

UNITED STATES MARINE CORPS
Logistics Operations School
Marine Corps Combat Service Support Schools
Training Command
PSC Box 20041
Camp Lejeune, North Carolina 28542-0041

MTMOC 2204

STUDENT OUTLINE

MAINTENANCE PRODUCTION

LEARNING OBJECTIVES

1. Terminal Learning Objectives:

a. Given the reference material and provided with a maintenance situation, direct the processing of equipment through the maintenance phases, per MCO P4790.2 and technical reference material.
(3510.2.5)

b. Given the reference materials and a requirements to supervise the performance of second echelon preventive maintenance checks and services on motor transport tactical equipment, identify the preventive maintenance services for the motor transport equipment, per MCO P4790.2, TM 4700-15/1, and the applicable equipment technical manuals. (3510.2.6)

c. Given the reference materials and requirements to supervise the performance of corrective maintenance services on motor transport equipment, identify corrective maintenance requirements for motor transport equipment, per MCO P4790.2 and applicable equipment technical manuals. (3510.2.7)

2. Enabling Learning Objectives:

a. Given the reference material and provided with a maintenance situation, per MCO P4790.2 and technical reference material, identify maintenance requirements to performed during the equipment:

(1) Acceptance phase. (3510.2.5a)

(2) Induction phase. (3510.2.5b)

(3) Active maintenance phase. (3510.2.5c)

(4) Maintenance close-out Phase. (3510.2.5d)

b. Given the reference materials and requirement to supervise the performance of second echelon preventive maintenance checks and services on motor transport tactical equipment, per MCO P4790.2, TM 4700-15/1, and the applicable equipment technical manuals, identify:

(1) The types of preventive maintenance services for motor transport vehicle. (3510.2.6a)

(2) The reasons for changing intervals between preventive maintenance services. (3510.2.6b)

(3) Who is authorized to change preventive maintenance service intervals. (3510.2.6c)

(4) Given the reference materials and requirements to supervise the performance of corrective maintenance services on motor transport equipment, per MCO P4790.2, and applicable equipment technical manuals, identify:

(a) Who is responsible for corrective maintenance. (3510.2.7a)

(b) The established corrective maintenance procedures. (3510.2.7b)

(c) The conditions that warrant a unit to request overflow maintenance. (3510.2.7c)

OUTLINE

1. PROCESSING OF EQUIPMENT THROUGH ITS MAINTENANCE PHASES

a. Maintenance production is that area of equipment maintenance which involves the physical performance of various maintenance functions. These maintenance functions are preventive maintenance (PM), corrective maintenance (CM), modification, calibration, conversion, modernization, overhaul, and rebuild. During the performance of maintenance production,

equipment will be processed through its maintenance cycle in phases.

b. The acceptance phase is the initial step in the equipment maintenance process. The acceptance phase consists of equipment inspection, scheduling, and shop assignment.

(1) The purpose of the acceptance inspection is to ensure that the equipment is complete and prepared for the required maintenance service. The inspection is conducted on equipment, including equipment which has been the subject of acceptance scheduling, upon initial receipt by the maintenance activity. The procedures to be followed in the acceptance inspection are as follows:

(a) First, determine if the equipment is complete and that the appropriate operator maintenance, including cleaning, has been performed. Collateral equipment should be removed and stored and the Equipment Repair Order (ERO) so annotated unless such equipment is required during the maintenance action. The unit commander should be informed about equipment which is incomplete or has not been properly prepared by the unit requesting maintenance.

(b) Next, verify if the ERO has been properly prepared. This verification includes the matching of the equipment serial number with the serial number on the ERO, when appropriate.

(c) After verification of the ERO, acceptance of the equipment for the required services is accomplished by signing the appropriate area on the ERO.

(d) The last step in the acceptance inspection is to assign a production priority for use within the maintenance activity. This priority will be based on the ERO priority and other criteria established by the maintenance officer or chief.

(2) The purpose of acceptance scheduling is to have equipment which requires maintenance arrive at the maintenance facility at or after the time that the required maintenance resources are available. This procedure allows the equipment owner maximum operational use of this equipment while avoiding needlessly large concentrations of equipment awaiting maintenance at the maintenance facility. Acceptance scheduling is normally applicable to all PM's, modifications, calibrations,

and routine repairs. Scheduling of equipment for maintenance requires close coordination between the owner and the maintenance facility if it is to be effective. Procedures for acceptance scheduling are as follows:

(a) First, the owning unit must prepare a deferred or unit recall ERO.

