Chapter 4

MAINTENANCE MANAGEMENT

The right aviation assets are critical to the Army's ability to maintain battlefield mobility. Especially important are the maintenance and repair of highly complex aircraft. To ensure that vital assets remain ready to fight, a highly developed maintenance system has evolved from years of peacetime and combat operational experience. Experience has shown that experienced managers who understand the complexities of the Army's aviation assets and the value of these assets to battlefield mobility must operate an effective maintenance program.

SECTION I – MAINTENANCE MANAGEMENT PHILOSOPHY

GENERAL

4-1. Working in any type of aviation environment is challenging. Maintenance is certainly a requirement for all mechanical ground equipment, trucks, ground support equipment, and so forth, but there is a critical difference between maintaining equipment and maintaining aircraft. Disastrous results can occur from any failure of an aircraft system at a critical phase of flight. For rotary-wing aircraft with their many highly balanced, moving, and rotating parts, maintenance requirements are even more intense. Therefore, the challenge for the aviation maintenance manager is to ensure that the maintenance program provides the assets the commander needs, without compromising established safe maintenance standards. The key to the manager's success is to consistently make the right decisions that will result in successful mission accomplishment.

OBJECTIVES

4-2. The primary objective of Army aviation maintenance is to provide safe, mission-capable aircraft to satisfy all mission requirements. In time of war, Army aviation missions primarily involve combat and CS. In peacetime, the primary mission is training for combat. In many instances, peacetime training requirements for aircraft are almost as stringent as wartime combat requirements. The maintenance manager must realize the significance of aircraft availability if the unit is to accomplish its mission in both war and peace.

4-3. Attaining the maintenance objective becomes much more challenging when resources are limited. This creates a secondary objective of making aircraft available in an economical and timely manner using available resources.

CONCEPTS

4-4. A maintenance concept is a general expression of intent; for instance how to maintain and support the weapons system. Concepts provide overall guidance while policies provide specific guidance. Examples of aviation maintenance concepts are the following:

- Each commander is responsible for the maintenance of equipment issued to the unit.
- Maintenance is accomplished at the levels prescribed by MAC and TMs. It is preformed at the lowest level consistent with the tactical situation, skill, time, repair parts, tools, and test equipment.
- Repairs are made on site, whenever possible.
- Unserviceable material beyond the maintenance authority or capability of a unit is promptly reported or delivered to the next higher maintenance level.
- All authorized maintenance within the capability of an organization is done, if possible, before evacuation of economically repairable items to the next higher maintenance level.
- When required, higher levels perform the maintenance of lower levels.
- Controlled exchange is used as a last resort to obtain repair parts and assemblies to support maintenance of equipment. Controlled exchange is taking serviceable parts from one unserviceable repairable end item to put on another unserviceable repairable end item to return the gaining end item to serviceable condition.
- Repairs are made under the OCM concept at all categories of maintenance (see TM 1-1500-328-23). AVIM and depot maintenance return an item to the user or to the supply system according to maintenance standards established for each item of equipment.
- Quality maintenance depends on preventive maintenance services and inspections. Aircraft maintenance inspections are oriented to the early detection of faults affecting SOF. All levels will make maximum use of test equipment for diagnostic testing and fault isolation.
- Operator (crew chief) maintenance is constantly emphasized throughout the chain of command because it is key to the operational readiness of Army aircraft.
- Work will be completed by the smallest possible number of personnel. Maintenance managers should establish standard procedures for doing jobs. As a result, soldiers will need to consult supervisors only in unusual situations.
- Time standards are determined by averaging the amount of time required to perform identical tasks. Time standards should be reviewed regularly and revised as needed.

PUBLICATIONS AND REGULATIONS

4-5. TM 1-1500-328-23 and DA Pam 738-751 contain specific maintenance policies that apply to all Army aircraft. Aviation maintenance managers at all levels should know and understand these policies. Technical publications provide guidance on use and operation of equipment and accessories. These publications include TMs, TBs, lubrication orders, and MWOs. They have specific instructions on the operation, maintenance, repair, modification, serviceability standards, testing, storage, issue, and inspection of equipment. The QC section maintains a master reference library of these publications, which are listed in DA Pam 25-30. The 750 series of Army regulations governs maintenance of supplies and equipment. The QC section should obtain and use those regulations that pertain to maintenance operations. DA Pam 25-30 lists all applicable regulations.

MAINTENANCE RECORDS

4-6. Operational units must properly use, prepare, and submit the forms identified in DA Pam 738-751. This is the key to the entire integrated Army maintenance management system. The commander and the maintenance officer use these forms to check operational status, trouble spots, equipment use, and performance. The ULLS-A provides an electronic means of completing maintenance forms and records. ULLS-A is now the primary means of aviation maintenance management (see Appendix A).

METHODS OF PERFORMING MAINTENANCE

Crew Chief

4-7. This is the primary method of performing maintenance on Army aircraft. It is accomplished by a crew chief assigned to the aircraft, who becomes the primary maintenance person for that aircraft. If the aircraft should require extensive maintenance, the crew chief will request and receive assistance from AVUM maintenance personnel.

Dock

4-8. This method is for aircraft undergoing extensive repairs or lengthy inspections. It uses a fixed maintenance dock or bay. The dock could be a location in a hangar or shop, a parking spot on the flight line, or any prearranged location. The aircraft normally remains in the maintenance dock until all maintenance is complete. Maintenance crews or teams rotate to and from the aircraft. The dock method is normally used at AVUM units, AVIM units, and depots.

Production Line

4-9. This method is routinely used for aircraft undergoing extensive modifications or complete overhaul such as at an Army depot or contractor facility. It is similar to an automobile production line, except that the aircraft or components can be disassembled or assembled using this system. Examples of the production line method can be seen at any airline overhaul facility. The basic characteristic of this method is that the aircraft moves through the disassembly or assembly area as maintenance crews or teams perform their respective tasks at a fixed location.

LOGISTICS PREPARATION OF THE THEATER

4-10. The logistics preparation of the theater is a detailed plan that lists maintenance considerations and how the maintenance manager plans to operate. The maintenance manager studies the tactical situation/mission and makes mental preparations and when possible physical preparations to be prepared for any maintenance situation that may affect his unit's maintenance posture. Areas that should always be addressed are aircraft recovery, AMCPs, Class IX resupply, BDAR, and responsibility.

AIRCRAFT RECOVERY AND EVACUATION

4-11. It is essential that maintenance managers prepare for aircraft maintenance failures during operations and battle damage severe enough to prohibit an aircraft from being flown. This is why a recovery team should be assembled, briefed, and on close hold. Personnel should be well trained in aircraft recovery techniques and have all the required equipment easily available to them. Transportation should also have been prearranged for the recovery team and for the recovered aircraft, either by ground or preferable by air. (Appendix F of this manual and FM 3-04.513(1-513) further discuss recovery operations.)

