prevent specific types of maintenance from being performed. Additionally, sea conditions and time constraints may restrict maintenance operations. Climatic conditions aboard ship affect embarked MAGTF weapons and

equipment. Dampness and salt water cause corrosion and deterioration to an extent beyond that usually experienced ashore. Therefore, weapons and equipment aboard ship require extra care.

All amphibious ships have some type of maintenance facilities or shops to maintain and repair the ship. Most ships have electrical, welding, carpentry, electronics, and machine shops. These facilities, although not designed to specifically support MAGTF maintenance operations, may be utilized when properly coordinated with ship personnel. The embarked MAGTF commander and staff should be aware of the maintenance facilities aboard ship and coordinate their use by MAGTF personnel if needed.

The following subparagraphs address issues that should be considered while conducting maintenance afloat:

Equipment Stowed Topside. Crew or operator maintenance is paramount for equipment stowed topside. Whenever possible, equipment should be protected from the weather by canvas and tarpaulins. Also, equipment may require additional maintenance attention due to the harsh environment.

Equipment Preventive Maintenance. Special consideration must be given to the extremely corrosive environment while embarked and during landing operations. If feasible, crews or operators should conduct either freshwater wash downs or wipe downs as frequently as possible, preferably no less than biweekly. Crew/operator PMCS are performed at more frequent intervals. Vehicles should be started periodically, whether stowed on the main deck or in holds. Before starting vehicles in a hold, unit maintenance personnel coordinate with ship personnel to ensure that the ship's safety regulations are strictly enforced (e.g., proper ventilation).

Equipment Inspections. Equipment inspections should be conducted frequently to ensure that all equipment will function properly when debarked. Permission must be obtained from the ship's commander to enter cargo holds for inspections. Inspections should focus on the following:

- Waterproofing.
- Fuel and oil leakage.
- Batteries and tires.
- Dampness or saltwater deterioration.
- Examination of lashing assemblies and shoring to ensure that equipment remains secured.
(This is normally a joint responsibility of the ship's deck department and embarked personnel.)

Maintenance in Maritime Prepositioning Force Operations

The maritime prepositioning force offload preparation party is task-organized and composed of the following maintenance personnel: mechanics, technicians, and operators. The offload preparation party deploys prior to the MAGTF to prepare equipment for offload and receipt by the MAGTF. Limited by size, capability, time, and workspace, its work is typically limited to minor field-level maintenance and emergency field expedient repairs. Therefore, preventive and corrective maintenance requirements of a more significant nature are identified for resolution by maintenance units at the point of offload.

Maintenance Support in Combat

During combat actions, the intent of maintenance support is to regenerate combat power as efficiently and effectively as possible. The LCE commander and staff must comprehend the MAGTF's operations and scheme of maneuver in relation to the battlespace in order to provide responsive maintenance support. The commander must be knowledgeable of the battlespace, enemy's location, disposition, and movement so that he can determine a position that provides scalable maintenance activities to best support the maneuver force. This occurs by designating the scope of tasks performed by maintenance activities and requirements for managing activities that perform maintenance. Austere conditions should be anticipated as support facilities, population receptiveness, and overall host-nation support may be unpredictable and unreliable. Therefore, planning for maintenance support during these operations requires thorough problem framing, careful identification of the force supported, and an understanding of the commander's intent.

Maintenance Support in the Offense

The ability to maintain momentum and mass at critical points is crucial in the attack. Maintenance operations must be thoroughly integrated into the attack plan in order to surge support to units preparing or executing an attack. They must also be positioned to respond quickly when repair on site is critical. The situation may dictate repair at the point of malfunction or damage in order to maintain the maximum number of operable and mobile weapon systems. Therefore, mechanics and technicians working in forward areas must be able to meet the increased demands for field-level maintenance. Maintenance support teams may also operate in direct support of lead units in the attack. Maintenance support teams must be properly configured (military occupational specialty and quantity), equipped (transportation, common tools, special tools, and communications), and supplied (components, assemblies, and repair parts) to perform their missions. Noncombat essential repair parts, components, and assemblies should not be carried forward due to their adverse effects on mobility.

Responsible technicians must make hasty but informed decisions regarding what can be repaired on site, what should be evacuated, and what should be cannibalized based upon the operational environment and recommendations from higher headquarters. They must also be capable of determining if operational necessity demands the destruction of damaged equipment to render it useless to the enemy. Guidelines should be set regarding the amount of time devoted to on site repair to determine whether or not equipment should be evacuated or reported to the next higher level and left for following units. Contact teams report the location of items left behind to their parent maintenance control element. Parent maintenance control elements coordinate recovery and evacuation of these items. When policy and SOPs dictate the destruction of equipment (e.g., trucks, tanks, amphibious assault vehicles, artillery) that equipment must be abandoned in accordance with the operator's equipment technical publications. The inherent danger of leaving equipment for recovery/salvage is that it provides the enemy the opportunity to exploit and/or compromise the equipment. Attempted recovery/salvage of equipment that has been compromised may not be feasible due to the tactical situation and safety.

