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**Army Aviation Maintenance**

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**OCTOBER 2020**

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# Army Aviation Maintenance

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# Preface

Army Techniques Publication (ATP) 3-04.7 provides techniques concerning aviation maintenance operations from aviation brigade to platoon level. The primary focus of this ATP involves performing maintenance, across the aviation brigade, within an aviation maintenance company (AMC) and aviation support company (ASC). It also includes information for sustainment-enabling organizations at echelons above brigade across the Army sustainment enterprise.

The principle audience for ATP 3-04.7 are commanders, maintenance leaders, officers, noncommissioned officers (NCOs), maintenance technicians, and maintenance trainers.

Commanders, staff, and subordinates ensure their decisions and actions comply with applicable United States, international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure their Soldiers operate according to the Law of War and the rules of engagement. (Field Manual [FM] 6-27/MCTP 11-10C)

The term 'aircraft' refers to all Army aircraft types (rotary wing [RW] aircraft, fixed-wing [FW] aircraft, and unmanned aircraft systems [UAS]); unless a specific aircraft has been identified in this publication. The terms combat aviation brigade (CAB) and AMC align with the Army's force design for Army Aviation. Terms and definitions for which this publication is the proponent publication are boldfaced in the text. For other definitions shown in the text, the term is italicized, and the number of the proponent publication follows the definition.

ATP 3-04.7 applies to all Active Army, Army National Guard/Army National Guard of the United States, United States Army Reserve, civilian, and contract maintenance personnel. Commanders must consider the contents of this document and the specific circumstances in which they find themselves (national military objectives, available forces, threat capabilities, and rules of engagements) when planning maintenance operations.

The proponent of ATP 3-04.7 is the United States Army Aviation Center of Excellence; the preparing agency is the Directorate of Training and Doctrine, United States Army Aviation Center of Excellence. Send comments and recommendations on Department of the Army (DA) Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Commander, United States Army Aviation Center of Excellence, ATTN: ATZQ-TDD, Fort Rucker, Alabama 36362-5263; by e-mail to [usarmyrucker.avnceo.mbx.doctrine-branch@mail.mil](mailto:usarmyrucker.avnceo.mbx.doctrine-branch@mail.mil); or submit an electronic DA Form 2028.

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# Introduction

ATP 3-04.7 provides techniques that shape the way Army Aviation conducts maintenance. Aviation maintainers must be able to execute maintenance operations in all environments to support operational requirements. During large-scale combat operations (LSCO), aviation maintenance practitioners must fully exploit opportunities while conducting expeditionary maintenance operations. This requires leaders to understand the organizational structure of support, as well as the strategic placement and availability of sustainment resources that further enables the regeneration of combat power.

Sustainment is critical for all aircraft platforms, systems, subsystems, and aviation ground support equipment. The failure of an operating aircraft system or subsystem resulting from improper maintenance procedures can result in catastrophic consequences to the Army's most valuable personnel and equipment resources. It is critical that leaders at all echelons schedule maintenance into the unit's training plan. This includes scheduled maintenance on aircraft and ground support equipment and encompasses the full spectrum of training to conduct maintenance operations safely. Whatever the training executed, aviation maintainers must adhere to the latest applicable aircraft technical manuals (TMs) and current references while conducting aircraft maintenance.

This ATP provides maintenance techniques that connect regulatory and pertinent doctrine guidance to practice and serves as the primary reference for effectively managing aviation maintenance.

ATP 3-04.7 contains nine chapters:

- Chapter 1 provides aviation maintenance fundamentals and considerations during LSCO and discusses aviation maintenance fundamentals leaders must know to establish a successful maintenance management program.
- Chapter 2 describes maintenance organizations and leadership roles and responsibilities in executing aviation maintenance operations from brigade to platoon level.
- Chapter 3 provides aviation maintenance techniques during aviation maintenance operations.
- Chapter 4 provides aviation maintenance techniques for production control operations.
- Chapter 5 provides aviation maintenance techniques for quality control operations.
- Chapter 6 provides information on equipment support programs.
- Chapter 7 provides information on automated management systems.
- Chapter 8 provides techniques on executing supply actions.
- Chapter 9 provides aviation maintenance techniques for airframe and component repair platoons.

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# Chapter 1

## Maintenance Fundamentals

*“Battlefield sustainment is both an art and a science; it’s ultimately about synchronizing, integrating and transporting commodities to provide maneuver commanders with the freedom of action, extended operational reach, and prolonged endurance”*

General Gustave Perna

Army Aviation is a critical member of the joint combined arms team. To ensure vital assets remain readily available to commanders during LSCO, a thorough understanding of Army sustainment is required to support the unit’s manned and unmanned maintenance programs. This means that a structured and well-synchronized aviation maintenance program is put in place to synchronize, track, and manage sustainment resources. This chapter addresses doctrinal guidance and sustainment fundamentals, and processes necessary for aviation units while conducting maintenance operations during LSCO.

### SECTION I – GENERAL

1-1. LSCO are inherently joint in terms of the scope and size of forces committed to conducting a campaign aimed at achieving operational and strategic objectives (Joint Publication [JP] 3-31). The shift from counterinsurgency operations to multi-domain operations during large-scale combat pose different challenges for aviation maintenance. Peer threats contest Army Aviation in all domains and phases of operations and impose a challenge more significant than anything the United States Army has faced since the end of the Cold War (FM 3-04). During LSCO, peer adversaries seek to interrupt the distribution of sustainment resources that are important in conducting maintenance operations necessary in extending the unit’s operational reach. It is imperative that sustainment and operational planners are nested early in planning so that leaders understand the sustainment resources available within the operational environment.

1-2. One of the biggest challenges for sustainment forces during LSCO is the fluidity of operational variables. Disruptions to Army Aviation maintenance operations can come from all domains—air, land, maritime, space, or cyber-space—resulting in an inability to immediately requisition a required part; propagate an increased requirement of troubleshooting and/or repairing systems and subsystems; or degrade the ability to receive other maintenance resources due to extended customer wait time impacts. Multidomain operations-related impacts occur during contested and non-contested operations. Units experience challenges evacuating equipment from one location to another to undergo repairs due to the time and distance requirements for air and ground movement operations and face challenges receiving items shipped via commercial air and vessels that are typically used to replenish petroleum, oil, and lubricates (POL). These situations challenge command and support relationships, disrupt distribution and support plans, and extend lines of communication. Leaders must remain responsive while developing contingency plans into the unit’s maintenance concept of support plan for instances when interruptions occur or is expected during maintenance operations. This is accomplished by incorporating the tenants outlined in the sustainment principles of integration, anticipation, responsiveness, simplicity, economy, survivability, continuity, and improvisation which are discussed in detail later in this chapter.

1-3. Units must anticipate additional requirements for maintenance resources such as sustainment information system requirements; aviation ground support equipment (AGSE); test, measurement, and diagnostic equipment (TMDE); and requirements across the classes of supply well in advance to mitigate impacts to the maintenance mission during LSCO. For example, if TMDE is transported via sea or other method with extended transport time, the calibration date may expire en route. A technique is to forecast the

desired usability time for equipment and tools during the initial sustainment planning phase to support operating for at least 90-120 days upon arrival. If mission essential TMDE expires prior to or immediately upon arrival into the unit's theater of operations, the support operations section consolidates and actions the requirement through the TMDE facility aligned to support the unit. This requirement creates maintenance challenges due to the required distance to transport equipment for support and the time it takes to receive it back to the unit once calibrated if the item is deemed mission critical. Additionally, aviation units may experience delays for high priority parts, even when expedited via commercial shipping, forcing units to improvise and use the fullest extent of its organic maintenance troubleshooting, fabrication, and repair capabilities. If there are projected requirements for repair parts based on environmental considerations the requirement must be a part of the initial sustainment planning considerations.

1-4. The chaotic nature of LSCO and the enormous strain it imposes on repairing, replacing, and troubleshooting requirements is further complicated due to dislocated and rapidly changing operational requirements. During LSCO, the enemy's employment of anti-access, area denial tactics could affect the usability of the unit's sustainment information systems as well as degrade or render inoperable important manned/unmanned aircraft systems. Sustainment information systems are enterprise resource planning systems that function across all levels of warfare (FM 4-0). With the modernization of the Army's information systems to make assets widely visible, a vulnerability exists that can be exploited by the enemy. As with any computer-based resource, these systems are susceptible to attacks using anti-satellite weapons or through anti-access, area denial actions. Sustainment information systems such as aircraft notebook and the Global Combat Support System-Army (GCSS-Army) that is used to requisition material experiences system degradation or a complete system failure during anti-satellite and anti-access, area denial attacks, thus further lengthening the maintenance repair turnaround time. Additionally, units experience an increase in the use of the aircraft's common missile warning system, such as chaff and flare dispenser employment, which is a capability that has not been employed in many years. This drives the requirement for an increase in areas such as capability related maintenance training, placing an added emphasis on munition forecasting, increasing skills in equipment/system troubleshooting and other aviation specific specialized maintenance requirements.

1-5. To prolong maintenance endurance of the operational unit, aviation commanders and staffs are required to plan and adhere to the principles of logistics contained in FM 4-0. These principles are—

- *Integration* is the process of combining all sustainment elements within the unit's operations to assure unity of effort throughout the command and synchronization of sustainment with operations across all levels of war (FM 4-0). This occurs by complementing and reinforcing maintenance efforts across the organization's footprint during the initial sustainment planning effort for things such as additional maintenance support required from the support company for scheduled/unscheduled maintenance support, AMC and forward support company forward arming and refueling points (FARPs) operation coordination, or any projected theater aviation sustainment maintenance group (TASMG) or regional aviation sustainment managers (RASM) requirements.
- *Anticipation* is the ability to forecast maintenance requirements and initiate necessary action to satisfy a response without waiting for operational orders or fragmentary orders (FM 4-0). Prior experience assists in anticipating maintenance and supply requirements. In anticipation of deployment into a known location, the sustainment staff and leaders forecast resources using prior experiences and a best judgment approach to increase sustainment resources to mitigate the risk of gaps in support.
- *Responsiveness* is the ability to react to changing requirements and respond to meet the need to maintain operational reach, freedom of action, and prolonged endurance (FM 4-0). A common operational picture (COP) facilitated by Army readiness common operating picture and other business intelligence tools associated with the Army's enterprise resource planning systems help facilitate responsiveness. Another option under this principle is that a commander may elect to deploy a field maintenance team (FMT) as far forward as the tactical situation allows to repair an aircraft for reinsertion back into the fight. Additionally, the supply system's accountable officer may initiate a request to ZDIRECT. A ZDIRECT is supply support activity (SSA) transaction; the ZDIRECT transaction identifies the specific SSA. The ZDIRECT transaction transfers a needed part to lessen the customer wait time from the source of supply.

- *Simplicity* relates to processes and procedures to minimize the complexity of sustainment. Unnecessary complexity of processes and procedures leads to confusion (FM 4-0). The simpler the processes and procedures are directly lends to effective and efficient practices. The unit's standard operating procedure (SOP) is the baseline that drives simplicity as it outlines processes and procedural expectations for the customer in areas such as supply and scheduled/unscheduled maintenance actions.
- *Economy* is providing sustainment resources in an efficient manner that enables the commander to employ all assets to the greatest effect possible (FM 4-0). Units that employ efficient management practices, discipline, prioritization, and allocation of resources execute the intent behind economy. The brigade aviation maintenance officer (BAMO), aviation maintenance officer (AMO), S-4, aviation support battalion (ASB) support operations officer (SPO), and production control OIC/NCOIC formulate the nucleus for the CAB's sustainment operations. These entities work together to provide the expertise needed in the efficient and proper utilization of the sustainment resources across the combat aviation brigade's footprint.
- *Survivability* is all aspects of protecting personnel, weapons, and supplies while simultaneously deceiving the enemy. Survivability consists of a quality or capability of military forces to avoid or withstand hostile actions or environmental conditions while retaining the ability to fulfill their primary mission (FM 4-0). Units select maintenance collection points, FARPs, and supply storage locations that provide the most advantageous concealment and protective conditions.
- *Continuity* is the uninterrupted provision of sustainment across all levels of war. Continuity is achieved through a system of integrated and focused networks linking sustainment to operations (FM 4-0). Continuity means that aviation leaders utilize the linked strategic-to-tactical sustainment organizations such as the United States Army Aviation and Missile Command (AMCOM), Army Communication-Electronics Command (CECOM), Defense Logistics Agency (DLA) distribution and integrated information systems to close the gap on sustainment requirements.
- *Improvisation* is the ability to adapt sustainment operations to unexpected situations or circumstances affecting a mission (FM 4-0). It includes creating, inventing, arranging, or fabricating resources to meet requirements. Aviation leaders improvise maintenance solutions through the fabrication of a needed item, through cross-training military occupational specialties in an effort to augment low density specialties, and through other efforts that sustain the force in austere environments. During LSCO, aviation leaders must use improvisation by exploiting all available air and ground resources to accomplish the mission.

1-6. It is extremely important for leaders to establish redundant systems in case the unit's sustainment information systems are denied, degraded, or disrupted. Support nodes and assembly areas are vulnerable to precision long-range fires and improvised explosive devices making it important to exercise alternate methods of reporting such as via radio, telephone, messenger, or through hard-copy methods (FM 4-0). FM 6-99 includes information on standardized reports in the instance of extended periods of degradation to a unit's sustainment information systems. Additionally, to prepare for LSCO and instances of expected degraded operations, maintainers continuously increase their requisite critical skills as contained in their individual critical task list and through the integration of Training Circular (TC) 3-04.71. The Aviation Maintenance Training Program (AMTP) is a program that standardizes aviation maintenance across the Army, Army Reserve, and National Guard to promote predictability and builds the knowledge base needed to provide maintenance excellence and skills through a progressive, cumulative, and regulatory training path that professionally develops maintainers' skills and understanding of their craft (TC 3-04.71). During LSCO, trained and proficient maintainers are vital while conducting operations in austere locations, under degraded conditions.

## SECTION II – TWO-LEVEL MAINTENANCE

1-7. The primary purpose of Army Aviation maintenance is to ensure readiness of aviation equipment. This includes aircraft, weapon systems, subcomponents, and support equipment. The Army utilizes a tiered two-level maintenance strategy comprised of field and sustainment maintenance. It is important that leaders, maintenance personnel, and planners fully understand the maintenance fundamentals in order to properly plan and execute maintenance operations. The intent of two-level maintenance is to provide the tactical formation with maintenance capabilities that are needed most to respond rapidly to current, emerging, or

expected requirements. Figure 1-1 depicts the two-level maintenance support relationships for field and sustainment maintenance.

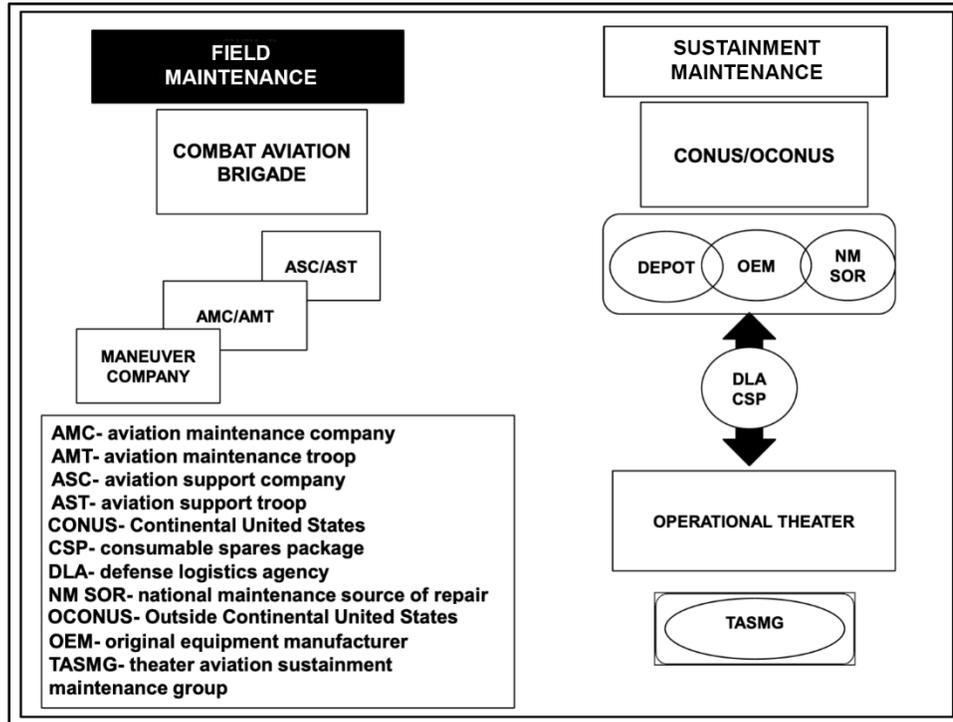


Figure 1-1. Army Aviation two-level maintenance support relationships

## FIELD MAINTENANCE

1-8. Aviation school trained maintainers perform field-level maintenance utilizing the unit's assigned tools and test equipment. Aviation maintenance companies provide scheduled and unscheduled maintenance support to aviation maneuver companies. The ASC is the pass-back maintenance support for requirements above the capacity and/or capability (personnel and equipment) posture for all supported AMCs.

1-9. The AMC and support company authorization to perform field-level maintenance involves use of the source maintenance and recoverability code and maintenance allocation chart. Specific tasks occur based on the modified table of organization and equipment set, kits, outfits, and tools assigned to the command and the availability of qualified personnel being on hand to perform the required task.

1-10. Aviation school trained Soldiers or contracted maintenance personnel perform field-level maintenance in UAS units. UAS maintenance personnel perform authorized maintenance procedures within their capability. Original equipment manufacturer representatives may provide contractor logistics support. If the product support strategy calls for contractor logistics support, these elements generally co-locate in the brigade support area along with the ASB. Depot or forward repair activities generally perform sustainment maintenance beyond unit-level repair. See Army Regulation (AR) 750-1 and ATP 4-33 for more information on field maintenance.

## SUSTAINMENT MAINTENANCE

1-11. Sustainment maintenance is an off-system component or end item repair that returns the item back to the supply system upon completion. These repairs are performed by national-level maintenance providers unless the owning unit is granted an exception. Sustainment maintenance consists of maintenance functions originally executed by general support and designated depot level support organization. Sustainment maintenance is a part of the national maintenance program (NMP). Sustainment maintenance managers ensure the maintenance system supports and sustains theater forces down to the individual Soldier. Aviation

maintainers continue to conduct limited repair forward within the ASB, returning repaired components to the customer for replenishment of the units' authorized stock. See ATP 4-33 for more information on two-level maintenance.

1-12. Sustainment maintenance support is divided and primarily performed by three separate entities: original equipment manufacturers and their contractor field service representatives (CFSRs), Army sustainment facilities located at fixed bases in the Continental United States, and the NMP source of repair. Army Doctrinal Publication (ADP) 4-0 defines sustainment maintenance as the Army strategic support. The strategic support base is the foundation of the NMP and the sustainment maintenance system.

1-13. Sustainment maintenance supports the supply system by economically repairing or overhauling components through the subcategories of below depot-level sustainment maintenance and depot-level sustainment maintenance. In special circumstances (normally caused by the lack of repair parts or components in the supply pipeline), the CAB may obtain a specialized repair authorization, one-time repair, or aircraft repair authorization. This authorization, requested through the AMCOM logistics assistance representative (LAR), enables the CAB to perform limited sustainment-level repairs on specific equipment classified as sustainment maintenance, if approved by Combat Capabilities Development Command Aviation and Missile Center engineering. A CAB may also request authorization to perform non-standard field maintenance through a maintenance engineering call (MEC). Typically, MECs conduct minor or limited non-standard field repairs; normally, they are not sustainment maintenance. See AR 750-1, ADP 4-0, FM 4-0, and ATP 4-33 for more information on sustainment maintenance.

## SECTION III – AVIATION MAINTENANCE OBJECTIVES

1-14. The primary objective of aviation maintenance is to provide safe and reliable mission-capable aircraft to support mission requirements. Leaders must prioritize resources that most effectively support the organization's mission requirements while advising the commander on the sustainment requirement and impact associated with various courses of action without compromising safety paramount in the standards of aviation maintenance.

1-15. Conducting aviation maintenance is a complicated business requiring the consistent engagement of commanders and leaders at every echelon of support. Mission readiness, training, safety, and standardization depend on the ability of the aviation commander to ensure the unit has an effective and efficient maintenance program. Aviation commanders must ensure maintenance has the visibility and priority commensurate with the time and energy dedicated from their Soldiers while maintaining the unit's aircraft and associated support equipment.

1-16. Maintenance management uses the following factors to channel maintenance efforts:

- Command emphasis.
- Measure of effectiveness (MOE).
- Management skills.
- Supervision.
- Motivation.
- Technical skills.

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*Note.* Failure to achieve desired results often stems from failure in one or more of these areas.

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## COMMAND EMPHASIS

1-17. The commander sets the intent for what is important within the command; Soldiers in the unit translate this intent into action. To place command emphasis on maintenance operations, a commander takes an active interest in daily maintenance operations and materiel readiness. Leaders use command emphasis and the established MOE to influence the maintenance program. To achieve quantifiable standards, commanders and leaders aggressively pursue maintenance resources and equipment required to perform each mission. By

actively tracking the unit MOE, commanders and leaders identify weaknesses to augment or request additional resources to improve unit performance and enhance its capabilities.

1-18. A commander's role in maintenance can be summarized through four primary areas of responsibilities: providing a vision, providing effective maintenance manpower management, ensuring the establishment of training programs, and assessing the unit.

1-19. Commanders provide a clear vision by instilling purpose, direction, and motivation to the unit's maintainers. Through instilling the importance of the unit's operational mission, maintainers gain ownership with assisting in executing the commander's maintenance intent. Establishing maintenance priorities during production control and training meetings further solidifies the important role that maintenance and maintenance management have on the overall mission.

1-20. A commander's emphasis on maintenance is important to maintenance manpower management. This means key leaders are present during production control, training, and any other maintenance readiness meetings. Commanders at echelon ensure the establishment of important training programs such as the AMTP, aircraft recovery training, unit movement, aircraft load/unload mobility training, and special skills training are identified for the unit.

1-21. Commanders who ensure that effective means of assessing the unit are in place tend to have a higher probability of mission success. This occurs through the establishment of measures of effectiveness as discussed in this chapter. Command supply discipline programs (CSDPs), commander's inquiries, placing emphasis on shop and safety inspections, as well as internal/external aviation resource management surveys are ways that commanders have visibility over all logistical actions being executed by the unit.

