

# **TECHNICAL MANUAL**

## **AERONAUTICAL EQUIPMENT MAINTENANCE MANAGEMENT POLICIES AND PROCEDURES**

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**\*This TM supersedes TM 1-1500-328-23, dated 28 February 1995.**

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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
30 JULY 1999**

CHANGE

NO. 1

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 25 November 2002

TECHNICAL MANUAL  
AERONAUTICAL EQUIPMENT  
MAINTENANCE MANAGEMENT  
POLICIES AND PROCEDURES

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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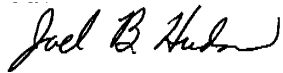
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0232504

**ERIC K. SHINSEKI**  
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TECHNICAL MANUAL  
NO. 1-1500-328-23

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DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 30 July 1999

AERONAUTICAL EQUIPMENT MAINTENANCE MANAGEMENT  
POLICIES AND PROCEDURES

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any Mistakes or if you know of a way to improve the Procedures please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications And Blank Forms) to: Commander, U.S. Army Aviation And Missile Command (AMCOM), ATTN: AMSAM-MMC-RE-FF, Redstone Arsenal, Alabama 35898-5230. A reply will Be furnished directly to you.

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**SECTION I****GENERAL**

**1-1. Purpose.** This manual establishes standards, that apply to maintenance and maintenance management of all Army aircraft, and ancillary aeronautical equipment.

**1-2. Scope.** This manual applies to all elements of the Army including the Army National Guard, Army Reserve, depots and contractors engaged in the operation, maintenance, or storage of Army aircraft, aviation associated equipment and applicable components owned and managed by the Army, with the exception of Unmanned Air Vehicles.

**1-3. Definitions.** For the purpose of this manual, definitions contained in the following sections apply, in addition to those contained in Army Regulation (AR) 310-25 (Dictionary of U.S. Army Terms).

**1-4. General.**

a. The maintenance management standards contained in this manual are established as basic mandatory requirements to which aeronautical equipment will conform.

b. Specific maintenance tasks and inspections will be performed in accordance with all appropriate publications; such as, Army Regulations (AR), Technical Bulletins (TB), Technical Manuals (TM), Electronic Technical Manuals (ETM), Interactive Electronic Technical Manuals (IETM) and other applicable publications. This manual is categorized as a "general information publication;" therefore, if a Department of the Army (DA), or Department of Defense (DOD) regulation or technical publication conflicts with the requirements or information in this manual, the regulation or technical publication will take precedence, unless specifically stated otherwise.

c. For specific information pertaining to airframe mounted Aviation Life Support Equipment (ALSE) or avionics equipment, refer to the applicable publications.

**1-5. Aircraft Record Keeping.** DA Pamphlet 738-751, Functional Users Manual for The Army Maintenance Management System-Aviation (TAMMS-A), is the Army's authority for the use, preparation and disposition of aircraft forms and records. Except for the special instructions stated in this TM, letters of deviation, written correspondence from

Aviation and Missile Command (AMCOM), AMSAM-MMC-RE-FF, or Headquarters DA, Department of Army Logistics Organization (DALO), or an AMCOM electronic message; such as, Safety of Flight (SOF), Aviation Safety Action Message (ASAM), or Maintenance Information Message (MIM), no deviation from DA Pamphlet 738-751 is authorized.

**1-6. Computer Generated Records.** Authorized computer-generated forms will normally have an "E" suffix added to the basic Army form number. "E" forms are considered the same as the basic (manual) form. Therefore, the same procedures stated in DA Pamphlet 738-751 will apply. An authorized exception between the manual and automated record keeping will be the 'Status Symbol.' On computer generated records ("E" forms) the 'Status Symbol' is BLACK; on manual records it will be RED or BLACK.

**1-7. Responsibilities.** It is the responsibility of each Commander, at every level of management, to ensure full compliance with the standards prescribed in this manual.

## SECTION II

## AIRCRAFT PREVENTIVE MAINTENANCE SYSTEM

## 2-1. General.

a. The aircraft preventive maintenance inspection system consists of a series of recurring inspections, checks, and services. The system is designed to provide a systematic examination of aircraft and aviation associated equipment during the item's life cycle. It provides for scheduled inspections, checks, services, and maintenance actions required by certain situations, conditions, or incidents at a predetermined interval. Required inspections and maintenance actions are normally listed in Chapter 1 of the appropriate -23 TMs, published in TBs, SOF messages, ASAMs or MIMs.

b. It is the Commander's responsibility to emphasize the importance of proper maintenance and ensure that all maintenance actions are accomplished per the proper maintenance publications. Specific preventive maintenance requirements for various aviation-associated equipment (such as, avionics and weapon systems) are published in separate technical publications for each system. Preventive maintenance on aviation-associated equipment will be scheduled and completed together with aircraft maintenance inspections to lessen downtime and increase available flying hours and resources.

c. The variety of aircraft in the Army inventory has resulted in several different inspection methods being used. These methods include Phase Maintenance (PM), Progressive Phase Maintenance (PPM), Combat Phase Maintenance (CPM), Periodic (PE) and Combat Periodic (CPE) inspections. No matter what the name of the method is, the inspections are all part of The Aviation Preventive Maintenance Program. The preventive maintenance program includes instructions for inspecting aircraft, and processing aircraft that have been damaged due to environment, weather, or accident/incident. All inspections, checks, services, and related maintenance actions must be documented manually on the appropriate forms and records, or electronically (ULLS-A, ELAS, or LAS) per DA Pamphlet 738-751.

d. Items designated as managed components/parts are listed in TB 1-1500-341-01, Aircraft Components Requiring Management and Historical Data Reports, for units using manual forms and records, and for ULLS-A user's in the ULLS-A Component Legitimate Code File. It is extremely important that the requirements of TB 1-1500-341-01 and the ULLS-A Component Legitimate Code File are fully complied with by all personnel when dealing with managed components and parts.

e. The Commander is authorized to increase the scope and frequency of any maintenance action when an aircraft or aviation-associated item is subjected to unusual situations; such as, adverse environmental or

weather conditions, mission type, periods of extended inactivity, or flight crew and/or maintenance personnel experience level.

f. Under no circumstance should the operating hours on an airframe be zeroed or adjusted as a result of a basic overhaul, or depot level airframe modification. AMCOM may direct that the original airframe hours be zeroed when an aircraft undergoes extensive depot level work, which results in a major configuration change that includes the assignment of a new airframe serial number. Annotate the DA Form 2408-15, Historical Record For Aircraft, with the old airframe serial number and airframe hours logged against that serial number, and submit two DA Form 2410s, copy 3 showing an "M" loss for the old serial number and a copy 2 showing an "S" gain for the new serial number.

#### NOTE

The variety of aircraft types, combined with several distinctly different inspection methods and an assortment of inspection checklists, may cause confusion as to the proper procedure to use when documenting an inspection and related faults or requirements. In the event that any checklist, regardless of the date the checklist was published, the requirements of DA Pamphlet 738-751 and any related AMCOM electronic message dated later than the DA Pamphlet 738-751, will take precedence.

**2-2. Flights and Maintenance Inspections under Operational Emergencies.** Required inspection and maintenance action intervals will not be exceeded except when an actual operational emergency exists. Operational emergencies are combat, weather, environmental, or other conditions, which would require flight to evacuate aircraft, personnel, or essential equipment. Commanders are authorized to postpone essential maintenance actions during emergency conditions. Since safety can be jeopardized when inspections or maintenance actions are delayed, each emergency operational extension must be evaluated, on a case by case basis. When an aircraft is operated beyond the scheduled inspection or component replacement due time under an emergency condition, a "Circled Red/Black X" status symbol and an appropriate statement, must be entered on DA Form 2408-13-1(-E) per DA Pamphlet 738-751. The Commander must ensure that the aircraft status symbol is changed to a Red/Black "X" immediately upon termination of the emergency. UNDER NO CIRCUMSTANCE will any type of training or evaluation exercise be considered an emergency.

**2-3. Evacuation of Grounded Aircraft.** Commanders may determine it necessary to evacuate an aircraft that is on a Red/Black "X" status. The "one time evacuation mission" clearance provision stated in DA Pamphlet 738-751 will be followed.

**2-4. Scheduled Preventive and Phase Maintenance Inspections.**

a. These inspections are due at predetermined flying hour or calendar intervals. They provide for systematic examination of the aircraft, and associated equipment at specified intervals during their service life. The intervals for scheduled maintenance inspections are published in the applicable aircraft maintenance TM or phase maintenance checklist. Planning and scheduling will be used to maximize use of available flying hours and make sure the inspection intervals are not exceeded.

b. Most TMs for standard aircraft (aircraft identified in AR 700-138) include a series of preventive maintenance checklists. The checklists assist maintenance personnel by organizing required tasks in an easy to follow sequence. The checklist is an extension of the aircraft -23 TM. If a checklist has not been developed for a specific type or model aircraft, the inspection and servicing instructions are included in the -23 TM.

c. Aircraft that are classified as non-standard aircraft (aircraft not identified in AR 700-138) will be inspected and maintained as follows:

(1) Standard aircraft that have been reclassified to non-standard will be inspected and maintained using the original TMs and maintenance procedures.

(2) Aircraft gained from other United States military services (Air Force, Navy, or Marines) will be inspected and maintained using the manuals and methods of the other military service.

(3) Aircraft that are "civilian in nature," extensively modified, or in development evaluation, seldom have established military maintenance procedures. These aircraft will be inspected and maintained using the manufacturer's maintenance instructions and manuals. All actions shall be documented per DA Pamphlet 738-751, unless specifically directed by AMCOM to be documented per Federal Aviation Regulations (FAR), and Federal Aviation Administration (FAA) policies.

**2-5. Phase Maintenance Inspection Method.**

a. This system includes two inspection elements, the Phase Maintenance Inspection (PM) and a Preventive Maintenance Daily (PMD) or a Preventive Maintenance Service (PMS). It provides a methodical examination of the aircraft and associated equipment. Requirements for these inspections are in the applicable PMD, PMS and PM inspection checklists.

b. The PMD and PMS are visual inspections that include some operational checks. The aircraft and associated equipment is checked to ensure satisfactory performance during the interval between phase inspections. Disassembly of components is not required unless major faults are found, but removal of screens, panels, and inspection plates may be required to complete the inspection.

(1) PMD Inspection. Inspection required after the last flight of the mission day or before the first flight of the next mission day. Flights/missions extending beyond 24 hours from the first take off of the mission, that calls for intermediate stops, loading/unloading, servicing, and so on does not require a new PMD inspection to complete the mission. The PMD is due at first engine shutdown or crew change after passing the 24-hour mark from the first take off of the mission. Refer to the individual aircraft PMD checklist for specific PMD requirements.

(2) PMS Inspection. The PMS is similar to a PMD inspection with the primary difference being when it is due. Usually a PMS is due every 10 flying hours or 14 days, whichever ever occurs first; however, the interval may vary depending on the type of aircraft. This type of inspection is considered a recurring inspection and must be listed on the aircraft DA Form 2408-18. The tolerance window stated in paragraph 2-10 shall not be used to extend the PMS inspection interval. Several PMS checklists state that when the forecasted flying hours for a mission, is greater than the number of hours remaining until the PMS is due, the inspection must be completed before the start of the mission; however, some checklists permit an extension of the due time. Deliberate over-flights of the PMS due time shall be avoided, any extension or deferment of the PMS could be inherently dangerous. Unless specifically authorized in the applicable PMS checklist, or approved by the Commander under the provisions in paragraph 2-2 or 2-3, over-flight of the PMS inspection interval is prohibited.

c. Phase Maintenance Inspection. The PM inspection is a thorough and searching examination of the aircraft and associated equipment. Removals of access plates, panels, screens, and some partial disassembly of the aircraft is required to complete the inspection. PM inspections are due after an appointed number of flying hours or calendar interval from the completion of the last PM inspection. PM inspection cycle numbers and requirements are listed in the applicable aircraft PM checklist. Requirements may vary depending on the PM inspection cycle number. PM inspections are numbered consecutively within a cyclic system. When the last inspection in the cycle is completed, the numbering system restarts with the next inspection due being number one. For example; aircraft that have a four inspection cycle, the phase inspections will be number 1, 2, 3, 4 (end of first cycle); restart, perform inspection number 1, 2, 3, 4 (end of second cycle), and so on. PM inspections must be completed in sequence. If



an aircraft is subjected to a depot level overhaul, before the end of a cycle, the sequence number will be reset to number one. The sequence number will not be reset when only depot level repairs are done. Depot level repairs must not be confused with depot overhaul. A PM inspection is complete when all maintenance and inspection requirements have been completed.

## **2-6. Progressive Phase Maintenance (PPM) Method.**

a. This inspection method resembles the PM method; however, it is a separate inspection method that must not be confused with the PM method. This inspection method currently applies only to the OH-58D and OH-58D(I) helicopters. The PPM inspection method consists of two interrelated parts. Part I is a series of separate progressive inspection checklists that become due after a designated number of flying hours. Part II consists of a PMS type inspection that is required after a designated number of flying hours, or expiration of a number of calendar days (whichever comes first). The PMS requirements are performed between progressive phase inspection intervals and are also included as a part of each PPM element. The unique nature of this inspection method provides the greatest mission flexibility; however, the requirements stated in the PPM checklist must be followed as written.

b. Part I of the PPM inspection method is a series of progressive inspection checklists that are sequentially numbered and must be performed in sequence. Inspections are due after an appointed number of flying hours. Each progressive inspection due time is figured from the start of the progressive inspection cycle, not from the completion of the last PPM. If an inspection is completed early or late it does not effect the scheduling of the remaining inspections in the cycle. For example, if there are 15 inspections per cycle, and the interval between inspections is 40 flying hours, and the current cycle started when the aircraft had 1380 hours, the first progressive inspection is due at 1420 hours, the second at 1460 hours, the third at 1500 hours, and so forth. If the second progressive inspection was completed at 1455 hours, the third progressive inspection is still due at 1500 hours. This method is unusual in that when a progressive inspection comes due the aircraft is not taken out of service, instead it is allowed to continue in use with the checklist requirements being performed when the aircraft is available. The checklist requirements may be performed all at one time, or spread out over a period time until the next progressive inspection is due. For example, if the progressive inspection interval is 40 hours, with the next progressive inspection being due at 1320 hours, and the PPM checklist authorizes the PPM element to be started up to 4 hours early (as early as 1316 aircraft hours), all tasks listed in the PPM element and the PMS checklist must be completed no later than 1360 aircraft hours (a window of 44 hours). If the PPM inspection element is not completed

before the next scheduled PPM (1360 in the example above), the aircraft must be placed in a Red/Black "X" status until all required actions have been completed.

c. Part II of the PPM inspection method is considered a preventive maintenance service. The PPM-PMS checklist has a dual purpose. First it details the requirements of the PPM-PMS inspection that must be performed after an appointed number of flying hours or calendar days. Second, it reduces the overall size of the PPM manual by listing items that are common to all PPM elements. The appointed number of flying hours or calendar days between PPM-PMS inspections is stated in the PPM manual. It is necessary that the PPM-PMS inspections be completed at regular intervals. However, if the forecasted flying hours for a mission are greater than the number of hours remaining until the next PPM-PMS inspection, the inspection should be completed before the start of the mission. The PPM-PMS inspection should not be overflowed except, for the conditions stated in paragraphs 2-2 and 2-3.

2-7. **Periodic/PMS Inspection Method.** Currently only "H-60" series aircraft use the Periodic (PE) type inspection method. Under this system, two inspection elements are used. These elements are referred to as PMS-1, an hour/calendar PMD type inspection, and PMS-2, a periodic inspection. The two elements provide a systematic examination of the aircraft and associated equipment. The prime difference between a Phase Inspection and a Periodic Inspection is that the inspection requirements under the periodic are always the same. The Phase Inspection Method also uses the acronym PMS to refer to some of its elements; however, the Periodic/PMS and PPM-PMS inspection methods are distinctly different and must not be intermixed. Requirements listed in PMS checklists 1 and 2, are defined as follows:

a. The PMS-1 (10-hours/14 day) is like the PMD inspection, the primary difference being when it is due. The inspection is to be completed after 10 flying hours or 14 days whichever comes first. This is a visual inspection that may require some limited operational checks. The disassembly of components is not required; but some screens, panels, or inspection plates may need to be removed. The PMS-1 inspection is considered a recurring inspection that must be listed on the aircraft DA Form 2408-18; however, the tolerance window stated in paragraph 2-10 is not authorized. If there are an insufficient number of flying hours available to complete a scheduled flight, the current H-60 series PMS-1 checklist allows for an extension of the due time, however, flight operations may exceed the authorized extension only under the conditions stated in paragraph 2-2 and 2-3. Deliberate over flights of the inspection interval for the purpose of utilizing the PMS-1 extension is prohibited. If the 14-day inspection comes due before the hourly requirement, the PMS-1 must be completed before the first flight of the mission day.

b. The PMS-2 inspection is a thorough and searching examination of the aircraft and associated equipment. During the PMS-2 inspection access plates, panels, and screens are removed and some partial disassembly of the aircraft will be required. Requirements under the Phase Method often vary between the phase elements. PMS-2 inspections are due after a designated number of flying hours since new or the completion of the last periodic inspection. The PMS-2 inspections must be accomplished when due and may be overflowed only under the conditions stated in paragraph 2-2 and 2-3.

#### 2-8. Combat Phase Maintenance (CPM) or Combat Periodic (CPE)

**Inspection.** The CPM/CPE is an abbreviated PM/PE inspection that is used only under combat or extreme emergency conditions. When the Commander authorizes a CPM/CPE in place of a standard PM/PE inspection, only selected items that are identified in the aircraft PM/PE checklist are used; therefore, the following conditions will apply:

a. CPM/CPE inspections must be accomplished when due and must not be overflowed except for the conditions stated in paragraphs 2-2 and 2-3.

b. Items annotated by the letter "C" in the respective PM/PE Checklist, along with any special inspection requirements listed on DA Form 2408-18 (Equipment Inspection Record), will be considered as the minimum mandatory CPM/CPE requirements.

c. Under no circumstance will the CPM/CPE requirements be used for consecutive inspection. After the completion of a CPM/CPE inspection, the next sequence numbered standard phase, or periodic inspection must be performed, at the interval stipulated in the PM/PE checklist.

d. CPM inspections will not use a sequence number. The next PM will follow the normal sequence number. For example, if phase number 2 was the last phase completed, then the CPM was performed, the next phase due will still be number 3.