Maintenance During the Amphibious Assault. Assault elements of the landing force are in either scheduled or on-call waves. Assault units usually have few organizational maintenance personnel. The majority of their organizational maintenance capability follows in nonscheduled waves.

The initial maintenance capability, to include limited recovery, evacuation, and repair, is provided by the LFSP. The LFSP maintenance detachment carries a small block of critical repair parts tailored to match the quantity and type of equipment in the assault waves. During times of increased activity while carrying out the assault phase, the LFSP's emphasis will be on replacement of components and assemblies rather than repairing them. The LFSP should request permission from the LCE commander to perform authorized selective interchange and cannibalization to offset the limited depth and breadth of the repair parts block. Immediate tasks of the LFSP maintenance detachment are to establish maintenance and salvage collection points and aggressively implement the recovery and evacuation plan. Assault elements must be made to understand the importance of recovering damaged equipment and returning the equipment to the appropriate collection point. Even extensively damaged items may provide parts for repair of other combat essential equipment items. Equipment should only be abandoned when the tactical situation leaves no other options. When units are unable to recover equipment, they should report the location to the LFSP for later recovery and evacuation. When the situation presents itself, assault elements should utilize unit distribution for resupply and should place damaged equipment on resupply vehicles for return to the LFSP.

Maintenance During Transition Periods. As the tactical situation stabilizes, assault element commanders phase in their nonscheduled units that include their unit/battalion trains and the remainder of their maintenance elements. The primary responsibility for maintenance then shifts to the unit owning the equipment. As the assault units' field maintenance capability expands, the LFSP shifts its efforts from organizational tasks to intermediate tasks. Assault units initially position their trains near the LFSP to enhance mutual support, avoid unnecessary duplication of effort, and reduce distance between train positions, which reduces the transportation burden for both maintenance and resupply.

Maintenance During Subsequent Operations. Only after the assault follow-on echelon arrives does the LCE reach full maintenance capability. When a maintenance unit cannot repair an item, it holds the item at the maintenance collection point or evacuates the item to the next higher level. As the situation continues to mature, the landing force commander phases in additional LCE units from the assault echelon and maintenance capabilities gradually increase. When satisfied that adequate capability and command and control are established by the LCE, the landing force commander will disestablish the LFSP, which will be subsequently absorbed into the LCE.

Maintenance Support in the Defense

The MAGTF maintenance effort's primary thrust during defensive operations is to prepare the maximum number of combat-ready weapon systems. During the preparation of the defense, priority of protection goes to those units preparing positions and obstacles. Once the positions are prepared, priority shifts to protection of the reserve, trains, and command post locations. Maintenance considerations for defensive operations include the following:

- Replace lost maintenance capability.
- Use maintenance teams well forward of collection points.
- Develop plans to displace often.
- Emphasize recovery and retrograde of equipment that require extended repair time.

Once defensive actions begin, the priority shifts to repairing the maximum number of damaged/inoperable systems and returning them to the battle as fast as possible. This requires conduct of maintenance on site or as near as possible to the location where the system is employed. Commanders task-organize personnel, equipment, and parts as required to provide responsive maintenance in the forward area (i.e., MSTs). This organization should include trained personnel who are able to diagnose problems quickly, make rapid repairs, or decide to evacuate equipment to the next level of maintenance.

Maintenance Support in Civil Support Operations

Civil support operations address the consequences of manmade or natural accidents and incidents beyond the capabilities of civilian authorities within the United States and its territories. The overall purpose of civil support operations is to meet the immediate needs of the citizens of the United States in time of emergency until civil authorities can accomplish these tasks without assistance. Marine air-ground task forces may be deployed into an area to support civilian agencies and provide essential services, assets and specialized resources to help civil authorities deal with situations beyond their capabilities. Also, MAGTFs may be called upon to operate in support of civil support operations as an independent organization or part of a joint task force.

Maintenance Support in Humanitarian Relief

As in peace operations, maintenance doctrine does not change during humanitarian operations. However, humanitarian operations do introduce unique challenges to logisticians. Depending on the regional political situation, the MAGTF may conduct humanitarian missions in either friendly or hostile environments.

Since humanitarian missions are situationally dependent, logistic planners must consider the following:

- Locate maintenance operations away from dense population centers.
- Identify maintenance sites that units can easily secure and defend.
- Establish and secure lines of communications.
- Coordinate with engineer support.
- Enclose maintenance operations areas.
- Establish entrance and exit control points.
- Maintain responsive 24-hour perimeter security.
- Consider the impact on the environment.

Maintenance Support in Disaster Relief

Disaster relief operations address the consequences of manmade or natural accidents and incidents beyond the capabilities of foreign civilian authorities (outside of the United States and its territories). In disaster relief operations, maintenance and logistic planners from national and multinational organizations need to identify commercial vendors who can quickly supply the technical support, repair parts required, assets from other agencies, contractors, and local maintenance resources for economy of effort.