(b) Next, the maintenance activity must accept the ERO. Acceptance of the ERO by the maintenance activity includes the establishment, when appropriate, of the date of delivery of the equipment for the required services.

(c) After the ERO is accepted, the equipment must be scheduled, if appropriate, to a specific shop within the maintenance activity.

(d) Now that the ERO and equipment have been accepted, an Equipment Repair Order/Shopping List (EROSL) should be initiated to ensure availability of repair parts at the time of service.

(3) The assignment of the equipment to a specific maintenance shop within the maintenance activity is made upon completion of the acceptance inspection and scheduling, when appropriate. In maintenance activities comprised of only one shop, shop assignment occurs at the time of acceptance of the equipment during the acceptance inspection. The procedures to be followed in the assignments of shops are as follows:

(a) First, identify the type of shop to perform the required services.

(b) Next, review the workloads and available resources of individual shops within the maintenance activity to determine which shop should be assigned the ERO.

(c) Assign the ERO to a specific maintenance shop. When assigning, always consider the priority assigned the ERO to ensure that the equipment readiness of supported units is not impaired.

(d) Now, assign the preexpended bin (PEB) parts required for the service to the ERO to ensure availability at the time of induction.

c. Equipment Induction Phase

(1) Induction of the equipment is the physical commitment of an ERO and associated equipment requiring service to the assigned shop.

(2) Induction of the equipment into a specific shop should be in accordance with the priority established in the equipment acceptance phase. The equipment should be called for by the maintenance shop at the time that the necessary maintenance resources are available to perform the required services.

d. The active maintenance phase begins with the induction of the ERO and its associated equipment into a maintenance shop. This phase is performed in a sequence of logical steps which are designed to ensure that the required services are conducted in an efficient and effective manner. During this phase, continual emphasis is placed on quality control of the actions and tasks performed. The steps to be followed in the conduct of active maintenance are described as the following.

(1) Inspection of the equipment. Maintenance personnel assigned to perform the service will perform a detailed inspection of the equipment upon its induction into the shop. This inspection serves as a basis for the performance of the maintenance and includes:

(a) Locating, identifying, and inventorying the equipment and its components.

(b) Verifying all paperwork associated with the required service. An ERO accompanying the equipment must be checked to ensure that the ID and/or serial number of the associated equipment correspond to those on the ERO, that the production priority assigned on the ERO is consistent with the shop priority, and that other maintenance information required on the ERO is correct.

(2) Preparation for the performance of maintenance actions includes the assembly of the appropriate technical manuals and other technical data (LO's, MI's, and so forth), and support and test equipment to perform the required services. Adequate preparation reduces the actual time required to perform the maintenance and also ensures that maintenance actions are not initiated for which required resources are not available.

(3) Performance of maintenance actions (PMCS, CM, modification, and calibration) will be in accordance with the appropriate technical manual.

(4) Checking of completed maintenance actions on an ERO. Maintenance personnel will check their completed work by performing the necessary final adjustments on the repaired equipment in accordance with the instructions in the applicable technical publications. Adjustments will be performed by, or under the supervision, of qualified personnel, using standards or gages which meet or exceed minimum acceptable standards.

(5) Quality control requires a complete equipment checkout to determine that maintenance actions have been properly completed and that equipment and shop records are complete. Equipment checkout will be conducted by qualified supervisory personnel under actual or simulated operating conditions. Equipment which does not perform satisfactorily will be rejected and recommendations made for further maintenance action. Acceptable performance results in the completion of the active maintenance phase and the movement of the equipment to the close-out phase.

(6) Resources (time, personnel, and supplies) must be allocated to clean-up the area used to perform the maintenance action. Support and test equipment, including tools, must be cleaned, serviced, and inventoried so that they are available for future maintenance actions. Technical publications must be returned to the library. Defective parts and other residue must be removed from the maintenance area through proper disposal procedures.

e. Maintenance Close-out Phase

(1) The close-out phase of the maintenance process commences when the equipment has been repaired and the serviceable item is to be returned to the owner, or when a decision has been made to evacuate or dispose of the equipment.

(2) The close-out phase requires close coordination with owning unit personnel to make sure that they are notified as soon as the equipment is ready for pickup. Any special packaging, preservation, transportation, and shipping requirements should be taken care of at this time. The using unit should make every effort to pick up completed equipment promptly.