AIRCRAFT MAINTENANCE COLLECTION POINTS

4-12. A maintenance collection point is a point established to collect equipment awaiting repair, controlled exchange, cannibalization, or evacuation. The lowest level a maintenance collection point should be established is the AVIM level. Aircraft that cannot be fixed forward by the AVUM or the AVIM MST are evacuated to the AMCP. Here they are evaluated and repaired or evacuated to another maintenance facility for repair. AVUMs must ensure they know where their support maintenance is located, and that they are very familiar with their support external SOP. AVIMs must consider accessibility to their supported units when selecting a tactical site.

CLASS IX RESUPPLY

4-13. This item is critical if you are going to maintain a viable maintenance program. It is also tied very closely to site selection. Maintenance units need to have easy access to vital transportation arteries. Most of the large Class IX parts will be transported by 5-ton vehicle and sometimes by tractor-trailer. You must consider maneuver space for these vehicles when choosing your site and when choosing the tactical layout of your field site.

BATTLEFIELD DAMAGE ASSESSMENT AND REPAIR

4-14. BDAR can be divided into two separate but mutually supporting functions—battlefield damage assessment and battle damage repair.

Battlefield Damage Assessment

4-15. BDA involves inspecting damaged equipment to determine the extent of damage, classifying the equipment according to the type of repairs required, and developing a plan of action for each item. BDA begins with the initial assessment by the crew chief/operator and continues through the various stages of repair, recovery, and evacuation.

Battlefield Damage Repair

4-16. BDR uses emergency expedient repairs to return the system to a fully or partial mission-capable status. Priorities for repair of the battle-damaged systems are usually—

- Essential to completion of the immediate mission.
- Repairable in the least amount of time.
- Repairable, but not in time to continue the immediate mission.
- Damaged beyond capability of repair; possible candidate for recovery.

4-17. BDAR teams must be trained, equipped, and organized before the start of any aircraft mission.

RESPONSIBILITY

4-18. The S4 is the primary logistic manager for an organization. For this reason, close coordination must be maintained with the S4. The maintenance officer, however, is responsible for the aircraft maintenance program and needs to ensure that all aspects of aviation maintenance have been considered before any operation.

SECTION II – MAINTENANCE MANAGEMENT FUNCTIONS

AVIATION UNIT MAINTENANCE/AVIATION INTERMEDIATE MAINTENANCE PLATOON/SECTION DUTIES

PRODUCTION CONTROL

4-19. The PC section manages the aircraft maintenance and supply functions of the aviation unit. The organization of PC sections varies depending on the number and type of aircraft assigned to the unit; whether the unit's level of maintenance is AVUM, AVIM, or depot; the unit's mission; the space available; the terrain; and the environment. A typical PC section will—

- Act as single point of contact for their unit or supported units.
- Monitor and maintain records of daily flying hours and condition of assigned aircraft.
- Inform the commander of the status and availability of the aircraft and of the flying hours available.
- Coordinate with the flight companies/platoons and flight operations on scheduling of aircraft to meet mission and training requirements.
- Monitor the progress of work in the various maintenance sections to ensure a balanced workload.
- Prepare and submit status reports of maintenance in progress to the commander and higher headquarters.
- Coordinate and schedule requirements with the next higher level of maintenance for all work beyond the unit's capability.
- Coordinate work input to the maintenance sections.
- Coordinate activities of the QC elements.
- Monitor management of the aircraft PLL and other repair parts.
- Monitor the operation and maintenance of power generation and ground support equipment.
- Monitor aircraft time-change component schedule to ensure replacement components are ordered according to flying-hour requirements.
- Supervise the controlled exchange program. (Note: The commander or his designated representatives are the only individuals authorized to approve controlled exchanges.)
- Coordinate all test flights.

- Coordinate transportation for the aircraft recovery teams and aircraft to be recovered or evacuated.
- Maintain DA Form 2405 (Maintenance Request Register) or computerized equivalent and the in-progress file.
- Maintain the PC board according to the unit's procedures. (See Appendix D for additional information on the PC board.)
- Supervise the cross training of personnel with aviation maintenance occupational skills. Aircraft repairers in one type of aircraft should be cross-trained in other types of aircraft whenever feasible.

QUALITY CONTROL

4-20. QC activities complement those of PC. QC management is coordinated with all phases of PC management to ensure maximum productivity. Properly designed QC procedures can ensure an acceptable level of quality while reducing inspection requirements and management efforts. However, QC standards must never be sacrificed to increase production. To ensure complete objectivity, QC personnel are directly responsible to the unit commander. The major functions and responsibilities of the QC element are to—

- Establish and maintain a complete technical reference library for assigned or supported aircraft and systems.
- Ensure all maintenance sections maintain a technical data familiarization chart for their section's maintenance personnel.
- Inspect the accuracy of equipment records required by DA Pam 738-751. This responsibility includes the proper use, preparation, and disposition of these records.
- Ensure full participation in the PQDR program.
- Monitor the application of MWO.
- Ensure compliance with the AOAP.
- Monitor and maintain the aircraft time-change component schedule and ensure that PC is given adequate notice (100 flight hours for time change, 2 months for calendar change) of upcoming component-change requirements.
- Review and update all shop standard inspection procedures files to incorporate new inspection techniques and to establish procedures for new equipment.
- Monitor nondestructive inspections of aircraft components and airframe structural members as described in TM 55-1500-335-23.
- Establish and maintain calibration schedules for TMDE (see Appendix K).
- Perform required technical inspections of aircraft, components, and related systems.
- Inspect all areas where aircraft maintenance is performed to ensure that maintenance operations are completed in a safe manner.

4-21. Technical inspection of aircraft maintenance assures adherence to the standards and practices established by applicable publications. Inspections ensure that all applicable technical requirements are followed. They also ensure that the maintenance shop is organized and performing quality work efficiently. Before performing an inspection, QC personnel will review all the latest applicable reference material to make sure that the inspection meets current requirements. (See Chapter 8 for additional details.)

AIRCRAFT MAINTENANCE ELEMENT

4-22. The aircraft maintenance elements of AVIM and AVUM units are responsible for unit-level maintenance of aircraft that is beyond the capability or responsibility of the crew chief.

Scheduled Maintenance

4-23. To effectively perform its mission, the aircraft maintenance section must perform the following scheduled maintenance tasks:

- Perform scheduled phase/periodic maintenance inspections assisted by the crew chief and aircraft component repair section personnel.
- Comply with SOF or unit-level TBs requiring onetime or recurring inspections of aircraft in coordination with the QC element.
- Perform operator maintenance on GSE assigned to the section.

Unscheduled Maintenance

4-24. The aircraft maintenance section will often have to perform unscheduled maintenance. This requirement normally results from the replacement of a component; for example, the crew chief needs help with replacement of a UH-60 main module. The crew chief or other personnel will handle the majority of unscheduled maintenance actions, as determined by the maintenance officer, in coordination with the appropriate company commander/platoon leader.