Planners must evaluate and prioritize equipment repair for infrastructure, firefighting, law enforcement, medical, construction, and power generation supporting the operation as well as belonging to other military elements involved in the operation.

Service-Specific Equipment Support to Non-MAGTF Organizations

During joint operations, commanders must understand the potential maintenance requirements of non-MAGTF units operating within their area of operation. Units such as Marine Forces Special Operations Command, transition teams, and security force assistance teams may require maintenance for Service-specific equipment that cannot be supported by their parent command. Understanding and planning for these requirements is critical to uninterrupted maintenance operations.

RECOVERY, BATTLE DAMAGE ASSESSMENT AND REPAIR, AND EVACUATION

Commanders must closely monitor and control recovery and evacuation operations. They must establish priorities that govern recovery and evacuation efforts, carefully allocate personnel and equipment to those efforts, and position their recovery capability as far forward as possible. As a rule, their recovery capability consists of the personnel and equipment in their MCTs. Commanders of intermediate maintenance activities should hold their recovery assets in a general support role at the force CSSA or the forward CSSA where they can achieve a balance between economy and responsiveness. For example, combat vehicles, platforms, and weapons systems often have a higher recovery priority than other items.

Recovery

Recovery is the responsibility of the units that own the equipment. Owning units retrieve or arrange to retrieve immobile, inoperative, and/or abandoned materiel. The owning unit's objective is to recover equipment to its maintenance collection point, main supply route, or maintenance detachment site.

If materiel is permanently unrecoverable or in danger of capture, owning units should make every attempt to properly identify and, if necessary, destroy equipment. If possible, units should remove salvageable materiel before destroying it.

Battle Damage Assessment and Repair

The purpose of battle damage assessment and repair (BDAR) is to return combat assets to an operational status as soon as possible. The BDAR procedures apply to most operational levels (from the operator/crew through the field level of maintenance). Repair depends on the extent of the damage, time allowances, available personnel with required skills, and accessible parts, tools, and materials. Maintenance personnel and operators/crews must act quickly to restore the vehicle

to combat-ready condition required to continue the mission or to the point the vehicle can self-recover. To be effective, BDAR should follow certain basic guiding principles:

- Ensure standard maintenance practice is always the first consideration.
- Base decisions of using BDAR versus standard maintenance on the METT-T [mission, enemy, terrain and weather, troops and support available-time available].
- Provide an accurate assessment to maintenance personnel.
- Ensure economy of maintenance effort (use maintenance personnel only when necessary).
- Train operators/crews in multifunctional BDAR skills.
- Repair only what is necessary to regain combat capability.
- Remain flexible about repair priorities.

Commanders should address BDAR in the logistic section of their operation order. This will provide the operators/crews and maintainers with a clear understanding of when and at what risk level they can perform BDAR. In wartime, BDAR may have to be liberally applied at the discretion of the commander. In military operations other than war, local command policy will direct the degree of BDAR to apply and when to use standard maintenance. However, commanders at all levels must ensure that both operators/crews and maintainers perform annual BDAR training.

Evacuation

If the owning unit is unable to repair a recovered item, the owning unit needs to coordinate movement of the equipment to a supporting maintenance activity. The supporting maintenance activity can repair the equipment or evacuate the recovered equipment directly to an agency that will repair or dispose of the equipment correctly. Since evacuation is to affect repair, cross-level maintenance workloads, or relieve units of disabled equipment during tactical movements, the commander is responsible to ensure the evacuation is conducted. Evacuation planning must also include the return of repairable equipment to the owning unit once repairs have been completed.

MAINTENANCE DIRECTIVES, TECHNICAL MANUALS, AND STOCK LISTS

Mechanics should use the applicable maintenance directives and TMs to ensure that inspection and repair procedures are effectively applied. The Marine Corps has a comprehensive technical publication system that supports the maintenance effort at all levels of maintenance. The commander and maintenance management officer ensure that an effective publication control program is established. It is the unit commander's responsibility to ensure that current maintenance publications are on hand and used. Stock lists provide all levels of Marine Corps supply and maintenance operations with essential, up-to-date information for Marine Corps-managed items.

The Marine Corps Manual

The *Marine Corps Manual* is the capstone publication for policy statements issued by the Commandant of the Marine Corps. It contains policies that supplement naval regulations

established by the Secretary of the Navy. The guidance contained in the *Marine Corps Manual* is very broad and it is amplified by other Marine Corps publications. However, the *Marine Corps Manual* clearly defines maintenance as a command responsibility.

Marine Corps Order 4790.25

The ground equipment maintenance program includes activities required to meet DOD and Marine Corps readiness, logistics, and sustainability objectives that enable the Marine Corps to maintain operational capabilities. As performance requirements for ground equipment continue to increase, in order to keep pace with evolving defense strategies and operational concepts of employment, the Marine Corps must continuously improve ground equipment acquisition, sustainment, and maintenance practices in order to sustain these capabilities. Roles and responsibilities of Marine Corps' agencies identified in MCO 4790.25 provide an integrated framework for a total productive maintenance strategy that supports continuous process improvement across the full range of actions required to maintain and sustain ground equipment, from initial requirements determination to final asset disposition.