(3) In the close-out phase, maintenance personnel must ensure that equipment records have been correctly completed.

2. IDENTIFICATION AND DIRECTION OF EQUIPMENT PREVENTIVE MAINTENANCE

a. Preventive maintenance (PM) is the care and servicing performed by personnel for the purpose of maintaining equipment in satisfactory operating condition. This is achieved by accomplishing the systematic inspection, detection, and correction of impending failures either before they occur or before they develop into major defects. PM is normally a function of organizational maintenance and is accomplished by operations and maintenance personnel.

b. The establishment of a PM program and the performance of timely PM services on equipment are the responsibilities of the unit owning or using the equipment.

(1) Preventive maintenance will be accomplished in accordance with the schedule and procedures established in the equipment technical publications.

(2) The unit using the equipment is responsible for PM of equipment and maintenance of PM records for equipment on loan.

c. Preventive maintenance services generally are cyclic in nature, one cycle being completed each year of the equipment's life. They are frequently referred to as scheduled maintenance and include PM services performed by:

(1) The operator, user, or crew before, during, and after operations.

(2) The operator or crew on an hourly, daily, weekly, or special occurrence basis.

(3) Organizational maintenance personnel, assisted by the operator on a calendar, mileage, or hours-of-operation basis.

(4) Operational and maintenance personnel in conjunction with the aforementioned services of a special nature.

d. Types of Preventive Maintenance Services

(1) Daily PM services are performed by the operator each day that the equipment is operated. Equipment which is operated infrequently or intermittently normally does not require daily PM services. Local commands must establish procedures to ensure that their equipment receives required PM services on an adequate basis when less than daily PM is appropriate; such as weekly or biweekly. Daily PM services are divided into before, during, and after equipment operation services.

(2) Weekly PM services are designed to reinforce daily PM services. Weekly PM services provide management with a good indication of the daily maintenance performed by the operator.

(a) Qualified supervisory personnel will provide supervision and inspection to ensure the proper performance of weekly PM services.

(b) Performance of weekly PM services by the operator without adequate supervision can be detrimental to the effective operation of the unit's maintenance program and is to be avoided whenever possible.

(3) Quarterly/semiannual PM services are normally performed by organizational maintenance personnel assisted by the operator.

(a) Quarterly and semiannual PM services will only be performed on motor transport equipment under warranty. Semiannual PM are at the discretion of the unit commander.

(b) Worn parts will be replaced during these services only if it is determined, after due consideration of life expectancy and the nature of anticipated operations, that they cannot be expected to provide safe service until the next scheduled PM.

(4) Annual preventive maintenance checks and services are performed by maintenance personnel, assisted by the operator. The normal interval between annual PM services is twelve months but may be advanced when the operating criteria (12,000 miles) specified in the equipment's technical manual are achieved earlier. Annual PMCS will include all PM services required for annual services and lower.

(5) Biennial PMCS are performed by maintenance personnel, assisted by the operator. The normal interval between biennial PMCS is twenty-four months but may be advanced when the operating criteria (24,000 miles) specified in the equipment's technical manual are achieved earlier. Biennial PMCS will include all PMCS required for biennial PMCS and lower.

e. Change in PM Service Intervals

(1) Commanders are authorized to reduce the intervals between the performance of PM services if the unit is operating under adverse climatic or terrain conditions for a period of time.

(2) Preventive maintenance services may be deferred or interval extended for the following reasons: equipment is placed in administrative storage or equipment is placed on administrative deadline. The criteria and PMCS requirements for equipment placed in the aforementioned programs are as follows:

(a) Major subordinate commanders have the authority to establish an administrative storage program. Equipment placed in this program must stay in for a period of not less than twelve months or more than thirty months. The equipment must:

1 Be in condition code A (serviceable, issuable without qualifications),

2 Be visually inspected quarterly,

3 Be exercised every six months,

4 Have a semiannual preventive maintenance (PM) service performed before induction,

5 Have any due PMCS performed and a new PM scheduled upon removal, and

6 Be in a level B (intermediate protection) preservation. Level B packing provides protection for materiel under anticipated favorable conditions of worldwide shipment, handling, and storage.