Deferred Maintenance

4-25. Minor faults noted during daily inspections that do not affect mission readiness or the safe operation of the aircraft may be deferred until the next scheduled inspection. The more faults deferred, however, the more delays when the aircraft receives scheduled maintenance. Minor faults deferred due to shop backlog or awaiting replacement parts will be reentered from DA Form 2408-13-1 (Aircraft Maintenance and Inspection Record) or DA Form 2408-13-3 (Aircraft Technical Inspection Worksheet) to DA Form 2408-14-1 (Uncorrected Fault Record [Aircraft]) only after a valid requisition document number or work order number has been received. The entries will be reentered back to DA Form 2408-13-1 and signed off when corrected. To ensure flight safety, the following factors must be considered before classifying a deficiency for deferred maintenance:

- No flight safety faults are considered for deferred maintenance.
- Aircraft must be grounded for maintenance if there is a reasonable doubt about flight safety.
- A large number of deferred faults that do not present SOF problems on an individual basis may degrade aircraft reliability when considered collectively.

Other Duties

4-26. Aircraft maintenance element personnel may also provide maintenance support teams as required and assistance in maintaining GSE.

SHOP SECTION/COMPONENT REPAIR

4-27. The shop section/component repair element performs repair and preventive maintenance of aircraft components and structures that require a high degree of specialized technical skills. The general areas of responsibility include the power plant section, structural repair section, pneudraulic section, avionics section, electrical section, armament section, and power train section.

Power Plant Section

4-28. MOS 68B personnel in this section service and repair power plants. They perform the following duties:

- Remove, replace, service, prepare, preserve, clean, and store engine assemblies or components.
- Disassemble, repair, reassemble, adjust, and diagnostically test turbine engine systems, subsystems, and components according to directives, TMs, and safety procedures.
- Assist in troubleshooting engines and rigging engine controls.
- Assist with maintenance operational checks.

Structural Repair Section

4-29. MOS 68G personnel in this section repair and maintain airframes. They perform the following duties:

- Apply overlay and flush patches on stressed aircraft skin.
- Remove and install mechanical-lock blind rivets, solid-shank rivets, lock-bolt rivets, nut plates, turn-lock fasteners, threaded-pin fasteners, other special-purpose fasteners, and rivets.
- Repair honeycomb and structural panels such as floor panels, work decks, and avionics shelves.
- Mix and apply fiberglass materials.
- Make emergency and permanent repairs to transparent plastic windows and enclosures.
- Remove, repair, and replace aircraft pneumatic deicing boots.
- Perform structural and honeycomb repair of helicopter rotor blades.
- Replace and repair stringers, longerons, bulkheads, and beams according to directives, TMs, and safety procedures.
- Use common measuring tools, precision measuring gauges, and alignment fixtures to perform structural repairs.
- Mix and apply primers and paints to aircraft surfaces, to include the layout and painting of aircraft markings.
- Perform corrosion-control treatment on aircraft metals.
- Fabricate structural parts and forming blocks, and shape metal using stretching, shrinking, and other metal-forming techniques.

Pneudraulic Section

4-30. MOS 68H personnel in this section maintain, repair, and troubleshoot pneudraulic systems. They perform the following duties:

- Disassemble, repair, reassemble, install, adjust, and test hydraulic systems, subsystems, and components according to directives, TMs, and safety procedures.
- Flush and bleed pneudraulic systems.
- Fabricate tubes, lines, and hoses.
- Diagnose, localize, and troubleshoot malfunctions to a specific pneudraulic system, subsystem, or component.

Avionics Section

4-31. MOSs 35L, 35R, 35Q, 35P, 68N, 68S, and 68Y personnel in this section service and maintain avionics systems. They perform the following duties:

- Make operational checks and adjust avionics equipment.
- Troubleshoot equipment to localize, diagnose, and replace malfunctioning components.
- Exchange readily replaceable components and make minor repairs and adjustments.
- Replace fuses, indicator lamps, microphones, headsets, antennas, impedance pads, cords, cables, and relays.
- Trace aircraft wiring harness to make repairs as required.
- Adjust receivers, transmitters, ICS, and antennas.
- Use portable and shop equipment for installation, radio-frequency power output measurements, alignment, and adjustment.

Electrical Section

4-32. MOSs 68F, 68S, 68X, or 68Y personnel in this section maintain, repair, and troubleshoot aircraft electrical systems. They perform the following duties:

- Diagnose, localize, and troubleshoot malfunctions to specific electrical and electronic components, including solid-state and transistorized subsystems.
- Repair aircraft instrument systems.
- Apply principles of electricity, electronics, hydrostatic motion, pneumatics, and hydraulics applicable to repairing aircraft instrument systems.
- Clean, preserve, and store electrical and electronic components and aircraft instruments.
- Remove, install, service, repair, and troubleshoot nickel-cadmium batteries.

Armament Section

4-33. MOSs 68S, 68X, or 68Y personnel in this section maintain and service armament systems for attack helicopters. They perform the following duties:

- Ensure that weapons are rendered safe.

- Remove, install, disassemble, and assemble fire-control system electrical and electronic components and subsystems according to TMs, directives, and safety procedures.
- Set up boresighting procedures for aircraft fire-control systems.
- Perform maintenance on fire-control units, including alignment of weapons with associated sighting elements, electronic or mechanical devices.
- Perform authorized modifications to fire control and supporting systems.
- Check, remove, disassemble, repair, assemble, install, service, test, and adjust fire-control electrical and electronic systems and supporting armament components.
- Troubleshoot, isolate, and correct malfunctions in aircraft armament electrical and electronic components.
- Test, troubleshoot, and repair system-peculiar test sets and diagnostic equipment.
- Remove, disassemble, repair, assemble, install, test, and adjust mechanical, electrical, and hydraulic components of weapons systems according to directives, TMs, and safety procedures.
- Perform maintenance and authorized modifications on aircraft weapons components, including mechanical boresighting and alignment.
- Perform cleaning, servicing, ammunition loading and unloading, and weapons subsystems configuration changes.
- Set up boresighting procedures for aircraft weapon systems.
- Perform operational checks, including built-in tests on aircraft weapon systems.
- Troubleshoot weapon systems for mechanical, electrical, and hydraulic functions using system test sets and equipment.
- Diagnose, localize, and troubleshoot malfunctions to specific electrical and electronic components, including solid-state and transistorized subsystems.
- Repair aircraft instrument systems.
- Apply principles of electricity, electronics, hydrostatic motion, pneumatics, and hydraulics applicable to repairing aircraft instrument systems.
- Clean, preserve, and store electrical and electronic components and aircraft instruments.
- Remove, install, service, repair, and troubleshoot nickel-cadmium batteries.