Users Manual 4000-125

The UM 4000-125 establishes execution procedures and prescribed processes in conducting all retail supply and levels of maintenance. It ensures standard, repeatable, and auditable processes to best support accountability and readiness reporting in a world-wide accessible web-based logistics platform. This manual is an excellent reference for commanders and their staffs to use when spot checking the reported condition of unit equipment and the maintenance commodity support procedures.

Equipment Technical Manuals

With ever-changing technological developments, equipment TMs have moved from paper copies to electronic versions. Electronic TMs provide instructions for the performance of authorized maintenance on specific equipment for each category of maintenance. These TMs are published by the Service that is designated as the item manager of a particular piece of equipment. Each part of an equipment TM is identified by a basic number that identifies the type of equipment, level of maintenance, subsequent source maintenance, and recoverability codes. Levels of maintenance and TMs have varied in definition and alpha-numeric labeling, requiring operators and mechanics to familiarize themselves with the specific electronic TMs needed for a particular piece of equipment.

Technical manuals that end with the letter "P" include parts listings. Technical manuals are published in parts to facilitate distribution and use.

Lubrication Instructions and Lubrication Orders

Lubrication instructions and orders furnish technical information and instructions on the service, lubrication, and other related PMCS required for equipment or materiel. A lubrication instruction, also identified as a lubrication order (depending on the Service sponsor), prescribes equipment lubrication instructions, describes proper lubricants, establishes required intervals, and explains lubrication maintenance. The difference between the two is that the lubrication instruction applies to Marine Corps-sponsored equipment (Marine Corps-peculiar equipment) and the lubrication order applies to equipment sponsored by another Service.

Modification Instructions

Many items require modifications to improve safety and/or operating characteristics. When a modification is required, the Marine Corps issues a publication known as a modification instruction.

Technical Instructions

Technical instructions provide technical information on equipment, materiel, and programs. For example, technical instructions may provide instructions for the replacement or evacuation of Marine Corps ground equipment or information on a particular oil program.

Stock List 1-2

Stock List 1-2 identifies technical publications required to support a unit's assigned equipment. It lists publications for each piece of equipment and provides the publication's number, current date, and any changes that have been issued. Commanders use Stock List 1-2 to ensure that their units have the required up-to-date technical publications on-hand.

Stock List 1-3

Stock List 1-3 lists all current and superseded publications by their publication control number and by their short title. Also, Stock List 1-3 provides amplifying information needed to order and maintain a unit's publication library. This includes general subject publications that may not be listed in Stock List 1-2.

Stock List-3

Stock List-3 provides component listings for every end item. It identifies the national stock number; quantity; and unit of issue. Also, Stock List-3 identifies if an item is an actual component of the end item or if the using unit provides the item that is to be used with the end item.

Stock List-4

Stock List-4 conveys supply and maintenance information to unit maintenance personnel. It lists the repair parts that apply to an end item, component, or major assembly requiring maintenance and supply support. Stock List-4 provides national stock numbers for ordering parts; graphic presentation of each part for easy identification; unit of issue (measurements by which the item is dispensed; e.g., each, feet, pounds); quantity of repair part being applied to the end item; and source, maintenance, and recoverability code. The source, maintenance, and recoverability code provides important information to maintenance personnel: it identifies the lowest level of maintenance authorized to remove and/or install a part and to perform the complete repair of that part. Commanders should occasionally question maintenance personnel concerning their use of the source, maintenance, and recoverability code to demonstrate interest in unit maintenance operations, to determine their maintenance personnel's knowledge in prescribed procedures, and to determine if training deficiencies exist.

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APPENDIX A

MAINTENANCE APPLICATION

OF GLOBAL COMBAT SUPPORT SYSTEM—

MARINE CORPS AND TOTAL LIFE CYCLE

MANAGEMENT OPERATIONAL SUPPORT TOOL

The mission of the Global Combat Support System–Marine Corps (GCSS–MC) is to maximize Marine Corps combat effectiveness through logistical information technology. The GCSS–MC enables an end-to-end logistical chain that is agile, responsive, flexible and reliable. More information can be found in the GCSS–MC user’s manual, UM 4000-125.

The GCSS–MC provides improved processes, driving quantifiable changes for precision distribution and logistical chain management. Additionally, it provides cross-functional information to enhance in-transit visibility and total asset visibility, thus affording timely decisions for logistics chain management through the last mile. Program benefits also include a reduction in customer wait time, a decreased dependency on forward positioned materiel, and less frequent redundant requisitioning. This system controls inventory issues and allows Marines to adjust on-hand inventories downward, increase inventory accuracy and validity, and improve initial inventory fills.