1-22. Commanders tailor and position maintenance assets and capabilities within the area of operations to best support maneuver. Army Aviation maintenance applies three considerations while conducting maintenance actions:

- Maintainability-The ability to provide safe, reliable, and fully mission capable aircraft retained in or restored to conditions specified in the TMs by personnel with the specified skill levels, using the specified tools and equipment, as indicated by the level of maintenance and repair.
- Reliability-The degree an item to perform a required function under stated conditions for a specified period.
- Availability-The time an item can be available at the start of a mission.

## **MEASURE OF EFFECTIVENESS**

1-23. Maintenance MOEs provide benchmarks to assess the unit's ability to regenerate combat power in support of the commander's tactical goals and missions. The maintenance team, specifically the maintenance team leader, can direct the organizational efforts toward these common goals by clearly defining these measures and capturing them in quantifiable reports and records. The maintenance program's COP and established MOE ensure aviation sustainers can pursue maintenance goals in line with established guidelines while retaining high confidence in the direction of their efforts.

1-24. Army field maintenance MOEs have four categories: combat power measures, maintenance metrics, technical supply measures, and core unit measures.

## **COMBAT POWER MEASURES**

1-25. Combat power measures quantify a unit's ability to perform its core and directed mission essential tasks. The three combat power measures of operational readiness (OR) rates/ready to launch (RTL) data, mission-design series (MDS) bank time, and aircraft recovery capabilities provide tangible information to track and manage the readiness posture of the unit's aircraft.

1-26. OR rates and RTL data provide a quantifiable status for immediate planning, trend analysis, and operations. OR percentages indicate a unit's overall aircraft availability over a prior period but does not reflect an actual real-time maintenance COP. To provide commanders and staff with a quantifiable measure of a unit's daily aircraft availability that meet mission capability requirements, maintenance officers at echelon report mission capable aircraft as RTL by aircraft tail number. Commanders establish RTL standards by

considering type of aircraft; unit tactics, techniques, and procedures; and mission equipment packages required to support operations. Fleet bank time, linked with operational requirements, provides commanders and leaders the ability to forecast scheduled service requirements. Leaders synchronize OR rates and RTL data to provide commanders with a depiction of the maximum combat power generation executable with all available maintenance personnel and resources.

1-27. Fleet bank time is another quantifiable measure of maintenance management that provides a running estimate for the sum of available aircraft hours per aircraft fleet. It also provides the commander a snapshot of the operational endurance for the unit. Fleet bank time, in conjunction with operational requirements, provides commanders and leaders the ability to forecast scheduled service requirements. Although the established baseline is 50 percent, actual percentages fluctuate due to operational tempo and maintenance management. Forecasted mission requirements may require a higher bank time but risks more aircraft out of the fight at the same time for scheduled maintenance.

1-28. Units reporting high OR/RTL rates while not supporting high operational requirements may mask the ability to regenerate combat power. High bank time without corresponding combat or training flight hour execution demonstrated aircraft underutilization and reduced combat presence in sustained operations. Units executing high flight hours against strong OR/RTL rates while sustaining or improving bank time ensure flexibility, predictability, and combat power generation.

1-29. The commander at the appropriate echelon of support specifies readiness goals and bank time percentages using existing regulatory standards in AR 700-138, AR 750-1, and Department of the Army Pamphlet (DA PAM) 750-1. Commanders report aircraft recovery training according to ATP 3-04.13 to the S-3. Figure 1-2 provides an example of combat power measures reporting.

Combat Power Measures Report						
	Oct	Nov	Dec	Jan	Feb	Mar
Operational readiness	83%	85%	79%	82%	88%	
Ready to launch rate	90%	91%	90%	82%	91%	
Bank time % = $\frac{X}{12000}$	50%	52%	51%	53%	55%	
DART equipment readiness	95%	97%	98%	96%	98%	
DART training status (% of unit personnel trained)	15%	18%	18%	20%	17%	
Date of last full dress DART rehearsal	Air	12 Aug XX		Ground	8 Nov XX	
DART - downed aircraft recovery team						

Figure 1-2. Combat power measures reporting example

## MAINTENANCE MEASURES

1-30. Maintenance measures directly affect the unit’s ability to regenerate combat power through repair and scheduled services. The seven maintenance measures are—

- Production index.
- Scheduled maintenance/phase completion goals.
- Annual internal or United States Army Forces Command (FORSCOM) aviation resource management survey (ARMS) results and corrective progress.
- Special tools acquisition, serviceability status, and replenishment.
- TMDE delinquency and instrument master record file (IMRF) data matching percentages.

- Specially qualified Soldier and personnel status such as nondestructive inspection, welder, hazardous material (HAZMAT), confined space, or protective clothing and equipment /personal protective equipment (PPE).
- Work-order rejection rate percentage (monthly and annually).

1-31. Maintenance measures are reported (figure 1-3) in brief format to higher commands up to brigade level at least monthly and historically tracked for analysis of improvement, degradation, and goals achieved.

Maintenance Measures Report						
	Oct	Nov	Dec	Jan	Feb	Mar
Production index/ workorders over 60 days	98% /20	101% /12	103% /1	100% /0	97% /8	
500 hour service completion average (standard = 15 days)	17 (+2)	15	15	14 (-1)	14 (-1)	
Workorder rejection rate	0%	0%	0%	.0014%	0%	
Special tools serviceable on hand %	75%	75%	77%	78%	80%	
TMDE delinquency % / IMRF match %	.5% / 100%	1% / 101%	1% / 101%	3% / 97%	.7% / 100%	
Specially qualified personnel on hand %	65 %	65 %	77 %	77 %	83 %	
Last annual ARMS date/ rating %	Jul XX/89%		Current tri-annual ARMS progress rating		96%	
<b>ARMS</b> - aviation resource management survey <b>IMRF</b> - instrument master record file <b>TMDE</b> - test, measurement, and diagnostic equipment						

Figure 1-3. Maintenance measures report

1-32. The production index quantifies a unit’s ability to complete work orders in a timely fashion and reflects its ability to reduce or eliminate backlogs. The production index is the ratio of work orders accepted by a maintenance unit compared to the number of work orders completed over a given period during the calendar month. The goal is 100 percent of accepted work orders completed in the period precluding the generation of a backlog. If a unit falls below 100 percent in any given period, a backlog is created that must be mitigated as soon as possible. Once a backlog is generated, the maintenance unit must exceed 100 percent for several reporting periods to recover from the backlog or risk the backlog reaching an unmanageable state. Successive periods below 100 percent indicate a systemic issue and demands command analysis and attention. Successive periods over 100 percent show positive results against a backlog of work orders and indicate a healthy maintenance operation. Work orders failing to meet standards according to DA PAM 738-751 are rejected. The number of rejections against the number of completed work orders are tracked and reported monthly and annually for possible trend analysis.

1-33. Unit commanders assess the capability of the proposed phase team members and set reasonable standards for the completion time allowed to complete scheduled or phase/periodic maintenance operations (table 1-1, page 1-9). A typical phase/periodic maintenance team consists of a phase team lead with four to eight mechanics and an aircraft crew chief as determined by the unit’s maintenance capabilities. A dedicated technical inspector (TI) is a member of the phase team to ensure all performed maintenance inspections/procedures comply with TMs and applicable references. Forecasted maintenance requiring back shop support is work ordered to the appropriate shop as required. Safety is always a primary maintenance consideration. While the focus is to achieve these goals in advance or at the established completion date, the quality of the phase should always be the main concern.

1-34. Competition between units is healthy and should be encouraged in achieving or exceeding all established maintenance goals. If units consistently miss established timelines, production control and the maintenance team leadership must analyze the causes and mitigate the challenges to bring the program back into compliance.

## PHASE COMPLETION PLANNING

1-35. The phase and periodic inspection working day goal is an additional metric established by FORSCOM and adopted in many instances by Army Service Component Commands to track the completion status of the CABs phase/periodic inspection maintenance requirements. This metric establishes a measurable timeline to track and readily identify problems through established work-day goals and the problem, plan, people, parts, time, tools, and training (P4T3) concept. The work-day goals metric provides a time-based measure for commanders to use to assist with keeping a phase or periodic inspection on its completion schedule. During the P4T3 planning, production control and the owning unit identifies all maintenance requirements such as deferred/opportunity-based maintenance actions required during the phase. Emphasis is placed on informing commanders of the expected amount of time needed to complete the phase/periodic maintenance inspection that is projected to exceed the established maintenance goal. Table 1-1 provides the FORSCOM phase/periodic inspection goals per MDS.

**Table 1-1. Maintenance goals (phase/periodic inspections)**

<b>MDS</b>	<b>GOALS IN WORKING DAYS</b>
<b>AH-64D/E</b>	
250 hours	11 days
500 hours	44 days
<b>CH-47F</b>	
200 hours	28 days
400 hours	39 days
<b>UH-60A/L/M</b>	
480 hours	30 days
960 hours	35 days
MDS- mission design series	

## AVIATION RESOURCE MANAGEMENT SURVEY

1-36. Units conduct internal ARMS annually, in addition to the actual FORSCOM ARMS evaluation, for the unit's annual internal requirement. The results establish benchmarks for sustainment and improvement. Commanders ensure all passing areas retain their satisfactory status and work toward commendable levels of performance. For failing areas, commanders establish a recurring reporting process to indicate progress on bringing substandard areas into compliance as rapidly as possible. This recurring requirement allows commanders to assess the overall performance of the unit and bring focus to areas needing attention. Evaluation emphasis ensures all major areas below standard comply by the subsequent evaluation and are sustained indefinitely thereafter. Progress reports for areas evaluated are provided to the support operations aviation cell every four months for analysis and assistance. The support SPO, aviation materiel officer, or designated representative re-inspects unsatisfactory and marginal areas prior to the first post-inspection tri-annual progress report. The FORSCOM ARMS checklist is located on the FORSCOM website located in the reference section.

## TMDE MANAGEMENT

1-37. Commanders receive delinquency rate reports and match rate reports between the unit internal TMDE inventory and the supporting calibration center IMRF. The IMRF serves as a quality check against the unit-generated list, not as a unit inventory. The goal of all unit calibration programs is for a delinquency rate, or failure to submit for required support, of two percent or less according to AR 750-43 and an IMRF match

against the unit TMDE inventory of 95 to 100 percent. Unit leaders monitor and manage the calibration of TMDE within the organization according to this publication, unit SOPs, and supporting regulations.

1-38. Aviation maintenance units require specialized and credentialed Soldiers to perform unique maintenance functions. Maintenance specialization includes but is not limited to non-destructive inspection testing, certified aviation grade welders, confined spaced trained personnel, protective clothing and equipment/PPE certified users and maintainers, and HAZMAT inspectors. Gaps identified for specialized Soldiers affect the unit's combat power regeneration capabilities. Units report the capability delta monthly as part of the unit's status reporting requirement while leveraging pass-back maintenance support from the support company or across the CAB.

1-39. Commanders monitor the status of their special tools and work diligently toward filling the shortages to achieve 100 percent of the commander-approved levels with matching serviceability ratings. The commander continually updates the logistics staff officer on funding necessary to acquire all required special tools. Special tools and test equipment are accounted for on the unit's property record book.

## **SUPPLY MEASURES**

1-40. Supply measures are nested to support maintenance measures and further enable combat power regeneration through conservation of time and funding. Supply measures exploit success and assess unit efficiencies by right-sizing shop stock, minimizing excess, and ensuring funding is applied against unit budget accounts. Supply measures include the following:

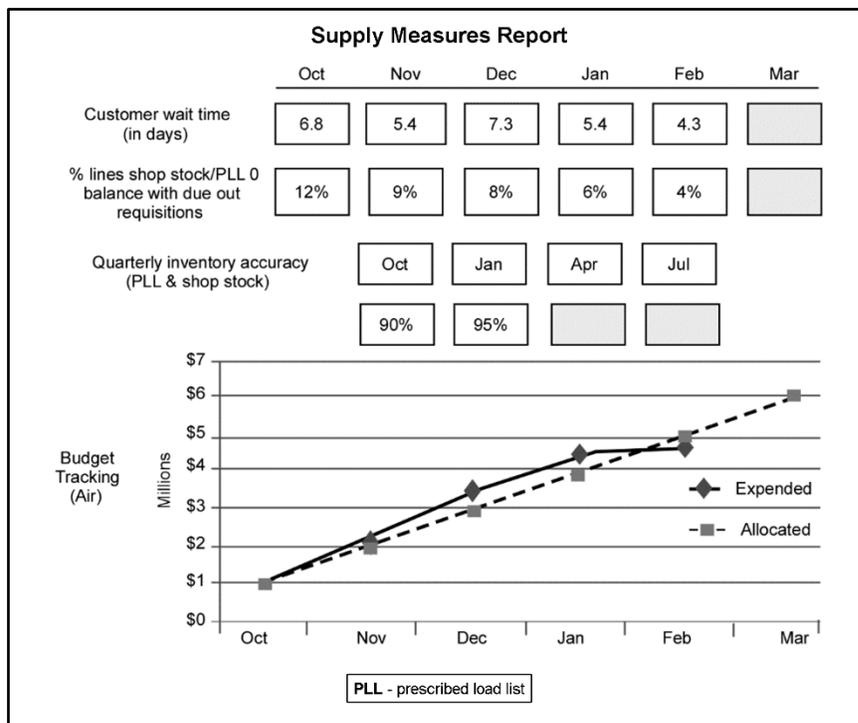
- Average customer wait-time.
- Reparable management.
- Rates for zero balance items without bound delivery requirements.
- Inventory accuracy and excess management.
- Aviation Class IX (Air) budget reconciliation.

1-41. Supply sections track and report the monthly average wait time required to complete both standard and high-priority requisitions. This provides an indication to the commander of how well the unit parts and supplies requirements are addressed with items on-hand. This reporting assists in determining when unsatisfied consumption rates are low, and items are appropriated in the unit and authorized stockage list (ASL).

1-42. Materiel stocked by the technical supply section for aircraft repairs and consumed through use is classified as a zero-balance item. Materiel with low zero balance percentages support a healthy and robust technical supply operation, where high zero balance percentages indicate a potential need to increase quantities on-hand or expedite certain items experiencing long lead-time delivery delays. Zero balance materiel with high consumption rates affect the unit's overall average customer wait time requirements which impacts the regeneration of combat power.

1-43. Frequent inventories of supply operations ensure quantities match automation information reports, allowing the "request and fill process" to function properly. The inventory match rate for all stock is 95 percent and demonstrates good stewardship of repair parts and supplies. Commanders set a schedule according to AR 710-2 to ensure inventories occur frequently to generate useful data for operations analysis. Commanders resource supply operations appropriately to improve and ensure inventory accuracy and consistency. The more accurate the inventory, the less idle and excess items remain in possession of the unit. The retention of serviceable and unserviceable excess items ties up assets needed by other units. Leaders ensure excess items receive immediate turn-in actions according to the unit SOP and AR 710-2, which supports unit mobility and supply budget fidelity.

1-44. The Class IX (Air) budget includes Class IX and limited items of other classes of supply in direct support of aviation maintenance requirements. Commanders review the budget monthly to ensure projections and statuses remain in line with available funding. Face-to-face comptroller reconciliations may be required to correct errors detected during budget management or command review. These measures are reported to higher at least monthly and historically tracked for analysis of improvement, degradation, and goals achieved. Figure 1-4, page 1-11, is an example supply measures report.



**Figure 1-4. Supply measures reporting**

## CORE UNIT MEASURES

1-45. While not unique to aviation field maintenance units, core unit measures enable leaders to assess the underlying operations of a maintenance unit. Individual Soldier training is significant and reportable but is not included in maintenance unit core measures due to the amount of regulations and guidance available in other publications. The core unit measures shown in figures 1-5 and 1-6, page 1-12, are best tracked and reported to higher commands as specific goals and measures in accordance with the unit's SOP. Core unit measures further assess the unit and assist the command in allocating troop to task as the assessed metrics fluctuate. Core unit measures are—

- Vehicle and non-flying system readiness rates.
- Semi-annual safety survey results and hazard log management.
- Monthly individual flying and safety awards presentations.
- CSDP results:
  - Shortage annex reduction status.
  - Property accountability (cash collection voucher, statement of charges, financial liability investigation of property loss).
  - Unit budget status (Classes II, IV, and VII).
- Unit reenlistment mission accomplishment.
- Uniform Code of Military Justice action percentage.

	OCT	NOV	DEC	JAN	FEB	MAR
Non-aviation systems and vehicle operational rate	94%	94%	88%	95%	91%	
Individual/safety/flight awards	2/4/1	4/5/0	6/10/1	3/4/3	1/2/1	
Unit shortages/ funds needed for 100% fill	400/ \$89,000	332/ \$74,000	310/ \$69,000	303/ \$68,000	301/ \$67,000	
Open hazard log entries	12	12	8	7	7	
Last semi-annual safety survey		Dec XX	Next semi-annual safety survey		Jun XX	

Figure 1-5. Core unit measures reporting-part A

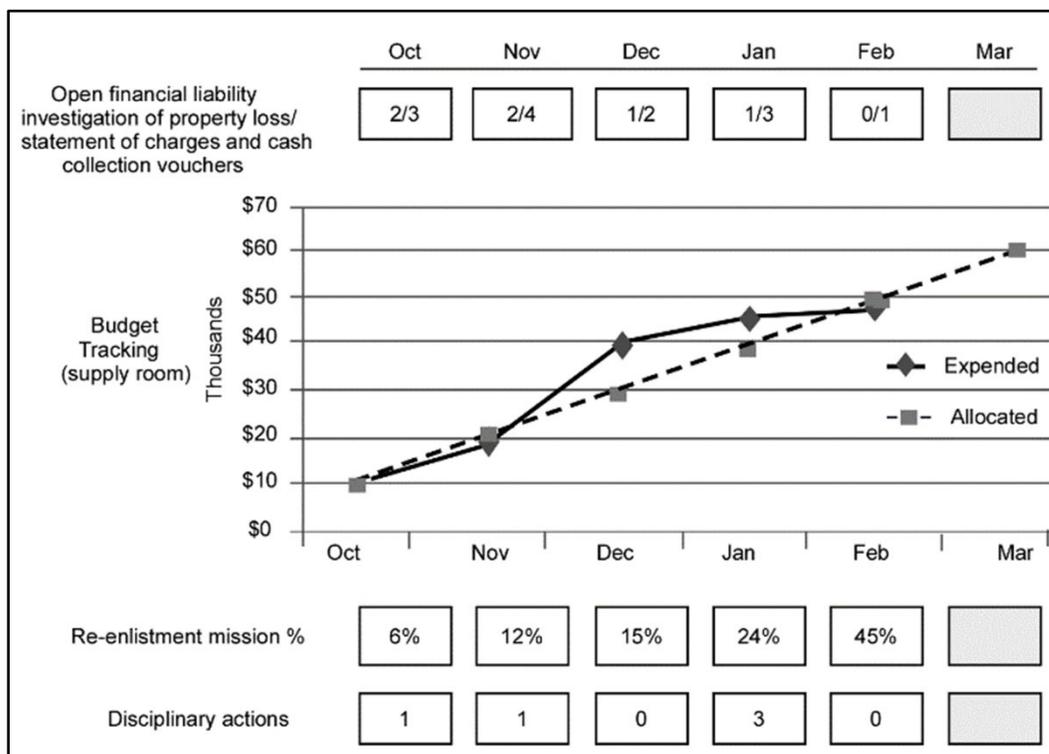


Figure 1-6. Core unit measures reporting-part B

1-46. Traditionally, emphasis on monitoring rolling stock assets occurs during motor stables. Aviation units have a heightened interest in ensuring the serviceability of rolling stock due to the impact this capability has on missions such as aircraft recovery operations, materials handling equipment (MHE) requirements, power generation equipment, AGSE, and peculiar ground support equipment support.

1-47. Annual safety survey results and accident reports establish reference points for the unit and can rapidly populate the hazard log. Commander's track annual safety survey results and hazard log entries to eliminate or mitigate risk in the same fashion as the work order backlog. Hazard log management requires command emphasis to ensure compliance and improve the environment in which Soldiers perform their missions.

1-48. The quantity of awards across the categories of individual, safety, and flying indicates the positive health of a unit. By monitoring these quantities, leaders ensure deserving Soldiers receive timely recognition. Excessive quantities can undermine the award's value, and insufficient quantities display a lack of consideration for the performance of individuals. Continued assessment and tracking of these metrics can help commands maintain a proper balance and increase unit health. By looking across the MOE, units can identify Soldiers who uniquely contribute to improving those measures and may award them appropriately.

1-49. The CSDP for aviation maintenance units is a critical aspect of a maintenance program and requires direct leader involvement. The three pillars of achieving a productive CSDP are shortage annex elimination, reducing loss of accountability actions, and balancing and monitoring the unit's budget. Leaders assist in reducing a Soldier's burden by ensuring maintenance resources are responsibly managed in support of the unit's assigned missions. Having the right compliment of serviceable items to perform a maintenance task directly improves the ability, morale, and effectiveness of any maintenance unit. Leaders train, mentor, and entrust Soldiers with the responsibility of securing property; however, the commander owns the acquisition and replenishment responsibility and uses their CSDP to maintain accountability and readiness.

### **Shortage Annex**

1-50. The unit's shortage annex includes all components, items, and special tools needed for tracking or elimination through the acquisition process. This includes new additions to the shortage annex generated by unserviceable turn-ins from a unit supply. Each month, the S-4 and unit supply sections provide the commander updates on additions and setbacks experienced while remediating shortages by quantity, class, accounting requirements code, acquisition advice code, and funding required. This enables commanders to apply appropriate resources necessary to eliminate the shortages. Procedures for shortage annex can be found in AR 710-2.

### **Reducing Loss of Accountability**

1-51. Loss of property accountability demands action according to AR 710-2. Whether an accepted loss, simple cash collection voucher, statement of charges, or a complete financial liability investigation of property loss, commanders must implement a process to confirm and determine the reason for an identified loss. The initiation of the chosen process allows integration onto the shortage annex of the item for replenishment and serves as a deterrent to negligence by users and hand receipt holders. A commitment to proper accounting prevents carelessness and preserves systems, tools, and special tools for future use. It prevents the frequent requisitioning of a lost or damaged item, allowing the commander to focus budget resources on additional unit priorities.

### **Balancing and Monitoring the Unit Budget**

1-52. The AMO, SPO, unit supply officer/sergeant and S-8/G-8 comptroller constantly monitor the unit Class II, IV, and VII budget. Commanders review the budget monthly to ensure projections and statuses remain in line with available funding.

## **MANAGEMENT SKILLS**

1-53. Maintenance managers continually look for ways to improve planning, organizing, coordinating, directing, and controlling of assets. Managers must also be proactive in influencing events before they happen rather than reacting to events as they happen. Feedback and after action reviews are proactive tools used by maintenance managers.

1-54. Small improvements in the overall sustainment system produce lasting results compared to a concentrated effort directed toward one or two specific areas. The maintenance manager must be careful that changes to maintenance operations do not undermine other unit initiatives.