Power Train Section

4-34. MOS 68D personnel in this section repair and maintain power train and rotor systems. They perform the following duties:

- Remove and replace power train quills, transmissions adapting parts, and rotary-wing hub oil tanks.
- Disassemble friction dampers and hanger assemblies.
- Disassemble, repair, reassemble, and adjust power train components, systems, and subsystems according to TMs, directives, and safety procedures.
- Apply corrosion preventive procedures.
- Clean, preserve, and store power train components.
- Disassemble, repair, reassemble, balance, and align main and tail rotor hub assemblies.
- Perform all required nondestructive inspections on selected aircraft components and related items.

AVIATION UNIT MAINTENANCE RESPONSIBILITIES

4-35. Any Army aviation unit authorized to perform unit maintenance is responsible for keeping its aircraft mission-capable. Such maintenance is usually done by the aircraft crew chief, with the assistance of the AVUM company's or platoon's aircraft maintenance, armament, aviation electronics, and aircraft component repair sections.

PREVENTIVE MAINTENANCE

4-36. Preventive maintenance is the first priority of AVUM units. The prime mission will be replacing parts and assemblies and making minor repairs, as authorized by the pertinent MAC. To attain high aircraft availability, all aviation logisticians should ensure that aircraft not flying are undergoing maintenance. They also ensure the following:

- When the aircraft is shut down, it is serviced immediately for fuel and oil.
- Maintenance personnel diagnose a suspected problem before the crew shuts down. This will save numerous man-hours.
- The pilot and crew chief perform a thorough postflight check or inspection according to the operator's manual (TM -10) and operator's and crew member's checklist (TM -CL).
- The crew chief checks the pilot's remarks on DA Form 2408-13-1 for any faults found during flight and corrects them on the spot, if practicable.
- DA Form 2408-14-1 is checked for delayed faults that can be corrected during the available downtime.
- DA Form 2408-18 (Equipment Inspection List) is checked for any inspections or services that are due.
- A technical supply check is conducted to determine the status of parts on request.
- If DA Forms 2408-13-1, 2408-13-2 (Related Maintenance Actions Record), 2408-13-3, and 2408-14-1 contain no faults which can be corrected, the crew chief or repairer should use available time to visually inspect those parts of the aircraft likely to cause trouble. Faults are determined from aircraft maintenance manuals and

experience based on knowledge of the aircraft, existing mission, terrain, and climatic conditions.

- Careful inspection of the aircraft at every opportunity simplifies preventive maintenance. During downtime, the crew chief or repairer should determine when the next scheduled phase/periodic inspection is due. If it is within the inspection windows given in TM 1-1500-328-23, portions of the inspection that do not require teardown of a component may be completed. The aircraft, however, should remain available for flight on short notice.
- The crew chief is completely familiar with aircraft TMs and with TAMMS-A as described in DA Pam 738-751. The crew chief's ability, knowledge, and maintenance efforts are vital to the ongoing, mission-capable performance of the aircraft.

4-37. TM 1-1500-328-23 prescribes the authorized inspection procedures for individuals and activities operating and maintaining Army aircraft. It describes each type of inspection and prescribes the intervals at which they will be performed. These intervals should not be exceeded. Under unusual conditions of environment, utilization, mission, and so forth, the maintenance officer may increase the scope or frequency of inspections. The maintenance officer is not authorized to increase the interval between inspections or to decrease their scope except under emergency conditions by authority of the commanding officer.

COORDINATION OF AIRCRAFT SCHEDULING FOR MISSIONS

4-38. A close working relationship between maintenance, operations personnel, and flight company commanders is essential to aviation units. PC works with the flight company platoon leaders/sergeants, operations personnel, and flight company commanders to provide tail numbers of mission-capable aircraft to be used each day to complete assigned missions. PC may give block times (hours) to be flown on assigned aircraft and let the commander assign tail numbers to missions. The PC officer, operations personnel, and flight company commanders work together in resolving problems that arise in meeting daily mission requirements. Aircraft requiring BDAR may cause fluctuations in availability. Frequent updating, however, will help to smooth scheduling and ensure support of maneuver elements.

AVIATION INTERMEDIATE MAINTENANCE RESPONSIBILITIES

4-39. AVIM units are responsible for providing AVIM level maintenance as well as back-up AVUM maintenance and technical assistance on the proper procedures for performing preventive and unit maintenance during surge activity. The supported unit (AVUM) depends on the supporting unit (AVIM) for help as well as guidance in aviation maintenance matters.

COORDINATION

4-40. Close coordination between supported and supporting units will eliminate many problems and result in a smooth, well-organized maintenance operation. Supported units can help make the maintenance operation easier by correctly preparing maintenance requests and completing all unit maintenance before moving equipment to the supporting maintenance activity. Another way to expedite maintenance and provide AVIM-level training for unit personnel is to let the assigned crew chief accompany the aircraft to the

AVIM unit. The commanders of the supported unit and the supporting maintenance company should jointly determine requirements for maintenance and repair parts supply. They should establish a mutually acceptable schedule for turn-in of equipment to the supporting activity. If either commander foresees a possible deviation from the established plan, he should immediately inform the other so that necessary adjustments can be made. This procedure helps ensure that equipment is repaired and returned as fast as possible. It also enables—

- The supported unit commanders to better plan and manage unit maintenance.
- The supporting unit commanders to program and manage the support work load, anticipate repair parts requirements, and request assistance when needed.
- The supported unit commanders to predict more accurately the availability of operational equipment over a sustained period.

TIME LIMITATIONS

4-41. The extent of maintenance performed on specific items is often restricted by time limitations. Limitations are normally stated in number of days allowed to repair a certain item and are subject to fluctuation. Availability of repair parts and shop workloads are considerations in determining whether time limitations will be exceeded. Various headquarters may establish time repair limitations for their units based on local conditions and on TB 43-0002-3.

MAN-HOURS

4-42. Criteria have been established governing inspection and classification of material to determine man-hour maintenance requirements. Maintenance man-hour limitations are in TB 43-0002-3, in other TBs developed by the FSC group for end items and selected repair parts and assemblies, and in pertinent SBs dealing with repair and serviceability criteria. Maintenance standards are also in technical publications pertinent to the items of equipment involved.

4-43. Before an unserviceable item is repaired, a classification inspection may be made to determine maintenance man-hour reparability. The service life of the aircraft or component must be considered (how many hours left before rebuild). If repair man-hours exceed maintenance man-hour limitations, the unserviceable item is cannibalized (only AMCOM can authorize cannibalization) or disposed of, unless circumstances or local policy dictates otherwise. In some cases, the critical need for the item and the difficulty of replacing it may dictate repair, regardless of the man-hours required. Component service life is addressed in the overhaul and retirement schedule of the applicable aircraft maintenance manual.

4-44. The classification inspection should not be confused with the initial technical inspection. Classification inspections are not made when the material is obviously repairable. They are made when the preliminary diagnosis or the initial inspection indicates that the number of repair man-hours is likely to exceed repair limits. For additional details on man-hour determination and application of repair limits, refer to AR 750-1.