The GCSS–MC modernizes, integrates, and sustains information technology solutions for the 21st century, providing the right logistical data, at the right time, and at the right place. The end state is a successfully implemented information technology system utilized by MAGTFs and supporting establishments to enhance their logistic warfighting capability with minimal disruption to the enterprise network.

DATABASE OUTPUT

Maintenance management officers at all levels are responsible to their commanders for all aspects of their unit’s maintenance programs, which includes GCSS–MC maintenance-related operations. Their duties include establishing and disseminating procedures for the submission of information and the dissemination of output reports, evaluating maintenance shop performance using GCSS–MC output reports and the training of personnel in all aspects of GCSS–MC maintenance-related operations.

The maintenance management officer coordinator sponsors and coordinates GCSS–MC operations within a unit. The information systems coordinator facilitates and disseminates system changes or directives from higher headquarters; consolidates system changes, modification requests, and impact statements from adjacent major commands to higher headquarters; coordinates the schedule for submission/dissemination of daily input and output reports; and prepares work requests for all update cycles and reports.

The using-unit account manager is responsible to assign, revoke, and manage the GCSS–MC system roles and responsibilities to users within their command and/or assigned units.

REPORTS

Report information is based on the input provided by users at the working level. Therefore, commanders must ensure that personnel are trained, guided, and motivated to perform their jobs effectively and report relevant information. These reports are used in two critical activities: validation of requisitions and reconciliation of readiness, maintenance, and supply reports. Validation involves confirming that repair parts on order are still needed and that cancellations, receipts, parts requisitioned outside the supply system, and challenges to estimated shipping dates are properly reflected. Reconciliation of information among maintenance, supply, and readiness reports is accomplished by the maintenance management officer in concert with commodity and supply representatives. Reconciliation is the means to monitor the status of mission-essential deadlined equipment and identify any recurring errors or trends that could result in a delay or degraded maintenance service. While not all inclusive, the following is a list of reports essential to managing the maintenance effort:

- Maintenance production report.
- Equipment status report.
- Maintenance management report.

Maintenance Production Report

The maintenance production report is used predominantly by leaders of organizational maintenance sections. The maintenance production report contains complete maintenance and repair parts information regarding each service request opened by a commodity. Section heads use the maintenance production report to track equipment repairs performed by the respective unit repair shops.

The maintenance production report presents both supply and maintenance data. The shop chief generally uses the information in day-to-day management of maintenance operations. It is useful in the conduct of periodic informal inspections, to identify work stoppages and delays, highlight outstanding parts requisition follow-up requirements, show visibility of disagreements between maintenance and repair parts priorities, detect what parts have been added, and show parts still needed for deadlined equipment.

Equipment Status Report

The equipment status report provides the specific repair status of individual pieces of equipment within a unit's maintenance cycle. This report is produced on demand by commodity. It includes active service requests at intermediate- and organizational-maintenance activities and the latest job status. The equipment status report is used to identify unfavorable trends in equipment defects, priority assignments, job status, days deadlined, and days in shop. The report also provides service request information from the intermediate maintenance level to determine current status of equipment that was evacuated to a supporting maintenance activity.

Maintenance Management Report

The maintenance management report is a tool used by logisticians and maintenance managers to monitor the status of all open, maintenance-related service requests. The maintenance management report may provide information that will aid in the identification of problems or delays in the maintenance production process. The understanding of this report and the immediate correction of problem areas is an essential process within maintenance production. These actions help to ensure each command is able to perform their assigned mission by minimizing the time equipment is in the maintenance cycle. The report contains the following information pertaining to the PEI for which the service request has been opened:

- *Operational status.* Identifies the operational status of the PEI. It is populated from the operational status field on the service request.
- *Service request number.* The number associated to the current service request.
- *Job status.* Identifies the current status of the service request and the equipment for which the service request was initiated (e.g., open, equipment accepted, short parts, evacuated to higher levels of maintenance, inter-shop repairs).
- *Days in status.* The actual number of days the service request and equipment have been in the reported job status.
- *Table of authorized materiel control number* (also referred to as TAMCN). A number assigned to a PEI.
- *Item designator number.* Assigned to PEI and major components of the PEI (i.e., secondary reparable).
- *Model.* Marine Corps common nomenclature for the equipment.
- *NIIN.* The national item identification number, also referred to as NIIN.
- *Nomenclature.* Common name for the family of equipment.
- *Serial number.* Serial/set number for the equipment identified on the service request.
- *Equipment owner.* Unit identification code.
- *Marine Corps Readiness Reporting category.* Identifies whether the equipment is essential for combat in accordance with MCBul 3000.
- *Severity.* Urgency of the repairs on the equipment for which the service request was opened.
- *Problem code.* Identifies the defect of the equipment and includes the additional problem type.
- *Service request owner.* Unit that initiated the service request.
- *Summary.* A free text field that further identifies what is wrong with the equipment.
- *Last updated.* Date the last time the service request was worked on.