**2-9. Recurring Special Inspections.** Besides the requirements listed in the preventive maintenance program, most aircraft are subject to recurring special inspections. These inspections or maintenance actions occur at intervals that are not usually compatible with other scheduled preventive maintenance inspections. The special recurring inspection requirements for aircraft are normally listed in Chapter 1, of the applicable aircraft -23 maintenance manual. Special recurring inspection requirements for aviation associated equipment (such as, weapons, engines, etc.) are normally listed in the associated equipment TMs. All special inspections are an important part of the preventive maintenance program. Methods used to schedule the different types of special recurring inspections are:

a. Flight hour based requirements. Inspections that are due after an appointed number of flight hours. For example, filter replacement, re-torque, or oil samples.

b. Calendar based requirements. Inspections that are due after the expiration of days, months, or years. For example, a fire extinguisher weight check, or aircraft inventory inspection.

c. Combined calendar and flight hour requirements. Inspections that have dual criteria flight hours and/or calendar time. Inspections are due at the next flight hour or calendar time, whichever comes first. For example; the UH-1H requires a battery check every 25-flight hours or every **30** days, whichever occurs first.

d. Rounds fired, cycles, starts, or HSF. Inspections that are due after an appointed number of rounds fired (weapons), cycles operated (landing gear, fixed wing), engine starts or Hot Section Factor (HSF) counts (OH-58D helicopter).

e. APU hours or APU starts. Inspections that are due after an appointed number of APU operating hours or APU starts.

2-10. Scheduling **of Recurring Special Inspections.** Recurring special inspections may be accomplished within a window of plus or minus 10 percent of the inspection interval, **not to exceed five flight hours or 30 calendar days**, unless otherwise stipulated in the individual aircraft or system TM. The importance of accomplishing and documenting recurring special inspections and maintenance actions when they are due is critical.

**NOTE**

The tolerance window will not be used to adjust the due time of any Phase/Periodic or any type of PMS inspection.

a. Tolerance window for flying hour based special inspections:

(1) The tolerance window for flying hour special inspections with an interval of less than 50 hours is obtained by multiplying the hours in the inspection interval by 10 per cent. For example, the tolerance for an inspection with a 25 hour interval would be 2.5 hours ( $25 \times 10\% = 2.5$ ). Therefore, if the inspection is due at 1472.7 aircraft hours the tolerance window starts at 1470.2 hours and ends at 1475.2 hours. If the inspection is completed anywhere in that hour range (1470.2 -- 1475.2) the next inspection due time will be 1497.7 ( $1472.7 + 25 = 1497.7$ ) aircraft hours.

(2) The tolerance window for flying hour inspections with an interval of 50 hours or more is 5 hours. For example, if an inspection has an interval of 75 hours and is due at 1609.4 aircraft hours the tolerance window starts at 1604.4 hours and ends at 1614.4 hours. If the inspection is completed anywhere in that hour range (1604.4 -- 1614.4) the next inspection due time will be 1684.4 (1609.4 + 75 = 1684.4) aircraft hours.

(3) Flying hour special inspections completed outside of the tolerance window are out of scheduled sequence for that specific period. If the inspection is completed outside of the tolerance window the next inspection due time will be obtained by adding the inspection interval to the hours on the aircraft when the inspection was completed. For example, if an inspection with a 50-flight hour interval is due at 1306.4 (tolerance window of 1301.4 to 1311.4 hours) and the inspection is completed at 1299.9, the next inspection due time will be 1349.9 (1299.9 + 50 = 1349.9) aircraft hours.

b. Tolerance window for calendar based special inspections (inspection due dates entered in block 8 of a DA Form 2408-18 must include the day, month and year for all calendar inspections):

(1) The tolerance window for inspections with an interval of less than 12 months (300 days) is obtained by multiplying the number of days in the inspection interval by 10 per cent. For example, the tolerance for a six-month interval would be plus or minus 18 days (180 days X 10% = 18). Therefore, if the inspection due date is 31 January 1999 the tolerance window starts on 13 January 1999 and ends 18 February 1999. If the inspection is completed anywhere in that time frame (13 Jan -- 18 Feb) the next inspection due date will be 31 July 1999.

(2) The tolerance window for inspections with an interval of 12 months or more (over 300 days) is 30 days. For example, an inspection with an interval of 12 months and is due on 6 February 1999 the tolerance window starts on 7 January 1999 and ends 8 March 1999. If the inspection is completed anywhere in that time frame (7 Jan -- 8 Mar) the next inspection due date will be 6 February 2000.

(3) Calendar inspections completed outside of the tolerance window are out of scheduled sequence for that specific period. If the inspection is completed outside of the tolerance window the next inspection due date is obtained by adding the inspection interval to the date the inspection was completed. For example, if an inspection with a six-month interval is due on 31 January 1999 (tolerance window of 13 Jan to 18 Feb) and the inspection is completed 11 January 1999, the next inspection due date will be 11 July 1999.

c. Tolerance window for special inspections on a dual criteria (flying hours/calendar time). The same guidelines apply when inspections, checks, or services, are scheduled using the dual

criteria method. For example, an AH-64 main rotor P/C link inspection is due every 14 days or 10 flight hours, if the aircraft had 1709 hours when the last inspection was completed on 22 May 1997 the next inspection is due at 1719 hours or on 5 June 1997, whichever comes first. Using the plus or minus 10 percent tolerance window not to exceed 5 hours or 30 days, the next inspection is due between 4 June and 6 June 1997 or between 1718 and 1720 aircraft hours, whichever comes first. When developing the due time/date of the next inspection each side of the dual requirement is computed separately by using the appropriate instructions in paragraph 2-10.a. and 2-10.b. If one element of the dual criteria inspection is within a tolerance window the rules for tolerance windows only effect that element. The side not in the tolerance window is computed by adding the inspection frequency to the current hours or date.

**2-11. Non-recurring Special Inspections.** The -23 TM for all standard aircraft contains special instructions for aircraft that have been subjected to an unusual event. These inspections are non-recurring special inspections and are contingent upon certain conditions or incidents. For example; aircraft flown in the rain, subjected to salt water spray, struck by lightning, hard landing, sudden stop/reduction, overspeed, or any type of accident/incident. All non-recurring special inspections must be accomplished before the next flight.

**2-12. Preflight Inspection.** The preflight inspection is a combination of flight preparedness checks and inspections accomplished before a flight. The preflight will be completed per the operator's manual (TM-10) and operators and crew members checklist (TM-CL). The preflight also includes a review of the aircraft logbook forms and records per DA Pamphlet 738-751. The review is to determine the aircraft status, to ensure that the symbol in the status block of the DA Form 2408-13 shows the current condition of the aircraft, that no inspections or checks are overdue, and the aircraft is safe to fly.

**2-13. Thru-flight Inspection.** The thru-flight inspection is a combination of flight preparedness checks and inspections. They are accomplished between flights when a turnaround mission or a continuation flight is scheduled during a mission day. Thru-flight inspections will be completed per the TM-10 and TM-CL. The inspection must include a review of aircraft forms and records per DA Pamphlet 738-751.

**2-14. Post-flight Inspection.** The post-flight is an inspection that is completed after the last flight of a mission day. This inspection is used to discover problems that may have developed during flight. Post-flight inspections will be completed per the TM-10 and TM-CL.

After flight when the pilot records any faults and/or remarks on DA Form 2408-13-1, the pilot's signature certifies that the preflight, thru-flight, and post-flight inspections have been properly completed.

2-15. Acceptance Inspection. The gaining unit or activity accomplishes acceptance inspections. The inspection is performed before receipt of or as soon as possible after the aircraft arrives on station from the manufacturer, overhaul facility, or other unit/activity. The inspection will include a thorough technical inspection of the aircraft, systems, and associated equipment. Access plates, panels, and screens will be removed, as necessary, to accomplish this inspection. The aircraft publication file, forms and records, and an inventory check (DA Form 2408-17) of property assigned to the aircraft are part of the acceptance inspection. When conditions warrant, a deficiency report will be submitted per DA Pamphlet 738-751.

2-16. Inspection of Aircraft in Storage. Aircraft in storage will be inspected per the requirements listed in the applicable aircraft maintenance manuals.

2-17. Transfer Inspection. The transfer inspection is performed by the organization that is losing the aircraft per the instruction in Section XII, (Standards of Serviceability) of this TM. The transferring organization will furnish proof that all equipment identified on the master inventory list is accounted for and documented on DA Form 2408-17, Aircraft Inventory Record, and all forms and records are complete and accurate per DA Pamphlet 738-751. When conditions warrant, the Commander having jurisdiction over both the transferring and receiving organizations may authorize the transfer without accomplishment of the transfer inspection. However, proof that all equipment is accounted for and all forms and records are complete and accurate is required.





## SECTION III

## MAINTENANCE TEST FLIGHTS AND OPERATIONAL CHECKS

**3-1. Definition.** For the purpose of this section, the following definitions will apply:

a. **Maintenance Test Flight.** A flight for which the primary purpose is to determine the airworthiness of the aircraft. That the airframe, flight controls, power plant, systems accessories and items of equipment are functioning according to predetermined specifications during flight.

b. **Removed and reinstalled.** Removing a component from an aircraft to aid maintenance and installing the same component back on the same aircraft, in the same location.

c. **Replaced.** Removing a component from an aircraft and installing a different component in its place.

d. **Adjusted.** Changes made to fit regulation specifications, or any adjustment, correction or modification that affects the performance of the component.

e. **Thrust/Weight Bearing.** Components attached to the airframe used to physically lift the aircraft or provide thrust to rotate the aircraft; for example, the forward transmission for the CH-47D, or the 90 degree gear box on the UH-1H.

f. **Functional Flight Test.** A check made by any rated aviator on equipment that does not compromise safety of flight. Functional flight checks may be used for equipment/systems components replacement/repair that does not deem the aircraft unsafe for flight, challenge the airworthiness of the aircraft, or for component troubleshooting that does not require a test flight IAW the requirements found in this manual or applicable aircraft specific maintenance manuals.

**3-2. General.** Maintenance test flights are classified as General Test Flights and Limited Test Flights.

**WARNING**

Anytime a flight control component is removed and reinstalled, ensure that the adjustable settings were not disturbed and that the component is reinstalled in the same configuration as when removed. If the component, was replaced ensure that all rigging checks per the applicable technical manual are completed.

**NOTE**

Conduct a test flight anytime an aircraft system or component has been disturbed and is not covered in this paragraph, or if there is any doubt about the airworthiness of the aircraft.

a. General Test Flight. A detailed flight to test the airworthiness of the entire aircraft and prove all systems/components are functioning as prescribed in applicable aircraft maintenance manuals. A General Test Flight is required when any of the following conditions occur.

(1) After a Periodic/Phase Maintenance or FAA equivalent inspection has been performed. When aircraft are maintained using the PPM inspection method, perform a general test flight when required by the applicable PPM checklist.

(2) When an aircraft is removed from "intermediate" storage.

(3) After an aircraft overhaul/modernization program, or major disassembly and reassembly of the aircraft.

(4) When accepting new aircraft into the Army inventory. The senior government representative (military or civilian) assigned to the factory is responsible for acceptance and airworthiness of the aircraft. They will make sure that all forms and records are complete and accurate per DA Pamphlet 738-751.

(5) Acceptances of an aircraft into the Army inventory after a period of bailment, loan or lease.

NOTE:

If the rotor blades were removed and reinstalled, to facilitate shipment of the aircraft per the instructions in the applicable shipping TM, the determination to perform a test flight will be at the discretion of the Unit Commander.

(6) When the Unit Commander or Maintenance Officer determines that a general test flight is necessary to ensure the airworthiness of the aircraft.

b. Limited Test Flight. A limited test flight evaluates the operation of specific items or systems. Only the applicable maneuvers or portions of the Maintenance Test Flight (MTF) manual required to verify satisfactory functioning of the item or system need to be completed. Unless specifically exempted by the appropriate technical manual, a limited test flight will be mandatory under the following conditions:

(1) When required by an applicable aircraft maintenance manual, MWO, TB or other AMCOM directive. In case of a conflict of test flight requirements, all MWOs, TBs, or any AMCOM directed procedures, with a later date than the particular aircraft TM, will take precedence over exceptions granted by the particular aircraft technical manual.

(2) When a propeller, propeller blade, or propeller governor has been replaced, removed and reinstalled, and when high revolutions per minute (RPM) settings, or blade angle has been reset or adjusted.

(3) When helicopter main or tail rotor systems or any assembly, component or part of these systems have been removed and reinstalled, replaced, repaired, or adjusted.

(4) When helicopter power train components, which are thrust/weight bearing, have been replaced, or removed and reinstalled.

(5) When adjustable flight control surfaces have been replaced or adjusted.

(6) When primary flight control actuators, flight control linkage or cables have been replaced or adjusted.

(7) When a fixed flight control surface on fixed wing aircraft has been replaced or adjusted.

(8) When an engine has been replaced, removed and reinstalled, realigned, or rigged. Adjustments to interstage airbleed systems or actuators that do not normally move while the aircraft is flying will require an MOC, the need to perform a test flight will be at the discretion of the Maintenance Officer.

(9) When a major subassembly of an engine; such as, any fuel metering device, complete section of a turbine engine or turbine blades have been replaced or removed and reinstalled on a single engine aircraft or on both engines for a multi-engine aircraft. Maintenance Test Flights are recommended, but not mandatory, when engine subassemblies are disturbed/changed on one engine of a multi-engine aircraft and a MOC throughout the engine power range has been performed satisfactorily.

(10) When any installed electronic flight control equipment; such as, autopilot components, Stability Control Augmentation Systems (SCAS), electronic sensors, and other equipment which can affect flight characteristics or performance has been replaced, removed and reinstalled, or adjusted.

(11) When a major repair or modification has been performed on the basic structure of the aircraft, and as required by a MWO/TB.

(12) When a MOC fails to simulate the conditions under which the system is operated.

(13) When the Unit Commander or Maintenance Officer determines that a limited test flight is necessary to be sure of the aircraft's airworthiness.

(14) A limited test flight may be required to verify or duplicate and determine cause/corrective action for an in-flight fault that cannot be resolved through troubleshooting procedures, visual, and/or an MOC.

c. Not all maintenance functions require a test flight. Normally the following conditions do not require a test flight.

(1) When a nonadjustable secondary or redundant flight control, flight control surface, or component has been replaced or removed and reinstalled and it requires no rigging or adjustment by the applicable aircraft maintenance manual.

(2) The reinstallation of any adjustable flight control component or item except main or tail rotor blades within the flight control system in the same location on the same aircraft; providing, that no adjustable linkage or settings have been disturbed.

(3) When hardware (bolts, nuts, washers) have been removed, reinstalled, or replaced in the flight control linkage, with no adjustment required (all aircraft).

(4) The replacement or reinstallation of driveshafts or hanger bearings.

(5) When a "setscrew" adjustment of the high (takeoff) RPM setting is made on one engine of a multi-engine fixed wing aircraft. However, a static propeller run-up to the point of prop governor "catch" and a high-speed taxi check to the point of takeoff are mandatory.

(6) When the engine low idle adjustment is made and a ground engine run is performed.

(7) Removal and replacement of inspection plates, cover screens, or fairings, for the purpose of gaining access to an area in order to accomplish an inspection does not constitute the need to conduct a test flight. When required, a technical inspection and MOC will be completed.

3-3. **Maintenance Test Flight Accomplishment.** To be sure that test flights are properly conducted, only aviators that are Aircraft Maintenance Test Flight Course graduates, or have qualified as stated below, will be selected to perform maintenance test flights. All pilots must meet the requirements of AR 95-1, Flight Regulations, before being appointed by the Unit Commander as "Maintenance Test Pilots" for a specific mission, type design, and series aircraft. Maintenance test flights will be accomplished with assistance **as** necessary from the most proficient flight crew available; such as,

copilot, technical inspectors, and observers. Aviators who are not graduates of the Aircraft Maintenance Test Flight course may be appointed as Maintenance Test Pilots upon completion of an evaluation administered per AR 95-1.

**NOTE**

Airplanes being flight checked for autopilot systems may depart under Instrument Flight Rule (IFR) conditions but must accomplish the checks under Visual Meteorological Conditions (VMC).

a. Maintenance test flights will be conducted with a minimum flight crew as prescribed in the applicable aircraft Operator's Manual (-10). Maintenance test flights must be performed within all operational limits and restrictions prescribed in the applicable -10 manual. Cargo and nonessential passengers are prohibited on all maintenance test flights.

(1) Only aviators that have completed all the requirements stated in AR 95-1 shall accomplish rotary wing maintenance test flights.

(2) Aviators conducting maintenance test flights in fixed wing aircraft must be on orders designated by the Unit Commander as "Maintenance Test Pilot" for a specific mission, type, design and series aircraft per AR 95-1.

(3) When the Army has accepted the risk of loss or damage, and the Army does not perform a follow-up MTF/acceptance flight (factory new or overhaul production) contractors or other agencies conducting MTFs will have received an evaluation from a unit/monitoring agency.

b. Maintenance test flights will normally be conducted under Visual Flight Rule (VFR) conditions during daylight hours.

c. The Commander of a unit to which the aircraft is assigned, or a Commander of a unit performing maintenance on a transient aircraft may determine the need for a maintenance test flight during conditions other than day VFR. The Commander is authorized to approve such flights on a case-by-case basis under the following conditions:

(1) During hours of darkness, if the aircraft is equipped for night flight.

(2) Under a combination of VFR, IFR, and VFR-on-TOP conditions, if the aircraft is equipped for instrument flight. When necessary the following will apply:

(a) The IFR equipment must be operational.