SHOP OPERATIONS

4-45. The term maintenance shop in an AVIM company is all-inclusive. All company facilities used directly in controlling and maintaining aircraft are located in the maintenance shop. Platoons and sections in the shop are needed to operate GSE, maintain ORF equipment, repair unserviceable equipment, evaluate the quality of work performed, and administer, plan, and control the maintenance work load.

WEIGHT AND BALANCE

4-46. The unit's weight and balance technician (on unit orders) is responsible for maintaining the aircraft's weight and balance records. Technical inspectors must coordinate with the technician any time maintenance performed on an aircraft could change its weight and balance. Refer to AR 95-1, TM 55-1500-342-23, the aircraft operator's manual, and the aircraft maintenance manual for information. Specific weight and balance data are contained in the -10 operator's manual for each aircraft. The unit's organic aircraft weighing equipment must be calibrated according to TM 55-1500-342-23 and TB 43-180.

AVIATION INTERMEDIATE MAINTENANCE PRODUCTION METHODS

4-47. In an AVIM shop, the production methods include bay shop or dock (job shop) and bench shop repair. The type of material to be repaired, the personnel, the facilities, and the time available determine the type of production method.

Bay Shops or Docks

4-48. This production method is used when various jobs are performed in the shop or when the item being repaired is difficult to move. In bay shop operations, the aircraft to be repaired remains in one shop location until the work is completed. The personnel and facilities needed to do the work move to the equipment. In a modified bay shop or dock operation, the equipment to be repaired is moved from one section to another at irregular intervals until the work is completed. Assemblies, components, and items of on-equipment material may be removed from an end item in a bay shop and sent to other shops, such as the electrical shop, for repair.

Bench Shops

4-49. These shops are used for repairing small items whose repair requires high technical skills and items whose repair requires the use of equipment mounted in a shop or vehicle. Work performed at stands or benches under maintenance shelters or within shop vehicles is considered to be bench shop repair. Items repaired by this method include aircraft components and assemblies, instruments, fuel and electrical system components, electric motors, and communications-electronics items that must be repaired under controlled conditions.

OPERATIONAL READINESS FLOAT AIRCRAFT

4-50. The purpose of having ORF aircraft is to replace unserviceable aircraft that cannot be readily repaired in response to the user's needs. If ORF aircraft are authorized the AVIM will maintain them. They will be issued to MACOMs and maintained at corps- or division-level AVIM units. Specially equipped and special-mission aircraft will not be floated, but will be repaired for return to the user. ORF aircraft will be exchanged on an item-for-item basis within the basic mission, design, and series. Property accountability will be maintained per AR 710-2 and AR 750-1. The equipment not included on the aircraft BIIL is maintained by separate accountability. TOE weapons systems and COMSEC equipment will be removed before exchange.

4-51. The MACOM commander will establish criteria for providing an ORF aircraft to a unit. The aircraft involved in operational plans for which identical mission, design, and series exchanges are not available will not be exchanged for ORF aircraft; they will be repaired on a return-to-user basis.

SECTION III – AIRCRAFT MAINTENANCE

SCHEDULED AIRCRAFT MAINTENANCE

4-52. Scheduled aircraft maintenance includes PMCS, which cover inspections, services, testing, classification, and special scheduled inspections. The primary objective of performing maintenance on Army aircraft under the preventive maintenance system is to predict, prevent, detect, and correct maintenance problems before they happen. AVUM units perform most scheduled inspections under the preventive maintenance system, although some are performed at the AVIM level. With these inspections, equipment is systematically examined at predetermined intervals. The intervals are usually specified in aircraft flight hours.

4-53. Several types of inspection methods are used on Army aircraft. These methods include phase maintenance, progressive phase maintenance, combat phase maintenance, periodic, and combat periodic inspections. Most Army aircraft are also subject to special recurring inspections. All of these methods fall under the aircraft preventive maintenance system. (See TM 1-1500-328-23 for specific details on the preventive maintenance system.)

PHASE MAINTENANCE INSPECTION METHOD

4-54. The phase maintenance inspection method is the most used maintenance inspection system. The two elements included in this method are the phase maintenance inspection and the preventive maintenance daily or preventive maintenance service.

Phase Maintenance Inspection

4-55. The PM inspection is a thorough inspection, which includes partial disassembly of the aircraft. Each phase inspection is a part of a total phase cycle, and each phase maintenance inspection cycle is a major scheduled maintenance service. During each PM cycle, all parts and systems of the aircraft requiring evaluation are inspected at least once. When all numbered phase inspections are done, a cycle is completed and the sequence is repeated. Examples of phase maintenance inspection cycles are shown in Table 4-1. (See the applicable TM for current cycles.)

Preventive Maintenance Daily/Preventive Maintenance Service

4-56. The PMD is a daily inspection, which ensures continuing safe operation of aircraft through visual and operational checks. The crew chief makes the inspection after the last flight of the mission day or before the first flight of the next mission day. Keeping aircraft in a fully mission-ready status is extremely important. To that end, the crew chief should make the inspection as soon as practicable after the flight crew makes its postflight inspection. A daily inspection must be performed on aircraft under this system that have not flown in a specified number of days. The number of days specified varies with different aircraft. The exact interval for such inspections is found in the applicable -23 TM. The removal of cowling and inspection plates should be

Table 4-1. Examples of PM/PE/PPM Inspection Times

TYPE OF AIRCRAFT	NUMBER OF PHASES PER CYCLE	TIME BETWEEN PHASES (FLIGHT HOURS)	TOTAL TIME OF CYCLE
AH-1E/F/P/S	4	150	600
AH-64	4	250	1,000
CH-47	4	200	800
UH-1H/V	6	150	900
OH-58A/C	4	300	1,200
OH-58D	THIS AIRCRAFT IS ON THE PPM INSPECTION SYSTEM		
UH-60	THIS AIRCRAFT IS ON A 500-HOUR PE INSPECTION SYSTEM		

minimal. Disassembly of components is not recommended unless faults found during the inspection make it necessary. The daily inspection includes checking for obvious damage, security of equipment installation and mountings, leaks, compliance with lubrication requirements, completeness of equipment, equipment operation, and availability of current forms. Aircraft are not considered air-worthy until this inspection is completed and noted on DA Form 2408-13-1.

4-57. A PMS inspection is similar to a PMD inspection. Instead of being due after the last flight of the mission day, this inspection is due when a specified number of flight hours or calendar days elapses. The complete requirements for this inspection are in the applicable aircraft TM.