## SUPERVISION

1-55. First-line supervisors are a commander's first line of defense in the prevention of mishaps. Reducing or eliminating accidents retains available manpower and equipment to execute the unit maintenance mission. The commander depends on first-line supervisors to accomplish the day-to-day mission and ensure the welfare of the troops.

1-56. First-line supervisors are the individual Soldier's primary source of assistance and further professional development. The first-line supervisor's major challenge lies in ensuring that the people they supervise accomplish the mission correctly the first time. First-line supervisors are responsible for ensuring that maintenance is accomplished according to applicable TMs, technical bulletins (TBs), and messages. These supervisors need to know the standards and MOE objectives set by the chain of command to direct their Soldiers' efforts.

1-57. First-line supervisors must be aware of mission requirements and the capabilities and limitations of the Soldiers under their control. The welfare and professional development of Soldiers is paramount in the supervisor's mind, even while focused on mission accomplishment.

## MOTIVATION

1-58. Maintenance managers should not underestimate the benefits of providing the necessary sustainment resources. Commanders and supervisors directly influence Soldiers by ensuring they have the training and tools to complete their maintenance tasks; Soldiers want to perform well. Leaders communicate the maintenance intent effectively and provide feedback on improvements or sustained work efforts. Superior achievement must receive recognition; substandard performance must be rapidly corrected.

## TECHNICAL SKILLS

1-59. At all levels, the technical development necessary to effectively execute and manage maintenance requirements are important aspects of leadership. Maintenance management affects the training/execution of essential warfighting missions. Development of junior leaders is critical for their professional development; it also prepares them for the next level of responsibility. Junior leaders are functional members of the maintenance team. Preparing them to operate in a fluid maintenance environment enables synchronization with the maintenance support plan and achievement of aviation maintenance MOE goals.

1-60. Fundamentals of maintenance management are observable and learned by involvement in regularly scheduled production control (PC) meetings reflected on the unit-training schedule. Attendance and involvement in the battalion or support company PC meeting is only one level of maintenance management and is an enabler in the development of junior leaders.

1-61. Leaders mentor junior leaders in the many facets of developing a sound maintenance plan and timeline. Once trained, junior leaders, at a minimum—

- Know the aviation maintenance MOE and quantify them into a usable report(s) according to the unit's SOP.
- Assess the maintenance mission and maintenance requirements in support of the operational maneuver battalion.
- Compare the time needed to accomplish the maintenance objectives with allocated time, personnel, and equipment while ensuring the availability of all resources needed prior to executing a maintenance task.
- Compare the time needed for maintenance actions with the allocated time and determine if additional courses of actions are available to expedite maintenance procedures safely.
- Maximize the skill and experience of assigned maintenance personnel to minimize supported unit's aircraft downtime.
- Are assertive in providing guidance to maintenance personnel.

1-62. With the establishment of TC 3-04.71, commanders and leaders have written guidance for training aviation maintainers and leaders. TC 3-04.71 covers critical technical training needed for the maintainer to

continue their career progression. Technical skills involve the ability to perform tasks associated with duty positions; on-the-job training further enhances these technical skills. A technically trained Soldier is one of the commander's most important assets. The commander must continuously strive for high levels of training to broaden the technical skills in order to multiply combat power to better support operational units.

1-63. The Army training system depends on the unit commander continuing the training process begun during advanced individual training. Training resources must be identified and made available to ensure quality training for assigned Soldiers. To the commander and maintenance manager, training on technical tasks is as important as training on tactical skills. Individual critical task lists establish the requirements for technical maintenance training. Additional NCO professional development information can be found in DA PAM 600-25 or on the Central Army Registry website.

1-64. Contractor-provided maintenance could potentially diminish Soldier technical skills if improperly managed. Over reliance on contract maintenance may continue to erode our Soldiers' experience level. The loss of maintenance experience negatively affects all aviation Soldiers as they progress to higher levels of responsibility. Experience gained by Soldiers enhances their future technical abilities and leadership qualities. Leveraging maintenance opportunities conducted by contractors can provide training opportunities for assigned Soldiers if prescribed within the established contract. Contractors with specialized skills or high levels of experience can effectively serve as trainers, improving Soldier skills. When practical, commanders/leaders should create training opportunities for Soldiers to enhance their maintenance skills.

1-65. For more information on AMTP, refer to TC 3-04.71 which covers the duties and responsibilities, training, evaluation, and records requirements to train and develop aviation maintainers and leaders.

## SECTION IV – PROBLEM, PLAN, PEOPLE, PARTS, TIME, TOOLS, AND TRAINING

1-66. P4T3 is a planning concept allowing commanders, leaders, and maintenance personnel to coordinate and plan the personnel and resources required to perform maintenance. Using the P4T3 concept streamlines maintenance operations and normally saves time and resources.

### PROBLEM

1-67. Clearly identifying a maintenance problem is necessary in executing efficient and effective practices that support the unit's maintenance program. This process can be as simple as identifying a particularly scheduled maintenance event or identifying a troubleshooting requirement affecting a mission.

1-68. The failure of an operating aircraft system or subsystem, resulting from improper maintenance procedures, can have catastrophic and deadly consequences to personnel and equipment. Aviation maintainers must adhere to the most current applicable interactive electronic technical manuals, aircraft TMs, and references when conducting maintenance on aircraft.

1-69. While conducting maintenance, maintenance managers or maintainers may encounter problems. Unanticipated or unscheduled maintenance may surface, affecting a mission after the mission has been accepted and planned for execution. Additionally, when conducting scheduled maintenance (phase maintenance), maintenance teams may encounter problems that hinder timely completion of a scheduled maintenance requirement within goal times.

1-70. When unforeseen problems occur during scheduled or unscheduled maintenance, planned missions could be hindered. Likewise, unforeseen problems encountered during scheduled maintenance affect units' OR rates. Maintenance managers must devise a maintenance plan that returns unserviceable aircraft to a fully-mission capable status.

1-71. Troubleshooting procedures are the first maintenance task the crew and maintenance personnel must complete to standard. During unscheduled maintenance, guiding questions to explore are listed as follows:

- Are maintainers diagnosing the faults using established troubleshooting procedures?
- Are the components causing the aircraft fault properly identified and repaired?

1-72. Disciplined use of TMs and adherence to troubleshooting procedures and the maintenance allocation chart are critical to aircraft readiness rates. Incorrect diagnosis at the start of maintenance troubleshooting procedures waste time, repair parts, and result in impacts to the Class IX (Air) budget. If the maintainers cannot diagnose the problem, maintenance technical experts and aircraft maintenance contractors' involvement is necessary at the onset of the task.

1-73. The ASC maintenance support personnel or the unit's designated LAR assist when requested throughout the troubleshooting process.

## **PLAN**

1-74. A plan involves implementing measures and devices to correct the problem without discontinuing the mission. The mission dependent unit's maintenance SOP and maintenance plan are the first steps towards ensuring a solid basis for production and quality control (QC). During maintenance planning, the PC officer in charge (OIC) begins by answering questions, such as—

- How do we accomplish the task?
- What is the maintenance plan for performing the task to completion?
- Who is responsible for performance of the task?
- Can the owning unit perform the maintenance?
- Can the maintenance be performed on site or is relocation required?

1-75. The leadership enforces the execution of the maintenance plan. The maintenance plan is continuously reviewed and updated until the task or event is resolved. The maintenance plan for scheduled services must contain adequate details to ensure uniformity. Details could include the maintainer—

- Reviewing the maintenance task.
- Anticipating mandatory replacement parts.
- Gathering all of the parts in one location.
- Ensuring required consumable materiel is on hand.
- Ensuring tools are available in sufficient quantity and type.
- Ensuring needed TMDE is current.

1-76. Planning for unscheduled maintenance is a team effort for platoon leaders and company/troop maintenance personnel to identify necessary resources needed to do the job. Leaders initiate the planning process by developing planning factors using the P4T3 concept. This includes incorporating supply requirements by researching the availability of a known needed item not on hand at the unit with the SSA. Additional maintenance techniques for part availability research includes the PC office checking with other aviation units with similar or the same aircraft to see if parts are available. PC should coordinate with internal and external maintenance enablers such as the support company, CFSR and LARs for additional maintenance assistance when necessary.

## **PEOPLE**

1-77. Maintenance managers assess available resources to ensure adequately trained personnel and the required level of expertise is available to conduct the required maintenance task. The maintenance manager and commander minimize conflicts between maintenance events and scheduled training (such as weapons qualification and driver training) while preparing for major maintenance events. Trained personnel have the military occupational specialty (MOS) classification or additional skill identifier authorizing them to perform the repairs.

1-78. The maintenance allocation chart shows the level of maintenance required to perform repairs. The maintenance manager uses the maintenance allocation chart to determine if repairs can be completed using internal resources or if a need for external support is required.

1-79. Supervision is an ongoing process throughout the entire phase of the repair. Section sergeants are responsible for the direct supervision of maintenance personnel who are performing specific jobs or repairs.

Technical inspectors and aviation maintenance officers provide technical supervision throughout the execution of the maintenance task.

1-80. Aviation maintenance company/troop and support company commanders and first sergeants must continually manage the use of low-density MOS Soldiers. Leaders should ensure the priority is for Soldiers to perform jobs that hone their technical skills instead of working on non-job-related details or duties.

## **PARTS**

1-81. PC personnel verify that the correct type and quantity of required parts are on hand. Parts assessments are necessary to determine what is required and available to correct deficiencies. To reduce not mission capable supply (NMCS) time for known items required for maintenance, PC ensures that the owning unit order time-change components or deferred task repair parts with ample lead-time. Additionally, crew chiefs and maintenance personnel must accurately identify the correct types and quantities of parts/components required to facilitate the maintenance action.

## **TIME**

1-82. Maintenance managers encounter maintenance or sustainment challenges that may ultimately affect the unit assigned mission. Maintenance managers must consider time to minimize or eliminate these challenges because time is critical to mission accomplishment. Maintenance managers must accurately evaluate time constraints when determining if the available time to accomplish a maintenance repair is adequate. Maintenance managers should consider the following questions when conducting maintenance procedures:

- How much time is required to complete the maintenance action?
- Is there sufficient time free from detractors to affect the repair?

1-83. The estimated completion date of maintenance that brings an aircraft to fully mission capable status is a critical aspect in forecasting combat power availability. Leaders must allow adequate time for aircraft maintainers to perform maintenance on the equipment and communicate the immediate need if more time is expected while completing the maintenance action.

## **TOOLS**

1-84. During the overall maintenance planning process, PC is responsible for overall assessment determination on whether the unit has the correct type and quantity of tools to perform the maintenance tasks. This is especially critical during split-based operations, making it important for supervisors to immediately identify tools shortages, serviceability, and calibration requirements. Leaders educate themselves on the different tools and enforce usage per the interactive electronic technical manuals/TMs/TBs while conducting aircraft maintenance.

## **TRAINING**

1-85. Commanders afford junior leaders the opportunity to develop an understanding of maintenance operations and management. Conducting aircraft maintenance directly correlates to leader development and enabling maintenance proficiencies required to regenerate combat power. At every opportunity, new Soldiers are matched with more experienced Soldiers to conduct specific tasks. This training practice, captured within the digital job book, ensures the new Soldiers get the training and experience needed to perform the task on their own in the future.

# **SECTION V – MAINTENANCE PLANNING AND SUPPORT**

## **AVIATION MAINTENANCE PLANNING**

1-86. Commanders at all levels anticipate maintenance requirements and plan maintenance accordingly. Properly planned and executed aviation maintenance requirements ensure the availability of maximum

aircraft for mission support. Increased operational tempo create maintenance surges before, during, and after training exercises. P4T3 concept provides a methodology for aviation commanders and staff to analyze and coordinate aviation maintenance while providing oversight to required maintenance actions.

1-87. Maintenance requirements such as phase/periodic inspections, aircraft condition evaluation inspections, modification work order (MWO) applications are synchronized with operations and training requirements and captured on the unit's training calendar. Leaders are visible during unit training meetings, production control meetings, and during the execution of maintenance repairs. This visibility places emphasis on the importance of maintenance and shows that maintenance is a high priority for the organization.

1-88. Aviation operations depends on an effective and efficient maintenance program. Managing maintenance resources such as maintainer training, designated time to perform maintenance, and budgetary allocations for the flying hour program requires management at all echelons of support. Specific considerations enhance the ability of aviation commanders to perform scheduled and unscheduled maintenance, and include the following:

- Aircraft flying hours and the flying hour budget to formulate the flying hour program are not removable from each other. Commanders receive both as a single resourcing package to support aviation training and maintenance. Management of the flying hour program budget occurs at the battalion level on an annual basis for accountability and predictability and is assessed monthly at a minimum.
- Direct labor is the time mechanics spend maintaining aircraft. Minimizing direct labor can degrade maintainer proficiency and hinders man-hour utilization effectiveness. Maintenance training is an important function in the regeneration of combat power. Many low-use MOSs require the incorporation of a focused training initiative geared at keeping a Soldier's maintenance proficiency intact. Consolidating training from all echelons for low density MOSs optimizes training opportunities and effectiveness and supports standardization. For more information on direct labor, see AR 750-1.

## **POSITIONING MAINTENANCE SUPPORT**

1-89. Proper maintenance support and execution maximize aircraft availability. Maintenance managers ensure the proper mix of maintenance support meets the commanders' requirements. Early arrival of maintenance support in theater ensures deployed aircraft are made operational in a more expeditious manner upon arrival.

1-90. The AMC/aviation maintenance troop (AMT) and ASC can conduct split-based operations by deploying mission specific FMTs within a single theater of operations. Each maintenance company is responsible for performing field maintenance on its assigned/attached aircraft. The support company provides field maintenance pass-back support to its supported units.

1-91. Aircraft repairs are completed as quickly and as forward as possible based on a mission, enemy, terrain, troops available, time and civilian considerations (METT-TC) factors. Maintenance assets move as far forward as the tactical situation permits to repair unserviceable and damaged aircraft to return them to the fight as quickly as possible. However, commanders and staff must balance maintenance with survivability and ability to retain freedom of rapid maneuver. Positioning of maintenance assets should not create and additional logistics requirement that detracts from the tactical mission.

## **MAINTENANCE COLLECTION POINTS**

1-92. Commanders can extend the unit's maintenance capabilities and better utilize limited resources by establishing maintenance collection points. Maintenance collection points are temporary locations established by a forward support company and an ASC within the battalion support area to collection equipment requiring or undergoing field maintenance. During LSCO, maintenance occurs as far forward as possible. Maintenance collection points located at a FARP assists with facilitating aircraft and weapon system repairs to reduce the burden of evacuating equipment as determined by METT-TC conditions.

## Chapter 2

# Aviation Maintenance Organizations

A well-established and managed maintenance program exponentially increases the availability of operational assets for aviation maneuver commanders conducting training and tactical missions. Each aviation maneuver company is responsible for performing field maintenance unless METT-TC and P4T3 planning dictate maintenance company or higher support. Aviation support companies organic to the ASB extend maintenance capabilities by providing field and pass-back maintenance in support of an AMC according to TMs and the maintenance allocation chart.

### SECTION I – AVIATION FIELD MAINTENANCE STRUCTURE

2-1. A comprehensive unit maintenance program is critical for the sustainment of aircraft weapon platforms, aircraft systems and subsystems, and ground support equipment (GSE). This section outlines the aviation field maintenance structure.

#### AVIATION MANEUVER COMPANY

2-2. The aviation maneuver company's maintenance activities primarily focus on field-level maintenance, to include operational inspections (preflight, post flight, and daily) and scheduled and unscheduled maintenance within the unit's capabilities. Allowing unit maintainers a degree of ownership in their assigned aircraft enhances the quality and standards of maintenance performed, leading to improving overall unit readiness. The maneuver company complete field level maintenance unless METT-TC and P4T3 dictate otherwise. If METT-TC/P4T3 allows, the unit submits automated work order request through the sustainment information system for approval by PC. Maneuver companies submit all parts requests through the approved sustainment information system for PC approval.

2-3. Maintenance representatives enter the identified fault into the sustainment information system and immediately initiate corrective action. If the repair is above the company's maintenance capabilities, the designated representative initiates a work order and immediately notifies the maintenance company PC office of the assistance needed. If a part is needed and not on hand at the unit, it is the unit's responsibility to ensure the part is requisitioned and a valid document number is established against the fault. The designated maintenance test pilot (MTP) manages and prioritizes the company's maintenance program based on personnel available and mission requirements. Crew chiefs and aviation maintenance personnel also perform aircraft launch and recovery operations, maintenance operational checks (MOCs), vibration analysis, and document maintenance in aircraft logbooks and historical records.

#### AVIATION MAINTENANCE COMPANY

2-4. The AMC manages the battalion maintenance program, operates a centralized tool room, and performs field-level maintenance and scheduled services. The primary mission of the maintenance company is to create combat power in support of the battalion mission. The maintenance company conducts phase maintenance, troubleshoots airframe and component malfunctions, performs maintenance and repair actions, removes and replaces aircraft components, and performs maintenance test flights (MTFs) and MOCs.

2-5. The maintenance company provides sustainment support by processing, requesting, and storing Class IX bench and shop stock. Supply personnel operate the unit's sustainment information systems, requisition Class IX (Air) serviceable spares, and manage the battalion/squadron Class IX (Air). The maintenance company performs unit-level repairs on aviation life support systems. Aviation maintainers operate and

maintain assigned GSE. In coordination with elements from the forward support company (FSC), the maintenance company conducts battalion-level FARP operations according to ATP 3-04.17.

2-6. The support company can assist the maintenance company with aircraft recovery operations or battle damage assessment and repair (BDAR) requirements as requested. Soldiers from the maintenance company can repair aircraft onsite or prepare them for evacuation if necessary. In these situations, maintenance procedures may be expedited to meet operational objectives.

2-7. BDAR uses specialized assessment criteria, repair kits, and trained personnel to repair damaged aircraft. These repairs are often only short-term solutions to meet operational needs. If the tactical situation allows application of a standard repair, do not use temporary repairs. Units are to place emphasis on conducting permanent repairs for aircraft that received temporary repairs immediately upon the improvement of the tactical situation.

2-8. An AMC is organic to aviation battalions/squadrons. Figure 2-1, figure 2-2 (page 2-3), and figure 2-3 (page 2-3) illustrate structural configurations for maintenance companies organic to aviation maneuver battalions.

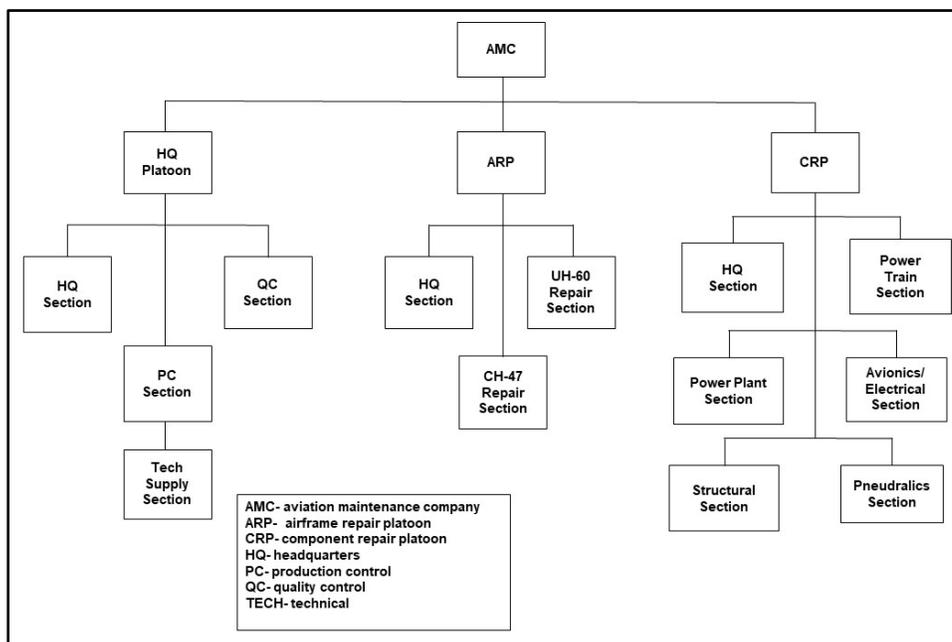


Figure 2-1. Aviation maintenance company (general support aviation battalion)

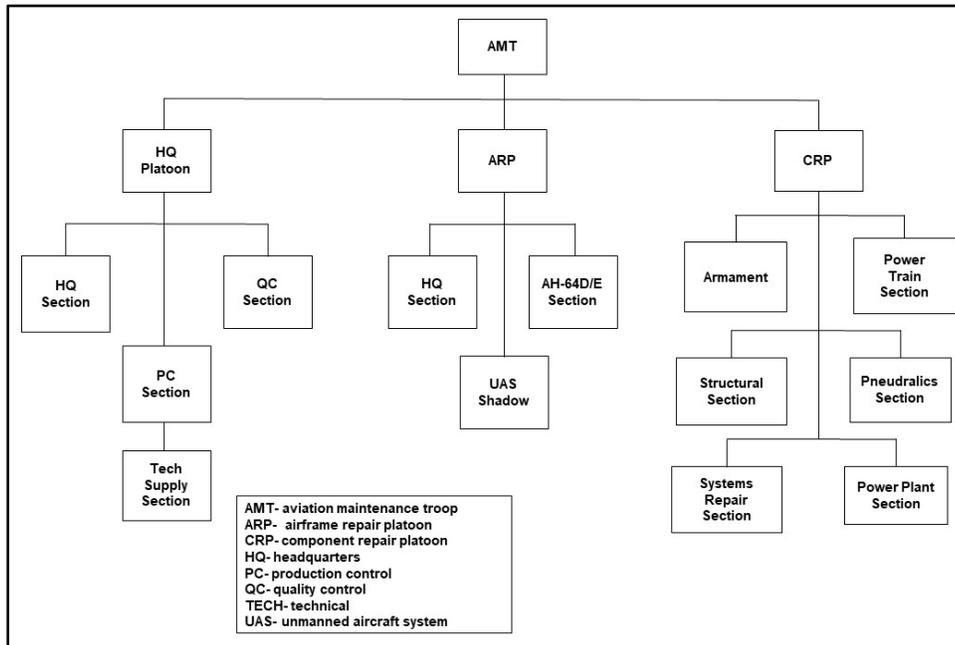


Figure 2-2. Aviation maintenance company/troop (attack/cavalry)

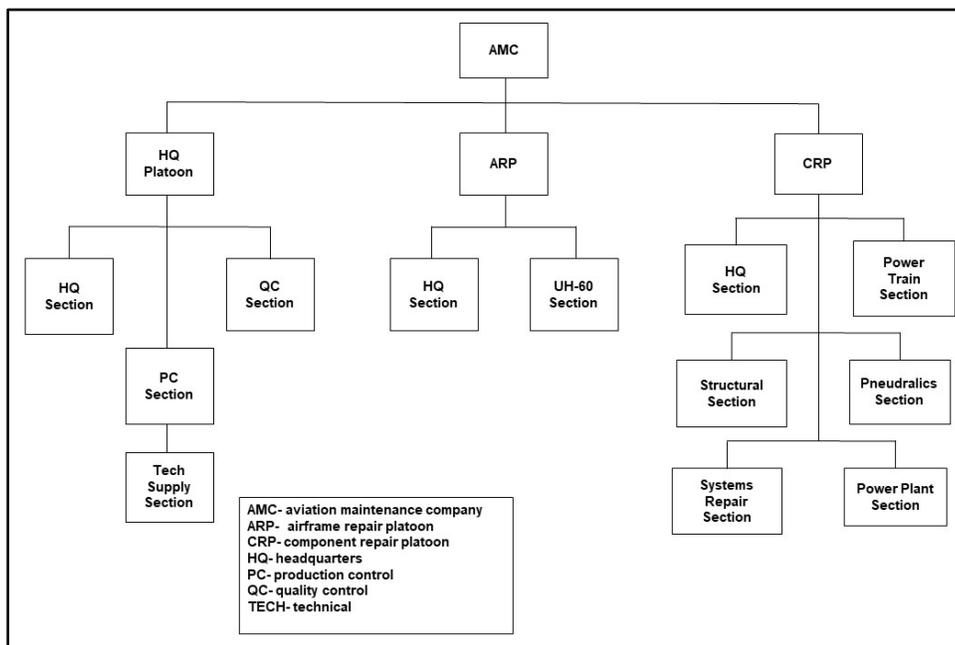


Figure 2-3. Aviation maintenance company (assault)

## HEADQUARTERS PLATOON

2-9. The headquarters (HQ) platoon consists of an HQ section, PC, QC, and technical supply section. The maintenance company HQ contains the command team and performs administrative and unit functions to include the following:

- Personnel actions.
- Training management.