(b) The failure or malfunction of the component or system to be checked will not affect IFR operation of the aircraft.

(c) The test pilot will begin the maintenance test flight under VFR conditions. If the aircraft is operating properly under VFR conditions, the test pilot may proceed IFR and penetrate the cloud cover to VFR-on-Top and accomplish the altitude phase to complete the maintenance test flight.

(3) A standing authorization to waive the case-by-case requirements stated above, may be granted by MACOMs only under extenuating circumstances where excessive delays would seriously effect combat potential or the availability of sufficient numbers of aircraft to meet a continuous operational requirement; for example, pilot training schools.

d. Maintenance test flight duration will be sufficient to complete a functional check of all item(s) being tested to make sure the aircraft is airworthy and capable of mission accomplishment.

e. After each maintenance test flight, a thorough post-flight inspection will be performed, to make sure that any deficiencies or faults that developed as a result of the test flight are detected. All red/black "X" deficiencies detected must be corrected before the aircraft is released for flight. Less serious faults will not prevent the aircraft from being released for flight.

f. Accomplishment of maintenance test flights will be recorded per DA Pamphlet 738-751.

#### 3-4. **Maintenance Test Flight Check Sheets.**

a. Maintenance test flight check sheets, prescribing the sequence of checks and test flight inspection items, are contained in the inspection requirement section of applicable Aircraft Maintenance Test Flight and/or Phase/Periodic Maintenance Manual.

b. DA approved Maintenance Test Flight Check Sheets will be reproduced locally and used during all test flights to record aircraft performance.

c. When the test flight is completed, the check sheets will be attached to and become a part of the DA Form 2408-13-1. Page numbers for the test flight check sheets are not needed. This will not have any effect on the numbering of the flight pack.

#### 3-5. Recording Maintenance Test Flights.

a. All maintenance test flights will be recorded on DA Form 2408-13-1 per DA Pamphlet 738-751.

b. Document faults or deficiencies discovered during a maintenance test flight per DA Pamphlet 738-751. The original maintenance test flight entry will be used for additional maintenance test flights when more testing is needed.

c. All flying hours accumulated during a test flight must be documented, and will be charged against component time change replacement and inspection/servicing schedules. When a test flight is needed to complete a Phase/Periodic Inspection or Progressive Phase Element, **ALL TEST FLIGHT TIME is charged to the interval of the next inspection.**

#### WARNING

Whenever a MOC requires the main engine(s) to be started and rotors turning, a qualified minimum crew required for flight, as specified in the appropriate operator's manual, shall be at their proper station(s) and manning the flight controls.

**3-6. Maintenance Operational Check Requirements.** A MOC consists of checks accomplished on the ground through engine run-up, aircraft taxiing, or use of auxiliary power or test equipment, to simulate conditions under which the system is to operate. MOCs are to help ensure that aircraft systems, associated equipment and/or components that have been disturbed or replaced during an inspection or maintenance action are repaired, re-assembled, or adjusted satisfactorily. MOCs that require engine run-up to check systems or component operation must be performed by qualified personnel, who are current, in the specific mission, type, design and series aircraft per AR 95-1.

**3-7. Maintenance Operational Check Accomplishment.** When satisfied with the functional operation of the aircraft, system or component, the accomplishment of the MOC will be documented on appropriate forms and records per DA Pamphlet 738-751.

a. MOCs that require the reading and interpretation of any aircraft instrument or engine/flight control response while the engine(s) are running, will be signed off by the operator.

b. MOCs that require engine run-up to check the operation of non-cockpit related items; such as fluid leaks, chaffing or sparking, will be signed off by the person that verified proper operation of the item or system.

c. The person that accomplished the MOC will sign off a MOC that does not require an engine run-up.

d. Minor maintenance actions; such as, changing light bulbs, making radio checks, and changing common hardware (not in flight controls), that do not require a separate DA Form 2408-13-1 entry for the MOC, will be signed off by the person that accomplished the maintenance action.

e. In the event of a conflict as to whom is responsible for signing off an MOC, the Unit Maintenance Officer will designate who will sign off the action.



## SECTION IV

## AIRCRAFT COMPONENT REPLACEMENT AND REUSE PROCEDURES

**4-1. Definitions.** For the purpose of this section, the following definitions will apply:

a. Maximum Allowable Operating Time (MAOT). An interval expressed in hours, cycles, starts, or calendar time (days, months, years) established as the maximum finite life usage for an item. When an item reaches its assigned MAOT it must be removed from service and processed per the instructions in Section IX of this manual.

b. Time Between Overhaul (TBO). The established maximum usage interval since new or overhaul, that a time change (TC) item may be operated before it must be removed from service and returned to a depot level facility for a thorough check and to be restored to good working order.

c. Retirement Change (RC) Item. An item that has a safe maximum allowable operating time since new (often referred to as a MAOT), that it may be used. All objects coded "RC" are finite life items; therefore, at the expiration of the assigned MAOT these items must be removed from service, mutilated, and processed per Section IX of this manual.

d. Time Change (TC) Item. An item that has a safe maximum allowable operating time between overhaul because of safety and design limitations. The item must be replaced with a fully serviceable item after the expiration of the specified operating time interval. These items are not classified as condition change items.

e. Condition Change (CC) Item. An item that is changed or repaired on an "as-needed" basis.

f. Thorough Inspection. A comprehensive visual examination and evaluation of an item with established standards and specifications. Performed when necessary to prove serviceability or to determine the extent of damage/deterioration. Disassembly will be kept to the minimum.

g. Part. An item that can not normally be disassembled or repaired. The design is such that disassembly or repair is impractical; for example, bolts, brackets, gears or bearings.

h. Component. A combination of parts mounted together during manufacture, which will be replaced, repaired, or tested as one unit; for example, transmissions, starters, and servo assemblies.

1. Functional Inspection. Physical operation of an item to determine whether or not it will function in a prescribed manner. This type of inspection uses specialized diagnostic equipment and operational test stands. The item may be checked with a MOC while installed on an aircraft if test equipment is not available. The test will duplicate, as close as possible, the conditions under which the item will operate in flight.

j. Component Overhaul. Maintenance performed to restore an item to a serviceable condition, at a depot level facility, as prescribed in the appropriate Depot Maintenance Work Requirement (DMWR). The item is subjected to a complete disassembly and inspection. All defective or excessively worn parts are replaced with new or reconditioned items. When a TC item is overhauled a new service life will start. This action will "zero" Time Since Overhaul, but not Time Since New.

k. Component Repair. Maintenance performed to restore an item to serviceable condition by correcting a specific failure or unserviceable condition. This allows a TC or RC item to complete its MAOT/TBO cycle. This action will not "zero" Time Since New or Time Since Overhaul.

1. Component Rebuild/Remanufacture. Maintenance performed to restore an item to a like new condition in appearance, performance, and life expectancy. This is done by complete disassembly, inspection, and repairing or replacing all worn or unserviceable elements with new parts or parts that have been reworked to original manufacturing specifications. When an item is rebuilt/remanufactured it starts a new life cycle. This action will "zero" Time Since New, and Time Since Overhaul.

#### 4-2. General.

a. Maximum utilization of programmed operating hours is necessary for economic operation of Army aircraft. Instructions in this section have been established to achieve this objective without jeopardizing safety.

b. All items listed in TB 1-1500-341-01 (Aircraft Components Requiring Maintenance Management and Historical Data Reports) or the ULLS-A Component Legitimate Code files are considered managed items; therefore, historical records are required to be maintained for all listed items per DA Pamphlet 738-751. DA Form 2410 component data will be submitted to AMCOM.

c. Components or parts not identified as TC or RC items in the overhaul and retirement schedule of the applicable aircraft (-23) maintenance manual are considered condition change (CC) components. CC items will be replaced only when they become unserviceable. All items listed in TB 1-1500-341-01 or the ULLS-A Component Legitimate Code files, will have historical data maintained and processed per DA Pamphlet 738-751.

d. Suitable engine diagnostic and repair procedures must be attempted when an engine fails to meet the operational limits stated in the appropriate aircraft operator's manual (-10). The engine should be changed if the problem can't be corrected. However, before replacing the engine, Aviation Unit Maintenance (AVUM) activities must request verification that the engine is defective, from the supporting Aviation Intermediate Maintenance (AVIM) facility. Only after AVIM has determined that the engine is non-reparable will authorization be given to replace the engine.

e. All items removed from an aircraft or engine must be tagged with a suitable tag to identify the end item the component/part was removed from. If the component/part is not intended to be reinstalled on the same aircraft, engine, or component it was removed from, the item must be tagged with the appropriate materiel condition tag and if applicable a DA Form **2410** submitted per DA Pamphlet 738-751.

f. When an item fails to perform satisfactorily, for the established MAOT or TBO interval, for reasons other than abuse, crash or battle damage, ground accident or incident, a Quality Deficiency Report, SF 368, will be submitted per DA Pamphlet 738-751.

g. Selected components used on Special Operations Aircraft have been designated as "Closed-Loop Components". These items are believed to be subjected to extra wear and stress, and normally have a lower TBO cycle than comparable items used on conventional fleet aircraft. Items designated, as "Closed-Loop" must be closely monitored to ensure that they are returned to the repair/overhaul facility that is capable of performing the maintenance requirements of these special components.

4-3. **The Army Warranty Program.** Under the current AMCOM aircraft warranty program, maintenance supervisors are not required to verify warranty status of aircraft components before performing routine maintenance. Standard maintenance actions will not void the warranty coverage. Maintenance supervisors are required to initiate a Quality Deficiency Report (QDR) when any of the conditions stated in DA Pamphlet 738-751 exists. All QDRs will be screened by AMCOM for warranty applications. If warranty actions are required, the AMCOM Warranty Claims Office will notify the QDR initiator within 30 days. Maintenance personnel are requested to coordinate all warranty questions or actions with their Logistics Assistance Representative (LAR), or the Warranty Claims Office. The address is COMMANDER, AMCOM, ATTN: AMSAM-MMC-RE-FC, Redstone Arsenal, AL 35898-5000, telephone DSN 788-8276 or Commercial (256) 842-8276, Data Fax DSN 746-4904 or Commercial (256) 876-4904, or E-mail cfo@redstone.army.mil.

**4-4.** Replacement of Limited Service Life Components. The TB 1-1500-341-01 and the ULLS-A Component Legitimate Code files employs the codes RC to refer to items that have an established MAOT, TC to

refer to items that have a TBO assigned and are authorized to be overhauled, and CC for items changed on an as-needed basis. Items coded RC or TC are considered limited service life items and will be replaced as follows:

a. Retirement Life Components. Items coded RC are finite life items. The MAOT for these items has been determined through engineering estimates and/or actual operational experience. Under no circumstance, will any RC item be subjected to any type of overhaul or repair procedures that adjusts the items total operating time. When possible these items should be scheduled for replacement in conjunction with the nearest scheduled inspection, or other maintenance action prior to the expiration of the items MAOT. The published MAOT may be exceeded only under the conditions stated in paragraph 2-2 and 2-3.

**NOTE**

The latitude permitted in paragraph 4-4b was established to reduce downtime by combining component replacement with other scheduled maintenance actions. If no scheduled maintenance actions are due within the tolerance window, the **TBO** replacement due time shall not be extended.

b. Time Between Overhaul Components. Items coded TC must be removed from service and returned to a depot level facility for overhaul when the item has reached its TBO. Only under the conditions stated in paragraph 2-2, **2-3** and this paragraph will any TC component be authorized to exceed the published TBO. When possible TBO items should be replaced in conjunction with other scheduled maintenance or inspections. To minimize downtime an "early/late" replacement tolerance window has been established. The tolerance window enables the adjustment of the TBO due time to coincide with other scheduled maintenance actions. However, even with the tolerance window, some items may come due for replacement at times not compatible with other scheduled maintenance actions. If there are no other scheduled maintenance actions due within the tolerance window, the tolerance window will not be used.

(1) For components with a TBO of **400** hours or more, the removal time may be varied above or below the assigned TBO by **75** hours.

(2) For components with a TBO of less than 400 hours, the removal time may be varied above or below the assigned TBO by 10 percent.

## Example

Component TBO	1000 hours
Tolerance Factor (plus or minus)	75 hours
Item Usage Window	925 to 1075 hours
Component TBO	300 hours
Tolerance Factor (plus or minus 10%)	30 hours
(300 x .10 = 30)	
Item Usage Window	270 to 330 hours

c. Components or parts replaced on a calendar cycle. Items replaced on a calendar cycle (day, month, year), will be considered a special inspection; therefore, they shall be listed on the aircraft DA Form 2408-18, and the provisions stated in paragraph 2-10, will apply.

#### 4-5. Replacement of Components on Aircraft Being Transferred.

a. Serviceable items will remain on aircraft being transferred, providing the operating time remaining on the items meet the standards in Section XII (Standards of Serviceability for Aircraft) of this manual.

b. When aircraft are being transferred to theaters with combat operations and due to justifiable conditions, the time does not permit changing of components per Section XII, the aircraft may be shipped with installed components meeting the standards for transfer between non-combat theaters. It is intended that this exception be used only with mutual consent of the shipping and receiving commands. The affected components would then be replaced at the time of normal replacement.

#### NOTE

All managed components removed and tagged IAW paragraph 4-6 will have the DA Form 2410 Control Number, time since new, time since last overhaul, any SOF message/ASAM/TB that need to be applied, and whether the item is or is not NRTS recorded on the applicable tag per DA Pamphlet 738-751. All documentation required by TB 1-1500-341-01 and the ULLS-A Component Legitimate Code files, must be prepared and submitted, per DA Pamphlet 738-751 before turn in to the appropriate supply activity.

4-6. **Removal of Components.** When an item is removed and no immediate requirement exists for use on another aircraft at the removing activity, it will be processed as follows:

a. Removed components meeting the following standards will be classified as serviceable and tagged with a DD Form 1574 (Serviceable Tag - Materiel):

(1) TC components assigned a TBO interval of 500 hours or more and have 25 percent or more of the interval remaining.

(2) TC components assigned a TBO interval of less than 500 hours and have 100 hours **or more of the interval remaining.**

(3) RC components with 100 or more hours of the assigned MAOT remaining.

b. Removed components meeting the following standards will be classified as unserviceable:

(1) TC components assigned a TBO interval of 500 hours or more and have less than 25 percent of the established interval remaining will be tagged with a DD Form 1577-2 (Unserviceable (Reparable) Tag - Materiel). The following statement will be recorded on the tag "Returned for overhaul IAW TM 1-1500-328-23."

(2) RC components with less than 100 hours of the assigned MAOT remaining will be tagged with a DD Form 1577 (Unserviceable (Condemned) Tag). The following statement will be recorded on the tag "Condemned IAW TM 1-1500-328-23." Mutilation per Section IX, this manual, will be accomplished before turn-in to the local property disposal office.

(3) TC components assigned a TBO interval of less than 500 hours and have less than 100 hours of the interval remaining will be tagged with a DD Form 1577-2 (Unserviceable (Reparable) Tag - Materiel). The following statement will be recorded on the tag "Returned for overhaul IAW TM 1-1500-328-23."

c. Unserviceable expendable RC components/parts; such as, hardware (bolts & nuts, etc.), cables and rod end bearings, will be discarded after compliance with the mutilation requirements in Section IX of this manual.

d. CC components will be subject to the necessary inspections and/or tests to determine their state of serviceability. The component will be appropriately tagged per DA Pamphlet 738-751 and turned-in to the local supply activity.

**4-7. Reuse of Serviceable Parts.** Used serviceable parts may be installed on other aircraft providing the item has been proven serviceable by a thorough inspection and/or functional test before installation or during a repair/overhaul process. All documentation will be prepared and submitted per DA Pamphlet 738-751.

**4-8. Components Obtained through Cannibalization.** Currently AMCOM is authorizing selected activities to retain designated retired aircraft for the purpose of local parts salvage, prior to the airframe being disposed of through the DRMO. It is critical that all-historical records and data of managed components is maintained, and processed per DA Pamphlet 738-751. Activities authorized a "Parts Bird" must comply with all cannibalization requirements stated in paragraph 10-6 of this manual.

**4-9. Reuse of Components Removed from Damaged Aircraft.**

Extreme caution must be used before reuse of an item removed from an aircraft damaged in an accident. Under no circumstances will components removed from a damaged aircraft be reused on another aircraft before compliance of the following requirements:

a. The item must be certified as serviceable by a thorough inspection and/or functional test before installation or during the repair or overhaul process.

(1) All functional components and assemblies; such as, engines, transmissions, pumps, valves, generators, gearboxes, rotor heads, etc., will be subjected to inspections and tests per the inspection and test standards required at the time of overhaul.

(2) Components not designated as overhaul items will be inspected and tested per the applicable "-23" technical manual. If the inspection and test requirements are beyond the capability of the AVIM unit, the item will be condemned locally or sent to a depot maintenance facility, per the recoverability code assigned to the item.

(3) All items that are locally condemned require a completed DD Form 1577 Unserviceable (Condemned) Tag-Materiel. This tag will be annotated to show the item was removed from an aircraft involved in a crash or accident. The condemned items will be mutilated per Section IX of this manual, before the item is sent to the local DRMO for disposal.

(4) All items that are to be shipped to a depot maintenance facility require a statement, on all accompanying documentation, that the item has been removed from a crashed aircraft or an aircraft involved in an accident. All documentation must be prepared and submitted per DA Pamphlet 738-751.

b. All required inspections and/or tests must be accomplished before the item is installed on another aircraft.

**4-10. Components Exposed to Fire and/or Saltwater Immersion.**

a. Do not reuse components exposed to fire and/or immersed in saltwater, unless the item has been determined serviceable by a depot level inspection/repair/overhaul.

b. Items will be condemned locally; or if considered repairable will be returned through proper channels for inspection and overhaul/repair.

c. Items condemned or returned for inspection and overhaul require a statement on all documentation, stating the item has been exposed to fire and/or saltwater immersion.