PROGRESSIVE PHASE MAINTENANCE METHOD

4-58. The PPM is a scheduled maintenance system that consolidates and replaces daily, phase, and special inspections. Its purpose is to minimize inspection requirements for increased mission flexibility and aircraft availability. Aircraft checklist inspection requirements are distributed into equalized checklist sections, which together constitute a complete PPM cycle. Specifics of checklist use, completion, and disposition are in the applicable aircraft PPM TMs. An automated aircraft maintenance management system complements the effectiveness of PPM. (See TM 1-1500-328-23 for a more detailed discussion of PPM)

PERIODIC MAINTENANCE METHOD

4-59. The two elements included under the PE inspection method are the PMS-1 and the PMS-2. (Do not confuse these with the PMS of the phase maintenance method.)

Preventive Maintenance Service-1

4-60. The PMS-1 is a 10-hour/14-day inspection like the preventive maintenance daily of the phase maintenance method. It entails a visual inspection with some operational checks. The aircraft is not disassembled, although some inspection panels and screens are removed. The primary difference between the PMS-1 and a PMD is when the inspection is due. A PMS-1 is completed after completion of 10 flight hours or 14 days (which ever comes first).

Preventive Maintenance Service-2

4-61. The PMS-2 is a thorough inspection of the aircraft like the phase maintenance inspection. It requires some disassembly of the aircraft. Unlike the phase maintenance inspection, the inspection requirements of the PMS-2 stay the same each time.

COMBAT PHASE MAINTENANCE OR COMBAT PERIODIC INSPECTION

4-62. During combat operations, the unit commander has the option of completing a CPM or CPE inspection instead of a standard PM/PE inspection. The combat phase maintenance inspection requirements are considered the minimum requirements to ensure continued safe combat operation. Under no circumstances will two combat phases be performed consecutively. They will be performed according to TM 1-1500-328-23.

SPECIAL RECURRING INSPECTIONS

4-63. Special recurring inspections occur at specific aircraft hours and/or calendar dates. Items such as safety belts, first aid kits, weight and balance records, and aircraft inventories are included in this category. Also included are specific inspections on aircraft engines based solely on engine-operating time. These special inspections become due at the time or date specified in the applicable aircraft -23 TM. They are written up as due and signed off on a DA Form 2408-13-1. After completion, the DA Form 2408-18 in the individual aircraft logbook is updated with the next due time or date.

UNSCHEDULED AIRCRAFT MAINTENANCE

4-64. Unscheduled aircraft maintenance includes unscheduled special inspections and unforeseen work requirements.

UNSCHEDULED SPECIAL INSPECTIONS

4-65. These inspections are required due to specific incidents such as hard landings, overspeeds, sudden stoppage, ASAM, or SOF messages. These special inspections are required by the aircraft -23 TM or by TWX notification. Normally, these inspections ground an aircraft and must be performed before the next flight or before a specific date or aircraft time.

UNFORESEEN WORK REQUIREMENTS

4-66. These requirements are due to specific incidents or conditions such as in-flight system malfunctions, premature material failure, and additional or unexpected faults discovered during scheduled inspections. These requirements represent a major portion of the maintenance workload. When planning a maintenance task, the maintenance officer and PC personnel must realize that these requirements are difficult to control. Flexibility in response is the key to achieving unforeseen requirements effectively.

TENETS OF PHASE AND/OR PERIODIC INSPECTIONS

PLANNING

4-67. The AVUM PC officer determines which aircraft will be scheduled into phase next. He establishes a workflow based on known phase/periodic maintenance inspection tasks at about 30 flying hours in advance and identifies tasks requiring resources. This lead-time may be longer or shorter depending on the flying hour program and combat operations. He must therefore develop an organized method for planning and conducting each phase and periodic maintenance inspection to ensure equipment readiness.

4-68. During stabilized operations, with programmed flying hours, the AVUM PC officer must determine how many phase and periodic inspections must be performed each year. To do this, he divides the unit's annual FHP for each specific type of aircraft assigned by the aircraft phases or periodic inspection interval. Example: UH-60 FHP = 6,000. 6,000 divided by 500 equals 12 periodic inspections. Without preplanning, simple tasks can delay availability. The following factors normally contribute to long phase maintenance inspection cycles:

- Deferred maintenance. AVUM units often postpone time-consuming minor repairs until phase. For example, they defer sheet metal repairs that are not critical to flight safety. While there is no hard, fast rule as to which deferred maintenance should be done during phase, work should be accomplished to make the best use of facilities and personnel.
- Non-related duties. Crew chiefs and repairers must maintain proficiency in common and collective soldier tasks. They may also get tasked for guard duty or other details.
- Fault detection. Inspection faults (corrosion, a crack in the airframe, worn parts, play in rod end bearings, and so forth) take time to repair or replace. If not discovered until the final inspection, they could cause unanticipated delays.
- Supply delays. Delay of requisitioned parts produces unwarranted supply delays and unacceptably low readiness levels.
- Scheduling. Problems of resource scheduling vary in kind and severity, depending on METT-TC and the organizational setting. In some cases, just one key resource (over-head hoist or a test set) may bottleneck a phase inspection. At the other extreme, completing deferred maintenance may require many resources, most of which are available in fixed, limited amounts. Scheduling activities so that resource availability is not exceeded and priorities are not violated is exceedingly difficult for most PM/PE inspections.
- Resources. The AVUM PC officer should make advance arrangements for all required resources for the phase maintenance inspection. Such resources include MOS 67 or 68 repairers, technical inspector, facilities, components, test equipment, and GSE. Items not on hand should be hand-receipted from the supporting AVIM unit as necessary, or prior arrangements should be made for concurrent AVUM/AVIM support to perform phase maintenance inspection.

PREPARATION

4-69. After prephase test flight is performed, the following must be done regardless of the maintenance level performing the test flight:

- Take component oil samples.
- Flush engine.
- Remove all articles from interior of aircraft to include mission equipment, passenger seats, manuals, and soundproofing.
- Clean aircraft.
- Complete an inventory to ensure accountability of equipment.

4-70. The aircraft is now ready for phase inspection. The PC officer should ensure all necessary tests and GSE are available.

COORDINATION

4-71. Internal coordination between PC, QC, shops, tech supply, the aircraft crewchief, and the phase team is crucial to ensure a smooth work flow during a phase inspection. PC must coordinate any external support required.

PERSONNEL

4-72. The general concept is for crew chiefs assigned to specific aircraft to perform daily servicing, daily inspections, and some remove-and-replace, on-aircraft repairs. A maintenance element within the AVUM organization does phase maintenance and other more time-consuming operator-level repairs. Normally the phase team leader is in charge of the repairers. There may be times, however, when the crew chief has the most experience and, depending on the circumstances, is the best person to take charge. The size of each phase inspection team varies depending on the following:

- Complexity of deferred maintenance.
- Time-change component replacement due.
- Equipment location.
- Facility availability.
- Tools and diagnostic equipment required.
- Special equipment package needs. (See Appendix G.)

4-73. Subsystems repair personnel must be scheduled for optimum use. During the phase maintenance inspection, MOS 68 repairers complete separate work requests. A TI should be assigned as the phase TI and inspects repairs while work is in progress.