- Information management.
- Reenlistment.
- Safety.
- Unit supply and arms room.
- Communications support.
- Chemical, biological, radiological, and nuclear (CBRN).

### Quality Control Section

2-10. The QC section is accountable directly to the commander, thereby eliminating potential conflicts of interest among the PC section, the maintenance shops, and the supported units. This accountability structure allows the inspectors to maintain objectivity in the performance of their inspection duties. QC should be composed of the most qualified and technically proficient maintainers. QC follows the priorities that PC provides and maintains constant communication pertaining to the status and progress of maintenance.

2-11. QC enforces aviation maintenance standards within the following areas:

- Component repair.
- Overhaul.
- Weight and balance.
- Modification.
- Ensures compliance with the Army oil analysis program (AOAP).
- Safety-of-flight, airworthiness release (AWR), and other required maintenance functions.
- Oversight of compliance with safety regulations in maintenance areas and historical records.

### Production Control Section

2-12. The PC manages maintenance production within the AMC to maximize maintenance resources. The PC performs the following:

- Receives and processes work requests.
- Coordinates external support within the ASC.
- Coordinates, schedules, and prioritizes maintenance and shop workloads.
- Maintains the status of aircraft parts and shop reports.
- Materiel readiness.
- Coordinates inspections, MOCs, MTFs, functional ground check and functional check flights.
- Returns repaired aircraft and equipment to supported units.
- Directs supply operations.

### Technical Supply Section

2-13. The technical supply section is part of the PC office and responsible for requisitioning, storing, and issuing Class IX (Air) repair parts. See chapter 8 for more information on supply operations.

### AIRFRAME REPAIR PLATOON

2-14. The airframe repair platoon (ARP) provides aviation field-level scheduled and unscheduled maintenance support. Daily and operator-level scheduled maintenance is the primary responsibility of the maneuver company/troop. Prolonged scheduled maintenance such as aircraft phases or compliance with aviation safety action messages (ASAMs) are best performed by the ARP and are requested by the maneuver company/troop through the PC office. If the maneuver company/troop cannot complete the unscheduled maintenance based on METT-TC and P4T3 planning, it should contact the PC office and request maintenance support.

2-15. Maneuver company/troop maintenance managers, PC OICs, and QC should communicate daily in scheduling and prioritizing scheduled and unscheduled maintenance support. Coordination must also include

the supply section to ensure required aircraft repair parts and components are available before commencing maintenance procedures.

### **COMPONENT REPAIR PLATOON**

2-16. The maintenance company/troop component repair platoon (CRP) provides component repair support functions to their supported unit assigned aircraft. Component repairs to aircraft systems entail field-level maintenance repairs according to the applicable TM.

2-17. The CRP contains specialized sections responsible for repairing subsystems associated with their supported aircraft. These specialized sections are power plant, powertrain, structural repair, pneudraulics, avionics and electrical, and systems repair sections. The systems repair sections, organic to the attach battalion/heavy reconnaissance battalion squadron's AMC and aviation maintenance troop CRPs, perform armament, avionics, and electrical repairs.

### **General Support Aviation Battalion**

2-18. A general support aviation battalion and assault helicopter battalion AMC CRP contains a headquarters and five shop sections—power plant, powertrain, structural (airframe), pneudraulics (hydraulics), and avionics/electrical.

2-19. Each shop section performs maintenance of aircraft components and structures requiring specialized technical skills. Assigned maintainers perform scheduled and unscheduled maintenance, troubleshoot components, remove and replace aircraft components and line replaceable unit, perform BDAR procedures, and manage deployment support kits (Class IX [Aviation] spares and shop stock) at platoon level.

### **Attack Battalions and Air Cavalry Squadron**

2-20. Attack battalions and air cavalry squadrons CRPs contain a headquarters, a system repair section, and four shop sections—power plant, powertrain, structural, and pneudraulics.

2-21. The system repair section is subordinate to the CRP and separate from the shops section. This section consists of AH-64 system repairs responsible for troubleshooting and repairing armament systems, subsystems, and components. Personnel assigned to the armament repair section conduct preventive maintenance, testing, and troubleshooting of aircraft weapons systems and subsystems to include configuration changes. They are also responsible for repairing and replacing weapons platform components according to applicable publications and references.

### **SHADOW PLATOON**

2-22. Shadow platoons are comprised of operators and maintainers providing flying and maintenance support of UAS aircraft and components. These Shadow platoons share the same organization and equipment, whether in the CAB, brigade combat team, or a Special Forces group.

2-23. The Shadow platoon leader and maintenance noncommissioned officer in charge (NCOIC) coordinate and schedule maintenance at forward locations using a combination of organic Soldiers and supporting unit personnel. The members of these platoons must be able to diagnose UAS component damage or serviceability rapidly and accurately.

2-24. Shadow platoon maintenance activities are focused on two primary responsibilities. The first is on operational inspections (preflight, post flight, and daily) and unscheduled maintenance. When deficiencies are identified and entered in the UAS component logbook, company personnel must initiate corrective action, submit the entry for work order assignment, or confirm a document number against the entry as quickly as possible. The Shadow platoon when detached from their organic organization should receive area support from the maintenance company/troop when performing unscheduled back shop maintenance.

2-25. The second focus is on managing the platoon maintenance program, operating a tool room, and performing field-level maintenance and scheduled services. The Shadow platoon troubleshoots UAS component malfunctions, performs maintenance and repair actions, removes, and replaces UAS components, and functional ground check/functional check flights. Platoon maintenance personnel operate the unit's

sustainment information systems, requisition Class IX (Air) serviceable spares, and manage the platoon Class IX (Air) parts. Aviation maintainers operate and maintain GSE.

## **SHADOW PLATOON IN AVIATION BATTALIONS**

2-26. Shadow platoons within an aviation battalion/squadron have field-maintenance performed by personnel assigned to maneuver companies/troops, with support from maintenance company/troop, the support company, and CFSR personnel for additional maintenance support. The maintenance company/troop PC office manages the unmanned maintenance program's scheduled and unscheduled field-level maintenance requirements. The maintenance company, with as-needed assistance from the CFSR, troubleshoots UAS component malfunctions, performs maintenance and repair actions, removes, and replaces UAS components, and performs functional ground check/functional check flights.

2-27. The Shadow platoon leader and maintenance NCOIC coordinate and schedule maintenance at forward locations using a combination of organic Soldiers and supporting unit personnel. The members of these platoons must be able to diagnose UAS component damage or serviceability rapidly and accurately. Shadow flight platoon maintenance activities are focused on operational inspections (preflight, post flight, and daily) and unscheduled maintenance. When deficiencies are identified and entered in the UAS sustainment information system, company personnel must initiate corrective action, submit the entry for work order assignment, and confirm requisitions are initiated against the fault as quickly as possible.

## **GRAY EAGLE COMPANY**

2-28. The Gray Eagle company is organized into two military table of organization and equipment (MTOE) configurations. The two configurations are divisional and echelon above division. In the divisional configuration, the company UAS assets are broken out by platoons to support two separate sites. In the echelon above division configuration, the company is broken out by platoons to support three separate sites.

2-29. The Gray Eagle company commander and PC OIC coordinate and schedule maintenance at forward locations (platoons) using a combination of organic Soldiers and supporting unit personnel. The members of these platoons must be able to diagnose UAS component damage or serviceability rapidly and accurately.

2-30. Gray Eagle company maintenance activities are focused on two primary responsibilities. The first is on operational inspections (preflight, post flight, and daily) and unscheduled maintenance. When deficiencies are identified and entered in the UAS component logbook, company personnel must initiate corrective action, submit the entry for work order assignment, or confirm a document number against the entry as quickly as possible. Gray Eagle company flight platoons when detached from the company receive area support from the maintenance company/troop when performing unscheduled back shop maintenance.

2-31. The second focus is on managing the company maintenance program, operating a centralized tool room, and performing scheduled and unscheduled field-level maintenance. In coordination with other support elements, the Gray Eagle company conducts company-level FARP operations per ATP 3-04.17.

## **OPERATIONAL CONTRACT SUPPORT**

2-32. Operational contract support (OCS) is the process of planning for and obtaining supplies, services, and construction from commercial sources in support of combatant commander directed operations and combatant commander directed single-service activities regardless of designation as a formal contingency operation (JP 4-10). OCS is a multi-faceted, cross functional staff activity executed primarily by the combatant command, subordinate staffs, service components, theater special operations commands, and in some cases, functional components along with supporting combat support agencies.

2-33. Contractors play a key role in the Army's ability to support their mission and provide a responsive alternative to increasing the number of support personnel necessary to perform the mission. During each phase of an operation, contract support is used to augment the support structure. Contracting personnel establish their operations with, or near, the local vendor base to support deployed forces. Contract support bridges gaps that occur as military logistics support resources mobilize. Commanders and staffs must identify requirements for supplies and services early in the sustainment planning process to ensure that the operational

need is requested through the OCS process. For additional information on the OCS process refer to JP 4-10 and ATP 4-10/MCRP4-1H/NTTP 4-09.1/AFMAN 10-409-0.

## AVIATION SUPPORT COMPANY

2-34. The ASC performs scheduled and unscheduled field-level pass-back maintenance support to its supported units. The support company is capable of supporting CAB split-based operations. The support company consists of a HQ platoon, ARP, CRP, armament repair platoon, and avionics repair platoon (figure 2-4). The five platoons of the ASC perform similar functions as the corresponding maintenance company/troop platoons.

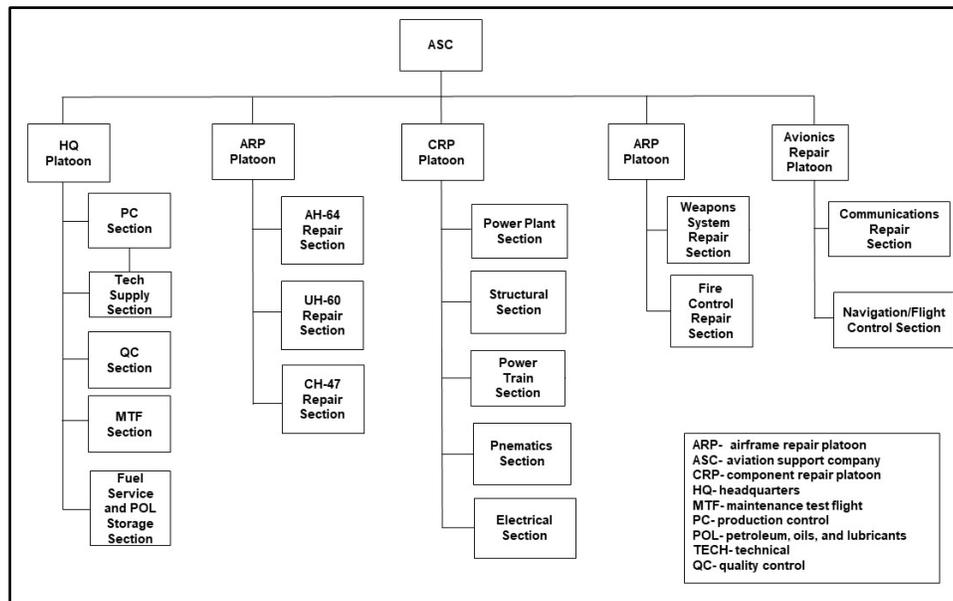


Figure 2-4. Aviation support company

## COMPANY HEADQUARTERS

2-35. The support company headquarters provides command and control (C2), administration, and logistics support required to conduct aviation maintenance operations. The commander has direct control over the company administrative functions. The commander coordinates training and operational matters and conducts consolidated training for low-density maintenance MOSs authorized within the support company. The commander is also responsible for the care, maintenance, and accountability of support company equipment. Key functions of the company headquarters include, but are not limited to—

- Performs route reconnaissance.
- Organizes the unit for movement and issues movement orders to support company personnel.
- Requests additional transportation through the ASB logistics staff officer.
- Maintains situational awareness and understanding of CAB aviation operations in coordination with the ASB intelligence or operations staff officer (S-3).
- Provides C2 of the support company in response to an air or ground attack.
- Coordinates base defense.
- Establishes communications.
- Coordinates CBRN readiness, maintenance, and defense.
- Information systems management.
- QC functions.

### **Production Control Section**

2-36. The designated ASC PC officer is the principal maintenance manager for the support company and is the single point of contact for internal and external logistics requirements. The PC officer coordinates sustainment-level maintenance support through the S-4 and/or SPO based on mission requirements. The support company PC office is responsible for establishing a formal SOP to maximize the efficient use of maintenance resources. PC performs the following:

- Receives and processes work requests.
- Coordinates, schedules, and prioritizes maintenance and shop workloads.
- Monitors the status of TMDE.
- Maintains the status of aircraft parts and shop reports.
- Materiel readiness.
- Coordinates inspections, MOCs, and MTFs.
- Returns repaired aircraft and equipment to supported units.
- Directs supply operations.

### **Quality Control Section**

2-37. The support company QC section is accountable directly to the support company commander, thereby eliminating potential conflicts of interest among the PC section, the maintenance shops, and the supported units. This accountability structure allows the inspectors to maintain objectivity in the performance of their inspection duties. QC should be composed of the most qualified and technically proficient maintainers. QC follows the priorities that PC provides and maintains constant communication pertaining to the status and progress of maintenance.

2-38. QC enforces aviation maintenance standards and manages the following areas:

- Component repair.
- Overhaul.
- Weight and balance.
- Modification.
- Compliance with AOAP.
- Compliance with safety-of-flight, AWR, ASAM, and other required maintenance functions.
- Oversight of compliance with safety regulations in maintenance areas and historical records.
- Master technical library.
- Quality deficiency reports.

### **Maintenance Test Flight Section**

2-39. The MTF section performs test flights on aircraft to troubleshoot problems, confirm repairs, and conduct initial break-in of major components. This section can perform scheduled MTF or limited test flight support after aircraft repairs are accomplished. This section also provides maintenance test pilot (MTP) and MTP evaluator support for MTPs throughout the CAB.

### **AIRFRAME REPAIR PLATOON**

2-40. The support company ARP primary role is to generate combat power by performing field-level maintenance, to include aircraft phase, scheduled, and unscheduled maintenance to support maintenance company/troop assigned aircraft. The support company ARP can also provide technical assistance and maintenance support when requested by the maintenance company/troop PC section and coordinated through the support company PC office. When requested by the support company PC section, the AMCOM LAR submits a written request authorization for repairs or deviations to the aviation engineer. If approval is granted, the aviation engineer provides a MEC letter of authorization (LOA) enabling the experienced maintainer to perform the maintenance repair.

2-41. The support company ARP is capable of supporting aviation units through contact maintenance teams using shop equipment. An ASC ARP FMT provide in-depth troubleshooting and diagnostics of aircraft systems, subsystems, and components.

2-42. The support company ARP has a headquarters and three repair sections. The headquarters has a 15D platoon leader and a 15-series platoon sergeant. The three repair sections are—

- AH-64 repair section.
- UH-60 repair section.
- CH-47 repair section.

### **COMPONENT REPAIR PLATOON**

2-43. The support company CRP is comprised of a HQ section, five shop sections, and three avionics repair sections. The HQ contains a platoon leader (15D), aviation maintenance technician (151A), and platoon sergeant (15K). The five CRP sections are power plant, structural, powertrain, pneudraulics, and electrical repair.

2-44. The support company CRP provides field-level maintenance support to its supported units. When requested by the support company PC office, the AMCOM LAR works with the maintenance engineer for a LOA enabling the support company CRP maintainers to perform tasks outlined within the maintenance engineering call. The CRP section is capable of supporting aviation units through contact maintenance teams using shop equipment contact maintenance vehicles. CRP FMTs provide support to all subordinate maintenance companies/troops and can extend support outside to other aviation units with approval from the support company PC office.

### **ARMAMENT REPAIR PLATOON**

2-45. The support company armament repair platoon has a headquarters and two sections. The headquarters contains an aviation maintenance technician (151A) and a platoon sergeant (15L). The two armament repair sections are fire control repair and weapons system repair.

2-46. The armament repair platoon is capable of supporting aviation units through FMTs. The armament's field maintenance team provide in-depth troubleshooting and diagnostics of weapon systems, subsystems, components and fire control radar repair.

### **Avionic Repair Platoon**

2-47. The avionic repair platoon has a headquarters and two sections. The headquarters contains an electronic systems maintenance warrant officer (948B) and a platoon sergeant (15L). The two avionic repair sections are communications equipment (94E) and flight control navigation (94R).

### **Technical and Shop Supply Section**

2-48. The support company technical and shop supply section is managed by MTOE by an aviation maintenance technician (151A). The support company technical supply section works in direct coordination with the PC office and is responsible for requisitioning, stocking, and issuing Class IX (Air) repair parts. This section has a technical supply officer and a section NCOIC. The technical supply officer and NCOIC monitor and direct the daily supply activity in support of all units assigned or attached to the support company. See chapter 8 for more information on supply operations.

### **Field Maintenance Teams**

2-49. An aviation unit's maintenance flexibility is enhanced through the formation of FMTs. Commanders deploy FMTs, parts, TMDE, and tools as far forward as feasibly possible to conduct maintenance. An aviation FMT is derived using the P4T3 concept to address maintenance requirements such as downed-aircraft recovery, BDAR, actions required for transporting aircraft as cargo, or on-aircraft system/component repairs. These teams could be enduring; a phase team that works together on multiple phase inspections is one

example. The team may also be short-lived; a team tasked to replace a single aircraft rotor blade is a short duration example. The concept provides as much flexibility to the commander as possible.

2-50. Efficiency in deploying the FMT requires commanders and leaders who fully understand the mission requirements. This includes information pertaining to the maintenance mission requirements, supported aircraft type and quantity to accurately plan, forecast, and compose FMT. FMTs provide a flexible capability to address specialized maintenance requirements without losing equipment resources for a long duration of time. FMTs can be used to conduct BDAR or during aircraft recovery. See ATP 3-04.13 for specific aircraft recovery operations.

2-51. The maintenance company/troop commander and PC OIC coordinate and schedule maintenance at forward locations of the battalion/squadron using the FMTs. The members of these forward elements must be able to diagnose aircraft damage or serviceability rapidly and accurately. FMT operations follow these principles:

- FMTs may be used for aircraft, structural, component, avionics, or armament repair.
- When time and situation allow, FMTs repair on site rather than evacuate aircraft; these repairs include BDAR.
- FMTs are transported by the fastest means available (usually by helicopter), or temporarily attached to supported units for extended repairs.
- FMTs may be oriented and equipped for special tasks to include recovery operations.

2-52. When employing contractor constructed FMTs, positioning them within the maintenance operational facilities can produce several consolidated teams in one location, multiple teams distributed across a geographic area, or a combination of heavy consolidation with some distributed teams. The aviation maintenance team addresses the contractor employment considerations in the logistics estimate and planning for the organization, and continually evaluates efficiencies to determine any required adjustments. Establishing separate geographical FMTs affects maintenance productivity in other locations.

2-53. FMTs move by ground or air to recover or repair the aircraft and return to an assembly area. These teams plan to move from the support area to the consolidation area and then return. Their security during movement is entirely dependent on mission variables, and commanders task organize security forces for FMTs.

## **SECTION II – STRATEGIC MAINTENANCE PARTNERS**

2-54. Strategic maintenance partners assist units with maximizing available sustainment functions. Strategic maintenance partners are important sustainment enablers that assist units with remediating sustainment gaps in areas such as repair parts, personnel shortages, and equipment requirements. This section covers aviation-related strategic maintenance partners.

## **UNITED STATES ARMY MATERIEL COMMAND**

2-55. The United States Army Materiel Command (USAMC) mission is to provide superior technology, acquisition support and logistics to ensure dominant land force capability for Soldiers, the United States, and its allies. The USAMC operates research, development, and engineering centers, the Army Research Laboratory, sustainment facilities, arsenals, ammunition plants, and other facilities. Subordinate commands provide specific aviation support within the USAMC structure. These commands include AMCOM and CECOM. For more information see AR 10-87.

2-56. The USAMC—

- Equips and sustains the Army and provides support to the Joint Force pursuant to Title 10, United States Code (USC).
- Acts as the Army's logistics integrator.
- Is responsible for the Army's logistics mobilization and contingency capability and capacity. It also maintains and stores assigned war reserve stocks, prepositioned stocks, and activity sets.