**4-11. Repair and Overhaul of Components.**

**NOTE**

Items that have been ruled as not repairable will be administratively condemned and processed per Section IX of this manual.

a. Before starting maintenance on recoverable repairable items, a thorough inspection and function test will be conducted to determine the item's condition, extent of repair, and level of maintenance required. Source-Maintenance Recoverability (SMR) Codes, listed in all aircraft "-23P" parts manuals, are used to determine if an item is authorized repair, and the maintenance level that will normally accomplish the work. Before start of any repair action accomplish the following:

(1) Determine if the item is economically repairable. Refer to the TB 43-0002-1, Maintenance Expenditure Limits for Aviation Secondary Items.

(2) Items that are considered repairable should be repaired at the lowest authorized maintenance level capable of doing the work.

(3) TC and RC items require additional evaluation. The remaining operating time (Refer to paragraph 4-7) on the item and the extent of required maintenance must be considered.

(a) TC items with a TBO interval of 500 hours or more, with 200 hours or more remaining which can be made serviceable with minimum disassembly, will be repaired at the lowest authorized maintenance level.

(b) TC items with a TBO interval of 500 hours or more, with 200 hours or more remaining but which can not be repaired with minimum disassembly will be shipped to depot maintenance.



(c) TC items with a TBO interval of 500 hours or more, with less than 200 hours remaining will be shipped to depot maintenance.

(d) TC items with a TBO interval of less than 500 hours, with 100 hours or more remaining which can be made serviceable with minimum disassembly, will be repaired at the lowest authorized maintenance level.

(e) TC items with a TBO interval of less than 500 hours, with 100 hours or more remaining but which can not be repaired with minimum disassembly will be shipped to depot maintenance.

(f) TC items with a TBO interval of less than 500 hours, with less than 100 hours remaining will be shipped to depot maintenance.

(g) RC items with 100 hours or more of the MAOT remaining which can be made serviceable with minimum disassembly, will be repaired at the lowest authorized maintenance level.

(h) RC items with 100 hours or more of the MAOT remaining but which can not be repaired with minimum disassembly will be shipped to depot maintenance.

(i) RC items with 99 hours or less will be processed per Section IX of this manual.

(4) CC items. When inspections and functional tests show that CC items are unserviceable, but economically repairable, they will be repaired at the lowest authorized maintenance level.

b. When it is determined that a component must be overhauled, tag the component and turn-in to the appropriate supply activity. All forms and records will be properly prepared per DA Pamphlet 738-751.

c. Upon completion of overhaul, the components will be tagged as serviceable and all forms and records prepared per DA Pamphlet 738-751.

#### 4-12. **Component Historical Records.**

a. Historical records are kept on specific aircraft components, accessories, and mission essential equipment aboard aircraft. They show important information and events in the life of aircraft and aviation associated equipment. Another purpose for keeping historical records is to prevent a component being operated beyond its TBO/MAOT limit. Historical records must be maintained and submitted, for all items that are identified in TB 1-1500-341-01 and the ULLS-A Component Legitimate Code file per DA Pamphlet 738-751.

b. The feedback of some maintenance data to AMCOM is accomplished using DA Form 2410. The "2410" information is used in a variety of ways to monitor and evaluate the performance of selected components.

The "2410" data is stored in the AMCOM TAMMS-A (The Army Maintenance Management System - Aviation) Component Tracking System (TACTS) database. This information is available to all military and authorized civilian maintenance activities, through the "2410 HOT LINE." The data can be used to help reconstruct lost or damaged historical records. See paragraph 4-16 for the 2410 Hot Line phone numbers.

(1) The DA Form 2410 reports the removal, gain, or loss of an item to the inventory, major repairs/overhauls, and the installation on an aircraft, or the disposal through DRMO. All significant events in the life of a component are tracked and reported using this form.

The importance of using this form correctly cannot be overemphasized.

(2) Not following the set procedures in DA Pamphlet 738-751 could result in premature overhaul or condemnation of an item.

c. It is the responsibility of each maintenance and supply activity that processes, or repairs items, requiring DA Form 2410, to be sure that all items are tagged with the proper materiel condition tag, and all required forms and records are prepared and included with the item.

d. Activities receiving items that are improperly tagged and/or do not have the required documentation must suspend all processing of the component, until the item is properly tagged and/or the required documentation is received. The following procedures will apply:

(1) Components that are suspended will not be arbitrarily returned to the shipping activity, nor will the item be issued to any other activity.

(2) Comply with the instructions in DA Pamphlet 738-751 for restoring lost or damaged records.

#### **4-13. Receipt of Electronic Messages or Technical Bulletins.**

When AMCOM issues electronic information; such as, Safety Of Flight (SOF) messages, Aviation Safety Action Messages (ASAM), Maintenance Information Messages (MIM) or publishes a Technical Bulletin, the following actions are required:

a. Messages and TB's that effect components and not the aircraft's airframe will be documented on the individual component DA Form 2408-5-1, Equipment Modification Record (Component). This documentation is essential; because, the "DA Form 2408-5-1" stays with the component during its life cycle, while other historical forms and records remain with the aircraft. Component Data should not be entered on the DA Form 2408-15, since the compliance data will become inaccurate when the component is changed and could result in an unsafe condition.

b. Messages and TBs that effect the aircraft's airframe, will be documented on the DA Form 2408-15, Historical Record for Aircraft.

4-14. **Managed components with missing data plates.** Missing component data plates should be replaced at the earliest possible time. Blank data plates are listed in the applicable repair parts manual (-23P), and available from supply.

a. If the item is currently installed on an aircraft, all needed information for the replacement data plate, may be obtained from the appropriate DA Form 2408-16 Aircraft Component Historical Record, or DA Form 2408-16-1, History Recorder, Component, Module Record.

b. When components are received from supply, AVIM, or depot level maintenance activities, and the item is not identifiable because the data plate is missing, or the stamped/etched markings have been obliterated do the following:

(1) Use the item only if the established serial number can be traced, and the component history verified.

(2) If the established serial number can not be confirmed, the component/part must not be used. Activities must contact the AMCOM "2410 Hot Line" for assistance using the appropriate 2410 Hot Line point of contact stated in paragraph 4-16. Full instructions for data reconstruction including the assignment of a replacement component serial number, or item disposition instructions will be provided.

4-15. **Counterfeit or Bogus component/part awareness.** Civilian and military investigators continue to encounter vendors that are engaged in selling unsafe aeronautical components in to civilian and military aviation.

a. Counterfeit items are the direct result of fraud. These items normally are defective and unsafe but are being sold as fully serviceable. Many counterfeit parts are condemned items that have been reworked to give the appearance of airworthy components, including the forgery of historical records.

b. When suspect components/parts are received, they must be brought to the attention of a qualified technical inspector. All items that are suspected of being counterfeit must be reported to the AMCOM Field Data Division, Customer Interface Branch Hotline by telephone, Datafax, or E-mail at the numbers stated in paragraph 4-16.b.

c. Identification of counterfeit or bogus components/parts is often very difficult due to the skill of the individuals or vendors that manipulated the item; however, some indicators of possible counterfeit items are:

- (1) New parts that show sign of having been reworked.
- (2) Used parts showing signs of unauthorized repair.
- (3) Parts with poor workmanship, or signs of having been reworked especially in the area of the part number and/or serial number.
- (4) Used parts that lack verifiable serviceability documentation and lineage.
- (5) Poor quality documentation, that was not prepared per DA Pamphlet 738-751.
- (6) Managed items with questionable part numbers not listed in TB 1-1500-341-01 or the ULLS-A Component Legitimate Code files, or fraudulent or suspicious DMWR, or FAA parts manufacturer approved markings.
- (7) Items received with photocopies of required records, and no attached materiel condition tag.
- (8) Parts with any finishing that is inconsistent with industry standards; for example, discoloration, resurfacing.
- (9) New parts received with maintenance release tags.
- (10) Parts with documentation exhibiting incomplete or inconsistent part identity information.

4-16. **Historical Data Assistance Activities.** AMCOM has established three component "2410 HOTLINE" assistance activities to resolve problems caused by missing or damaged component historical data. The hotline activities also will provide guidance in the event a component data plate is lost or obliterated, and assist in the investigation of suspected counterfeit and bogus parts. Aviation activities should contact the appropriate "HOTLINE" listed below:

a. Active duty, National Guard and Army Reserve activities should contact the AMCOM "2410 Hot Line" by telephone at DSN 897-2410 or Commercial (256) 313-2410 or DATAFAX at DSN 897-2075. E-mail should be addressed to data2410@redstone.army.mil.

b. DOD activities or contractors to DOD activities contact the Field Data Division, Customer Interface Branch Hotline by telephone at DSN 788-6092/6098/6091 or commercial at (256) 842-6092/6098/6091, the Datafax is DSN 897-2075 or Commercial (256) 313-2075. There is voice mail on the phone system, so do not hang up.

c. All Corpus Christi Army Depot personnel and field teams should contact the CCAD 2410 coordinator at DSN 861-4544, or commercial (512) 939-4544, the Datafax extension is 3352.

## SECTION V

## COMPONENT SERIALIZATION

**5-1. General.** The AMCOM component Serial Number Assignment Reporting Requirement (SNARR) has been established to help in the management and control of selected items at all levels of maintenance.

**5-2. Conditions That Require Item Serialization.**

a. All items listed in TB 1-1500-341-01, Aircraft Components Requiring Maintenance management and Historical Data Reports and the ULLS-A Component Legitimate Code file are considered as managed components; therefore, they must be identifiable with individualized identification numbers called serial numbers. Serial numbers will be assigned for the following reasons:

(1) When an item that was not previously serialized, is designated a managed item and included in TB 1-1500-341-01 and the ULLS-A Component Legitimate Code file.

(2) When local identification of unique or special items is needed for management and control.

(3) When a serial number of an un-installed managed component is unknown due to a lost data plate, or obliteration of the identification markings on the item.

**NOTE**

New serial numbers will be assigned to items classified as RC, TC, or CC only after coordination with the applicable AMCOM 2410 Hotline (see paragraph 4-16). If the SNARR Administrator determines that a new serial number should not be assigned, the unidentified item must be condemned and processed per Section IX of this manual.

**5-3. Assignment of New Component Serial Numbers.** AMCOM will provide new component serial number(s) for any of the conditions stated above. Under no circumstances will locally assigned serial numbers be developed or used. Requests for new serial numbers will be submitted to the AMCOM SNARR coordinator, by telephone at DSN 897-2900, or commercial 256-313-2900, or DATAFAX DSN 897-2075, commercial 256-313-2075. Written correspondence should be addressed to Commander, AMCOM, ATTN: AMSAM-MMC-RE-FD, Redstone Arsenal, Huntsville, AL 35898-5000. The E-mail address is data2410@redstone.army.mil.

a. Request for serial numbers will, contain the following information:

- (1) National stock number
- (2) Part number
- (3) Work Unit Code (WUC)
- (4) Model of component
- (5) Component nomenclature
- (6) Number of items needing serialization**
- (7) Contract Number
- (8) Manufacturer's name
- (9) Federal Supply Manufacturer's Code
- (10) Point of contact and telephone number
- (11) Unit Identification Code
- (12) Unit designation (Name)

b. The SNARR coordinator will assign the serial numbers and inform the requester telephonically, and follow up with written confirmation.

c. Upon receipt of the serial number(s) the requester will initiate a DA Form 2410, copy 2, gain to the Army inventory, per DA Pamphlet 738-751.

**SECTION VI****AIRCRAFT COMPONENT REPAIR KITS**

**6-1. Definition.** For the purpose of this section, the following definition applies: Repair Kit - A group of selected expendable material packaged, identified, and issued, as a single item under one National Stock Number

**6-2. General.** Repair kits will be acquired and used to aid maintenance operations, reduce aircraft downtime, and reduce requisitions and line items of supply. Repair kits are used to restore certain unserviceable reparable items to a serviceable condition.

**6-3. Procedures for Obtaining and Use of Repair Kits.**

a. Repair kits are listed in the applicable aircraft parts and special tools manual (-23P). The kits will be stored and issued by authorized supply activities. The kits will be requisitioned as needed and used by authorized repair activities. Authorized maintenance activities will stock and use repair kits to the maximum extent practicable.

b. Repair kits will include parts normally needed to correct most recurring unserviceable conditions, which do not require an overhaul. Repair kits will not contain bulk supply or consumable items.

c. When a repair kit is used all parts furnished with the kit will normally be used; however, the degree and extent of the repair performed will not be extended merely to consume all parts available in the kit.

d. Serviceable repair parts remaining after the completion of a repair task, will be properly identified and retained as shop stock unless otherwise directed.

e. Unserviceable non-reparable parts replaced during the repair will be condemned, and disposed of per the instructions in Section IX of this manual.

f. Defective or unsatisfactory repair kits must be reported using SF Form 368, Product Quality Deficiency Report (QDR). A QDR will be submitted when the following conditions are met:

- (1) When kit contents are not enough for the repair task.
- (2) When kit contents are in excess for the required repair task.

(3) When the need for a kit is determined, and development of a kit is recommended.

g. When submitting a QDR provide a narrative summary with the following information:

(1) Reason parts were not used.

(2) Reason additional parts were required.

(3) Reason for addition or deletion of parts from the kit.

(4) Reason for recommending development of a new kit.

(5) Additional information which can be used to evaluate kit suitability.

h. When like components are being repaired in quantity, only one QDR is needed to report the kit problem(s); however, care must be taken to identify the correct quantity of kits and parts concerned.

i. QDRs are submitted against the repair kit and not the component that is being repaired.



## SECTION VII

## DEPOT LEVEL REPAIR/OVERHAUL OPERATIONS

**7-1. Definitions.** For the purpose of this section, the following definitions apply:

a. On Condition Maintenance (OCM). A concept for selecting aircraft for input to depot maintenance based on a technical evaluation of designated key points of the aircraft to measure the degree of structural stress or deterioration.

b. Airframe Condition Evaluation (ACE). The results of an annual evaluation of a specific aircraft, by a specially trained inspection team, per AMCOM Pamphlet 750-1(Series).

c. Joint Airframe Condition Evaluation (JACE). Annual evaluation of the UH-60 series airframe per TB 1-1520-237-25-2.

d. Profile Index (PI). The profile index, of an aircraft, is the summation of the weighted factors assigned to each condition found and is a relative measure of airframe, structural distress or deterioration.

e. Depot Maintenance Overhaul (DMO). A maintenance action, with the objective of restoring an aircraft to a fully serviceable condition per the requirements of the appropriate Depot Maintenance Work Requirement (DMWR).

f. Depot Maintenance Level Repair (DMLR). A depot maintenance action that corrects a specific fault or deficiency.

g. Un-programmed Depot Maintenance (UDM). Repairs that may occur between scheduled depot maintenance due to the repair being allocated to depot level in the Maintenance Allocation Chart (MAC) or it is required maintenance which cannot be accomplished by the supporting units due to capacity or capability.

h. Standards of Serviceability (SOS). Wear limits, fits, tolerances and specifications contained in aircraft, component, or general maintenance TMs or DMWRs that are used to determine the condition of an aircraft or component, and used to determine the maintenance required to assure a high degree of serviceability, availability and safety.

**7-2. General.**

a. Non-combat Operations:

(1) Mission essential aircraft will be programmed for depot repair under the OCM concept based on the aircraft condition profile index as designated by AMCOM (AMSAM-MMC-VS-EC).

(2) Chief of Reserve Components (CORC), National Guard and Reserve Forces budget for their own programmed maintenance depot repair/overhaul. Transportation costs will be at the expense of the National Guard and Reserve Forces. Aircraft scheduled for depot repair by the National Maintenance Point (NMP) will be processed on a reimbursable basis.

b. Combat Operations.

(1) Mission essential aircraft will be programmed for depot repair in accordance with the criteria established in Table 7-1.

(2) Mandatory aircraft operating time between depot level repair will not be exceeded. DA DCSLOG must approve any request for extension of this time.

c. Depot repair of Army aircraft will be accomplished when directed by higher authority to meet transfer agreements (Grant Aid, Military Sales).

d. Depot repair of aircraft will be accomplished when directed by AMCOM. Aircraft requiring depot maintenance as a result of crash/battle damage, deterioration, or maintenance that is beyond the capacity or capability of AVIM units, will be reported per TB 43-0002-3. Repair allocated below depot level by the MAC will be processed as reimbursable on a repair and return to user basis.

e. Accountability of Aircraft.

(1) AMCOM will assume accountability of all in-transit aircraft directed into storage at a Depot Repair Facility (AR 710-2).

(2) Formal accountability will be transferred to AMCOM on all aircraft requiring 30 or more day's maintenance or storage at a depot facility (AR 710-2).

(3) Accountability will not be transferred on an aircraft directed into depot maintenance for repair and return to user requiring less than 30 days to repair.

(4) All aircraft assigned to a depot facility will be reported monthly on DA Form 1352 (Army Aircraft Inventory Status and Flying Time) per AR 700-138 (Army Logistics Readiness and Sustainability).

f. AMCOM will provide a fund citation to cover cost of transportation for Army aircraft to be input to depot level repair or crash damage repair, with the exception that National Guard and Army

Reserve activities provide their own funding. MACOMs that own the aircraft will provide funds to cover cost of transportation for aircraft input on a repair and return to user basis.

g. Aircraft input to depot maintenance will be delivered to the designated facility completely intact, unless otherwise authorized in writing by the National Inventory Control Point (NICP), to include:

(1) All equipment, un-installed or installed, listed on DA Form 2408-17 (Aircraft Inventory Record). Documentation is required for all missing items. Un-installed property must be properly packaged to prevent damage, and stowed in or attached to the aircraft to ensure safe arrival.

(2) All Modification Work Order (MWO) kits on hand to support un-installed MWOs.

(3) All forms and records required by DA Pamphlet 738-751.

h. Maintenance functions scheduled and unscheduled, authorized below Depot level, will be accomplished by field units with available resources and will not be deferred for accomplishment with the depot repair program. Deferring maintenance is a large contributor to deterioration of aircraft and aviation equipment.

i. MACOMs may recommend aircraft for accelerated input to programmed depot maintenance based on condition of aircraft established by a thorough technical inspection. In these cases, the aircraft will be reported in the same format as a request for disposition instructions per TB 43-0002-3.