(b) Commanding Officers have the authority to establish an administrative deadline program within their own

commands. Equipment, batteries and pilferable items may be removed and stored. The equipment must:

1 Not be stored less than six months or more than twelve months,

2 Be in a mission capable status,

3 Be visually inspected monthly,

4 Have a daily or equivalent PM service performed in conjunction with its quarterly exercise,

5 Have an annual PM service performed within thirty days before induction, and

6 Have a biennial PMCS conducted and a new PM scheduled upon removal.

f. Special Preventive Maintenance Services. The following are examples of special occasions which require the performance of PM services.

(1) An operating force unit or selected Marine Corps Reserve unit alerted for combat or training operation will perform a limited technical inspection (LTI) on all equipment before deployment. This LTI is an inspection performed by unit maintenance personnel to make sure that the equipment is complete, safe to operate, and capable of performing its designated primary combat function.

(2) Upon receipt of new equipment and before new equipment is placed into service, intermediate maintenance will perform an acceptance LTI and such service as required by the equipment technical manual will be performed. This LTI will include the correction of defects and the inspection of the equipment to determine if required modifications have been applied. Upon completion of the LTI and PM services, equipment records will be updated.

(3) Special PM procedures are necessary if equipment has been exposed to salt or fresh water, or has been operated in loose sand or mud. The equipment will be washed thoroughly with fresh water and appropriate servicing performed as soon as possible to include checking all areas for contamination. Servicing will be performed in accordance with the applicable technical manual.

g. Relationship of Preventive Maintenance (PM) to Corrective Maintenance (CM). The main objective of PM services on equipment is to reduce CM. The relationship between these services is evident in the following areas.

(1) Common facilities are utilized for both CM and PM. This requires close scheduling of facilities so that PM services may be performed while not preventing the timely completion of CM.

(2) Common servicing. During the conduct of CM, tasks are sometimes required which normally are part of a scheduled PM, such as an engine repair could require oil and filter change. When this occurs, the decision must be made as to whether the full PM will be performed or not and the PM schedule (NAVMC 10561) appropriately modified.

(3) Defects discovered during PM services. Preventive maintenance actions frequently detect broken or worn parts before major damage occurs. Supervisors must decide whether the necessary CM will be performed independently or in conjunction with the PM.

(4) Evacuation of equipment to a higher echelon for CM. All PM services which are due will be performed on equipment before the evacuation of the equipment to a higher echelon of maintenance for CM. An exception to this policy would be the case where the PM services would have to be repeated during the CM, such as not changing engine oil when the engine is to be replaced.

(a) Equipment waiting or undergoing CM must still receive its scheduled PM services.

(b) Equipment undergoing repairs at a support activity must also receive its scheduled PM services.

(c) Periodic PM services will be performed on equipment awaiting or undergoing CM. For equipment evacuated to support maintenance activities, these services must be coordinated between the equipment owner and the support activity.

3. IDENTIFICATION AND DIRECTION OF EQUIPMENT CORRECTIVE MAINTENANCE

a. Corrective maintenance consists of all maintenance actions performed, as a result of failure, to restore equipment to a specific serviceable condition.

b. The owning unit is responsible for the timely performance of all CM actions within its authorized echelon of maintenance. Corrective maintenance requirements exceeding the echelon of maintenance authorized by the owning unit are the responsibility of the designated support maintenance activity.

c. Use of Established Corrective Maintenance Procedures. Corrective maintenance actions will be performed in accordance with the procedures established in appropriate technical manuals. Deviations from these procedures should be minimized and consistent with the effective performance of the specific maintenance action. Recommendations for the improvement of established CM procedures will be forwarded to the CMC (LP).

d. Overflow maintenance is that maintenance which is within a unit's authorization to perform but beyond its capability because of restrictive and/or unusual circumstances and is consequently performed by another unit, usually a support activity. The following conditions may cause a unit to overflow maintenance.

(1) The unit has insufficient maintenance resources, such as shortage of technicians or mechanics, shop space or facilities, maintenance equipment, and in unusual circumstances inadequate supply support.

(2) The unit may have a surge in workload. For example, requirements to meet predeployment schedule or post-deployment requirements, urgent modifications required on high-density equipment, and so forth.

(3) Another reason for requesting overflow maintenance is cost effectiveness, such as there may be instances when it would be more cost effective for the support maintenance activity to perform organization maintenance on equipment in conjunction with or independent of intermediate maintenance services.

REFERENCE

MCO P4790.2, MIMMS Field Procedures Manual