WORKLOAD OPTIONS

4-74. When a phase maintenance inspection falls behind, the following options are available to help remedy the situation:

- Evaluate resources available (people, parts, tools, and time); adjust them accordingly.
- Seek help. The supporting AVIM company can augment unit maintenance personnel during surge activity. AVIM repairers can perform inspection, repair, and replacement operations at the AVUM location. Borrowing AVIM personnel to perform AVUM-level work, however, may cause a backlog of the AVIM workload.

- Reduce nonproductive time. Exempt phase team members from other duties during the inspection. Reduce maintenance distracters such as equipment shortages or insufficient publications.
- Extend hours of operation. This may include establishing a night shift.
- Reduce the mission load. Slow daily missions to allow time for corrective maintenance. This is often done after major exercises involving extensive aircraft flying.
- Perform a combat phase maintenance inspection during combat operations.

ORGANIZED APPROACH

4-75. The PM/PE inspection should be completed in a systematic matter. This includes an initial inspection, in-progress inspections, and a final inspection.

Initial Inspection

4-76. Only those panels/components necessary to complete the inspection should be removed. The crew chief and/or maintenance personnel inspect the entire aircraft, using the current phase checklist, and enter all faults identified in the phase book. This process may take several hours or days to complete, after which fault correction begins. Panels are replaced after the inspection is completed. In the event of a discrepancy requiring repair or replacement, a technical inspection is required. If any discrepancy requires a repair part not on hand, the part should be ordered immediately.

In-Progress Inspections

4-77. During the phase, work requiring technical inspections should be inspected as soon as practical following work completion. Deferring in-progress inspections until the end of the PM/PE inspection can result in delays. Discrepancies are often discovered that require unavailable parts or components to be removed for repair.

Final Inspection

4-78. Once the phase is completed, a final inspection will be performed. When the final inspection is complete, the logbook is closed out, historical records updated, and the aircraft made ready for operational checks and test flight. If possible, the same test pilot that performed the prephase test flight should perform the postphase test flight.

SECTION IV – REPORTS AND ESTIMATES

REPORTS

4-79. Maintenance reports provide information for identifying readiness deficiencies, fixing those deficiencies, and sustaining readiness improvement.

LOCAL UNIT DAILY AIRCRAFT STATUS REPORT

4-80. The unit daily aircraft status report is a locally designed and produced work sheet intended to serve several functions. First, the PC officer may use the report to determine daily work priorities by identifying aircraft on red-X status and other critical requirements such as part shortages or time constraints. Second, PC personnel may use the report for information, together with the PM/PE inspection flowchart, to provide aircraft for missions and to plan inspection schedules. In addition, the PC officer will use the report as a means of informing the unit commander and higher headquarters of aircraft status on a daily basis and as a summary source for completing DA Form 1352-1 (Daily Aircraft Status Record).

4-81. Procedures for completing the unit daily aircraft status report vary from unit to unit. The key factor in making it a useful management tool is that the report contain only timely information needed for making decisions. See Figure 4-1 for a sample of a typical unit daily aircraft status report.

DAILY AIRCRAFT STATUS REPORT
DATE 12 Mar 99 PLATOON 2nd

ACFT TAIL NUMBER	TOTAL ACFT HRS	STATUS	HRS TO SERVICE	HRS TO PHASE	
878	1998	X	—	—	PMS 2 66% COMPLETE
973	1345	/	5	155	
975	1509	/	14	491	
278	1227	⊗	23	273	REST FROM NIGHT FLIGHT
073	1866	/	9	134	

SAMPLE

Figure 4-1. Sample Daily Aircraft Status Report

AIRCRAFT MATERIAL READINESS REPORT

4-82. Units using the ULLS-A system use the management tools and the AMSS of ULLS-A for tracking aircraft status and monthly reporting of operational data. Organizations and activities not using ULLS-A will record daily aircraft status and flying time on DA Form 1352-1. At the end of the reporting period, totals on DA Form 1352-1 for assigned aircraft will be transferred to DA Form 1352 (Army Aircraft Inventory, Status and Flying Time). The monthly reporting period is from the 16th of each month through the 15th of the following month. Most units will forward completed DA Form 1352 through local command channels. Detailed procedures for preparing DA Forms 1352 and 1352-1 are in AR 700-138.

4-83. The general objective of aircraft readiness is to achieve a 75-percent FMC goal at all times. There is, however, a wide divergence in complexity and logistic supportability of aircraft systems by MDS and by priorities given to units. Therefore, certain readiness goals are not prescribed at 75-percent FMC. Normally, PMC time should not exceed 5 percent for any aircraft system. Commanders must make every effort to meet FMC goals shown in Table 3-3, AR 700-138.

MISSILE MATERIAL READINESS REPORT

4-84. Units owning tactical missile systems and subsystems, such as HELLFIRE or TOW, must record material condition status daily on these items to ensure maximum system readiness. Units will prepare DA Form 3266-2-R (Missile Material Condition Status Report Worksheet [LRA]) for systems having NMC time during each reporting period. The daily missile material condition status report work sheet is used to track missile system NMC time and prepare DA Form 3266-1 (Army Missile Material Readiness Report) at the end of the report period. Detailed procedures for preparing missile status forms are in Chapter 4, AR 700-138.

ESTIMATES

4-85. Performance estimates aid in planning to meet future maintenance requirements. The maintenance officer must be able to project unit man-hour availability to determine maintenance capability. To do this, he must make valid approximations based on past performance. By using the following tracking systems, programs, and computations, the maintenance officer can make sound estimates.

UNIT MANPOWER

4-86. One of the most significant areas that a unit maintenance manager at all levels faces is use of manpower. Maintenance managers must devise a simple yet informative means of tracking unit manpower with minimum assistance. Figure 4-2 shows one way that management personnel can track unit man-hours. Table 4-2 shows computation formulas for man-hours.

NAME:________________ MAN HOUR DATA SHEET SEC/DIV/DIR:_______

MONTH/YEAR:__________ SECTION I PRODUCTIVE TIME (DATE) DUTY POS:_______

TASK (REG TIME/OT)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
TOTAL PT															
SECTION II - NON PRODUCTIVE TIME															
1. ANNUAL LEAVE															
2. SICK/QTR/HOSP															
3. TDY (NONMISSION)															
4. MIL TNG / DETAIL															
5. OTHER															
6.															
7.															
TOTAL PT															

SECTION I - PRODUCTION TIME (CONTINUED) (DATE)

TASK #	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTAL REG	TOTAL O/T
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
TOTAL																		
SECTION II - NONPRODUCTIVE TIME (CONTINUED)																		
1. AL																		
2. SL																		
3. TDY																		
4. TNG																		
5. OTHER																		
6.																		
7.																		
TOTAL																		

SECTION III - PERSONNEL WRAP UP AS OF: PER CAT: CLK/ PROF/ SUPR/

ASSIGNED: OFF/ WO/ ENL/ CIV/ TOTAL OTHER: OFF/ WO/ ENL/ CIV/ TOTAL

SAMPLE

Figure 4-2. Sample Form for Tracking Unit Man-Hours

Table 4-2. Computation Formulas

ASSIGNED MAN-HOURS

A x H x D = assigned man-hours

A = Assigned personnel in one MOS
H = Hours in the duty day
D = Duty days in a given period (week, month, etc.)