### 7-3. Programmed Depot Maintenance of Army Aircraft.

a. Non-combat Theaters of Operations:

(1) OCM concept for aircraft depot repair candidates is used in place of using accumulated flying hours or calendar time.

(2) ACE guides are established for each aircraft within a mission, type, design and series.

(3) A profile threshold is established by AMCOM. Aircraft meeting or exceeding the established threshold are candidates for programmed depot maintenance. Analysis of ACE data enables AMCOM to call aircraft into depot maintenance by serial number on a "worst case basis".

(4) MACOMs will be provided the Department of the Army approved retrograde schedule of aircraft requiring programmed depot maintenance for the ensuing fiscal year by mission, type, design, series and serial number. The induction schedule will be finalized 60 days prior to the start of each quarter.

Table 7-1. Programmed Depot Maintenance Criteria (Combat Area)

AIRCRAFT	MEANTIME BETWEEN PROGRAMMED DEPOT MAINTENANCE	MANDATORY TIME BETWEEN PROGRAMMED DEPOT MAINTENANCE
AH-1 series	2200 hours	3300 hours or 36 mos.
AH-64 series	To be determined	To be determined
CH-47 series	2100 hours	2400 hours or 36 mos.
OH-6 series	2100 hours	2400 hours or 36 mos.
OH-58 series	2100 hours	2400 hours or 36 mos.
UH-1H/V	2700 hours	3300 hours or 36 mos.
UH-60 series	To be determined	To be determined
U-21 series		48 months
RU-21 series		36 months

b. Combat Theaters of Operations. Aircraft usage limits between depot level overhaul/repair actions should not exceed the values stated in Table 7-1. HQ DA, DCSLOG, must approve all requests for extensions to these limits.

**7-4. Un-programmed Depot Maintenance of Army Aircraft.**

a. Aircraft requiring depot maintenance as a result of crash/battle damage or deterioration will be reported per TB 43-0002-3 for disposition instructions.

b. Aircraft requiring depot repair will be reported to, and disposition received from AMCOM (AMSAM-MMC-BM-DSC) prior to induction when:

(1) Maintenance function(s) to be performed are depot level in the MAC.

(2) Repairs are beyond the capability or capacity of support units.

c. Active Army aircraft evacuated for depot repair will be processed on a non-reimbursable basis when the MAC allocates the required maintenance to depot. USA Reserve and National Guard aircraft will be on a reimbursable basis.

d. Aircraft evacuated for depot repair will be processed on a reimbursable basis when required maintenance is allocated below depot level in the MAC.

**7-5. Limited Depot Level Maintenance Performed by AVIM Activities.**

a. AMCOM may designate an AVIM unit to be a Specialized Repair Activity (SRA) if the unit meets certain requirements. The unit

requesting the SRA must already be a Center of Excellence (COE) for the item requested. An SRA involves a recurring repair that entails a specific depot task to make the end item serviceable. A DA Form 2410, copy 2, will be completed and forwarded to AMCOM, AMSAM-MMC-RE-FD on all reportable tracked items. If parts are replaced as part of this task the backside of DA Form 2410, copy 2, will be completed indicating each component replaced.

b. Requests for SRAs will be in accordance with AR 750-1 and will list the specific depot task to be performed. Requests for SRA status shall be submitted to AMCOM, ATTN: AMSAM-MMC-RE-FC.

c. AMCOM may designate an AVIM unit to perform a one-time repair (OTR). An OTR is a single repair of an individual item. Request for OTR will be submitted to the local Liaison Engineer or to AMCOM, Attn: AMSAM-MMC-VS. If the authorization is granted for the OTR and the component is a reportable tracked item then a DA Form 2410, copy 2, will be completed to document the repair and forwarded to AMCOM, AMSAM-MMC-RE-FD. If parts are replaced as part of this task the backside of DA Form 2410, copy 2 will be completed indicating each component replaced. Each OTR request must contain the following information:

- (1) Aircraft Mission, Design and Series (MDS).
- (2) Serial number of the aircraft and/or serial number of the item to be repaired.
- (3) Nomenclature of the item to be repaired.
- (4) National Stock Number (NSN) of the item to be repaired.
- (5) Part Number (PN) of the item to be repaired.
- (6) A statement of the required tools and/or fixtures, and availability of these items to accomplish the repair work.
- (7) Proposed repair procedures necessary to make the repair and if instructions are available to you, such as a DMWR. These proposed repair procedures must be specific.
- (8) Capability and availability of unit personnel to perform the task.

#### 7-6. **Special Responsibilities.**

a. Major commands will ensure that:

- (1) Aircraft that have been selected for retrograde, to a depot facility for repair, are available for input when scheduled and are complete per paragraph 7-2.g.

(2) Controls are established to prevent unauthorized removal of items from the aircraft prior to input into depot maintenance. The provisions of AR 750-1 apply.

(3) Recommendations are made to AMCOM for accelerated input of aircraft into depot maintenance when deemed necessary.

(4) Field units questioning aircraft selected for input to programmed depot maintenance will submit queries through MACOM channels to AMCOM for possible substitution or substantiation.

(5) Aircraft designated, by serial number, for input to programmed depot maintenance under the OCM concept will not be transferred to another MACOM after receipt of the finalized quarterly schedule.

(6) Units performing acceptance inspections on aircraft returned from depot maintenance and finding any significant defects will use SF 368 (Quality Deficiency Report) to report the deficiency per DA Pamphlet 738-751.

(7) AMCOM is notified when an aircraft scheduled for programmed depot maintenance is lost through attrition or crash damage.

b. AMCOM will:

(1) Provide MACOMs with the OCM programmed quarterly input schedule and request retrograde of aircraft by serial number accordingly.

(2) Review and evaluate request disposition documentation, when the amount of damage and/or deterioration of an aircraft exceed the limits stated in TB 43-0002-3.

#### **7-7. Depot Maintenance Standards.**

a. Aircraft processed through depot overhaul will be issued in a serviceable condition. This will be accomplished by conducting a thorough technical inspection, which encompasses all inspection requirements including those listed on DA Form 2408-18, Equipment Inspection List, and correcting all faults discovered during this inspection. Upon completion of overhaul, the next Phase or Progressive Phase inspection will be established as "number one". Total aircraft hours will not be changed due to an overhaul.

b. Aircraft processed through depot repair will receive maintenance required to correct previously detected and recorded faults and any "safety-of-flight" deficiencies detected during repair. The Periodic or Phase Maintenance inspection will not be adjusted as a result of a repair action.

c. Modification Work Orders (MWO) for which parts or kits are available or can be acquired, will be accomplished during the depot maintenance process.

d. Aircraft components removed from aircraft undergoing depot maintenance will be processed per Section IV, this manual, prior to reuse.

#### 7-8. Recording and Reporting.

a. Upon completion of the programmed depot maintenance overhaul DA Form **2408-13**, Aircraft Status Information Record, will reflect the next Periodic/Phase Maintenance inspection due as number "1". The following entry will be made on the DA Form 2408-15, Historical Record for Aircraft, "All Periodic/Phase Maintenance inspections as applicable requirements complete. Next Periodic/Phase Maintenance inspection due is number 1. Aircraft programmed depot maintenance overhaul accomplished (DATE) by (Name of Facility) at (Hours) aircraft hours."

b. Upon completion of depot level repairs annotate the following on DA Form 2408-15, "Aircraft underwent Depot maintenance repair on (Date) by (Name of Facility) at (Hours) aircraft hours." The DA Form **2408-13**, Next Periodic/Phase Maintenance inspection will not be changed to number "1".

c. Accomplishment of MWOs will be recorded and reported per DA Pamphlet 738-751.

d. Depot facilities will furnish data to AMCOM, as required, for evaluation of the OCM concept and for improvement of maintainability and reliability of the aircraft.

## SECTION VIII

## AVIATION CORROSION PREVENTION AND CONTROL POLICY

**8-1. Aviation Corrosion Prevention and Control Policy.** Commanders and maintenance officers, at all levels, must ensure that all Army policy and procedures for the detection and treatment of corrosion for aircraft and associated equipment are followed.

**8-2. General.**

a. Commanders will ensure compliance with these requirements and will establish additional Corrosion, Prevention and Control (CPC) procedures, as necessary, for all aviation resources under their control.

b. All activities that have control of aircraft and associated equipment will prepare a CPC plan in writing. The CPC plan and implementing instructions should be included in the Unit's Standing Operating Procedures (SOP). A flow chart that could be useful to establish a basic CPC program is contained in TM 1-1500-343-23, Avionics Cleaning and Corrosion Control, figure 3-3.

c. Commanders may waive CPC procedures only when the conditions stated in paragraphs 2-2 and 2-3, of this manual apply.

**8-3. Responsibilities.**

a. Commanders will integrate CPC awareness into all levels of maintenance including depot and inter-service contracts (contractors). CPC directives will be published to provide adequate instructions and awareness without reducing mission effectiveness. Commanders will ensure the following:

(1) CPC directives address all aviation maintenance levels.

(2) A CPC monitor is designated and appointed on Unit Orders. The monitor is an additional duty, normally assigned to a Technical Inspector (TI) or maintenance supervisor.

(3) The CPC monitor receives full training in corrosion prevention, treatment and safety, if the monitor is not a graduate from an accredited corrosion course or program.

(4) Specific CPC responsibilities are delegated to appropriate staff members, maintenance supervisors, and technical inspectors.

(5) A safe environment is created and maintained for those working in the CPC program. This includes but is not limited to facilities, equipment, and supplies.



(6) Unit SOP CPC procedures are complete and revised when necessary, and all personnel are aware of and comply with them.

(7) A training program is established at all maintenance levels to re-enforce CPC inspection, detection and treatment skills. As a minimum, it should include annual refresher training, appropriate to the skill level of each job identified as needing training.

(8) The effectiveness of the unit's CPC program must be continuously reviewed. All recommendations for improvement must be reviewed and all approved changes should be promptly implemented.

b. The appointed Unit CPC program monitor will:

(1) Work with maintenance supervisors, technical inspectors, and mechanics to determine the effectiveness of the Unit's CPC program; advise the Commander on all CPC concerns and findings.

(2) Implement and coordinate the Commander's CPC program and make sure that all unit personnel are properly trained appropriate to the skill level of their job.

(3) Maintain or have access to a current reference library of aviation CPC literature, to include as a minimum those items listed in paragraph 8-9.

(4) Monitor techniques and proficiency of maintenance personnel accomplishing corrosion inspections and aircraft washings, and take prompt corrective action when needed. This should include, but is not limited to, spot checks of chemicals used, proper dilution of cleaning compounds, and proper application of corrosion preventive and water displacing compounds.

(5) Maintain training and performance records (manually or automated) to include training received, and demonstrated proficiency for all effected personnel. Conduct periodic record reviews and ensure that additional assistance is given as needed.

#### 8-4. **Methodology.**

a. The unit CPC monitor will observe inspections and other maintenance actions to determine the extent of corrosion on unit aircraft, and make sure that prompt action is taken to treat any corrosion detected.

b. All problems involving corrosion shall be entered on the aircraft DA Form 2408-13-1 per DA Pamphlet 738-751. The status symbol will depend on the degree of corrosion, location and allowable limits for the area as directed by the applicable aircraft TM.

c. To prevent further deterioration, corrective action must be taken as soon as possible. When a corrosion defect is assigned a "Red/Black Diagonal (/)" status symbol and corrective action is not initiated within 30 days from date of discovery, **the aircraft status symbol will be changed to a "Red/Black X."** The aircraft will remain grounded and reported as not mission capable (NMC) on readiness reports, until corrective action has been taken.

d. Proper cleaning procedures are extremely important; therefore, comply with the following:

(1) Use only authorized cleaning compounds and solvents as described in TM 1-1500-344-23, Aircraft Weapon Systems Cleaning and Corrosion Control, or the appropriate -23 TM. Dilution of materials will follow the recommendations in the aircraft -23 TM or the label on the container. **More is not always better!** Comply with dilution instructions.

(2) Exposure to chemical compounds can pose potential health hazards. Supervisory personnel must make sure everyone complies with all products warning statements and placards. Caution will be taken to avoid direct skin contact with solvents, breathing of vapors and ingestion by swallowing.

(3) The CPC program monitor will evaluate potential health problems, and make sure proper equipment is used and all cautions are observed. Protective clothing will be worn, to include items such as goggles, gloves, aprons, and boots.

(4) Water temperature is important, warmer water is usually more effective. In the absence of specific aircraft washing instructions, apply water from the bottom up, followed by scrubbing with approved soap/solvent and then rinse from the top down. Be careful not to let soaps/solvents dry on the aircraft before rinsing. It may be necessary to cool the aircraft surfaces before washing to prevent soap/solvent from drying.

(5) Generally aircraft should not be washed outdoors when the air temperature is below 40 degrees Fahrenheit.

(6) Comply with post, camp, station, or installation requirements and guidelines for the disposal of waste products such as, water, soap, and solvents.

8-5. Procedures.

**CAUTION**

Prevention control measures must be conducted as soon as possible per the applicable TM when aircraft or associated equipment are suspected of being exposed to any type of environmental or atmospheric condition that could contribute to any type of corrosion.

a. Aircraft will be lubricated and corrosion preventive compounds applied after a wash, per the appropriate aircraft -23 TM.

b. When corrosion is discovered during an inspection and subsequently removed, the area must be properly treated. The metal and finish for the part or surface must be properly identified. If any temporary finish is removed, pre-treat metal when necessary, and apply new paint/coating.

c. Prevention and control of corrosion is vital to unit readiness. When it is neglected, the potential for aircraft to become unsafe for flight is increased. Aircraft will be washed on a regular basis per paragraph 8-6 or following a spill of battery electrolyte, application of a fire extinguisher agent, or exposure to salt water spray. Drain holes must be kept open and functional to prevent water from standing inside the aircraft. Sealant and corrosion preventive compounds shall be used per TM 1-1500-344-23 and TM 1-1500-343-23 or the applicable -23 TM.

d. The reliability of complex avionics systems is critical for aircraft operations and mission accomplishment. Corrosion is a major cause of avionics failure. Corrosion on avionics equipment is similar to that found on airframe structures; however, small amounts of corrosion on avionics equipment can cause intermittent or complete system malfunctions. TM 1-1500-343-23 and applicable component -23 TMs will be used.

**NOTE**

When wash and inspection interval requirements stated in this manual conflict with the applicable aircraft -23 TM, **the publication that has the most stringent wash and inspection requirements, shall take precedence.** When procedural differences for the prevention and treatment of corrosion occur between either of the tri-service manuals (TM 1-1500-343-23 and TM 1-1500-344-23), and the applicable aircraft or component technical manuals, the specific

aircraft or component manual will take precedence. If the applicable aircraft or component publication does not contain corrosion prevention and treatment procedures, comply with the general requirements in the tri-service manuals.

**8-6. Geographical Location CPC Inspection and Wash Frequency.** The frequency of aircraft washing and CPC inspections will vary depending on aircraft MDS and home station. Aircraft will be washed and have corrosion inspections on a regular basis, per the guidelines contained in applicable specific aircraft manual. If the aircraft home station or operational area is not listed, use the criteria for the closest location with similar operating parameters.

**8-7. Operating Environment CPC Inspection and Wash Requirements.** In addition to the prerequisites for home station geographical location requirements, the specific aircraft -23 manual will be followed.

**8-8. Aviation Associated Equipment.** Items such as, Aviation Ground Support Equipment and Aviation Life Support Equipment, will be scheduled for CPC inspections per the applicable TM. When no TM has been developed for the item, or if a CPC inspection interval is not included, a CPC inspection will be due every 180 days. Document on DD Form 314, Preventive Maintenance Schedule and Record, or DA Form 2409, Equipment Maintenance Log, per DA Pamphlet 738-750. More frequent inspections are authorized due to operational requirements or environment.

**8-9. Required References.** The following publications are considered as the minimum requirements for a CPC library.

- a. AR 750-1, Army Materiel Maintenance Policies.
- b. AR 750-59, Army Corrosion Prevention and Control Program.
- c. **TM 1-1500-204-23-(Series)**, General Aircraft Maintenance Manuals.
- d. TM 1-1500-343-23, Avionics Cleaning And Corrosion Prevention/Control.
- e. **TM 1-1500-344-23**, Aircraft Weapon Systems Cleaning and Corrosion Control.

**8-10. CPC Training.** Currently no formal Army resident, correspondence, or video tape training programs for unit CPC Monitors exist; however, training is available from the following sources:

**TM 1-1500-328-23**

a. Videotapes from other U.S. military services are available from the installation Training Audiovisual Center. If your installation does not have the product you want, or you are at a remote activity, contact the Defense Audiovisual Information Service (DAVIS) Tobyhanna Army Depot, PA 18466, the Datafax number is DSN 795-6106 or commercial (717) 819-6106.

b. Questions pertaining to specific corrosion problems should be addressed to the U.S. Army Aviation Logistics School, ATTN: ATSQ-LAC-PE, Fort Eustis, VA 23604-5439, telephone DSN 927-6605 or commercial (804) 878-6605 or contact the U.S. Army Aviation and Missile Command, Aviation Systems Directorate (AMSAM-MMC-VS).

## SECTION IX

PROCESSING REQUIREMENTS FOR AERONAUTICAL  
EQUIPMENT PRIOR TO DISPOSAL

**9-1. Definitions.** The following definitions will apply to this section:

a. Flight Safety Critical Aircraft Part (FSCAP). Any part, assembly, or installation containing a Critical Characteristic whose failure, malfunction, or absence could cause an un-commanded engine shutdown, or catastrophic failure resulting in loss of life, serious injury, damage to the aircraft/property, or an unsafe operating condition.

b. Critical Characteristic. Any feature throughout the life cycle of a FSCAP item; such as, dimension, tolerance, finish, material, or assembly, manufacturing or inspection process, operation, AVUM/AVIM maintenance, or depot level overhaul requirement which if non conforming, missing, or degraded could cause the failure or malfunction of a FSCAP item.

c. Manufacturing Critical Characteristics. Critical Characteristics produced during the manufacturing process.

d. Installation Critical Characteristics. Critical Characteristics which are not introduced during the manufacture of the item; but, are critical in terms of assembly/installation; such as, proper torque.

e. Condemned status. An item determined to be unsuitable for return to a serviceable condition, has reached its retirement life, or is of no further value for which it was manufactured or authorized. A condemned status is further defined as follows:

(1) Conditionally condemned. An item that has been determined to be damaged beyond economical repair, or is hazardous to personnel or equipment.