- *Days since last modified.* Total days since the service request was worked on.
- *Days deadlined.* Total days the equipment has been in a deadline status.
- *Deadline control date.* The date the equipment was identified as deadlined.
- *DRIS.* Date received in shop, written as DRIS.
- *Creation date.* Date of service request initiation.
- *DIS.* Days in shop, written as DIS.
- *Days open.* Total number of days beginning with the date the service request was initiated and ending with the current date.
- *Required delivery date.* The required delivery date of the PEI as identified by the equipment owner.
- *Contact name.* The person to be contacted for questions regarding the equipment.
- *Activity address code.* The supply account for the owner of the equipment.
- *Open/closed status.* Identifies whether the service request is open or closed.
- *Unit name.* Name of organizational unit that owns the equipment.
- *Group.* The resource group to which the equipment belongs.

TOTAL LIFE CYCLE MANAGEMENT OPERATIONAL SUPPORT TOOL

The Total Life Cycle Management Operational Support Tool is a business intelligence/decision support tool that rationalizes capabilities and functions of the existing life cycle modeling integrator suite of tools and combines them into a single application. The Total Life Cycle Management Operational Support Tool's goal is to provide decision makers at all levels usable integrated acquisition, logistic, and financial authoritative enterprise information from a single source (i.e., the master data repository) which enables effective and efficient equipment accountability, visibility, readiness, and operational effectiveness. For more detailed information concerning the Total Life Cycle Management Operational Support Tool, see MCO 4000.57A, *Marine Corps Total Life Cycle Management (TLCM) of Ground Weapons, Equipment and Materiel*.

GLOSSARY

Section I. Abbreviations and Acronyms

BDAR	battle damage assessment and repair
BSA.....	beach support area
CSS	combat service support
CSSA	combat service support area
DOD.....	Department of Defense
EGEM	Enterprise Ground Equipment Management
G-1	manpower or personnel staff officer
G-3	operations staff officer
G-4	logistics staff officer
GCSS–MC	Global Combat Support System–Marine Corps
HQMC	Headquarters, United States Marine Corps
ISSA.....	inter-Service support agreement
LCE.....	logistics combat element
LFSP	landing force support party
LZ.....	landing zone
LZSA	landing zone support area
MAGTF	Marine air-ground task force
MARCORLOGCOM.....	Marine Corps Logistics Command
MARCORSYSCOM.....	Marine Corps Systems Command
MCBul	Marine Corps bulletin
MCDP	Marine Corps doctrinal publication
MCO	Marine Corps order
MCT.....	maintenance contact team
MCTP.....	Marine Corps tactical publication
MLG.....	Marine logistics group
MST	maintenance support team
PEI	principal end item
PEO.....	Program Executive Office
PMCS.....	preventive maintenance checks and services

S-1 personnel office/personnel officer
S-3 operations office/operations officer
S-4 logistics office/logistics officer
SOP standing operating procedure

T/E table of equipment
T/O table of organization
TAM table of authorized materiel
TM technical manual
TMDE test, measurement, and diagnostic equipment
TO&E table of organization and equipment

UM users manual
US United States

Section II. Terms and Definitions

combat service support—The essential capabilities, functions, activities, and tasks necessary to sustain all elements of all operating forces in theater at all levels of war. Also called **CSS**. (DOD Dictionary)

combat service support area— (See the DOD Dictionary for core definition. Marine Corps amplification follows.) The primary combat service support installation established to support Marine air-ground task force operations ashore. Normally located near a beach, port, and/or an airfield, it usually contains the command post of the logistics combat element commander and supports other combat service support installations. Also called **CSSA**. (MCRP 1-10.2)

component—In logistics, a part or combination of parts having a specific function, which can be installed or replaced only as an entity. (DOD Dictionary, part 2 of a 2-part definition)

deadline—To remove a vehicle or piece of equipment from operations or use for one of the following reasons: **a.** is inoperative due to damage, malfunctioning, or necessary repairs. The term does not include items temporarily removed from use by reason of routine maintenance, and repairs that do not affect the combat capability of the item; **b.** is unsafe; and **c.** would be damaged by further use. (Upon promulgation of this publication, this term and definition are approved for use and will be included in the next edition of MCRP 1-10.2)

direct support—A mission requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance. Also called **DS**. See also **general support**. (DOD Dictionary)

end item—A final combination of end products, component parts, and/or materials that is ready for its intended use. (DOD Dictionary)

equipment—In logistics, all nonexpendable items needed to outfit or equip an individual or organization. See also **component**; **supplies**. (DOD Dictionary)

evacuation—1. Removal of a patient by any of a variety of transport means from a theater of military operation, or between health services capabilities, for the purpose of preventing further illness or injury, providing additional care, or providing disposition of patients from the military health care system. 2. The clearance of personnel, animals, or materiel from a given locality. 3. The controlled process of collecting, classifying, and shipping unserviceable or abandoned materiel, United States or foreign, to appropriate reclamation, maintenance, technical intelligence, or disposal facilities. 4. The ordered or authorized departure of noncombatant evacuees from a specific area to another in the same or different countries by Department of State, Department of Defense, or appropriate military commander. (DOD Dictionary)