- Is responsible for lifecycle sustainment for assigned programs of record and provides integrated materiel life cycle management of systems and equipment in partnership with program executive offices and program/project/product managers.
- Supports capability and materiel developers with materiel supportability analysis in the requirements determination process.
- Provides basic and applied research, development, and engineering through laboratories and research, development and engineering centers, leading to new and improved operational capabilities, and facilitates technology transition and integration into current capabilities.
- Exercises C2 over the Army organic industrial base (arsenals and depots).
- Commands assigned forces and establishes command and support relationships through subordinate commanders to build and sustain readiness.
- Supports planning and execution of transformation, integration, concept development, and experimentation activities to shape the Logistics Future Force.
- Supports the execution of operations plans, contingency plans, contingency operations, joint training, joint exercises, and joint experimentation with ready and responsive forces.
- Provides and executes installation logistics requirements, services, and strategic power projection at posts, camps and installations.
- Acts as the national-level sustainment maintenance process owner.
- Manages and executes installation and procurement contracting support; provides expeditionary and contingency contracting to the Army Service Component Commands and combat commands at the strategic and operational level and provides C2 for contracting missions.
- Provides materiel and services to other nations through the security assistance programs that support the combat commander's theater security cooperation strategies and plans.
- Manages and executes the Army's Logistics Civilian Augmentation Program.
- Is the Department of Defense Executive Director for conventional ammunition and exercises mission command over the Armaments Industrial base.
- Manages and executes the Army's standardization program as the Army Standardization Executive.
- Provides bulk petroleum (Class III [B]) requirements planning and mission execution support for Army expeditionary and installation operations worldwide.
- Acts as the Army's Treaty Implementing Agent for management and compliance with the Chemical Weapons Convention, provides centralized management for assessment and destruction of Recovered Chemical Warfare Materiel, and oversees the Army Chemical Stockpile Emergency Preparedness Program.
- Is the authoritative source of certified system level performance data, joint service authenticated weapons effects data, and the associated systems analysis to enable critical acquisition and sustainment decisions across the materiel lifecycle.
- Recommends procedures for reviews and implementation of corrective actions to support the Engineering for Transportability program.
- Manages *The Defense Production Act of 1950* (50 USC 4501) responsibilities and the Diminishing Manufacturing Sources and Material Shortages Program as the Army's Executive Agent.
- Manages and administers the Government Industry Data Exchange Program as the Army's Executive Agent.

## UNITED STATES ARMY AVIATION AND MISSILE COMMAND

2-57. AMCOM is a major subordinate command of the USAMC. It is responsible for commodity management of aeronautical equipment, including—

- Design, research, and development.
- Maintenance engineering.
- Supply and stock control.
- Logistics assistance for all Army Aviation and aerial delivery equipment.

- Provides the logistics assistance program (LAP) program to the field.
- Provides oversight on the maintenance consolidated database system to track parts and help manage maintenance programs.
- AWR authority for the field (MWOs, safety-of-flight, and ASAMs).

2-58. AMCOM has direct operational control of the NMP sources of repair, Corpus Christi Army Depot, Letterkenny Army Depot, Aviation Field Maintenance Directorate, and new equipment training teams.

### **CORPUS CHRISTI ARMY DEPOT**

2-59. Corpus Christi Army Depot is the Army's organic facility for the repair and overhaul of RW aircraft. Corpus Christi Army Depot provides worldwide readiness, sustainment, and training support for all Army RW aircraft. Corpus Christi Army Depot partners with industry to overhaul, repair, modify, retrofit, and modernize Army aircraft and related engines and components. Corpus Christi Army Depot also provides hands-on training for Reserve, National Guard, and active-duty personnel. On a case-by-case basis, Corpus Christi Army Depot provides additional on-site sustainment maintenance support for crash damage analysis and repair. Sustainment maintenance is employed primarily in the Continental United States; however, it projects itself worldwide through maintenance support teams using organic assets and through contract programs.

2-60. Corpus Christi Army Depot provides the following maintenance support:

- Overhauls, repairs, modifies, retrofits, and modernizes aircraft systems.
- Maintains a mobilization and training base to provide capability for missions.
- Provides maintenance support services for aeronautical equipment worldwide.
- Provides project development and design services for special projects, as assigned.
- Provides worldwide telephone hotline and on-site technical assistance for the inspection, maintenance, and repair of customer aircraft and engines.
- Provide Soldier development through LAR University.

### **LETTERKENNY ARMY DEPOT**

2-61. Letterkenny Army Depot provides a variety of support to the Army. AH-64 target acquisition designation sight/pilot night vision sensors and aviation ground power units (AGPUs) are two aviation-specific systems that are overhauled and returned to the NMP. AGPU reset and overhaul are functions of the service life extension program. Letterkenny Army Depot also provides sustainment-level maintenance for Hellfire launchers and air-to-air Stinger pressure bottle refurbishment.

### **AVIATION AND MISSILE COMMAND FIELD MAINTENANCE DIRECTORATE**

2-62. Aviation and Missile Command Field Maintenance Directorate (AFMD) manages the Army's regional aviation field maintenance contracts supporting commanders throughout all phases of the sustainable readiness model. AFMD support sustainment actions across enduring services and non-enduring services.

### **Enduring Services**

2-63. The following is a list of enduring services provided by AFMD:

- Unit field-level maintenance support mobilization support.
- Back shops and AGSE support.
- Installation and regional support.
- Aircraft modifications.
- NMP.
- Airframe condition evaluation.
- Multi-modal strategic movement support.
- AFM contract management/oversight.
- Foreign military sales support.

- Mobilization support.
- LUH maintenance support.

### Non-Enduring Services

2-64. The following is a list of non-enduring services provided by AFMD:

- Aircraft and sub-system reset.
- Unit-maintained equipment support.
- In-theater contract oversight.
- Army Aviation Assessment Team.
- Trans-modal movement support.
- FORSCOM training support.

2-65. AFMD has a Logistics Readiness Center-Aviation collocated with each CAB and forward deployed in Germany. The Logistics Readiness Center-Aviation consist of personnel (general services and contractor), facilities, and specialized tooling not organic in the CAB that support the installation's tenant/non-tenant units. Aviation-specialized tooling often mimics the installation's Directorate of Logistics ground tools capabilities. These specializations include dedicated hangar/workspace, aircraft/component painting and stripping, flexible engine diagnostic system, aircraft wash racks, blade and composite repair, and unique aviation component repair tools. Collectively, the Logistics Readiness Center-Aviation and Directorate of Logistics assist in augmenting a CABs maintenance shortfall within the active component.

2-66. The Logistics Readiness Center-Aviation along with other contracted support sites fall under the operational control (OPCON) of the regional aviation sustainment managers (RASMs) for two regions. RASM-East, headquartered at Fort Campbell, Kentucky, is responsible for coverage east of the Mississippi. This area covers United States Army Central, United States Army Europe, United States Army Africa, and United States Army South commands. RASM-West headquartered at Fort Hood, Texas, is responsible for coverage west of the Mississippi. This area covers United States Army North and Indo Pacific Command. Headquarters for AFMD program offices is Redstone, Alabama.

### NEW EQUIPMENT TRAINING TEAMS

2-67. The Logistics Assistance and New Equipment Training Division is a subordinate division of the Directorate of Readiness. Its mission is staff supervision and operational control of worldwide LAPs for Army aircraft and related support equipment. The division also provides representatives to make command staff visits and manage all aspects of new equipment training and support services.

2-68. Army aircraft mobile training teams consist of specialists or contract technical services personnel trained in the support of a particular aircraft. These teams are controlled by AMCOM and assist the commander in improving the proficiency of maintenance personnel at the maintenance company/troop and support company. When the team completes a job, it prepares and forwards a report to AMCOM with consolidated findings.

### DEFENSE LOGISTICS AGENCY

**2-69.** DLA provides supply support and technical and logistics assistance to the SPO cell in the ASB and battalion/squadron technical supply officers. DLA manages, stores, and distributes hardware and electronics used in the maintenance and repair of equipment and weapons systems.

2-70. DLA maintains three supply centers in the following locations:

- Defense Supply Center-Richmond, Virginia.
- Defense Supply Center-Columbus, Ohio.
- Defense Supply Center-Philadelphia, Pennsylvania.

2-71. Defense Supply Center, Richmond, Virginia is the designated aviation supply chain manager and can be found on the DLA website.

2-72. With internet access to Defense Supply Center (Richmond), the following functions are possible:

- View current flight safety critical parts list.
- Input requisitions through direct online ordering option; using this option does not preclude inputting/submitting the requisition into the user appropriate command requisitioning system.
- Query the system for back-ordered items.
- Access the asset visibility system.

2-73. Defense Supply Center (Philadelphia) is the Soldier support and construction supply manager providing food, clothing, textiles, medicines, medical equipment, and construction supplies and equipment. The general and industrial commodities (nuts and washers, bolts and studs, screws, packing and gaskets, pins, rivets, and springs), are managed by Defense Supply Center (Columbus) and Defense Supply Center (Richmond) locations. DLA and the General Services Administration websites provide material researching support for the BAMO to use in tracking and managing sustainment, maintenance, and supply transactions. These websites are found in the reference section of this publication.

## **ARMY COMMUNICATIONS-ELECTRONICS COMMAND**

2-74. The CECOM mission is to provide, integrate, and sustain command, control, communications, computers, intelligence, surveillance, and reconnaissance readiness to enable unified land operations. CECOM controls and operates Tobyhanna Army Depot. Tobyhanna Army Depot is the largest, full-service electronics maintenance facility in DOD. Tobyhanna Army Depot's mission is to provide superior logistics support, sustainment, manufacturing, integration, and field support for command, control, communications, computers, intelligence, surveillance, and reconnaissance systems for the Joint Warfighter-Worldwide. Levels of support encompass total sustainment, design, repair, and overhaul of hundreds of electronic systems. These include satellite terminals, radio and radar systems, telephones, electro-optics, night vision and anti-intrusion devices, airborne surveillance equipment, navigational instruments, electronic warfare, guidance, and control systems for tactical missiles, and Blue Force Tracking installation kits.

## **THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP**

2-75. The theater sustainment maintenance program consists of the theater sustainment maintenance HQ and four TASMGS. The locations of the HQ and TASMGS are—

- Theater sustainment HQ is Edgewood, Maryland.
- 1106th TASMG is Fresno, California.
- 1107th TASMG is Springfield, Missouri.
- 1108th TASMG is Gulfport, Mississippi.
- 1109th TASMG is Groton, Connecticut.

2-76. The TASMG mission in the Continental United States is to provide sustainment maintenance, including limited depot capabilities and backup field maintenance support to each regionally supported Army aviation support facility. TASMG deployed mission is to provide a forward deployable dedicated theater aviation sustainment/depot minus capability that supports AMC, AMCOM, and the deployed CABs. TASM-G may assist in port-opening operations but is not solely responsible for this function. TASMG can support manned and unmanned aviation assets.

2-77. The TASMG consists of a—

- Headquarters and headquarters company.
- ASC.
- Group support company.

2-78. The TASMG provides theater-level support for all aviation sustainment and maintenance requirements, including—

- Sustainment maintenance of airframes and components in theater as directed by USAMC.
- Field-level maintenance to support theater surge requirements.
- Repair and return of depot-level repairable components to the theater ASL.

- Selected depot-level airframe repair.
  - Oil analysis.
  - Calibration of TMDE.
  - Limited rapid parts fabrication capability and selective circuit card repair.
- 2-79. The theater aviation maintenance program tasks executed by the TASMG are—
- Provides technical assistance.
  - Provides limited sustainment and backup field maintenance.
  - Supports the sustainment classification mission.
  - Assists units in reception, staging, onward movement, and integration (RSOI) at aerial ports of debarkation and/or seaports of debarkation.
  - Provides FMTs.
  - Validates estimated cost of repair.
  - Provides application of MWO.
  - Forecasts and supports theater aviation maintenance surge requirements.
  - Provides special test and troubleshooting capability.
  - Establishes/manages staging areas, wash points, and inspections.
  - Repairs crashed or battle-damaged aircraft.
  - Facilitates and coordinates engineer requirement and authorization repair support.

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## Chapter 3

# Aviation Maintenance Operations

*“The line between disorder and order lies in logistics...”*

Sun Tzu

Aviation maintenance operations are often dynamic thus requires the consistency of engaged and knowledgeable leaders. A successful maintenance program requires the consistency, presence, and active involvement from leaders from the brigade down to the platoon level of operations.

### SECTION I – AVIATION LEADERSHIP

3-1. Aviation maintenance operations involve a variety of maintenance roles and responsibilities within a CAB. This section covers key leadership, aviation maintenance leaders, and staff roles involved in facilitating aviation maintenance operations.

#### BRIGADE COMMANDER

3-2. The brigade commander enforces maintenance standards according to applicable regulatory policies and procedural guidance. They prioritize and allocate resources, provide training guidance, and retain responsibility for safely executing the maintenance mission through sound material readiness practices.

3-3. As the overall leader, the brigade commander sets the maintenance priorities for their subordinate units in support of mission requirements, balances operational pace/tempo against maintenance and sustainment capabilities, and resources their subordinate maintenance structure to assure high ratings across the MOE. The S-4 distributes the MOE roll-up reports from the brigade’s BAMO or AMO for review, consideration, and usually lead aviation resource council meetings to ensure a common picture and vision for the entire maintenance team. Additionally, when MOE require reinforcing, the brigade commander applies assets and resources to achieve the desired results in concert with his aviation maintenance team vision.

#### BATTALION/SQUADRON COMMANDER

3-4. Battalion/squadron commanders execute the brigade commander maintenance priorities in support of mission requirements, balance operational pace/tempo against maintenance and sustainment capabilities, and resource their subordinate maintenance structure to assure high ratings across the MOE. They receive the MOE roll-up reports from the maintenance company/troop or support company commanders for review, consideration, and submission to the BAMO. When MOE require reinforcing, these commanders directly apply assets and resources appropriately to achieve the desired results.

#### AVIATION SUPPORT BATTALION COMMANDER

3-5. The ASB commander executes the brigade commander’s maintenance priorities, providing maintenance augmentation to aviation battalions and ground field maintenance, network communications, resupply, and medical support in support of mission requirements.

#### MAINTENANCE AND SUPPORT COMPANY/TROOP COMMANDER

3-6. The company/troop commander plans, directs, and supervises the operations and employment of the company/troop through skilled application and synthesis of all unit Soldiers and assets to achieve the MOE

goals established by their higher commanders. These leaders provide the battalion and squadron commanders with status and recommendations regarding all maintenance operations of their unit and serve as the single point of entry for all issues related to maintenance in support of their parent organizations. They are the primary advisor to their battalion or squadron commanders regarding all maintenance issues. Maintenance and support company and troop commanders present the MOE reports to the battalion or squadron commander identifying progress, negative trends, and required resources to maintain or improve the MOE. Maintenance and support company and troop commanders make direct coordination with battalion and squadron staff sections in pursuit of MOE goals.

## SECTION II – AVIATION MAINTENANCE LEADERS

### BRIGADE AVIATION MAINTENANCE OFFICER

3-7. The BAMO advises the brigade commander on maintenance personnel management, supply, equipment, and facility assets to maintain and repair Army RW, FW, and unmanned aircraft. The BAMO helps organize maintenance elements in support of CAB operations by providing expertise in preparing, implementing, and maintaining SOPs for management of maintenance activities. The BAMO participates in internal maintenance evaluations organized by the support operations section and conducted by subordinate commands. The BAMO works together with each supported element's PC OIC, operations, logistics, and support operations personnel as a key supporting member of the maintenance team.

3-8. BAMOs provides aviation sustainment analysis to the operations and logistics officer during all planning processes. They identify and address unit maintenance capability gaps with respect to doctrine, organizational, training, logistics, and facilities. In concert with the ASB, ASC, and AMC/AMT commanders and the PC OIC, the BAMO recommends actions and forecasts future capabilities based on the existing maintenance posture.

3-9. The BAMO assists in interpreting regulations, TMs, and orders pertaining to sustainment actions for Army aircraft for commanders and subordinates. The BAMO office provides continuous maintenance and logistical information to the brigade commander and staff on aviation and aviation-related systems matters. The BAMO keeps the command informed of current and future capabilities based on the current maintenance posture.

3-10. In coordination with the entire aviation leadership team, the duties and responsibilities of the BAMO also include the following:

- Acts as primary advisor for aircraft maintenance and related readiness reporting requirements.
- Coordinates and submits the CABs monthly army materiel systems status report.
- Responds to all levels of staff concerns regarding aviation maintenance and execution of the maintenance plan.
- Coordinates brigade-level aviation ARMS requirements.
- Serves as a member of the Brigade Maintenance Readiness Review.
- Serves as principal staff advisor to develop and maintain aircraft logistics and deployment resource planning requirements.
- Serves as a senior aviation maintainer responsible for standardization of all maintenance training and evaluations.
- Assists in determining composition of the deployment or redeployment team.
- Monitors the deployment execution and provides procedural guidance when necessary.
- Consolidates the MOE reports as necessary to ensure maintenance situational awareness to the brigade commander and staff.
- Monitors and advises commanders at all levels on—
  - Sustainment and combat retrograde MWO.
  - Nonstandard equipment applications such as an airworthiness release, statement of airworthiness qualification, or LOA.
  - Organizing aircraft recovery missions (ATP 3-04.13).

- TMDE compliance (AR 750-43).
  - AOAP compliance (AR 750-1).
  - Facilitates effective scheduled maintenance forecasting and planning with all CAB assets in support of mission requirements, the flying-hour program, and the MOE bank time goals.
  - Tracks, advises, and reports on performance goals in Classes III/IIIP, V, and IX (Air).
  - Assists in the development of SOPs.
  - Participates in United States Army Training and Doctrine Command (TRADOC) doctrine development and review.
  - Supports sustainment policy development.
  - Organizes routine aviation readiness councils, conference participation or maintenance meetings.
  - Monitors maintainer utilization and effectiveness.
  - Monitors sustainment information system (GCSS-Army and aircraft notebook) execution and discipline.
  - Ensures adherence to applicable TM, Army regulations, doctrinal publications, and maintenance safety messages.
  - Serves as an evaluator during the CABs internal maintenance ARMS inspections.
  - Assists units in coordinating maintenance procedures for nonstandard repair applications between a LAR, original equipment manufacturer, CFSR, or the specified project management office.
  - Coordinates with logistics readiness center for any additional maintenance support.
- 3-11. If appointed as contracting officer representative (COR) or administrative COR, the BAMO—
- Participates in Army command contractor staffing missions.
  - Helps project contractor-staffing levels to meet additional maintenance requirements.
  - Monitors brigade aviation resource management, to include the—
    - Flying-hour program execution and effect on the allocated Class IX (Air) budget.
    - Contracting resources.
    - GSE maintenance.
    - Nonstandard equipment acquisition and sustainment funding.

**GOVERNMENT FLIGHT REPRESENTATIVE**

3-12. The BAMO can execute duties as the government flight representative, COR, or the administrative COR if the need arises. This requirement may become the responsibility of the BAMO if contractors conduct maintenance on aircraft and other organizational equipment. Performance of the government flight representative responsibility is essential if the primary providers of the contract maintenance support are not collocated with the unit in garrison or while deployed from home station.

3-13. Life support requirements outlined in the contractor’s contract are the oversight responsibility of the government flight representative, COR, or administrative COR assigned to a CAB. The BAMO performing any of these roles remains responsible for managing those related contractors and providing for their overall welfare.

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*Note.* Refer to ATP 4-10/ MCRP4-1H/NTTP 4-09.1/AFMAN 10-409-0 for further guidance on assigned contractors tasked with providing aviation maintenance and logistics support. Refer to AR 95-20 for the government flight representative responsibilities.

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**AVIATION READINESS REPORTING CAPABILITIES**

3-14. The BAMO is responsible for ensuring that the monthly Army materiel systems status is submitted on time to the Logistics Data Analysis Center (LDAC). The SPO’s aviation materiel officer shares in this responsibility by tracking the submission process to assist with the immediate remediation of any sustainment information system’s related impact.

## MANAGING AIRCRAFT AND WEAPONS SYSTEMS

3-15. When aircraft or weapons systems require any modifications, improvements, or upgrades, the BAMO is responsible for coordinating and managing all efforts to ensure smooth maintenance and logistics support between unit personnel and representatives executing the modifications, improvements, and upgrades. These responsibilities include—

- Coordinating new equipment training for maintainers and operators when required.
- Assisting commanders in determining how equipment and weapons system improvements are going to affect the unit-assigned mission.
- Assisting units with coordinating and arranging a systematic flow of aircraft into maintenance for scheduled modifications, upgrades, and improvements.
- Tracking the status of all aircraft and weapons system undergoing modification, improvements, or upgrades.
- Ensuring availability of up-to-date technical information to maintain improved and upgraded systems.
- In concert with the support operations section, ensuring all required parts for systems upgrades are on-hand well in advance of the arrival of the representatives who conduct the maintenance actions.
- Ensuring CAB personnel follow policies and procedures to secure the updating of pertinent forms and records to reflect the addition of new items and deletion of replaced items.
- Coordinating the simultaneous completion of multiple MWOs for impacted equipment.

## COORDINATING AUTOMATED ACTIONS

3-16. The BAMO retrieves reports from the on-hand sustainment information system. These reports provide the BAMO with the flexibility to go into the automated system and retrieve any reports needed to support the brigade mission. The BAMO coordinates with the sustainment automation support management office (SASMO) for support needed by the BAMO. The BAMO monitors maintenance man-hours, aircraft repair parts and components, maintenance work orders, and aircraft historical data using functions associated with the sustainment information system such as GCSS-Army.

## BATTALION AVIATION MAINTENANCE OFFICER

3-17. The AMO advises the battalion/squadron commander on maintenance personnel management, supply, equipment, and facility assets to maintain the commander's fleet of aircraft. The battalion/squadron AMO is the conduit for the battalion/squadron to the brigade on all maintenance requirements and works with the BAMO and ASB commander on developing the CABs phase plan. As the battalion/squadron maintenance examiner the AMO is the standardization officer for the maintenance test pilots (MTPs) and is responsible for training, development, and evaluation of the battalion's MTPs. The AMO provides QC for the MTP through the commander's standardization program. They also provide expertise in preparing, implementing, and maintaining SOPs for management of maintenance activities. Additionally, the AMO participates in internal maintenance evaluations organized by the support operations section and conducted by subordinate commands.

3-18. The AMO interprets regulations, TMs, and messages pertaining to maintenance and sustainment actions of Army aircraft for commanders and subordinates. The AMO provides continuous logistical information on maintenance actions to the battalion commander and staff on aviation and aviation-related systems to include tracking information of aircraft repair parts affecting the OR posture of assigned aircraft. The AMO keeps the command informed of current and future capabilities based on the current maintenance posture. They also assist maintenance companies and troops in planning maintenance actions based on operational necessities.

3-19. The AMO assists the PC officer as an additional MTP to support unit aircraft as well as tracking requisitions that are keeping the aircraft in a NMCS status. The AMO monitors the TMDE program to ensure the unit's calibration program meets the DA standards.