(2) Administratively condemned. When items are declared unserviceable by the National Maintenance Point (NMP) or other authority, and directed to be removed from service and discarded, regardless of the items apparent condition or value.

f. Mutilation. The physical act of making an item useless for its intended purpose, by reducing it to scrap, therefore preventing any reconditioning of the item to a usable condition.

g. Scrap. Materiel classified condemned that has no value except its basic material content.

h. Salvage. Materiel classified condemned that has some value in excess of its basic material content. It may contain serviceable components, have the potential of being repaired or altered by the purchaser to increase its value. A salvage item is further defined as one that is clearly impractical to return to its originally intended use without extensive major repairs or alterations.

i. FED LOG. An interactive personal computer based information system that uses a CD-ROM (Compact Disk - Read Only Memory) data source to provide a quick and easy reference to Federal logistical information. Included in the FED LOG system are the Army Master Data File (AMDF), Air Force Ship to Stock Record Account (SRAN), and Navy Master Repairable Item List (MRIL) data files.

**9-2. General.** To provide information and guidance, to persons involved in the maintenance and disposal of aeronautical parts, on issues and practices related to the disposition of aeronautical parts and materials. To describe an acceptable means, but not the sole means, of compliance.

a. The policy of the Department of the Army is to obtain fair monetary value from property by assuring that property is forwarded to appropriate supply activities in a physical condition which would insure a reasonable monetary return when offered as salable surplus property. It is also the responsibility of the Army to ensure that items that would be dangerous to public health or safety if released in a defective, unserviceable or non-repairable condition are prevented from any possible reuse. Reportable components and non-reportable items designated as FSCAP items that are in a condemned status shall be mutilated before turn-in, to prevent re-entry into civil or military aviation.

b. It is common practice for holders of aeronautical parts to dispose of un-airworthy parts and materials by selling, discarding, or transferring such items. In some instances, these items have reappeared in sales and active inventories in the aviation community. Misrepresentation of the status of parts and materiel, coupled with the ability to make such items appear airworthy, has resulted in the unintended use of parts and materials in un-airworthy condition. This Section addresses actions that may prevent previously disposed of un-airworthy parts from being reintroduced into the system.

c. Persons releasing unsalvageable aeronautical parts and materials should consider the possibility of such parts later being misrepresented and sold as airworthy. Mutilating the unsalvageable items before release may prevent such misrepresentation.

d. The turn-in documentation of unsalvageable aircraft that have not been reported to the General Services Administration (GSA) for Federal reutilization prior to disposal through the DRMO must contain the statement "Aircraft has not previously been screened by GSA".

**9-3. Identification and Processing of FSCAP Items.** All items identified with a code of "E" or "F" in the Criticality Code (CC) column of the AMDF in FED LOG are considered FSCAP items. All FSCAP items require special processing prior to being turned-in to the DRMO for disposal. See para 9-4, for additional guidance, for FSCAP items that are Retirement Life Components that have reached their MAOT or have 99 hours or less of the MAOT remaining.

a. Organizations turning in FSCAP items must request disposition guidance from the managing commodity command. All AMCOM managed FSCAP items go through a special process that generates the "U.S. Army FSCAP Disposal Guidance" document, which is required for turning in the item(s) to the DRMO.

(1) Request disposition guidance from AMCOM prior to DRMO turn in by contacting AMSAM-MMC-RE-FC by the following (annotate all E-mail and/or Data Fax requests with "REQUEST FOR FSCAP DISPOSAL GUIDANCE"):

(a) E-mail - [chivers-me@exchange1.redstone.army.mil](mailto:chivers-me@exchange1.redstone.army.mil)

(b) Facsimile - DSN 788-6534, commercial (256) 842-6534 or DSN 746-4904, commercial (256) 876-4904.

(c) Voice telephone - DSN 746-2570, commercial (256) 876-2570.

(2) Specific information about the item(s) is necessary before the disposition guidance can be issues. The information required for each item(s) is:

(a) National Stock Number (NSN).

(b) Part Number (PN).

(c) Serial Number (SN) of each item.

(d) Unit Identification Code (UIC), Air Force Ship to Stock Record Account (SRAN), or DoD Activity Address Code (DODAAC) of the activity that is turning-in the item.

(e) Requester's name and organization.

(f) Requester's telephone number, include an E-mail address and Data Fax number if available.

(3) When FSCAP disposition guidance is received, verify the item's serial number and part number, and attach a copy of the disposition guidance, and any other relevant documentation; such as, FAA form 8130-3 to the item. Comply with the instructions in paragraph 9-10 prior to turn-in to the DRMO.



**TM 1-1500-328-23**

b. All items listed in TB 1-1500-341-01 and/or ULLS-A component legitimate code files and do not have a criticality code of "E" or "F" are managed items and should have historical documentation. These items will be processed per paragraph 9-5 or 9-10

c. Condemned managed and non-managed item(s) must be mutilated per paragraph 9-6.

d. Serviceable or repairable items shall not be released for sale into the commercial sector without adequate historical documentation suitable for FAA airworthiness certification and paragraph 9-10.

**9-4. Responsibility for Mutilation.** Commanders of units or activities that are authorized by the Maintenance Allocation Chart, in the appropriate "-23" TM to remove, replace, and use an aircraft component/part, will ensure the following:

a. Items coded "L" or "A" in the Recoverability Code column of the FED LOG is considered as requiring special handling and will be processed per the appropriate directive. All other condemned aeronautical items shall be mutilated at the lowest possible maintenance level, prior to the item being disposed of through the local DRMO.

b. Retirement life items with a SMR/Recoverability code of "D" or "L" (condemnation and disposal at Depot or Special Repair Activity) that have reached their designated MAOT, or have 99 hours or less of the MAOT remaining are to be classified as condemned materiel and mutilated at the AVUM/AVIM level before turn-in to local supply or DRMO as scrap. The SMR/Recoverability code of "D" or "L" DOES NOT APPLY to these items.

c. Until the mutilation of a condemned item is accomplished, all condemned aeronautical items will be identified with DD Form 1577/1577-1, Unserviceable (Condemned) Tag/Label per DA Pamphlet 738-751. The "CONDITION CODE" block on the Tag/Label must contain the Supply Condition Code of "H" to indicate that the materiel is unserviceable and does not meet repair criteria. Also, the "REMARKS" block will contain a statement "Mutilation per TM 1-1500-328-23 required." Once the mutilation has been completed, prior to turn-in, change the statement to "Mutilation has been accomplished IAW TM 1-1500-328-23."

d. Items identified in TB 1-1500-341-01 or the ULLS-A component legitimate code file will have all required forms and records prepared and processed per DA Pamphlet 738-751.

**NOTE**

Mutilation is mandatory at the lowest possible maintenance level for all condemned aeronautical items that do not require special handling.

**9-5. Criteria for Condemnation.** Caution should be exercised to be sure that items such as, but not limited to the following, are disposed of in a manner which does not allow the aeronautical parts to be returned to service:

a. Parts with non-repairable defects, observable or unobservable to the naked eye.

b. Parts that are not within the specifications set forth by the type designs, and cannot be brought into conformance with applicable specifications.

c. Parts and materials that cannot undergo further processing or rework to make them eligible for certification under a recognized certificate holder's system.

d. Parts subjected to unacceptable modification or rework that is irreversible.

e. Retirement Life items which have reached their MAOT or have 99 hours or less of the MAOT remaining at time of removal.

f. Retirement life items that are removed from an aircraft and do not qualify for reuse per Section IV, of this manual.

g. Items administratively condemned by the NMP or higher authority through a Modification Work Order (MWO) or other directive.

h. Items which have been condemned as a result of inspection using magnetic particle, fluorescent penetrate, X-ray, dye penetrate, or other methods which reveal defects or conditions not apparent through normal visual inspection methods.

i. Items that have sustained major structural stress, been exposed to fire/heat, or immersed in saltwater as a result of a crash/accident will be considered unsafe for further use.

j. Components/parts listed in TB 1-1500-341-01 or the ULLS-A component legitimate code file, when operational time is unknown, or the item's historical maintenance records are not available. Before condemning any item because of lost records or unknown operating time, every attempt must be made to reconstruct the missing data. If local attempts at data reconstruction fail, contact the following:

**TM 1-1500-328-23**

1. AVUM/AVIM activities and AVCRADs contact AMCOM 2410 Hotline at DSN 897-2410, Commercial (256) 313-2410, or E-mail data2410@redstone.army.mil.

2. Depot/DOD activities and manufacturers contact Field Data Division, Customer Interface Branch Hotline at DSN 788-6092/6098/6091, Commercial (256) 842-6092/6098/6091, or data fax DSN 897-2075, Commercial (256) 313-2075.

3. All Corpus Christi Army Depot (CCAD) personnel contact the CCAD 2410 Hotline at DSN 861-4544, Commercial (512) 939-4544, or send requests to Corpus Christi Army Depot, Mail Stop 55 Corpus Christi, TX, 78419-6195, or data fax DSN 861-3352.

**NOTE**

The disposition of toxic or hazardous material must be in accordance with Environmental Protection Agency directives as implemented by the activities servicing environmental coordinator and AR 200-1, Environmental Protection and Enhancement.

**9-6. How to Mutilate.** Mutilation of condemned items is the act of making the item unfit for its intended purpose. Mutilation of flight safety parts or reportable components will be accomplished at the lowest maintenance activity possible contingent on personnel and equipment availability.

a. Mutilation of all parts and materials will be accomplished to make them unusable for their original intended use, so that rework or camouflage cannot restore such parts to the appearance of being serviceable (by such processes as re-plating, shortening and re-threading long bolts, welding, straightening, machining, repainting, etc.).

b. Key points for mutilation of parts are alignment points and attaching fittings which cannot possibly be repaired, restored, replaced, or improvised and which are necessary factors in restoring the next higher assembly to design function and capability. Crushing to the extent that an item is flattened and completely destroyed is the preferred method of mutilation. Items that have a threaded part shall have the threads removed or cut through so the threaded portion can not be used. Specific questions about key points for mutilation of aeronautical parts shall be directed to AMCOM, AMSAM-MMC-VS, DSN 897-1323 or commercial (256) 313-1323.

c. Mutilation may be accomplished by one or a combination of the following actions, but is not limited to:

- (1) Crushing.
- (2) Grinding.
- (3) Burning.
- (4) Removal of a major lug or feature.
- (5) Permanent distortion of parts.
- (6) Cutting a hole with cutting torch or saw.
- (7) Melting.
- (8) Sawing in to many small pieces.

d. Examples of methods of mutilation that are not acceptable because they are not considered effective include:

- (1) Stamping (such as stamping "R" on a part).
- (2) Spraying with paint.
- (3) Hammer marks.
- (4) Identification by tagging or markings.
- (5) Drilling small holes.

(6) Sawing in two pieces. (Be aware that persons who rework unsalvageable parts and materials are usually highly skilled technicians and have been known to reunite parts that were cut in two pieces in such a manner that the union proves difficult to detect.)

**9-7. Data Plates, Information Tags and Etched Markings.** During the mutilation process, all data plates, modification tags, and other information tags must be removed from the component or part. When a serial number or other information has been etched or stamped directly on the item, it must be removed or obliterated.

**9-8. Parts for Training, Educational, Research and Developmental.** There may be times when a commander may wish to release a part or materiel which would ordinarily be a candidate for mutilation, but such action would interfere with the part or materiel's legitimate, non-flight use. When making agreements or contracts to transfer parts to training, educational, research and development, and non-aviation concerns, written quality assurance procedures should be established concerning disposition and disposal of such parts. Precautions should be taken when releasing materials for training, education, research and development use. Individuals should consider such actions as:

- a. Permanently marking or stamping the parts, sub-components, or materiel as un-airworthy. Ink stamping is usually not permanent
- b. Removing original part number identification.
- c. Removing data plate identification.
- d. Maintaining a record keeping system that identifies items transferred by serial number or other individualized data, dates, and who took possession.

**9-9. Verification and Certification.** A qualified maintenance supervisor or technical inspector should witness the mutilation action. In cases where witnessing the mutilation action could present an unnecessary hazard and the mutilated materiel can be laid out to clearly display the residue from each item mutilated, the act may be vouched for through inspection of the residue.

a. After the item has been mutilated the verifying authority will complete and submit Copy 3 of DA Form **2410** (Installation/Loss) per DA Pamphlet 738-751, for all components listed in TB 1-1500-341-01 or the ULLS-A component legitimate code file. The only acceptable loss code that may be entered in Block 66 (Reason for Loss) is "D" (loss through mutilation). Blocks 72 through 75 will be filled in. The verifying authority will put the following statement in the Remarks block "I certify that the item identified on this document was mutilated IAW Section IX of TM 1-1500-328-23, Aeronautical Equipment Maintenance Management Policies and Procedures, and/or DOD 4160.21-M, Defense Demilitarization Manual." then sign and date the statement. The loss code of "D" and mutilation statement on DA Form 2410 certifies that the item was mutilated. **SIGNING A FALSE CERTIFICATE CONSTITUTES A FELONY**, and may subject the individual to criminal prosecution.

b. When mutilation has been completed, the Remarks block of the DD Form 1577, Unserviceable (Condemned) Tag-Materiel will be changed to contain the statement "Mutilation has been accomplished IAW TM 1-1500-328-23". The tag will remain attached to the largest portion of the mutilated item when turned-in to the unit supply and local DRMO.

**NOTE**

Strict compliance with mutilation requirements and procedures are essential to prevent possibility of continued use of items which are not reparable, are potentially unreliable and unsafe to operate for their original intended purpose. Therefore, if any publication conflicts with the provisions stated in this Section, the mutilation instructions in this Technical Manual shall take precedence over any other publication.

**9-10. Disposal of Non-condemned Items Through the DRMO.** When an aircraft component is being disposed of through the DRMO, and it does not meet the requirement for mutilation as stated in paragraph 9-4, the following statement will be entered on the materiel condition tag/label attached to the item: "This documentation shall be used to certify military airworthiness only. This part may not be in accordance with Federal Aviation Regulation (FAR) Part 21 and **43.**" Annotate the remarks block of the turn-in DD 1348-1 with the acronym "FSCAP" for all items coded "E" or "F" in the CC column of FED LOG.

## SECTION X

CONTROLLED EXCHANGE AND CANNIBALIZATION  
OF AVIATION MATERIEL

**10-1. Definitions.** For the purpose of this section the following definitions will apply:

a. **Controlled Exchange.** The removal of serviceable parts, components, assemblies, and/or sub-assemblies from an unserviceable economically reparable item for immediate installation on a like item to restore it to a Mission Capable (MC) condition.

b. **Cannibalization.** The authorized removal under specified conditions, of serviceable and unserviceable reparable parts, components, assemblies, and/or sub-assemblies from an item chosen for disposal.

**10-2. Controlled Exchange or Cannibalization of Materiel.**

a. Controlled exchange or cannibalization supplements supply operations by providing assets not immediately available through the Army supply system.

b. Controlled exchange is authorized only when the required part, component, assembly, or sub-assembly cannot be obtained from the supply system in time to meet operational readiness requirements. During periods of combat or transition to combat, MACOMs may change the controlled exchange conditions, as they deem necessary.

c. Controlled exchange will not be accomplished on items which have been involved in any type of accident or mishap until it has been formally released by the investigating officer from U.S. Army Safety Center, Ft. Rucker, AL or AMCOM.

d. Items awaiting disposition instructions from the National Inventory Control Point (NICP), will not be cannibalized without approval of AMCOM and other Army Materiel Command (AMC) subordinate commands, or until disposition instructions have been received allowing local salvage or cannibalization. All actions will be completed per the disposition instructions.

e. Detailed instructions and control procedures for conducting cannibalization and controlled exchange actions must be included in the Unit's Standing Operating Procedures (SOP).

**10-3. Controlled Exchange by Unit, Organization, or Activity.** The controlled exchange of serviceable parts, components, assemblies, and sub-assemblies from an item will be allowed only when:

**TM 1-1500-328-23**

a. It is the only available way to correct an adverse effect on the operational readiness of the unit, organization, or activity.

b. The action will immediately restore the unserviceable, reparable item to a Full Mission Capable (FMC) condition.

c. All of the unserviceable reparable items involved are owned or controlled by the unit, organization, or activity doing the action.

d. The maintenance effort needed to restore all of the unserviceable reparable items involved to a FMC condition is within the maintenance authority and capability of the unit, organization, or activity doing the action.

e. The controlled exchange will not degrade any of the items involved to an uneconomically reparable condition.

f. The aircraft or associated equipment, from which a serviceable component is removed, must be classified Not Mission Capable Supply (NMCS), Not Mission Capable Maintenance (NMCM), or Partially Mission Capable (PMC) .

**10-4. Documentation Required.** The following documentation is required for completion of any controlled exchange or cannibalization action.

a. Open requisitions must be transferred to the donor aircraft or associated equipment, when an aircraft or associated equipment has open requisitions and the needed items were obtained using controlled exchange. If the needed item was gained through cannibalization, then the open requisitions must be canceled.

b. All repairs completed as a result of controlled exchange or cannibalization must be documented per DA Pamphlet 738-751.

c. Components listed in TB 1-1500-341-01 or the ULLS-A component legitimate code files are regarded as managed or controlled items and must have DA Forms 2410, 2408-16 and/or 2408-16-1 submitted per DA Pamphlet 738-751.

d. Removal and installation of items involved in controlled exchange or cannibalization actions must be documented on DA Form 2408-13-1 per DA Pamphlet 738-751.

e. Items involved in controlled exchange or cannibalization actions must be properly tagged with DD Forms 1574, 1577-2 or 1577 per DA Pamphlet 738-751.