general support—That support which is given to the supported force as a whole and not to any particular subdivision thereof. Also called **GS**. See also **direct support**. (DOD Dictionary, part 1 of a 2-part definition)

host-nation support—Civil and/or military assistance rendered by a nation to foreign forces within its territory during peacetime, crises or emergencies, or war based on agreements mutually concluded between nations. Also called **HNS**. (DOD Dictionary)

in support of—Assisting or protecting another formation, unit, or organization while remaining under original control. (DOD Dictionary)

item manager—An individual within the organization of an inventory control point or other such organization assigned management responsibility for one or more specific items of materiel. (DOD Dictionary)

joint—Connotes activities, operations, organizations, etc., in which elements of two or more Military Departments participate. (DOD Dictionary)

landing force support party—(See DOD Dictionary for core definition. Marine Corps amplification follows.) The forward echelon of the logistics combat element formed to facilitate the transportation and throughput operations. In maritime prepositioning force operations, the landing force support party is responsible to the Marine air-ground task force commander for the reception of maritime prepositioned equipment and supplies and personnel at the beach, port, and arrival airfield, and movement control to the unit assembly areas. Also called **LFSP**. (MCRP 1-10.2)

landing zone support area—A forward support installation that provides minimum essential support to the air assault forces of the Marine air-ground task force. It can expand into a combat service support area but it is most often a short-term installation with limited capabilities, normally containing dumps for rations, fuel, ammunition, and water only; maintenance is limited to contact teams and/or support teams. Also called **LZSA**. (MCRP 1-10.2)

logistics—(See DOD Dictionary for core definition. Marine Corps amplification follows.) 1. The science of planning and executing the movement and support of forces. 2. All activities required to move and sustain military forces. Logistics is one of the six warfighting functions. (MCRP 1-10.2)

logistics combat element—The core element of a Marine air-ground task force (MAGTF) that is task-organized to provide the combat service support necessary to accomplish the MAGTF's mission. The logistics combat element varies in size from a small detachment to one or more Marine logistics groups. It provides supply, maintenance, transportation, general engineering, health services, and a variety of other services to the MAGTF. In a joint or multinational environment, it may also contain other Service or multinational forces assigned or attached to the MAGTF. The logistics combat element itself is not a formal command. Also called **LCE**. See also **Marine air-ground task force**. (MCRP 1-10.2)

maintenance—1. All action, including inspection, testing, servicing, classification as to serviceability, repair, rebuilding, and reclamation, taken to retain materiel in a serviceable condition or to restore it to serviceability. 2. All supply and repair action taken to keep a force in condition to carry out its mission. 3. The routine recurring work required to keep a facility in such condition that it may be continuously used at its original or designed capacity and efficiency for its intended purpose. (DOD Dictionary)

maintenance float—End items or components of equipment authorized for stockage at installations or activities for replacement of unserviceable items of equipment when immediate repair of unserviceable equipment cannot be accomplished at the organic level of maintenance. (MCRP 1-10.2)

Marine air-ground task force—The Marine Corps' principal organization for all missions across the range of military operations, composed of forces task-organized under a single commander capable of responding rapidly to a contingency anywhere in the world. The types of forces in the Marine air-ground task force (MAGTF) are functionally grouped into four core elements: a command element, an aviation combat element, a ground combat element, and a logistics combat element. The four core elements are categories of forces, not formal commands. The basic structure of the MAGTF never varies, though the number, size, and type of Marine Corps units comprising each of its four elements will always be mission dependent. The flexibility of the organizational structure allows for one or more subordinate MAGTFs to be assigned. In a joint or multinational environment, other Service or multinational forces may be assigned or attached. Also called **MAGTF**. See also **logistics combat element**. (MCRP 1-10.2)

maritime prepositioning force—A task organization of units under one commander formed for the purpose of introducing a Marine air-ground task force and its associated equipment and supplies into a secure area. The maritime prepositioning force is composed of a command element, a maritime prepositioning ships squadron, a Marine air-ground task force, and a Navy support element. Also called **MPF**. (MCRP 1-10.2)

mission-essential equipment—Designated items that are of such importance that they are subject to continuous monitoring and management at all levels of command. (MCRP 1-10.2)

national stock number—The 13-digit number that identifies a stock item consisting of the 4-digit federal supply classification code plus the 9-digit national item identification number and arranged as follows: 9999-00-999-9999. Also called **NSN**. (DOD Dictionary)

on hand—The quantity of an item that is physically available in a storage location and contained in the accountable property book records of an issuing activity. (DOD Dictionary)

overhaul—The restoration of an item to a completely serviceable condition as prescribed by maintenance serviceability standards. See also **rebuild; repair**. (MCRP 1-10.2)

petroleum, oils, and lubricants—A broad term that includes all petroleum and associated products used by the Armed Forces. Also called **POL**. (DOD Dictionary)

preventive maintenance—The care and servicing by personnel for the purpose of maintaining equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection, and correction of incipient failures either before they occur or before they develop into major defects. (DOD Dictionary)

principal end items—Those items of equipment necessary for the accomplishment of the Marine air-ground task force mission. Also called **PEIs**. (Upon promulgation of this

publication, this term and definition are approved for use and will be included in the next edition of MCRP 1-10.2.)