3-20. The AMO conducts the following maintenance examiner (ME) responsibilities for the battalion:

- MTP training and progression.
- Annual proficiency and no-notice MTP evaluations.
- Monitors the MOS sustainment and technical training for the maintainer and nonrated crewmember training.

3-21. The AMO participates in the battalion aviation standardization programs, to include the following:

- Ensures training flight hours include maintenance training.
- Oversees the planning and development of MOS sustainment and technical training for the maintainer and nonrated crewmember training.
- Identifies the high frequency/critical maintenance task that needs to be trained.
- Ensures standardization of all aviation maintenance training, evaluations, and record keeping for all assigned maintenance personnel.
- Plans and develops nonrated non-crew member performance standards.
- Plans and develops maintainer performance standards.

3-22. The AMO monitors battalion aviation resource management, to include the following:

- Flying-hour program execution and effect on allocated Class IX (Air) budget.
- If appointed as COR, —
  - Participates in Army command contractor staffing missions.
  - Helps project contractor-staffing levels to meet additional maintenance requirements.
- AGSE maintenance.
- Aviation life support equipment resources.
- Nonstandard equipment acquisition and CSS funding.
- Equipment purchase and sustainment.

3-23. The AMO is the senior maintenance officer in the battalion and is part of the battalion's special staff. The AMO position is a chief warrant officer four ME assigned by MTOE/tables of distribution and allowances (TDAs). Refer to DA PAM 611-21 to determine who is authorized to fill AMO positions.

## **MAINTENANCE TEST PILOT**

3-24. MTPs manage and execute the unit commander's maintenance program. They provide advanced troubleshooting skills within their specific aircraft MDS to facilitate efficient repairs and maintenance and are responsible for conducting maintenance test flights to determine the airworthiness of the unit's aircraft. Per AR 95-1, TM 1-1500-328-23, and the applicable MTF manual, qualified personnel perform all MTFs and MOCs according to specific aircraft TMs. They are primary advisors and are appointed by the unit commander to fill maintenance specific MTOE positions within the CAB. The MTP serves as the primary advisor to the commander on all issues related to the AMTP. Selected MTPs fill ME positions to train, develop, and evaluate unit MTPs to enhance skills and proficiency.

## **MAINTENANCE PLATOON AND SECTION LEADER**

3-25. Maintenance platoon and section leaders ensure the operation of their respective platoon or section supports unit mission goals, priorities, and MOE. They must understand and ensure standardization according to regulations and publications and monitor maintenance procedures for strict compliance with the TMs. They constantly receive reports, monitor progress, and provide specific missions and tasks to their warrant officers and NCOs. They track and report the movement of the MOE assessment in support of their commander guidance and actively pursue necessary resources to ensure and improve platoon performance. They are the senior advisor to the PC officer and retain control over the employment of their formations in support of mission accomplishment. The platoon leader provides administrative direction for the platoon as well as serves as the primary resource manager for their organizations ensuring accountability, maintenance, and serviceability of assigned assets.

## **AVIATION MAINTENANCE TECHNICIAN**

3-26. Aviation maintenance technicians are technical experts and managers responsible for directing daily aircraft system maintenance, component repair, technical and property supply, and armament operations for their assigned units. Aviation maintenance technicians assist with ensuring regulatory compliance through management oversight and technical interpretation in completing maintenance tasks, maintenance forms/records, parts requisitioning, associated aviation specific support equipment actions, and readiness-reporting requirements. Aviation maintenance technicians ensure the proper usage of all associated maintenance tools and test, measurement, and diagnostic equipment (TMDE) during fault isolation tasks. This includes ensuring that QC procedures are in place and executed during aviation maintenance actions. Aviation maintenance technicians serve as key aviation maintenance advisors to the commander from the maintenance company/troop, support company, and serve in key maintenance positions such as assistant support company PC officer, Division G-4, Corps G-4, FORSCOM G-4, HQ DA G-4, Theater Sustainment Command SPO, and under special considerations determined by the ASB commander, facilitates the duties of the aviation materiel officer within the ASB SPO.

## **NONCOMMISSIONED OFFICER**

3-27. Noncommissioned officers play vital roles in advising and directing aviation maintenance operations.

### **COMMAND SERGEANTS MAJOR**

3-28. As the senior enlisted leader, the command sergeant major ensures the right NCO leaders and Soldiers receive assignment to the appropriate positions. With their extensive background, they serve as the primary advisor to the battalion, squadron, or brigade commander on all issues related to Soldiers assigned to maintenance positions and units. Additionally, the CSM participates in TRADOC doctrine development and review processes. Commanders always consider CSM input when formulating decisions against the maintenance MOE.

### **FIRST SERGEANT**

3-29. Company/troop first sergeants serve as the senior enlisted advisor to the maintenance company/troop or support company commander. First sergeants assist the CSM with managing maintenance talent through advising and recommending talented NCO and/or Soldiers for maintenance positions/assignment. With their extensive background, they serve as the primary advisors to the company or troop commander on all issues related to Soldiers assigned to maintenance positions and units. Commanders consider their input when formulating decisions against the maintenance MOE. The first sergeant also directs the headquarters operations supporting administrative functions of the company or troop.

### **PLATOON SERGEANT**

3-30. Platoon sergeants direct the performance of assigned Soldiers through their section sergeants. Platoon sergeants serve as first-line supervisors, responsible for ensuring all assigned aircraft receive maintenance according to regulatory policies, standards, and procedures. Platoon sergeants are responsible for the training and development of the NCOs and soldiers within their platoon. Platoon sergeants ensure accountability of all platoon resources and that maintenance operations meet or exceed the established MOE. The platoon sergeant ensures platoon/shop personnel are familiar with the latest aircraft and component TMs and changes affecting maintenance and repair procedures. They prepare reports supporting the MOE for the platoon leader to review for presentation to the commander and manage the work-order load. Additionally, they perform administrative support functions for the platoon in concert with the platoon leader. Platoon leaders consider platoon sergeant input when formulating decisions and making maintenance recommendations to the commander.

### **SECTION SERGEANT**

3-31. The section sergeant monitors individual Soldier activities and assists with new or unfamiliar tasks. Section sergeants are the primary trainers who conduct the MOS sustainment training of Soldiers within their

section. Section sergeants mentor Soldiers on procedures and their connection with the maintenance MOE. They assess, develop, and counsel individual Soldiers to ensure appropriate progression, growth, and skill improvement. Section sergeants ensure Soldiers under their charge complete required individual tasks related to aviation maintenance operations and the MOE.

### **TEAM LEADER**

3-32. Team leaders have overall responsibility for assigned scheduled/phase maintenance operations. They coordinate special tools, repair parts, and personnel to facilitate and expedite maintenance actions.

### **ADDITIONAL MAINTENANCE STAFF ROLES**

3-33. Aviation organizations have a variety of unique staff to assist the commander in managing the production and quality of aviation maintenance.

### **PRODUCTION CONTROL OFFICER AND NONCOMMISSIONED OFFICER-IN-CHARGE**

3-34. The PC OIC is the principal maintenance manager and coordinator in the maintenance company/troop or support company and coordinates maintenance at the company/troop and battalion/squadron level. The PC OIC is the maintenance company/troop or support company commanders' primary maintenance advisor for all internal production and maintenance activities. The PC OIC in the support company also serves as the second in command for those organizations and must possess sufficient maintenance experience and background to direct these large operations, as well as command the support company in the commander's absence.

3-35. The PC NCOIC coordinates all maintenance actions in the absence of the PC OIC. The PC NCOIC assists the PC OIC; and in the PC OIC absence, coordinates and establishes priorities of work with QC, ARP, CRP, technical supply, and maneuver companies as required. See chapter 3 for additional details regarding PC activities.

### **QUALITY CONTROL OFFICER AND NONCOMMISSIONED OFFICER-IN-CHARGE**

3-36. The QC OIC is responsible for the internal management of the QC section to include quality assurance of all work performed by the technical inspectors (TIs). The QC OIC coordinates priority of work with the unit PC OIC/NCOIC. To avoid conflict of interest, the QC OIC is accountable to the commander.

3-37. The QC NCOIC is responsible for the operational management of the QC section. The NCOIC assists the QC OIC in coordinating and establishing priority of work with the PC OIC. The QC NCOIC is responsible for the technical training and development of the TIs in the shop. The NCOIC distributes the work and supervises the TIs for quality assurance of work assigned. See chapter 4 for additional details regarding QC activities.

### **TECHNICAL AND SHOP SUPPLY OFFICER AND NONCOMMISSIONED OFFICER-IN-CHARGE**

3-38. The technical supply officer is responsible for and performs oversight of the internal management and daily operations of the technical supply section, to include requesting, processing, issuing, stocking, and turn-in of Class IX (Air) repair parts, special tools, and components. The officer coordinates high-priority urgency of need designator (UND) A and B parts requests with the unit PC OIC. If authorized by the commander, the OIC certifies and authorizes all high-priority Class IX (Air) requests. The technical supply OIC balances the unit Class IX (Air) budget in detail for review by the commander.

3-39. The technical supply NCOIC coordinates high-priority (UND A and B) requisitions with the technical supply officer. The NCOIC directs and supervises all technical supply actions assigned to the logistics clerks. The technical supply NCOIC is responsible to the technical supply officer. See chapter 7 for additional details regarding technical supply activities.

## SECTION III – SUPPORT OPERATIONS SECTION

3-40. The ASB commander is the designated senior logistician, logistics operator, and advisor for support to the CAB. The SPO staff is a part of the ASB and provides logistics oversight and management in support of the CAB's mission.

### DUTIES AND RESPONSIBILITIES

3-41. The support operations staff executes total logistics oversight over its support organization's readiness through logistics synchronization meetings, logistics running estimates, and reporting processes for the brigade (ATP 4-33). The SPO coordinates with the brigade logistics officer and the BAMO to establish maintenance priorities and resolve logistics support issues under the supervision of the ASB commander. Under the direction of the SPO, this section provides centralized, integrated, and automated C2 planning for logistics operations within the battalion. The support operations section interfaces with the Army field support's brigade logistics support team for assistance expediting materiel and prioritizing logistics representative support. The primary concern of the support operations section is customer support and increasing the responsiveness of support provided by subordinate units. This section continually monitors the support and advises the battalion commander on the ability to support future tactical operations.

3-42. The support operations section's aviation materiel officer coordinates and executes the CAB's internal annual ARMS inspections for each aviation support and maintenance company/troop. The support operations section aviation materiel officer collects, consolidates, and archives tri-annual maintenance unit ARMS progress reports for command review. Along with this function, the support operations aviation materiel officer assists with coordinating the semi-annual logistics award councils and serves as an advisor during the award preparation and submission processing.

3-43. With in-transit visibility (ITV)/total AV, battle command sustainment and support system (BCS3), joint battle command-platform, and the maneuver control system, the support operations section has access to significant, useful information and receives such information in near-real time. This access allows support operations personnel to identify problems quickly and allocate resources efficiently. BCS3 provides support operations with the visibility of the logistics status from the ASB back to theater level. This staff section serves as point of contact (POC) for supported units and directs problems to appropriate technical experts within subordinate branches. The support operations section—

- Conducts continuous logistics support analysis.
- Plans and coordinates aerial resupply and plans for landing zones in the vicinity of the BSA.
- Develops the sustainment synchronization matrix.
- Submits sustainment forecasts to the sustainment brigade support operations/distribution management center.
- Manages all flat-racks throughput to and retrograding from the BSA.
- Coordinates and provides technical supervision for the ASB sustainment mission, which includes supply activities, maintenance support, and coordination of transportation assets.
- Identifies tentative force structure and size to be supported.
- Coordinates the preparation of the support operations estimate on external support.
- Provides support posture and planning recommendations to the ASB commander.
- Sets up and supervises the logistics operations center.
- Provides centralized coordination for units providing external support to the brigade.
- Coordinates with the CAB S-3 for air routes for supply and medical support.
- Analyzes the effect of BCS3 reports.
- Advises the battalion commander on the status of logistics support.
- Coordinates logistics support for units passing through the brigade area.
- Analyzes contingency mission support requirements.
- Revises customer lists (as required by changing requirements, workloads, and priorities) for support of tactical operations.

- Coordinates external logistics support provided by subordinate units.
- Advises the battalion commander on the supportability of ASB missions and of shortfalls that may affect mission accomplishment.
- Serves as the single point of coordination for supported units to resolve logistics support problems.
- Plans and coordinates contingency support.
- Develops supply, service, ground maintenance, and transportation policies.

3-44. The SPO performs functions as the BCS3 manager. The SPO must work with all staff officers to establish and manage the BCS3 network and database. The SPO must maintain field level supply point, and maintenance data should be entered into the system. The following are specific tasks for the SPO—

- Develops the commander’s tracked item list to track supply point items of interest.
- Sets message handling tables to correctly route supply logistics messages.
- Sets status thresholds for supply point items.
- Establishes reporting times for subordinate direct support units.
- Sets support to supported relationships to reflect which supply points support which units.
- Establishes and sets continuity operations pairing according to guidance from the CAB logistics staff officer.
- Assists supported units in locating needed parts.

3-45. When an aircraft status changes to NMCS, the PC officer processes a high priority requisition and notifies the aviation materiel officer and BAMO of the requirement.

3-46. The support operations section conducts horizontal and vertical logistics research for critical serviceable parts in support of the unit maintenance mission. Once a part is located, steps and actions covering procurement of aircraft repair parts and/or the requisition process is followed as outlined in the unit aviation maintenance SOP. If an SSA is not collocated with the supported unit, required information is transmitted to the SSA. The SPO aviation materiel officer assists the BAMO with monitoring high priority requisitions until the unit receives the ordered components.

3-47. DLA logistics information services are another avenue that can track parts and requisitions. Logistics Information Services offers logistics applications designed for logistics data support for tracking DOD supply requisitions and inventory items and for placing or modifying DOD requisitions. Logistics Information Services logistics applications allow queries by telephone or email messages or from World Wide Web forms. Logistics Information Services logistics applications are located at all 19 DOD inventory control points and are available for aviation maintenance customers 24 hours a day, 7 days a week.

## **SUPPLY SUPPORT ACTIVITY INTERACTION**

3-48. The relationship between the logistics staff officer, SPO, BAMO and SSA accountable officer is critical to the sustainment responsibilities for aircraft and ground equipment requirements. To build a professional relationship, the representatives should—

- Conduct face-to-face synchronization meetings to ensure aviation needs, including shortages of critical aircraft repair parts, receive documentation, and discuss resolution planning.
- Ensure the responsible accountable officer is aware of ever-changing aircraft repair parts requirements and priorities.
- Request the accountable officer provide timely information of logistical issues to include sustainment information system shortcomings.
- Allow the accountable officer to serve as a POC for tracking aircraft repair parts/components off the installation.
- Allow the accountable officer to provide guidance on turn-ins, credits, excesses, forms, records, and reports.
- Obtain assistance from the accountable officer on all sustainment issues (such as ASL, bench stock, and shop stock).
- Obtain tracking numbers for brigade/battalion/unit-generated document numbers on and off the installation.

- Reviews and validates the authorized to forecast (ATF) process for SSA Class IX items.

## Chapter 4

# Production Control

This chapter provides aviation maintenance management principles required to maintain, repair, overhaul, and apply modification work orders, safety-of-flight (SOF) messages, and other mandated maintenance functions. Utilizing these principles ensures the airworthiness of all assigned/attached aircraft.

### SECTION I – DUTIES AND RESPONSIBILITIES

4-1. The PC officer is the principal maintenance coordinator in the aviation maintenance company/troop or support company and coordinates maintenance and sustainment actions at the company/troop and battalion/squadron level. The PC OIC is the commander's primary maintenance advisor for all internal production and maintenance activities. Additionally, the PC officer manages the supply section within the maintenance company/troop.

### PRODUCTION CONTROL OFFICER-IN-CHARGE

4-2. The commander selects the PC OIC based on skills, qualifications, experience, and leadership abilities. In the maintenance company/troop, the PC OIC is a warrant officer graduate of the aviation maintenance officer course and the MTP course. In the support company, the PC OIC is a captain who has completed the aviation maintenance officer course or with prior experience as an AMC commander or a 151A who has preferably completed the aviation maintenance technician warrant officer advance course. Requirements for COMPO 2/3 organizations may differ due to training allocations. At a minimum, 151As filling COMPO 2/3 PC OIC roles should preferably be graduates of the aviation maintenance technician basic course.

4-3. In the absence of the maintenance company/troop or support company commander, the PC OIC can act as the battalion/squadron primary maintenance advisor at battalion/squadron level. The PC OIC manages daily maintenance operations and workflow for the maintenance or support company. The PC OIC assists the commander with balancing unit maintenance priorities with unit mission requirements. The PC OIC orchestrates maintenance efforts and priorities by coordinating with commanders, BAMO, and the SPO for aviation maintenance requirements.

### COMMAND RELATIONSHIPS

4-4. The maintenance company/troop or support company commander has overall responsibility for aviation maintenance activities. The PC OIC is responsible for prioritizing aviation maintenance and support matters according to command guidance and acts as the direct link for the unit commanders for internal and external maintenance requirements. He/she always keeps the commander and staff informed of critical maintenance issues and the operational status of battalion/squadron equipment.

4-5. The PC OIC establishes, coordinates, and directs priorities of work with the leadership for mission support requirements. Responsibilities include but are not limited to—

- Analyzing, planning, and coordinating required support for all maintenance activities.
- Supervising preparation of reports and records.
- Coordinating with the maintenance company/troop or support company as required.
- Establishing maintenance priorities based on command guidance and mission requirements.
- Providing unit-level Class II, III, V, and IX air support.

- Facilitating appropriate aircraft recovery operations capability and responsiveness according to ATP 3-04.13.

### **PRODUCTION CONTROL OFFICER RELATIONSHIPS**

4-6. The PC OIC, AMO, and the BAMO must interact and closely coordinate all sustainment activities which aide in mutually achieving high rates on the maintenance MOE. The SPO, with support from the BAMO, facilitates sustainment support to all supported production control elements. When airframes are experiencing NMCS conditions, the PC OIC coordinates logistic actions with the SPO to expedite release of high-priority repair parts.

### **ASSISTANT PRODUCTION CONTROL OFFICER**

4-7. In the ASC, the PC office is authorized an assistant PC officer. An aviation maintenance technician (151A) serving as an assistant PC officer in the support company provides the organization with technical depth in managing larger quantities of work orders. The assistant PC officer reinforces the PC officer in the execution of duties and responsibilities while extending internal manning capabilities such as 24-hour operations as required.

### **PRODUCTION CONTROL NONCOMMISSIONED OFFICER-IN-CHARGE**

4-8. The commander and PC OIC select the PC NCOIC based on skills, qualifications, experience, and leadership abilities. The PC NCOIC is usually one of the most senior and experienced maintenance NCOs assigned to the unit. The PC NCOIC should be a graduate of the senior leaders' course.

4-9. The PC NCOIC coordinates all maintenance actions in the absence of the PC OIC and assistant PC OIC, and acts on the PC OIC behalf as required. The PC OIC, assistant PC OIC, and PC NCOIC must function as a team.

### **PRODUCTION CONTROL CLERK**

4-10. In aviation maintenance companies/troops, the commander, PC OIC, and first sergeant selects the PC clerk based on skills, qualifications, and experience. The PC clerk should be a senior-grade specialist with knowledge of supported aircraft systems and subsystems. The position requires a working knowledge of sustainment information systems and related software. The PC clerk should demonstrate sufficient knowledge to assist the PC NCOIC in managing the battalion/squadron sustainment information systems server. In the support company, the aviation operations sergeant in the PC section also serves as the PC clerk. The PC OIC, assistant PC OIC, and NCOIC are responsible for the on the job training necessary to support their mission and the MOE.

4-11. The PC clerk is responsible to the PC OIC, assistant PC OIC, and PC NCOIC. With the proper training, the PC clerk assists with—

- Execution of administrative PC functions, processing, and updating of the sustainment information systems.
- Updating and processing forms, records, and work orders pertaining to aircraft systems and subsystems according to appropriate regulatory guidance, manuals, and the sustainment information systems end-users guide.
- Distribution and evacuation of work-ordered unserviceable aircraft repair parts and components to the support company or sustainment-level support agencies.
- Generation of internal work orders for maintenance support from assigned shops and maintenance sections.
- Reconciliation of work orders with the supporting and supported units according to the SOP.
- Reconciliation of work orders within the maintenance unit.
- Reconciliation of evacuation work-order from external maintenance activities and agencies as required.

- Distribution of forms and records to QC and flight operations for inspection according to AR 25-400-2 and DA PAM 738-751.

## SECTION II – PRODUCTION CONTROL OPERATIONS

4-12. PC operations provide maintenance guidance and priorities per command guidance. PC is the direct linkage between unit commanders, the aviation maintenance company/troop, and the ASB’s support company for internal and external production issues.

### MEETINGS

4-13. The PC meeting is the maintenance workflow and prioritization consolidation point used to coordinate and synchronization internal and external sustainment actions. This meeting ensures leaders and maintenance managers have a maintenance COP for immediate or projected aircraft maintenance requirements. The PC meeting focuses on day/night scheduled and unscheduled maintenance requirements to manage the maintenance workflow.

### AGENDA

4-14. By following a specific and well-defined agenda built around scheduled and unscheduled maintenance actions, the PC meeting facilitates the organization’s priorities of work and coordinating efforts for internal or external maintenance support. The PC meeting provides essential personnel/leaders with equipment and material status awareness for the unit’s overall maintenance posture. The PC meeting agenda should address the organizational workflow, maintenance priorities, supply requirements, and coordination among sections, platoons, and companies.

4-15. PC personnel immediately report issues that could affect maintenance action to the PC OIC/NCOIC or designated representative. Maintenance enablers periodically provide updates throughout the day to the PC OIC/NCOIC or designated representative. This ensures an accurate COP is available for aircraft readiness. Table 4-1 and table 4-2 (page 4-4) are examples of an agenda shell and may be tailored as required.