**10-5. Controlled Exchange Approval.** No controlled exchange action will be started without prior approval of the Commander, or designated representative of the organization doing the controlled exchange.



**10-6. Inventory Control of Cannibalized Managed Components.** Large numbers of AH-1, UH-1 and OH-58 aircraft are currently being retired. Many of these aircraft have **been designated** for local parts salvage. Activities authorized to "strip" and retain components must ensure accountability of all tracked components, listed in TB 1-1500-341-01 or the ULLS-A component legitimate code file, is maintained.

a. All tracked components removed and retained or turned-in to supply per the disposition instructions must have a DA Form 2410 prepared and submitted per DA Pamphlet 738-751.

b. Unless specifically instructed, do not remove unserviceable components and return them for overhaul.

c. AMCOM is aware of the amount of time required to document tracked components; therefore, only serviceable items that are being retained will require the preparation of a DA Form 2410. AMCOM will prepare the 2410s for all items that are still installed, when the "Hulk" (stripped airframe) is ready for turn-in to the DRMO:

(1) Draw a line through all items on the DA Form 2408-16 and DA Form 2408-16-1 that are being retained in the inventory. AMCOM will delete all items not lined out from the AMCOM 2410 TAMMS inventory.

(2) Make a closing statement on DA Form 2408-15, include the location of the DRMO, and any other significant information.

(3) Send copies of the current DA Form 2408-13, the most current page of the aircraft DA Form 2408-15, and all DA Form-16s, and 2408-16-1s to: Commander, AMCOM, ATTN: AMSAM-MMC-RE-FD (2410), Redstone Arsenal, Huntsville, AL 35898-5000.

d. Commanders will ensure that all condemned Flight Safety Critical Aviation Parts are mutilated per Section IX of this manual.

e. Accuracy in reporting components sent to the DRMO is essential, significant problems could occur, if a unit reported an item as lost to the inventory, and later it was discovered that the item was installed on an operational aircraft.

## SECTION XI

## STATIC AND MUSEUM DISPLAYS

**11-1. Purpose.** Federal law provides that surplus, condemned, or obsolete combat equipment, may be used on military installations, or donated to authorized civilian activities for use as static or museum displays. This section provides guidance for completion of required processing and preparation of aircraft and associated items to be used for static and museum displays.

## NOTE

Department of Defense elements, U.S. Government agencies, and civilian activities listed in DOD Manual 4160.21-M, are considered authorized recipients for aircraft and associated aviation items.

**11-2. Requests for Display Aircraft and Associated Items.** Military and authorized civilian recipients that want aircraft or associated items, for a museum or static display, shall submit a written request to Commander, U.S. Army Aviation And Missile Command, ATTN: AMSAM-MMC-VS, Redstone Arsenal, Huntsville, AL 35898-5000. All requests will be reviewed by AMSAM-MMC-VS, and coordinated with the appropriate item Project Manager (PM). Requests for aircraft classified as having no civilian flight use, or FAA certification, such as the AH-1 and AH-64 series helicopters, require special handling and control. If the request for donation is for a special control item, the donation must also be coordinated with the Defense Logistics Agency (DLA), ATTN: MMSC, Cameron Station, Alexandria, VA 22304-6100. Include the following information:

1. Name and telephone number (voice & FAX) of the requester.
2. Name and telephone number (voice & FAX) of the respective AMCOM aircraft manager.
3. Identify the aircraft to be offered for static display by serial number and MDS.
4. List of all weapon systems, and other special systems, on the aircraft, by serial number and part number.
5. Request a waiver of all demilitarization requirements. A copy of that approval must be provided to AMCOM with the donation request.

**11-3. Processing Requirements.** The preparation needed to ready an aircraft or associated items for use as a display item may vary

considerably, depending on the type of display, historical significance, and the future ownership. The tasks stated in this manual should be considered as the minimum requirements, additional conditions and instructions may be provided by AMCOM. Table 11-1 shows the minimum actions by display type. All actions must be completed before the aircraft or item is used for display.

**Table 11-1. Required Actions for Aircraft or Associated Equipment Designated for use as Museum or Static Displays**

	U.S. ARMY INSTALLATION		DONATION OR TRANSFER OUTSIDE OF ARMY CONTROL		SPECIAL HISTORICAL VALUE
	STATIC	MUSEUM	STATIC	MUSEUM	MUSEUM
DA Form 1352	X	X	X	X	X
DA Form 2408-15	X	X	X	X	X
AMCOM Save List	X	X	X	X	
Record Processing	X	X	X	X	X
Remove Acft DataPlate	X		X	X	
Limited Demil.	X	X	X	X	
Non-Visual Cannibal.	X		X		
Donation Agreement			X	X	X

**11-4. Explanation of Preparation Actions.** The actions identified in Tale 11-1 above is defined in this paragraph as the minimum preparation and processing requirements for aviation display items.

a. DA Form 1352. When AMCOM selects aircraft as a static or museum display, the action retires the aircraft from the operational fleet. Therefore, a loss to the inventory must be reported on DA Form 1352, Army Aircraft Inventory and Flying Time Reporting.

b. DA Form 2408-15. The retirement of an aircraft and its continued use as a display item, is a major event in the life cycle of the aircraft, and will be documented on the aircraft DA Form 2408-15, Historical Record for Army Aircraft.

c. AMCOM Save List. The item manager at AMCOM will often issue a "Save List" for the removal of costly or needed items. The removal of these items will not change the outward appearance of the aircraft, but will save valuable assets for the Army. All "Save List" components that are listed in TB 1-1500-341-01 or the ULLS-A component legitimate code files, must have all required documentation completed and processed per DA Pamphlet 738-751, before the aircraft is released.

d. Record processing. All components identified in TB 1-1500-341-01 or ULLS-A component legitimate code files that will

remain installed on the aircraft, or used separately in a display, must be reported as a loss to the Army inventory. AMCOM is aware of the large volume of DA Form 2410s needed to be generated when an aircraft becomes a display item; therefore, AMCOM **will prepare the DA Form 2410s for all managed items that will remain installed on, or accompany the aircraft.** The losing activity will comply with the following requirements.

1. Aircraft selected for use, as a static display will forward all the aircraft records to AMCOM.

2. Records of aircraft used in a museum display may remain with the aircraft under the following conditions:

(a) The aircraft has significant historical value.

(b) The records are required to add value to the display.

(c) When directed by AMCOM.

3. Prepare a memorandum summarizing the reclassification of the aircraft to a display/museum status.

4. Perform a serial number inventory of the aircraft, comparing serial numbers listed on DA forms 2408-16 and 2408-16-1 with the installed items. Disassembly of sub-components for inaccessible serial numbers is NOT REQUIRED. All discrepancies between the installed components and historical records will be documented in the significant historical data block. Do not line out components on DA Form 2408-16 or DA Form 2408-16-1, which are installed or will remain installed on the aircraft.

5. If the records are designated to accompany the aircraft, make a readable photocopy of the current DA Form 2408-13, and all DA Forms 2408-15, 2408-16, and 2408-16-1 in the aircraft historical logbook.

6. Mail records (copies when authorized), a photocopy of the AMCOM "Save List" with the appropriate DA Form 2410s, the reclassification memorandum, and all other documentation stated in the transfer instructions, to Commander AMCOM, ATTN: AMSAM-MMC-RE-FD (CDRA), Redstone Arsenal, Huntsville, AL 35898-5000.

e. Remove Aircraft Data Plate. Aircraft selected as static displays are considered condemned; therefore, the aircraft data plate, must be removed before release. Aircraft that are donated to museums may retain their data plates, provided the individual aircraft has special historical value, or AMCOM approves the retention of the data plate. Data plates on aircraft selected for Army museums will remain in place until the display is no longer needed.

f. Limited Demilitarization. All explosive devices must be removed from the aircraft. Any weapons that remain installed must be made

totally and permanently inoperative. DLA, MMSC will provide instructions for the limited demilitarization. These instructions are provided on a case by case bases for a specific aircraft by serial number and model, and should not be considered as applying to all aircraft of the same MDS. The instructions will be detailed enough to make the aircraft non-airworthy, but still keep the appearance and historical value of the display. All demilitarization actions will be completed, before the receiver takes possession of the aircraft. Mail a copy of the limited demilitarization certificate that validates that the appropriate mutilation has been completed as instructed to Defense Logistics Agency (DLA), ATTN: MMSC, Cameron Station, Alexandria, VA 22304-6100

g. Non-Visual Cannibalization. Unless otherwise instructed by AMCOM, aircraft selected for use as a static display may be candidates for non-visual cannibalization. In addition to the save list items, units processing display aircraft may remove any needed component or part, provided the removal does not change the appearance, or the safety of the display.

h. Donation Agreement. All non-U.S. Government receivers must sign a donation agreement before taking custody of the aircraft or item per Chapter XIII of DOD Manual 4160.21-M. The agreement should include instructions for disposal of the display item when it is no longer needed.

**11-5. Reporting of Pilfered or Missing Display Items.** Display custodians are obligated to make sure the display is adequately safeguarded. When theft of any item is discovered, the following actions will be taken:

a. If the theft occurred on an U.S. Army installation the commander, or museum director, will report the incident to the Military Police Criminal Investigation Division (CID).

b. Theft that occurs on federal property belonging to other military services will be reported to the agency equivalent to the CID. Theft that happens in the civilian community will be reported to the local civilian police.

c. All stolen aviation items will be reported to Federal Aviation Administration (FAA), Surveillance and Analysis Division (Air-300), PO Box 17030, Washington, DC 20591, the Datafax number is (703) 661-0113.

**11-6. Disposition of Display Aircraft.** Aircraft and items no longer wanted or needed for display, will be disposed of in such a way to prevent the unauthorized reuse of the aircraft or associated item. Aircraft donated to civilian activities will be disposed of per the donation agreement. The display custodian will request disposition instructions from AMCOM for aircraft or associated items that remained under the Active Army, Reserve, or National Guard control.

**SECTION XII****STANDARDS OF SERVICEABILITY FOR TRANSFER OF AIRCRAFT**

**12-1. Definitions.** For the purpose of this section, the following definitions will apply:

- a. Transfer. The change of property accountability from one organizational entity to another.
- b. Transferring activity. The activity losing accountability for the aircraft at time of transfer.
- c. Receiving activity. The activity acquiring accountability for the aircraft at time of transfer.

**12-2. General.**

- a. The standards of serviceability for transfer have been established to minimize the impact upon the receiving activity of a transferred aircraft.
- b. Cost of transfer inspections and maintenance will be borne by the transferring activity (refer to AR 750-1).
- c. This section prescribes the amount of inspections and maintenance necessary to ensure that ample flight hours are remaining to satisfy immediate operational and logistical requirements within CONUS, overseas, or combat operations.
- d. A deviation to degree of serviceability may be authorized when an aircraft is being prepared for transfer to the National Inventory Control Point (NICP) for the purpose of accountability and induction to depot overhaul. Therefore, specific instructions will be provided by AMCOM, when the aircraft is scheduled for depot induction.

**12-3. Standards of Serviceability.**

- a. General. Standards of Serviceability for use in day-to-day inspection and maintenance of aircraft are published as fits, tolerances, wear limits and specifications, in the applicable aircraft maintenance TMs.
- b. Transfer Standards. Standards of Serviceability for transfer of aircraft listed in Table 12-1 must be complied with in addition to all other requirements stated in this Section.

(1) Aircraft maintained under the Phase Maintenance Method:

- (a) Within or between non-combat theaters:  
If the number of hours left until the next Phase Inspection is less than half of the scheduled Phase interval — perform the next phase inspection.

**For example:**

UH-1H/V and AH-1E/F/S have a phase interval of 150 hours. If the time remaining to the next phase is less than 75 hours complete the next phase inspection.

**OR**

OH-58A/C have a phase interval of 300 hours. If the time remaining to the next Phase is less than 150 hours complete the next phase inspection.

- (b) Into theaters with combat operations:  
Perform next phase inspection, and all servicing tasks and special inspections due within 50 hours.

- (2) Aircraft maintained using the PMS - Periodic Inspection Method; such as, UH-60A/K/L and MH-60K:

- (a) Within or between non-combat theaters:  
If the next scheduled periodic inspection is due within 100 flying hours — perform a periodic inspection.

- (b) Into theaters with combat operations:  
Perform next periodic inspection, and all servicing tasks and special inspections due within the next 50 hours.

- (3) Aircraft maintained using the Progressive Phase Maintenance Inspection Method (PPM); such as **OH-58D**:  
For all transfers (non-combat or combat) — complete the current PPM and all special inspections due within the next 50 hours.

c. Aircraft being withdrawn from combat. Aircraft that are being withdrawn from combat will be prepared per instructions that will be provided by HQDA and AMCOM.

d. Commanders waiver authority.

(1) Commanders with jurisdiction over both the transferring and receiving organizations are authorized to waive any or all, of the

standards of serviceability for transfer stated in this manual. Verification of accountability of equipment and accuracy of forms and records is a mandatory requirement.

(2) MACOMs will coordinate aircraft transfers between MACOMs with a memorandum of agreement (MOA) that outlines: details for the transfer, maintenance and serviceability standards, transfer inspection and acceptance procedures, and a transfer completion timeline. These procedures are essential for orderly and timely aircraft transfers.

(3) MACOMs will coordinate and publish directives for Inter-MACOM aircraft transfers. MACOM aircraft transfer directives will include any special instructions, procedures for transfer, funding responsibilities and if a MOA is required.

e. Requests for waivers. Waivers for any of the standards of serviceability for transfer will not be issued unless both the losing and gaining MACOMs agree and it is approved by HQDA. MACOMs can request a waiver by submitting complete justification to HQDA, ATTN: ODCSLOG.



TABLE 12-1. STANDARDS OF SERVICEABILITY REQUIREMENTS

REQUIREMENTS FOR THE TRANSFER OF OPERATIONAL AIRCRAFT		
ITEM	WITHIN OR BETWEEN NON-COMBAT THEATERS	INTO THEATERS WITH COMBAT OPERATIONS
1. Major Inspection Requirements:  (a) Phase Maintenance Inspection Method  (b) PMS Periodic Insp. Method (UH-60)  (c) Progressive Phase Maintenance Method	See paragraph 12-3b(1) (a)  See paragraph 12-3b(2) (a)  See paragraph 12-3b(3)	See paragraph 12-3b(1) (b)  See paragraph 12-3b(2) (b)  See paragraph 12-3b(3)
2. Special Inspections and servicing:	Perform all special inspections and servicing tasks that are due within the next 25 flight hours or 30 calendar days.	Perform all special inspections and servicing tasks that are due within the next 50 flight hours or 60 calendar days.
3. Modifications:	Perform all EMERGENCY and URGENT MWOs -- plus any ROUTINE MWOs required before the next mission assignment. (This applies to MWOs that are field level or the authority to apply has been delegated to the field, and MWO kits have been received and are awaiting installation.)	Perform all EMERGENCY and URGENT MWOs required before the next mission assignment, and those MWOs that have a time compliance date that will come due within 90 days of the scheduled transfer date. (This applies to MWOs that are field level or the authority to apply has been delegated to the field and MWO kits have been received and are awaiting installation.)
4. Technical Bulletins:	Comply with all EMERGENCY and URGENT TBs.	Comply with all EMERGENCY and URGENT TBs.
5. AMCOM "TWX" Messages:	Comply with all Safety of Flight (SOF) Messages and all Aviation Safety Action Messages (ASAMs).	Comply with all Safety of Flight (SOF) Messages and all Aviation Safety Action Messages (ASAMs).
6. Inventory:	Inventory the aircraft per the applicable aircraft maintenance manual and record the results on DA Form 2408-17 per DA Pam 738-751.  NOTE: All shortages must be accounted for.	Inventory the aircraft per the applicable aircraft maintenance manual and record the results on DA Form 2408-17 per DA Pam 738-751.  NOTE: No shortages are authorized, all required items must accompany the aircraft.
7. Forms, Records and Documentation:	Inspect all logbook and historical forms for completeness and accuracy. Perform a component serial number check; discrepancies must be resolved. Ensure that the aircraft "flight pack" is closed out and all appropriate forms, records, documentation and publications accompany the aircraft per DA PAM 738-751. ULLS-A aircraft must have a transfer disk and a hard copy logbook and historical records.	Inspect all logbook and historical forms for completeness and accuracy. Perform a component serial number check; discrepancies must be resolved. Ensure that the aircraft "flight pack" is closed out and all appropriate forms, records, documentation and publications accompany the aircraft per DA PAM 738-751. ULLS-A aircraft must have a transfer disk and a hard copy logbook and historical records.

TABLE 12-1. STANDARDS OF SERVICEABILITY REQUIREMENTS -- CONTINUED

REQUIREMENTS FOR THE TRANSFER OF OPERATIONAL AIRCRAFT		
ITEM	WITHIN OR BETWEEN NON-COMBAT THEATERS	INTO THEATERS WITH COMBAT OPERATIONS
8. Required Equipment:	All equipment/devices required for flight in day, night, and IMC conditions without regard for mission requirements as stated in AR 95-1, must be installed and operational. Mission equipment identified in AR 700-138, such as AEC (Aviation Electronics Combat) and weapons systems must be present and operational.	All equipment/devices required for flight in day, night, and IMC conditions without regard for mission requirements as stated in AR 95-1, must be installed, operational, and compatible with equipment prescribed in the transfer directive. Mission equipment identified in AR 700-138, such as AEC (Aviation Electronics Combat) and weapons systems must be present and operational.
9. Component Replacement:		
(a) TC/RC Items of 500 hours or less.	Replace items with 50-hours or less of the scheduled TC/RC replacement time left.	Replace items with 300-hours or less of the scheduled TC/RC replacement time left.
(b) TC/RC Items with more than 500 hours.	Replace items with 100-hours or less of the scheduled TC/RE replacement time left.	Replace items with 300-hours or less of the scheduled TC/RE replacement time left.
(c) Calendar based TC/RC Items.	Replace items due within 30-days of the scheduled transfer date.	Replace items due within 4 months of the scheduled transfer date.
10. Aircraft Paint:	Touch up with spray paint as necessary to protect exposed surfaces required per TM 55-1500-345-23.	Touch up with spray paint as necessary to protect exposed surfaces required per TM 55-1500-345-23, and apply unique markings required for the combat theater.
11. Tires (If applicable):	Replace tire if 25% or less of the tire tread remains.	Replace tire if 50% or less of the tire tread remains, or if any indication of dry rot is present.