rebuild—The restoration of an item to a standard as near as possible to its original condition in appearance, performance, and life expectancy. See **overhaul; repair**. (MCRP 1-10.2)

repair—The restoration of an item to serviceable condition through correction of a specific failure or unserviceable condition. See **overhaul; rebuild**. (MCRP 1-10.2)

repairable item—An item that can be reconditioned or economically repaired for reuse when it becomes unserviceable. (DOD Dictionary)

repair cycle—The stages through which a repairable item passes from the time of its removal or replacement until it is reinstalled or placed in stock in a serviceable condition. (DOD Dictionary)

salvage—1. Property that has some value in excess of its basic material content but is in such condition that it has no reasonable prospect of use for any purpose as a unit and its repair or rehabilitation for use as a unit is clearly impractical. 2. The saving or rescuing of condemned, discarded, or abandoned property, and of materials contained therein, for reuse, refabrication, or scrapping. (JP 4-0)

standing operating procedure—A set of instructions covering those features of operations that lend themselves to a definite or standardized procedure without loss of effectiveness. The procedure is applicable unless ordered otherwise. Also called **SOP**. (MCRP 1-10.2)

supplies—In logistics, all materiel and items used in the equipment, support, and maintenance of military forces. See also **component; equipment**. (DOD Dictionary)

supply—The procurement, distribution, maintenance while in storage, and salvage of supplies, including the determination of kind and quantity of supplies. **a. producer phase**—That phase of military supply that extends from determination of procurement schedules to acceptance of finished supplies by the Services. **b. consumer phase**—That phase of military supply that extends from receipt of finished supplies by the Services through issue for use or consumption. (DOD Dictionary)

unserviceable—Items or components in a condition unfit for use, excluding clothing and non-repairable items, that can be restored to a serviceable condition after repair, calibration, or rebuild. (Upon promulgation of this publication, this term and definition are approved for use and will be included in the next edition of MCRP 1-10.2.)

REFERENCES AND RELATED PUBLICATIONS

Joint Issuances

Miscellaneous

DOD Dictionary of Military and Associated Terms

Department of Defense Directive (DODD)

4151.18 Maintenance of Military Materiel

Marine Corps Publications

Marine Corps Doctrinal Publications (MCDP)

1 Warfighting
1-0 Marine Corps Operations
4 Logistics

Marine Corps Reference Publications (MCRP)

1-10.2 Marine Corps Supplement to the DOD Dictionary of Military and Associated Terms

Marine Corps Orders (MCO)

3000.11_ Ground Equipment Condition and Supply Materiel Readiness Reporting (MRR) Policy
4000.57_ Marine Corps Total Life Cycle Management (TLCM) of Ground Weapons, Equipment and Materiel
4400.16_ Uniform Materiel Movement and Issue Priority System (UMMIPS)
4400.201 Management of the Property in the Possession of the Marine Corps – Volumes 1-17
Vol. 6: Dispositions, Exchanges, and Returns of Marine Corps Property
Vol. 12: Marine Corps Class VIII Management and Sustainment
4450.12_ Storage and Handling of Hazardous Materials
4790.18_ Corrosion Prevention and Control (CPAC) Program
4790.2 Field-Level Maintenance Management Policy (FLMMP)
4790.25 Ground Equipment Maintenance Program (GEMP)
5600.31_ Marine Corps Printing and Publishing Regulations

Marine Corps Bulletins (MCBul)

3000 Marine Corps Readiness Reportable Ground Equipment

Marine Administrative Message (MARADMIN)

193/15 Initiating Directive for Enterprise Ground Equipment Management

Technical Manuals (TMs)

4700-15/1H Ground Equipment Record Procedures

4750-OD/1 Painting, Coating, Underbody and Registration Marking for Marine Corps Combat and Tactical Equipment

4795-OR/1 Organizational Corrosion Prevention and Control Procedures for USMC Ground Combat Equipment

Marine Corps User's Manual (UM)

4000-125 Retail Supply and Maintenance Execution Procedures

Miscellaneous

Publications Library Management System Version 3: Users Guide

Marine Corps Manual

Navy Publications

Chief of Naval Operations Instruction (OPNAVINST)

4790.2_ The Naval Aviation Maintenance Program (NAMP)

Navy Tactical Reference Publication (NTRP)

1-02 Navy Supplement to the DOD Dictionary of Military and Associated Terms

To Our Readers

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