CATEGORIES OF MAN-HOURS

Direct productive + indirect productive + nonproductive available + nonproductive nonavailable = assigned man-hours

UNIT EFFICIENCY

$$\frac{\text{Indirect productive man-hours}}{\text{Direct productive man-hours}} = \text{unit efficiency}$$

DIRECT PRODUCTIVITY

$$\frac{\text{Direct productive man-hours}}{\text{Assigned man-hours}} = \text{direct productivity}$$

PRODUCTIVE EFFECTIVENESS

$$\frac{\text{Direct productive man-hours}}{\text{Available man-hours}} = \text{productive effectiveness}$$

MAN-HOUR CAPABILITY

A x H x D x P x E = C

A = Assigned personnel in one MOS
H = Hours in the duty day
D = Duty days in a given period (week, month, etc.)
P = Percentage of time personnel are available
(available man-hours as a percentage of assigned man-hours)
E = Percentage of productive effectiveness
C = Capability

ASSIGNED MAN-HOURS

4-87. Assigned man-hours equal the number of people on the unit strength report in a single MOS times the number of hours in the duty day times the number of days in a given period (normally, 5 days per week or 22 days per month). Assigned man-hours exclude supervisory personnel. The total number of assigned man-hours can be broken down into one or more of four categories—direct productive, indirect productive, nonproductive available, and nonproductive nonavailable.

Direct Productive

4-88. These are man-hours used on one or more of the direct productive maintenance tasks for maintenance of an item of equipment, sometimes referred to as wrench-turning time or hands-on time. Hands-on time also includes productive time expenditure that can be identified and assessed either against a particular work unit, workload factor, or against a group of products without undue effort or expense.

Indirect Productive

4-89. These are man-hours used for the normal performance of maintenance tasks. They do not add to the total time required to complete any one direct productive task. Examples are maintenance of tools and equipment, requisitioning replacement bench stock, and hangar and flight line FOD checks. These man-hours cannot be credited against a particular work unit without undue effort or expense.

Nonproductive Available

4-90. These man-hours are available for productive work but are used in other than primary MOS duties. Examples are details, security, and special duty. These man-hours could be redirected to productive work.

Nonproductive Nonavailable

4-91. These man-hours are assigned to a unit but are not available. This time is commonly called absent time. Examples are personnel who are on leave, TDY, or AWOL. These man-hours are part of a unit's assigned man-hours, but they cannot be redirected to productive work.

DIRECT PRODUCTIVITY

4-92. When direct productivity is computed, the direct productive man-hours are measured against the total assigned man-hours. This must be done within a given MOS. Do not mix 67-series and 68-series personnel together. Likewise, do not mix one 68-series MOS with another 68-series MOS. It is important to remember that supervisory personnel are not counted when computing man-hours.

PRODUCTIVE EFFECTIVENESS

4-93. To more accurately portray the effectiveness of those available for work, subtract the nonproductive, nonavailable, or absent time from the assigned man-hours. The resulting figure is called available man-hours. When available man-hours are computed against direct productive man-hours, a more accurate picture of unit effectiveness results.

4-94. The percent of direct productivity indicates the productivity of assigned workers, while the percent of productive effectiveness indicates the productivity of those available for work.

FLYING-HOUR PROGRAM

4-95. The Department of the Army has developed a worldwide flying-hour program for preparing budgets and planning aircraft logistics support. To estimate the number of maintenance man-hours needed to support your unit's flying hour program, use the following formulas:

Maintenance Man-Hour-to-Flight-Hour Ratio

4-96. In AR 71-32, the given number of direct man-hours required to support one hour of flying represents a worldwide average. To get an accurate number of required maintenance man-hours, each unit must compute its man-hour-to-flying-hour ratio by using the man-hours expended and hours flown by the unit. By dividing the total direct productive man-hours expended by the total hours flown (over the same period of time), each unit can determine its man-hour-to-flight-hour ratio. The figure for hours flown can be taken from the unit's monthly Army aircraft inventory, status, and flying-time report (DA Form 1352/AMSS Report). Direct productive man-hours must be accounted for by whatever data collecting means the unit devises.

Monthly Maintenance Man-Hour Requirement

4-97. To determine the number of maintenance man-hours needed to support a given flying-hour program, multiply the number of aircraft by MDS times the average monthly flying-hour rate per aircraft times the man-hour-to-flight-hour ratio. This will determine requirements, based on past performance, for one month. If the flying-hour program is for more than one month, multiply that figure times the number of months. It is imperative to use like periods of time due to seasonal flying requirements. For example, don't use man-hours expended during the winter when computing a summer flight program. In addition, man-hours expended in the field will differ from those expended in garrison or at a fixed facility.

MAINTENANCE MAN-HOUR CAPABILITY

4-98. To compute a unit's capability, use the following steps. First, compute the assigned man-hours for a given period of time. Second, factor out absent time to obtain available man-hours. Third, multiply available man-hours by the percent of productive effectiveness to obtain the number of direct productive man-hours for the given period.

4-99. With both man-hour requirement and man-capability computed, the requirement should be subtracted from the capability. If the result is a negative number, the number of additional personnel needed to meet the requirement under present conditions can be computed, using the following steps. First, divide the number of workers into the capability to obtain the capability of one individual. Second, divide the capability of one individual into the deficit obtained by subtracting the total requirement from the total capability. The result will be the number of personnel needed to meet the requirement under present conditions. If the number is not a whole number, round it up (example: 15.2 = 16 personnel).

4-100. When the capability and the maintenance man-hour-to-flying-hour ratio are known, divide the capability by the man-hour-to-flying-hour ratio for the number of flying hours that can be supported. When given a flying-hour program, the unit will find that comparing requirements against capability will result in a surplus or a deficit man-hour situation.

4-101. If a man-hour deficit is revealed and additional personnel cannot be obtained, the maintenance officer has certain options with which to correct the deficit:

- Defer minor maintenance.
- Consolidate maintenance resources (personnel, equipment, facilities).
- Reduce nonproductive time of assigned maintenance personnel.
- Obtain maintenance assistance from other available sources.
- Consolidate missions to limit the number of flights.

- Schedule flights to provide more time for maintenance between flights.
- Use maintenance operational readiness float aircraft when appropriate.
- Increase work schedule.
- Increase personnel to authorized strength or request an overstrength.
- Schedule maintenance stand-downs.