**Table 4-1. Typical AMC/AMT PC meeting agenda**

<b><i>Roll call</i></b>
PC OIC PC NCOIC PC clerk/PC sustainment information system administrative QC Technical supply Airframe repair platoon Component repair platoon Maneuver units
<b><i>Administrative data/notes</i></b>
PC OIC/NCOIC PC sustainment information system clerk Sustainment information systems send/receive update and production index Forms/records QC—trends, policy changes, and/or issues Technical supply NMCS report brief/zero lines shop stock/recoverable items report status Airframe repair platoon Component repair platoon

Table 4-1. Typical AMC/AMT meeting agenda cont'd

<b>Maneuver company/troop (each company/troop briefs major changes and support requirements)</b>	
Maneuver company/troop status brief (changes) Flight schedule Scheduled maintenance Unscheduled maintenance	
<b>AMCOM LAR</b>	
<b>CFSRs</b>	
Aircraft manufacture representative Specific aircraft component representative Support contract team leader	
<b>PC resource prioritization plan</b>	
<b>Section confirmation briefs</b>	
<b>PC outsourcing requirements brief</b>	
<b>Alibis</b>	
<b>PC back brief</b>	
<b>Commanders closing comments</b>	
AMCOM-Aviation and Missile Command CFSR – Contractor Field Service Representative LAR – Logistics Assistance Representative NCOIC – Noncommissioned Officer in Charge	NMCS – Not Mission Capable Supply OIC – Officer in Charge PC – Production Control QC – Quality Control

Table 4-2. Typical ASC PC meeting agenda

<b>Roll call</b>
PC OIC and assistant PC OIC PC NCOIC PC clerk/PC sustainment information systems administrator QC Technical supply Airframe repair platoon Component repair platoon MTF Section
<b>Administrative data/notes</b>
PC OIC, assistant PC OIC, and NCOIC PC sustainment information system clerk Sustainment information systems update and production index Forms/records QC-trends, policy changes, and/or issues Technical supply outbound delivery status update and zero balance shop stock/recoverable items report status Airframe repair platoon Component repair platoon MTF section

Table 4-2. Typical ASC PC meeting agenda cont'd

<b>AMCOM LAR</b>	
<b>CFSRs</b>	
Aircraft manufacture representative Subcomponent representative Support contract team leader	
<b>Scheduled maintenance status</b>	
<b>Evacuated work order status</b>	
<b>PC resource prioritization plan</b>	
<b>Section confirmation briefs</b>	
<b>Alibis</b>	
<b>PC back brief</b>	
<b>Commanders closing comments</b>	
AMCOM-Aviation and Missile Command CFSR – Contractor Field Service Representative LAR – Logistics Assistance Representative MTF – Maintenance Test Flight	NCOIC– Noncommissioned Officer in Charge OIC – Officer in Charge PC – Production Control QC – Quality Control

## ATTENDEES

4-16. Commanders emphasize the importance of junior leaders participating in the unit's PC meeting. PC meetings provide junior leaders the ability to develop an overall understanding of maintenance and logistics operations that are essential in the foundational development of aviation sustainment leaders. Senior leadership emphasis is critical to the successful execution of any maintenance program; therefore, weekly attendance is highly encouraged by the—

- Battalion/squadron commander.
- Battalion/squadron executive officer.
- Battalion/squadron assistant S-3.
- BAMO.
- Command sergeant major.

4-17. The following personnel should frequently attend PC meetings:

- Aviation maintenance company/troop or support company commanders/first sergeants.
- Maneuver company/troop commanders/first sergeants (aviation operational units only).
- Platoon leaders/sergeants (maneuver platoon, ARP, and CRP).
- SPO (aviation).
- PC OIC/assistant PC OIC/NCOIC (meeting facilitator).
- Aviation safety officer (ASO) or unit safety manager.
- PC clerk.
- SIS administrator/clerk.
- Technical supply officer/NCOIC.
- QC OIC/NCOIC.
- Shops officer/NCOIC.
- Maintenance officers/NCOIC.
- Armament officer/NCOIC.
- Contract support (team lead).
- CFSR.
- LAR.

## ESTABLISHING PRIORITIES OF WORK

4-18. The company/troop commander sets MOE goals that are the responsibilities of the PC OIC to achieve. The PC OIC is responsible for establishing internal work priorities and coordinating external support such as pass-back maintenance support through the ASC. Effective communication is required to best determine and relay the daily or weekly workflow priorities. The establishment of work priorities by the PC OIC results in a balance of workload. When conflicts arise between supported units and the PC OIC, the PC OIC establishes work priorities in the best interest of the overall battalion/squadron maintenance program.

4-19. Incorporating aviation support personnel provides training opportunities to enhance a Soldier's maintenance proficiency while assisting with balancing the maintenance capacity to regenerate combat power efficiently. Maintenance managers must balance maintenance requirements across the maintenance company/troop, support company, and contract maintenance support with the goal of improving a Soldier's maintenance proficiency.

### APPLICATION

4-20. The continuous evaluation of establishing and maintaining work priorities requires close supervision and management at all levels. Utilizing the P4T3 concept is not restricted to phase/periodic inspection planning. Maintenance managers can use the P4T3 concept to develop a structured PC meeting format to establish and socialize the maintenance plan. P4T3 planning can be used during the PC meeting planning process to increase communications and establish professional working conditions between the supported and supporting team elements.

### PRODUCTION CONTROL STATUS BOARD

4-21. The PC board (table 4-3) is a depiction of displayed data on aircraft status, shop operations, or unique issues. Accurate and prompt information recorded on the board is used to control current operations, plan anticipated work, and measure work performed. Although maintenance managers have quick access to information through the unit's sustainment information systems, a well-planned and informative PC board (equipment status board) can serve as a handy, quick-look source of information for the commander and other personnel (such as platoon leaders and section chiefs). The status board serves as a good source of information on the progress of non-standard goals or missions associated with the MOE.

**Table 4-3. Example PC board layout**

<i>(Unit) PC Status Board</i>			
<i>Aircraft/System</i>	<i>Status</i>	<i>Fault/Issue</i>	<i>Remarks</i>
037	/		
954	X	Hard landing	Awaiting tool-Bell
Special tool fabrication	In progress	Spanner wrench out of round	TASMG accepted fabrication work order on 10 Feb 09
PC-production control TASMG-theater aviation sustainment maintenance group			

4-22. The design of the PC board should be simple and easy to understand. The organization of the board is determined by the unit's requirement. Some suggested entries are—

- Current aircraft/system status (updated throughout the day as the status changes).
- Priority of work.
- Status of special tools and equipment (such as hoists, tugs, AGPUs, and test sets).
- Reasons for stopped work.
- Work awaiting receipt of parts.
- Document number and status.
- Significant evacuation work order tracking.
- Phase status (for example, “75 percent” [estimated percentage complete]).

## MAINTENANCE COMPLETION ESTIMATES

4-23. The PC OIC or NCOIC must be able to accurately plan maintenance flow and back brief his or her commander on aircraft status to complete assigned operational mission cycle. Accurate reporting to higher headquarters is important; however, it is more important to give an accurate estimate to the responsible operational company commander.

4-24. Maintenance completion estimate should incorporate an evaluation of the training level of assigned personnel. The evaluation process allows for the development and training of supportive maintenance crews, which sometimes may extend maintenance downtime on the front end. Variables include number of personnel, individual Soldier experience and time in MOS, availability and condition of tools and equipment, and facility and environment limitations. Some variables are easier to assess than others; however, as the maintenance manager gains experience, his or her estimates become more refined and accurate. The goal is accurate and timely reporting of man-hour estimates to the commander to assist in managing the units and meeting operational requirements.

## WORK ORDER TRACKING AND FILING SYSTEM

4-25. The sustainment information system provides an efficient tracking mechanism for maintenance and supply actions. This automated system provides maintenance section and shop personnel with a snapshot in time of maintenance actions taking place within their areas of responsibility.

4-26. Tracking work order statuses within a sustainment information system is the preferred method. There are methods for tracking the statuses of work orders outside of sustainment information systems in the event sustainment information systems is not working or available. PC shops track work orders using the following categories:

- Parts required.
- Waiting parts.
- In shop.
- Maintenance in progress.
- Inspection.
- Test flight.
- Delivery/pick-up.

## COMPONENT EXCHANGE

4-27. Component exchange is accomplished using repairable exchange and controlled exchange policy.

## CONTROLLED EXCHANGE

4-28. Controlled exchange is the removal of serviceable components from unserviceable, economically repairable end items for immediate reuse in restoring a like item or weapon system to a mission capable condition. AR 750-1 sets forth the following criteria:

- Approval authority remains with the commander of the organization in formal control of the system.
- Controlled exchange is authorized only when—
  - It is the only means of providing a fully mission capable end item or weapon system to a supported unit within the time frame indicated by the initial priority designator on a DA Form 2407 (*Maintenance Request*).
  - Approved by the first O-5 commander of the owning equipment or sustainment maintenance commander per AR 750-1.

4-29. Controlled exchange is an Army supply policy according to criteria and approval authorization outlined in AR 750-1. Aviation maintenance SOPs must contain controlled exchange policies and procedures. Controlled exchange actions require meticulous record-keeping practices, particularly when transferring items with historical records between aircraft. PC, QC, technical supply, and maintenance personnel have

important roles towards ensuring that records and logbooks are properly annotated to reflect, necessary parts are requisitioned before, during, and immediately after the controlled exchange.

## **UNSCHEDULED MAINTENANCE MANAGEMENT**

4-30. An unscheduled maintenance requirement occurs when an aircraft experiences an unexpected malfunction, premature component breakdown, or battle damage. The PC OIC/assistant PC OIC/NCOIC prioritizes, coordinates, manages, and tracks unscheduled repairs.

## **SCHEDULED MAINTENANCE MANAGEMENT**

4-31. Scheduled maintenance takes place anytime an aircraft phase, preventive maintenance service, or scheduled component replacement is conducted.

### **SCHEDULED SYSTEM**

4-32. A scheduling system promoting efficient workflow is needed to ensure customers receive their aircraft with the least possible delay. Many factors must be considered when developing a scheduling system. These factors may include the current workloads and priorities of the supported units, the availability of tools, and the supply of major components, parts, and hardware.

4-33. A PC operation requires a scheduling system and preplanned workflow. The PC element must track the following information to establish maintenance workweek priorities compatible with the unit mission:

- Mission requirements and priorities of supported commanders, to include numbers of aircraft and scheduled systems, and specific capabilities required for those aircraft and systems.
- Aircraft maintenance flow, by flying hours remaining for each assigned aircraft until upcoming scheduled maintenance inspections.
- Current total number of flight hours, status of avionics and armament, and the operational status of each assigned aircraft.
- Work in progress and work deferred/delayed.
- Support company work in progress and work deferred/delayed.
- Time-change requirements for components, by individual assigned aircraft tail number.
- Non-flying enabling systems scheduled maintenance intervals.

### **SCHEDULED MAINTENANCE MANAGEMENT**

4-34. Poorly coordinated scheduled maintenance events have a negative effect on the battalion/squadron aircraft readiness. To ensure minimum disruption to the supported unit training/tactical missions and aircraft/system readiness, PC personnel ensure a suitable maintenance program is in place to coordinate all maintenance and logistics actions. Contents of the maintenance program must be fully communicated, by way of a maintenance SOP, to all levels of command within the battalion/squadron. Battalion/squadron leadership must accept responsibility and provide command emphasis in support of the maintenance program.

4-35. Maintenance functions are designed to maintain the fleet and systems to a standard allowing the operational commander to accomplish the mission on time, every time. The PC office should have visibility on all major scheduled maintenance requiring internal and external support. The visibility of maintenance actions allows the PC office to coordinate and forecast support, allowing for reaction time.

### **DEFERRED/DELAYED MAINTENANCE MANAGEMENT**

4-36. The PC OIC/NCOIC prioritizes maintenance actions daily. Occasionally insufficient personnel, equipment, or time may exist and the PC OIC/NCOIC decides which aircraft/components are repaired or deferred/delayed.

4-37. The commander's designated representative is the approval authority for all deferred maintenance actions. These actions cannot be delayed indefinitely; they must be coordinated and scheduled to be performed at the earliest opportunity. Deferred/delayed maintenance actions should be completed when an

aircraft experiences an unscheduled maintenance requirement or is scheduled for a preventive maintenance service or phase. If a deferred maintenance task is not corrected during an unscheduled repair, preventive maintenance checks and services, or phase/periodic inspection then the owning unit commander validates the explanation in the logbook extending the deferral/delay beyond the repair opportunity. The PC section ensures all follow-on deferrals/delays receive command review and signature.

4-38. Deferred maintenance should be minimized by the PC office in collaboration with the maneuver company owing the aircraft. In monitoring deferred/delayed maintenance work orders, PC evaluates the open fault status for each aircraft during mandatory monthly, or more frequent, recurring logbook reviews for excessive deferred/delayed maintenance. The trending of deferred/delayed maintenance should be tracked for faults and work orders of less than 30 days, 31 to 60 days, and more than 60 days. Faults or work orders deferred/delayed for 31 to 60 days should receive PC office and maneuver company emphasis. Those more than 60 days should receive command review to determine the validity and reasons for the deferral/delay. PC allocates resources as necessary to eliminate work order backlogs. These work orders are associated with a system requirement and indicate an area where combat power can be generated. The backlog report, as part of the production index, is part of the unit MOE.

### **INTERNAL MAINTENANCE SUPPORT COORDINATION**

4-39. Internal maintenance support is coordinated at the daily PC meeting by the PC OIC/assistant PC OIC/NCOIC. Internal maintenance support, whenever possible, is aligned with the daily operations of the maneuver companies to ensure a matched and responsive support effort. Internal maintenance support not only conducts work-order requests for maintenance, but the PC section also assists the maneuver units by reviewing aircraft logbooks during each reporting period to identify open faults for coordination with PC.

### **EXTERNAL MAINTENANCE SUPPORT COORDINATION**

4-40. The aviation maintenance company/troop PC OIC/NCOIC plans and coordinates all external DA Form 2407 with the support company PC office. He or she also conducts daily transmittals of sustainment information systems information as necessary to track ongoing maintenance actions. The support company PC officer coordinates for all evacuation work orders outside the brigade. The PC OIC/assistant PC OIC/NCOIC should plan and allow for as much lead-time as possible to maximize the P4T3 concept.

### **BATTLE DAMAGE ASSESSMENT AND REPAIR**

4-41. The purpose of BDAR is to rapidly return disabled equipment to combat or enable the equipment to self-recover. BDAR is the responsibility of the commander, based on METT-TC, and is accomplished by the operator/crew and field maintenance personnel. The commander is responsible for the training and resourcing of aircraft recovery operations and delegates those missions to an OIC. See ATP 3-04.13 for more information.

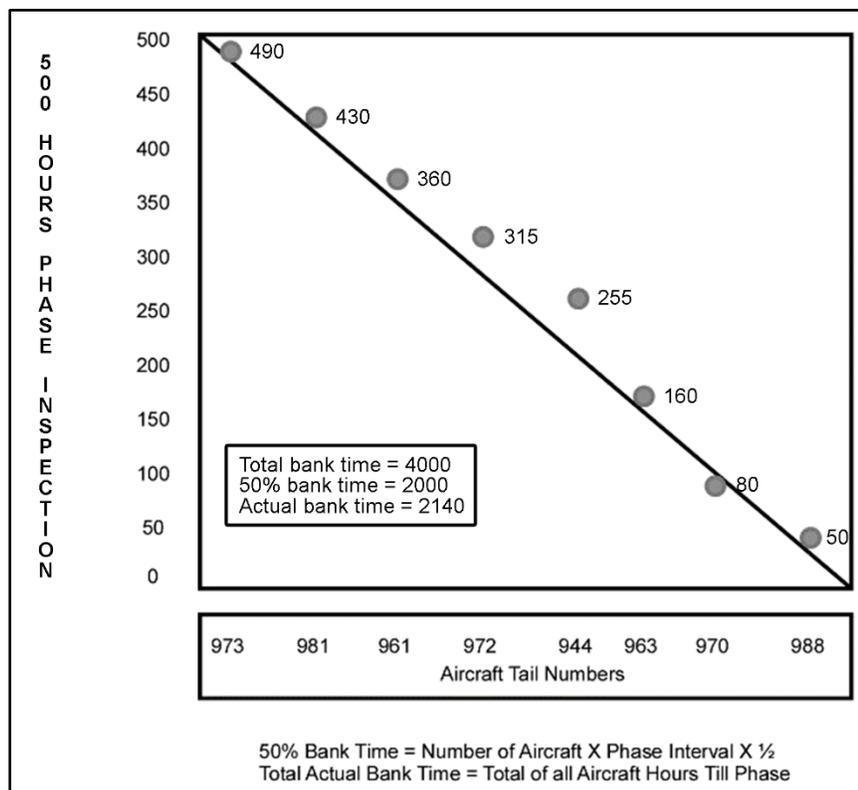
4-42. The assigned OIC is responsible for training, coordinating, organizing, assembling, and assigning the appropriate aircraft recovery operations package. The maintenance company/troop OIC coordinates with the support company if recovery is beyond the capability of the maintenance company/troop.

### **MAINTENANCE OPERATIONAL CHECKS AND MAINTENANCE TEST FLIGHTS COORDINATION**

4-43. The PC OIC coordinates all MOCs and MTFs at the PC meeting with the supported company/troop and, on case-by-case basis, throughout the duty day as required. The support company coordinates MOCs and MTFs at PC meetings with the MTF section representative.

### **AIRCRAFT PHASE/PERIODIC INSPECTION MAINTENANCE MANAGEMENT**

4-44. Each maneuver company/troop is individually responsible for managing the flow of aircraft into phase by hours or days (figure 4-1, page 4-10). The companies work with one another and the maintenance company/troop PC OIC/NCOIC to sequence major inspections that reduce lag times created by limited assets for performing inspections.



**Figure 4-1. Bank time flowchart**

4-45. Maintenance units can support a predetermined number of aircraft in phase at any time based on the overall maintenance capacity of the unit. Aviation maneuver units want to avoid a large percentage of assets in scheduled maintenance simultaneously. This multi-phase condition reduces operational flexibility and limits training opportunities. When managing the scheduled maintenance program, predetermined hourly intervals generally determine approximate induction dates for a phase or progressive maintenance scheduled inspection. This process places some limits on predictability but maximizes the hours flown between scheduled maintenance. To enhance predictability when using the hourly method, units either fly or rest aircraft to support the sequential flow of systems into the program, as phase capacity becomes available.

4-46. In operations with high or very predictable tempos, predetermining a date of induction, regardless of hours flown on the aircraft, can yield a predetermined amount of bank time sufficient to support foreseeable operations. This method sometimes inducts aircraft into scheduled maintenance early, sacrificing short-term bank hours for overall program sustainment. This date-generated predictability can ease pre-maintenance supply and verification-operations challenges such as phase kit ordering, time between overhaul (TBO) acquisition, MTF scheduling and logbook pre-inspection, while producing the required available aircraft hours between scheduled events.

4-47. The maintenance company/troop PC OIC assists the maneuver companies in their flow management and manages the overall battalion/squadron phase flow to ensure multiple company/troop aircraft are not in phase at the same time. The PC OIC/NCOIC monitors and manages spacing between major scheduled maintenance events and phase maintenance inspections.

4-48. The coordinated scheduled maintenance effort includes consultation with the BAMO/AMO and support company PC. This ensures adequate phase maintenance work orders reach the support company to maintain proficiency. See appendix G for more information on usable techniques to manage phase/periodic inspection maintenance requirements.

## MANAGING AIRCRAFT SCHEDULING FLOW

4-49. An efficient, effectively managed aircraft scheduling flow provides the maximum number of aircraft available on a consistent basis for mission support.

### BLOCK SCHEDULING METHOD (FLOW CHART)

4-50. The benefits of the block scheduling system include the following:

- Flight companies have flexibility in selecting aircraft for missions during the operation.
- Flight companies can match the aircraft to the mission.
- It spreads the responsibility of aircraft assignments and staggers the aircraft on a flowchart.
- The maintenance officer can plan his or her workload instead of having to react to everyday changes in missions and unscheduled maintenance.
- The flowchart posture should still be at an optimum level after the mission/operation.

4-51. Block scheduling provides flight companies with flight-hour blocks computed from the battalion average. The PC section maintains the overall battalion flow chart in the maintenance company/troop. For this system to be successful, battalion commanders must reinforce their maintenance officers' guidance and ensure that flight companies do not over fly their given block times. To determine how many hours that each aircraft is allowed to fly during a given period, the maintenance officer uses the following formula:

- **Step 1:** Find the average hours per aircraft by dividing the total number of hours to be flown by the number of aircraft to be flown (for example, 180 hours to be flown, divided by 9 aircraft, equals 20 average hours per aircraft).
- **Step 2:** Plot the average hours per aircraft on the flowchart below the highest-time flyable aircraft; then draw a line parallel to the optimum bank-time line.
- **Step 3:** Compute the difference between each aircraft's current position on the flowchart and the new parallel line; these figures are the maximum amount of flight hours that the particular aircraft can fly during the mission. (For example, aircraft 955 is 26 hours above the lower optimum line; therefore, it is given a block time of 26 hours to fly.)

4-52. The company flight schedule allows the maximum hours required to support the mission. The platoon sergeant or maintenance officer assigns aircraft aligned with the anticipated flight schedule requirements. Aircraft are assigned to flight crews with a minimum and maximum flight-hour requirement that must be flown to establish and maintain the flow of aircraft into scheduled maintenance events or to provide aircraft separation as required. When planning scheduled maintenance events, the assigned flight crews should fly the anticipated scheduled times. Under flying is, at times, as harmful to the flow of scheduled maintenance as over flying the aircraft.

### SLIDING SCALE SCHEDULING METHOD (FLOWCHART)

4-53. The maintenance manager should observe the following rules when using the sliding scale maintenance scheduling method (flowchart):

- Update the chart at least once each day that aircraft fly (if using the sustainment information systems ensure that aircraft data is updated regularly for visibility by the PC office).
- Fly aircraft that are above the optimum line to attempt to get them down to the line.
- Hold (do not fly) aircraft that are below the optimum line to attempt to bring them up to the line or fly the minimum number of hours.
- Count aircraft that are in phase inspection zero towards actual bank time.
- Count aircraft that are grounded for any reason (other than phase) towards actual bank time.

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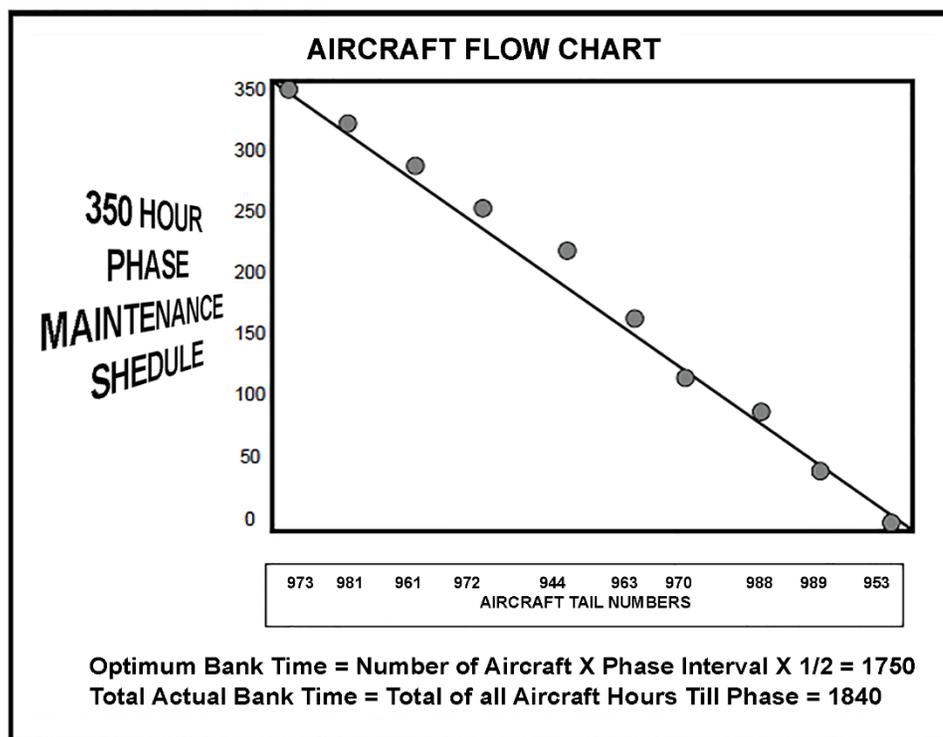
*Note.* Remember that total actual bank time is only a relative indicator of the maintenance scheduling process.