## SECTION XIII

## AERONAUTICAL ITEMS USED FOR MAINTENANCE TRAINING

**13-1. Definitions.** Items used for technical training of ground maintenance personnel are defined as follows:

a. Maintenance Training Aircraft. Aircraft used for technical training, and evaluations that do not require airborne operations. They are restricted from any type of flight. Maintenance training aircraft are classified in two categories:

(1) Category "A" Aircraft. Temporarily grounded aircraft that can be used for ground run operations. They will be maintained per applicable publications, and must be capable of being returned to full flyable status at the AVUM/AVIM level with, all inspections, maintenance, and required MWOs completed within 60 working days.

(2) Category "B" Aircraft. Grounded aircraft that can be used for ground run operations, if all required equipment and components, are installed and functioning properly. They may be returned to flight status only after depot level overhaul.

b. Maintenance Training Airframe (MTA). Condemned aircraft used to train maintenance personnel, or equipment validation procedures. These aircraft are retired, or damaged and/or deteriorated beyond the authorized expenditure limits.

c. Fabricated Airframe Training Device (FATD). Training devices that have been constructed under specific contract statements of work to conform to the needs of the aircraft maintenance training community.

d. Structural Training Device. Normally "pieces" of aircraft; such as, wing, tail boom, cabin, or empennage. Used by students for "practical exercises."

e. Dynamic Training Device. Component mock-ups, cut-aways, and displays.

f. Isolated Aeronautical Training Element (IATE). Components or modules that are being used separately for training purposes.

**13-2. General.** This section establishes standards for management and control of aircraft, and other aviation related items used for aircraft maintenance technical training. Training aircraft, MTAs, FATDs, and other training devices will be maintained per AR 750-1, all applicable publications, and this manual.

**13-3. MTA Mission Design Series (MDS).** When an aircraft is classified a MTA the prefix "G" must be added to the MDS. The "G" shows that the former aircraft has been downgraded to MTA status, permanently grounded, and used only for maintenance training, or as a testbed for modification validation procedures; for example, an UH-1H is changed to a GUH-1H.

**13-4. FATD Training Device.** This type of device is fabricated using a combination of salvaged items from damaged and/or retired aircraft, and specifically designed and/or manufactured components. The intent of these devices is to be used as replacements for Category B Training Aircraft; however, they also may be used to fulfill MTA requirements. All FATDs are assigned a device number that will be used the same as a serial number for management and administrative control of the device. The control number does not necessarily relate to any aircraft or item used in the construction of the FATD.

**13-5. Item Identification.** MTAs, isolated aeronautical elements, or other training devices, that do not have an established serial number must have a serial number assigned per Section V of this manual. When a MTA is made from pieces of several aircraft, the MTA will assume the identity of the former aircraft that contains the structural element where the aircraft data plate is attached.

**13-6. Maintenance Requirements.**

a. The following exceptions to the aircraft -23 TM are permitted:

(1) All inspections listed on DA Form 2408-18 (Equipment Inspection List) will be completed, when due, for all Category A and B aircraft unless a waiver is granted by AMCOM. The DA Form 2408-18 requirements are optional for MTAs, and all other training devices.

(2) Category A and B aircraft will have ground operating time recorded and maintained on DA Form **2408-13**, Aircraft Status Information Record. A combination of prior flight time and ground run time will be used to determine component time change requirements. Extensions of time change limits for Category A and B aircraft may be granted by AMCOM.

b. The unique nature of the training environment creates conditions that may make full compliance with DA Pamphlet 738-751 difficult to comply with; therefore, the following deviations are authorized.

(1) DA Form 2408-13-1, Aircraft Maintenance and Inspection Record. For Category A and B aircraft that are not involved in ground run operations, the form will be closed out only after major maintenance.

(2) DA Form 2408-14-1, Uncorrected Fault Record Aircraft. This form is authorized for use to record Red "X" and Circled Red "X" conditions on MTAs, and Category A or B training aircraft that are not used for ground run operations. Enter "Grounding Conditions" in the top margin of the form. When the aircraft is transferred outside of the training environment, all faults and deficiencies will be re-entered to a DA Form 2408-13-1 and the "Grounding Condition" DA Form 2408-14-1 will be discarded after the transfer.

(3) DA Form 2408-13 close out action is not needed for MTAs.

13-7. **Configuration Control.** Configuration control of training aircraft and MTAs is essential. The training fleet should be comparable to actual field aircraft. Modification Work Orders (MWOs) should be applied to Category A and B aircraft as soon as practical.

Category A or B aircraft may have temporary local modifications applied, with prior approval from AMCOM. Local modifications to MTAs are allowed provided the modification improves training, or corrects a potentially unsafe situation resulting from the condition of the MTA. Category A or B aircraft, MTAs, and all types of training devices must not be allowed to deteriorate. If training aircraft are accidentally damaged, they must be promptly repaired. If needed repairs are beyond the capability of the activity, or exceed the repair limits in TB

43-0002-3, Maintenance Expenditure Limits for Army Aircraft AMCOM must be notified.

13-8. **Records and Historical Data.** Logbook and historical data will be maintained on all Category A and B aircraft, and MTAs. The necessity for record keeping also extends to dynamic training devices with managed components installed, and isolated aeronautical elements. All requirements of TB 1-1500-341-01 will apply.

13-9. **Lost or Missing Logbook/Historical Data.** Category A and B aircraft, and MTAs that have incomplete or missing logbook/historical data must have the data reconstructed.

13-10. **DA Form 2410 Submission.** DA Form 2410 (Component Removal Repair/Overhaul Record) submission is vital to the management of TC, RC, and CC items. The aircraft maintenance-training environment presents some unusual conditions that may require special variances such as:

a. Components obtained from supply or through controlled exchange to repair a MTA or other training device, or will be used, as an isolated aeronautical element must be removed from the active inventory. The loss will be reported using copy 3 of DA Form 2410. In the Failure Code, block 10, use "930". In the Loss Code, block 66,

use "X". In blocks 72, 73, 74 enter the data for the unit that is responsible for the MTA or training device. In block 75, enter the date the aircraft was classified to MTA status, or when the component was received. In the remarks block enter a comment showing that the item is being used for training.

b. When components are removed from a MTA or other training devices, and returned to the active inventory the following action is required.

(1) Use copy 2 (Repair/Overhaul/Gain) to report the gain of the component back into the active inventory. In Reason for Gain, block 44, enter the code "C" (Return from training). Dispose of copy 1 and copy 3, they are not needed.

(2) Use copy 1 (Removal Report) of a new set of DA Form 2410 for the removal of the item from the MTA or training device. **DO NOT USE COPY 1 OF THE DA FORM 2410 USED AS A GAIN TO THE INVENTORY.** In Failure Code, block 10, enter "925" (Turned-in to supply per Table 1-3, DA Pamphlet 738-751). In the Remarks block enter "Removed from a maintenance training device", and any significant comments about the condition of the item, such as; time since new or overhaul, etc. Copy 2 and 3 will remain with the item. Attach copy 2 from the first "2410" to this copy 1 and forward both DA Forms 2410 to AMCOM.

c. When RC items reach their assigned MAOT, or when directed by AMCOM, to dispose of the item by sending it to the local DRMO, the following procedures will apply:

(1) Report the removal of the item from the MTA or training device with Copy 1 (Removal report). In the Failure Code, block 10, enter "930" (Used for training). Destroy copy 2.

(2) Use copy 3 (Installation/Loss) to report the loss of the component to the inventory. In Reason for Loss, block 66, enter the code "D" (Loss through mutilation).

d. Reporting the installation of components on Category A or B aircraft, MTAs, or training devices will be per the instructions in DA Pamphlet 738-751.

**13-11. Theft or Misappropriation of Training Items.** Theft and reuse of aircraft components could have catastrophic results in civil or military aviation; therefore, the following procedures will apply to all incidents involving stolen components:

a. Report the incident to the Military Police Criminal Investigation Division (CID).

b. Notify the Federal Aviation Administration (FAA), Surveillance and Analysis Division, (Air-300) PO Box 17030, Washington, DC 20591, the Datafax number is (703) 661-0113.

c. If the stolen item is a managed item, report the removal from the Category A or B aircraft, MTA, or training device with Copy 1 (Removal report). In Failure Code, block 10, enter "928" (Item was pilfered). In the Remarks block enter the CID case number, and any significant comments about the condition of the item. Report the loss of the item to the inventory with copy 3 (Installation/Loss) of the same DA Form 2410. In Reason for Loss, block 66, enter "L" (Physical loss other than combat).

13-12. Controlled Substitution of Components. Substitution of components/parts from Category A and B aircraft, to flyable or other Category A or B aircraft is allowed. The component must be determined serviceable by a qualified technical inspector, and must be of the proper configuration with all-necessary modifications and SOF/ASAM/SOU messages applied. Unserviceable non-reportable items may be removed from flyable or Category A or B aircraft and installed on a MTA. Serviceable items should not be removed from aircraft for use on MTAs or FATDs. The substitution between MTAs or other training devices except FATDs is permitted, and the exchange of items between FATDs is authorized. ITEMS LISTED IN TB 1-1500-341-01 OR THE ULLLS-A COMPONENT LEGITIMENT CODE FILES WILL NOT BE REMOVED FROM ANY MTA, FATD, OR ANY OTHER TYPE OF TRAINING DEVICE, AND INSTALLED ON AN OPERATIONAL AIRCRAFT, OR TRAINING AIRCRAFT. Reportable items removed from a MTA, training devices or isolated elements must be returned for depot level repair/overhaul before reuse. Condition change items must undergo a thorough technical inspection at the AVIM level or higher, and be certified serviceable before reuse. Item's of any type will not be removed from a FATD and installed on an operational or training aircraft, MTA, dynamic training device, or used as an Isolated Aeronautical Element. Furthermore, items removed from a FATD will not be turned-in to the supply/repair system without the approval of the item manager at AMCOM. When items are removed from a Category A, aircraft the item must be replaced with a serviceable replacement, at the earliest possible date.

13-13. Classification/Reclassification to Training Aircraft/MTA. Whenever possible, aircraft that are damaged, deteriorated or retired will be used as a source for MTAs. The final determination on classification of a retired, crash damaged or deteriorated aircraft will be made by AMCOM. Under no circumstance will any aircraft be classified to a Category A or B aircraft or MTA, without the written approval from AMCOM. When notified to reclassify an aircraft to MTA status, the following actions are required:

a. On DA Form 2408-13 the condition status, entered for all MTAs, will be a Red/Black "X". On DA Form 2408-13-1 enter in the Fault/Remark block "Aircraft permanently grounded, and restricted from all ground run operations," and a Red/Black "X" entered in the status block.

b. The reclassification will be recorded as a significant historic event on DA Form 2408-15 per DA Pamphlet 738-751.

c. Managed components that remain installed on an aircraft when it is downgraded to MTA status, or used on any type of training device will be processed as follows:

(1) Perform a serial number inventory of the aircraft, comparing items listed on DA form 2408-16 and DA Form 2408-16-1 with the installed item. Disassembly for sub-components with inaccessible serial numbers is NOT REQUIRED. All discrepancies between the installed components and historical records must be documented in the significant historical data block.

(2) All managed components on an AMCOM "Save List" must have a DA Form 2410 submitted per DA Pamphlet 738-751. Line out the "Save List" items on the aircraft DA form 2408-16 and make appropriate comments in the significant historical data block. If T700 series engines or H-60 series APUs are on the "Save List" include information on these items as a comment on the aircraft DA Form 2408-15.

(3) Make a readable photocopy of the current DA Form 2408-13, all DA Forms 2408-15, 2408-16, and 2408-16-1, in the aircraft historical logbook, and a copy of the AMCOM "Save List." Prepare a cover memorandum summarizing the downgrade, and send all documentation to Commander AMCOM, ATTN: AMSAM-MMC-RE-FD (CDRA), Redstone Arsenal, Huntsville, AL 35898-5000. This data will be used by AMCOM to move the components from an active inventory to a training status.

13-14. **Designation of Components as IATE Items.** Only TRADOC operated training facilities are authorized to designate serviceable aeronautical components/parts into IATE status. However, all commanders may designate condemned components/parts as an IATE item if the item will be useful as a training aid. When a managed item (listed in TB 1-1500-341-01 or the ULLS-A Component Legitimate Code File) is classified as an IATE, DA Form 2410 information must be submitted to AMCOM.

13-15. **Aircraft Data Plate Control.** Data plates on Category A or B aircraft, MTA, and other training devices will remain affixed to the item as long as the item remains under U.S. Army control.

13-16. **Disposition of Maintenance Training Aircraft/MTA.** When maintenance training aircraft or MTAs become excess to the needs of the using activity, they will request disposition instructions from the appropriate item manager at AMCOM.



a. Disposition instructions that direct disposal of the excess Maintenance Training Aircraft or MTA through the DRMO will often include a "save list." All TBO, RC, and CC items on the "save list" will be turned in for depot level repair/overhaul.

(1) All items listed in TB 1-1500-341-01 or the ULLS-A Component Legitimate Code File will require the preparation of a DA Form 2410 per DA Pamphlet 738-751, and paragraph 13-10.

(2) All RC and CC components not on the "save list" will be condemned and mutilated before the aircraft, MTA, or training device is turned-in to the DRMO.

(3) A close out entry on DA form 2408-15 is required per DA Pamphlet 738-751.

(4) Forward required forms and records to AMCOM, per DA Pamphlet 738-751.

b. Excess maintenance training aircraft or MTAs that have no civilian application, such as AH-1 and AH-64 series helicopter will be demilitarized per DOD 4160.21-M.

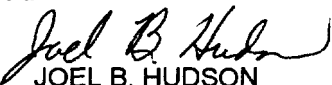
APPENDIX A

REFERENCES

AR 200-1	Environmental Protection and Enhancement
AR 310-25	Dictionary of United States Army Terms
AR 700-138	Army Logistics Readiness and Sustainability.
AR 710-1	Centralized Inventory Management of the Army Supply System.
AR 710-2	Inventory Management Supply Policy Below The Wholesale Level.
AR 750-1	Army Material Maintenance Policy and Retail Maintenance Operations.
AR 750-59	Army Corrosion Prevention and Control Program.
AR 95-1	Flight Regulations.
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
DA PAM 738-751	Functional Users Manual for The Army Maintenance Management System-Aviation (TAMMS-A).
DOD 4160.21-M	Defense Utilization and Disposal Manual.
TM 1-1500-204-23 (Series)	AVUM and AVIM Manual for General Aircraft Maintenance
TM 1-1500-341-01	Aircraft Components Requiring Maintenance Management And Historical Data Reports
TM 1-1500-343-23	Avionics Cleaning And Corrosion Prevention/Control.
TM 1-1500-344-23	Aircraft Weapon Systems Cleaning and Corrosion Control.
TB 1-1520-237-25-2	Policy Directive Governing the Execution of the Joint Airframe Condition Evaluation (JACE) in the Field for Army, Air Force, Navy, All H-60 Aircraft
TB 43-0002-1	Maintenance Expenditure Limits for Aviation Secondary Items.
TB 43-0002-3	Maintenance Expenditure Limits for Army Aircraft.

By Order of the Secretary of the Army

Official:

  
JOEL B. HUDSON  
*Administrative Assistant to the  
Secretary of the Army*  
9916612

**ERIC K. SHINSEKI**  
*General, United States Army*  
*Chief of Staff*

**DISTRIBUTION:**

To be distributed in accordance with Initial Distribution Number  
(IDN) 313115, requirements for TM I-1500-328-23.

## ***These are the instructions for sending an electronic 2028***

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@wherever.army.mil>

To: 2028@redstone.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:** T
15. **Submitter LName:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.

<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is ODISC4.						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM)	DATE <b>8/30/02</b>
TO: (Forward to proponent of publication or form)(Include ZIP Code) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898						FROM: (Activity and location)(Include ZIP Code) MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	
<b>PART 1 - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER <b>TM 9-1005-433-24</b>						DATE <b>16 Sep 2002</b>	TITLE Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON	
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number.	
<b>EXAMPLE</b>							
<i>* Reference to line numbers within the paragraph or subparagraph.</i>							
TYPED NAME, GRADE OR TITLE <b>MSG, Jane Q. Doe, SFC</b>				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION <b>788-1234</b>		SIGNATURE	

<b>TO:</b> (Forward direct to addressee listed in publication) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898	<b>FROM:</b> (Activity and location) (Include ZIP Code) MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	<b>DATE</b> 8/30/02
--	--	------------------------

**PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS**

PUBLICATION NUMBER			DATE	TITLE				
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

**PART III - REMARKS** (Any general remarks, corrections, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

**EXAMPLE**

TYPED NAME, GRADE OR TITLE MSG, Jane Q. Doe, SFC	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION 788-1234	SIGNATURE
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<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b>						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM)	DATE
For use of this form, see AR 25-30; the proponent agency is ODISC4.							
TO: (Forward to proponent of publication or form)(Include ZIP Code) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898						FROM: (Activity and location)(Include ZIP Code)	
<b>PART 1 - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON	
* Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION		SIGNATURE	

<b>TO:</b> (Forward direct to addressee listed in publication) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898	<b>FROM:</b> (Activity and location) (Include ZIP Code)	<b>DATE</b>
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**PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS**

PUBLICATION NUMBER			DATE	TITLE				
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

**PART III - REMARKS** (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

--

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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## The Metric System and Equivalents

### Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

### Temperature (Exact)

F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	C
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