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4-54. Phase/periodic inspection planning is a critical part of mission readiness for aviation units. Aviation commanders/PC must ensure aircraft phases are planned well into the future. Although many factors influence the best time for accomplishing aircraft phases, training exercises and deployments can have a major effect on the unit's bank time.

4-55. Flying more than one aircraft into phase at one time can severely affect and reduce the unit's OP impacts. To alleviate crisis management, the unit's flying-hour program, deployments, training, bank time, and the availability of resources (such as tools, maintenance personnel, repair parts, and special equipment) must be carefully considered when maintenance personnel are planning phases.

4-56. The aircraft flowchart is an important tool for scheduling aircraft for phase and for deciding which aircraft should fly certain missions. Figure 4-2 shows an example of a typical flowchart for a typical assault unit. The diagonal line represents the optimum bank time, or time until phase, for each individual aircraft. This flowchart demonstrates a unit with good total actual bank time (above optimum) and good separation between phases.

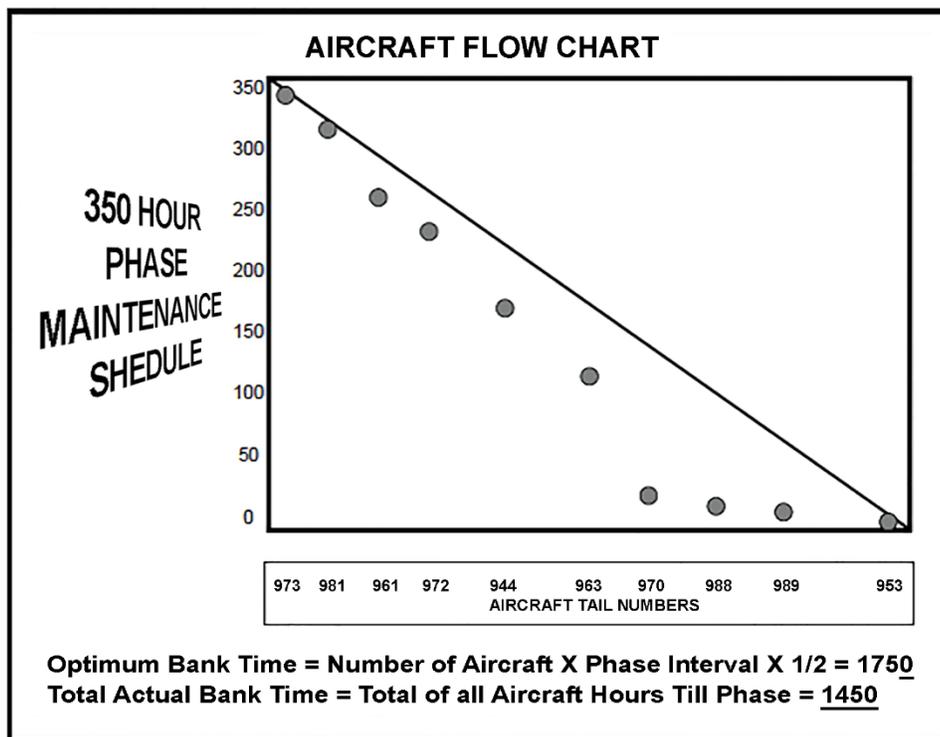


**Figure 4-2. Aircraft flowchart with good bank time**

4-57. If every aircraft were exactly on the optimum line, this would represent the ideal bank time, or 1,750 flying hours, available. The optimum bank time could be expressed in terms of percentage available, for example, 50 percent bank time. Obviously, this is unrealistic because some aircraft may be above the line and some are below the line. Therefore, the only way to obtain the actual bank time is to add the total flying hours remaining on all aircraft until the next phase/periodic inspection. Thus, total actual bank time is only a relative indicator of how well the maintenance scheduling process is working compared to the ideal, or optimum, bank-time formula.

4-58. Under heavy flying conditions (surge), bank-time available is obviously lower than desired. In preparation for a surge, it is possible to push aircraft into phase earlier than under a normal flying regimen to increase the overall bank time available to the commander. Figure 4-3, page 4-13, shows a flowchart of a unit with less than the optimum bank time. This unit has one aircraft in phase and three aircraft within 25 hours of phase. This unit has aircraft stacked up and awaiting phase. Although this unit may be posting good OR rates on its end-of-month report, the unit is not able to schedule certain aircraft for missions because of

low hours on nearly half of its fleet. Because of the low availability of aircraft hours, the unit's effectiveness to perform tactical/training missions is reduced.



**Figure 4-3. Aircraft flowchart with less than optimum**

- 4-59. The flowchart is a simple, but effective, method that maintenance officers use. Using the flowchart—
- Prevents an unnecessary backlog of scheduled maintenance inspections under normal conditions.
  - Prevents a corresponding sudden surge in requirements for aircraft parts.
  - Allows the unit maintenance officer a degree of control over individual aircraft hours flown.
  - Provides a graphic depiction of future scheduled maintenance requirements.

## OPERATIONAL READINESS FLOAT

4-60. AR 750-1 authorizes OR float as an Army Aviation maintenance regeneration enabler. An OR float is a strategic asset deployed to an installation consisting of an authorized quantity of assets used to maintain established readiness levels or meet training availability requirements during peacetime. These assets are maintained by TDA and MTOE maintenance activities with a field or sustainment maintenance mission to exchange with supported units when repairs cannot be accomplished within Army command-established guidelines.

## SECTION III – SUSTAINMENT INFORMATION SYSTEMS MONITORING

### MONITORING NOT MISSION CAPABLE SUPPLY REQUISITION STATUSES

4-61. The PC OIC/NCOIC monitors the daily status of Class IX (Air) repair parts affecting the status of a work order or the overall mission readiness of an aircraft.

4-62. Technical supply reports the status of all high priority requisitions during the daily PC meeting. Any changes in the status of these requisitions are briefed immediately to the PC OIC/NCOIC.

4-63. The PC OIC tracks the weekly parts requisitioned by the technical supply section as well as turn-in credit. This information is provided to the PC OIC by the technical supply OIC prior to the commander's exception report being submitted to the aviation maintenance company/troop commander to track the unit overall aviation financial fitness. The BAMO, AMO, and the SPO must be notified if prolonged maintenance downtime is a result of a NMCS condition or a high-priority designator requested repair part.

4-64. The source of supply material requirements planning controller is the source for tracking information on a given high-priority designator and/or high-priority repair part requisition. They focus on processing high-priority designator requisitions and the release and shipment of critical repair parts. Through the sustainment information system, the PC personnel can track high-priority designator information, financial transactions, and open the document register.

4-65. When conducting split-based operations, the deployed server function provides a unit with the capability of deploying aircraft to support operations away from the unit primary database. The deployed server allows maintenance managers access to management functions (excluding program administrator functions), while tracking maintenance actions. The sustainment information system assists the PC user with various tools to enhance the following:

- Tracking aircraft status, reporting, and flying hours per AR 700-138.
- Initializing, processing, and tracking work-order requests.
- Facilitating aircraft transfers.
- Initiating and tracking parts requisitions.
- Monitoring overall maintenance operations and generating required reports.

## **AIRCRAFT TRANSFERS**

4-66. TM 1-1500-328-23 identifies the standards of serviceability for aircraft transfers. A transfer is defined as a change of property accountability from one organization to another. The cost of transfer, inspections, and maintenance is outlined in the transferring directive.

4-67. Historical forms and records provide commanders and maintenance managers with information on aircraft transfers (gains/losses). These records must be controlled and kept safe from loss or damage and are sent to the gaining unit separate from the aircraft.

## Chapter 5

# Quality Control

The QC section is responsible for the quality assurance of all work performed by assigned maintainers. This is an extremely technical position and requires a high-level of technical expertise and aircraft systems understanding. This chapter provides QC personnel with a how-to for identifying and reviewing standards of repair, overhaul, modification, safety-of-flight, and other required maintenance functions. This chapter also provides QC personnel with an overview of QC management operations procedures. Technical inspections are the command system of checks and balances. These inspections ensure high-quality maintenance and safety of Army aircraft.

### SECTION I – DUTIES AND RESPONSIBILITIES

5-1. The QC section consists of highly skilled maintenance subject matter experts who provide a broad range of technical oversight in support of the commander's maintenance program. The QC section is the commander's technical connection to ensure a unit is producing safe, reliable, and airworthy aircraft. The QC section is staffed with a QC OIC, a QC NCOIC, and TIs. This section covers duties and responsibilities of the QC section.

#### QUALITY CONTROL OFFICER-IN-CHARGE

5-2. The aviation maintenance company/troop or support company commander selects the QC OIC, on orders, based on his or her skills, qualifications, and experience. It is preferred that the QC OIC be a graduate of the Aviation Maintenance Officer Course. The officer is responsible for the internal management of the QC section, to include quality assurance of all work performed by TI. The QC OIC coordinates priority of work with the unit PC OIC and QC NCOIC. The QC OIC executes the sustainment information system unit-training program.

#### QUALITY CONTROL NONCOMMISSIONED OFFICER-IN-CHARGE

5-3. The QC NCOIC is an authorized MTOE position; the Soldier chosen is placed on orders by the aviation maintenance company/troop or support company commander based on his or her skills, qualifications, and experience. Generally, the NCOIC is one of the senior maintenance NCOs assigned to the unit. Preferably, the QC NCOIC is a graduate of the senior leader course. The NCOIC is directly responsible for the operational management of the QC section. The QC NCOIC is responsible for the development and execution of the TI training program as well as training and progression of the TI. The QC NCOIC coordinates and establish priorities of work with the QC OIC. In the absence of the OIC, the NCOIC performs all duties of the QC OIC. Additionally, the NCOIC distributes the work and supervises the TIs for quality assurance of work assigned. The QC NCOIC also coordinates the efforts of the QC section.

#### QUALITY CONTROL TECHNICAL INSPECTORS

5-4. The unit commander selects TIs, on orders, based on their skills, qualifications, and experience. Preferably, TIs are advanced leader course graduates. They are responsible to the QC OIC, QC NCOIC, and ultimately, the aviation maintenance commander for quality assurance. With the establishment of the AMTP, TIs are responsible for the evaluation training requirements per TC 3-04.71. TIs are placed on orders signed by the first Lieutenant Colonel in the chain of command. This procedural step enables flexibility in the inspection of aircraft across the entire unit.

5-5. TIs train according to the established TI program in the QC section. The QC OIC or NCOIC distributes the work and supervises the TIs to meet the PC officer operational maintenance requirements. TIs serve as primary instructors for the sustainment information system training program.

5-6. The QC OIC or NCOIC serves as the TI rater. If the QC section does not have an OIC or NCOIC, the assigned commander rates the TI. This rating scheme allows TIs to remain objective in their quality assurance duties and ensures the crews' overall safety remains their goal.

5-7. TIs are the commander-designated representatives in aircraft SOF areas and are responsible for—

- Airworthiness of the aircraft.
- Component and shop inspections.
- Maintaining the master reference library.
- Reviewing publications, forms, and records for currency and accuracy.
- Ensuring all performed maintenance procedures comply with TMs and applicable references.

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*Note.* Most aviation maintenance contracts require technical inspection completion as part of any procedure. Ensuring contractor TIs possess appropriate certification to inspect aircraft maintenance tasks is challenging when complying with ARs. The entire maintenance team, to include COR and government flight representative, agree on and publish the requirements baseline for contractor TIs and determine validation and approval procedures to support their contractor mission.

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## SECTION II – MANAGEMENT

5-8. The importance of the technical inspector cannot be under-estimated and must be actively managed.

### COMMANDER'S TECHNICAL INSPECTOR INTEGRATION

5-9. Commanders should interview or assess TI candidates to ensure proper integration into the unit QC operation. This is especially useful during high turnover or high-tempo operations and provides the commander with a standard of reference when assigning duties to newly assigned or recommended TI candidates. This allows commanders to match personnel with the proper amount of TI responsibility relative to their skills and experience.

### DELEGATION OF AUTHORITY ORDERS

5-10. The unit commander must approve delegation of authority orders for performing specific duties. This authority is designated, in writing, by memorandum. The memorandum states the functions, responsibilities, and duration of assigned duties.

5-11. Completed delegation of authority orders (memorandums) are maintained on file until revoked, rescinded, or no longer applicable. Units maintain orders (memorandums) on—

- Commanders (assumption of command orders).
- TIs (DA PAM 738-751).
- Limited TIs (DA PAM 738-751).
- MEs, MPs, and FCPs (AR 95-1 and TM 1-1500-328-23).
- Unit safety programs (AR 385-10).
- Personnel signing equipment and component condition tags for turning in components and equipment (aircraft maintenance only) (DA PAM 738-751).
- Personnel authorizing evacuation of aircraft with a grounding condition (X) status for a one-time evacuation mission (DA PAM 738-751).
- Personnel authorized to change an aircraft with a grounding condition (X) status to (—) status for the performance of a maintenance test flight (DA PAM 738-751).
- Personnel inspecting aircraft first aid kits (TM 1-1500-328-23).

- Weight-and-balance technicians (AR 95-1).
- Technical supply officers (aviation maintenance company/troop).
- TMDE support coordinators and alternates (AR 750-43).
- Publications officers or NCOs (DA PAM 25-40).
- Corrosion prevention and control (CPC) program monitors (TM 1-1500-328-23).
- Foreign object damage (FOD) prevention officers and NCOs (AR 385-10).
- Personnel responsible for the FOD prevention plan (AR 385-10).
- AOAP monitors (TB 43-0211).
- Unit maintenance (PC) officers (AR 750-1).
- Controlled exchange officers (AR 750-1).
- Records management officers (AR 25-1, AR 25-400-2).
- Sustainment information system administrators.

5-12. Units must periodically review Army publications for changes and revisions and update all orders accordingly.

## LIMITED TECHNICAL INSPECTOR APPOINTMENT

5-13. The commander may appoint an experienced Soldier to execute technical inspector duties on limited TI orders. Specifications for technical inspection limitations are annotated on an official memorandum for record. Soldiers appointed are required to remain within the written limits. Limited TIs train according to the TI training program established by the QC shop.

## SECTION III – RESPONSIBILITIES

5-14. The QC section is responsible for the oversight and management of many important maintenance functions in support of the commander's maintenance program. QC executes responsibilities over areas such as aircraft and component inspections, maintenance, and shop safety inspections, facilitates responsibilities for aircraft weighing, oversees the unit's TMDE utilization requirements, and forms and records management. This section outlines responsibilities of the QC section.

## PROCEDURES

5-15. The QC technical inspection for a completed maintenance procedure, logbook and form entries completes the maintenance cycle. These procedures are part of the management function. This process ensures the maintenance task occurs according to maintenance manuals for specific aircraft. QC maintenance requirements are coordinated with PC and matched to the maintenance workload to maintain maximum productivity, efficiency, and effectiveness.

5-16. Well-designed QC procedures assure published quality assurance standards are met and maximum effective production is balanced with quality without lowering standards.

## AIRCRAFT AND COMPONENT INSPECTIONS

- 5-17. Safety of the aircraft and crew depends on—
- A rigorous aircraft inspection before, during, and after a maintenance action is conducted.
  - Compliance with all applicable maintenance publications and references.

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*Note.* TM 1-1500-328-23 contains information on the preventive maintenance inspection system, acceptance inspection, transfer inspection, and in-storage inspection.

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## TRACKING AIRCRAFT TIME BEFORE OVERHAUL AND RETIREMENT LIFE COMPONENTS

5-18. QC personnel use computerized printouts or a TBO and retirement life component chart to monitor the in-service time of all aircraft components requiring replacement on an hour, cycle, meter, or calendar basis. For a list of these components, refer to the applicable aircraft maintenance manual. To track TBO by MDS, users must request access to the Airworthiness Database at the website located in the reference section of this publication. Once access is granted, select maintenance consolidated database system in the upper left corner of the page and follow the instructions.

5-19. TIs ensure the TBO or retirement life is not over-flown unless specifically authorized in TM 1-1500-328-23. TIs review the TBO charts or computerized printouts and update information periodically but not less than the reporting period (see AR 700-138 for reporting criteria) and when reportable components are replaced.

*Note.* Any method of tracking TBO or retirement components is acceptable; however, the preferred method is through the unit's sustainment information systems. The importance of not over-flying a repair part or component cannot be overstated.

5-20. The three variations of the TBO chart are:

- TBO schedule chart (figure 5-1).
- Time-change bar graph component chart (figure 5-2, page 5-5).
- TBO reports generated by the unit's sustainment information system (table 5-1, page 5-5).

5-21. TBO reports produced by the unit's sustainment information systems track replacement of aircraft components and are generated by part number or work unit code. If computerized printouts are used, ensure they contain all required information (table 5-1, page 5-5) and maintain a separate disk copy in the QC office. QC personnel notify PC, maintenance officers, and NCOs when 100 hours or less remain until replacement of hourly components and/or when two months remain until replacement of calendar components. In most cases, this notification allows adequate time for advance ordering of replacement parts. TBO notification hours may vary depending on operational tempo and/or operational environment.

*Note.* Coordination and follow-up of existing aircraft TBO parts requests are made by unit maintenance personnel according to the unit maintenance SOP.

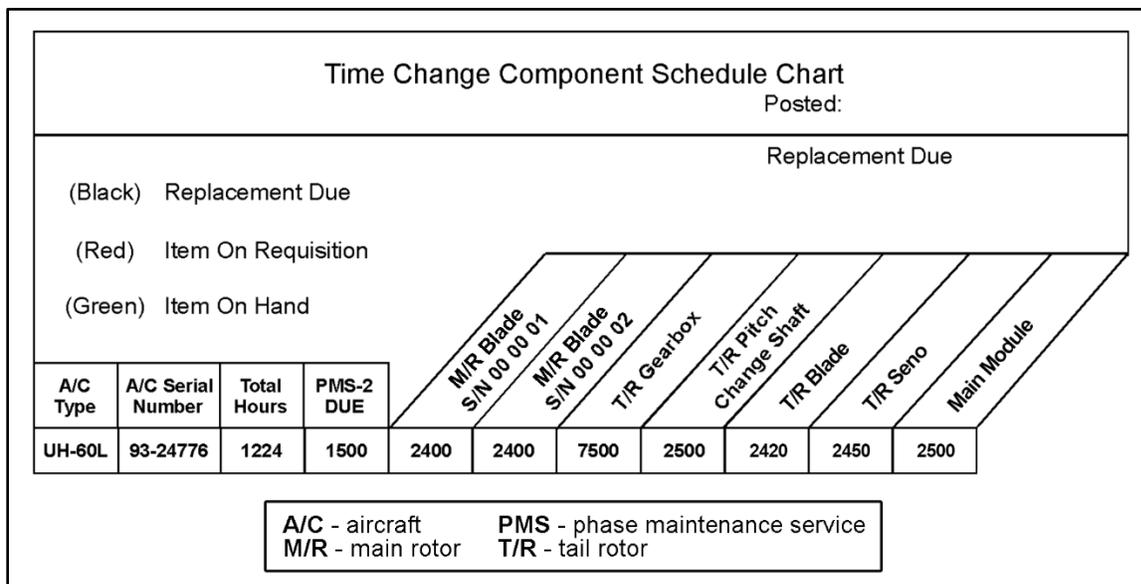


Figure 5-1. Sample format for a time-change component schedule chart

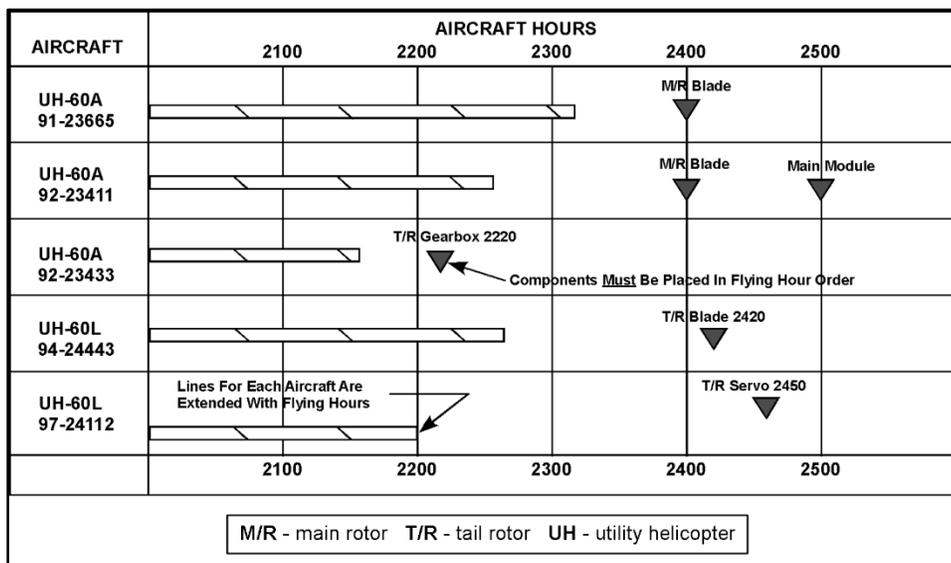


Figure 5-2. Sample format for a time-change bar graph component schedule chart

Table 5-1. Sample format for a computerized time-change computer printout

2408-16 Component Projection Report						
Product Control Number: AVAHRIGA						
Report Date: 12-MAY-05				UIC: WG31A8		
Aircraft Serial number: 6916148				Current Hours: 3576.8		
Projected Hours: 988						
WUC	Part Number	Material Number	Material Description	Serial Number	Aircraft Hours	
					TBO	Until Due
85A81H84	286-811-148-1	1615818386653	Retention strap fitting	A-4583	3695.0	118.2
85A81H84	286-811-148-1	1615010306653	Retention strap fitting	A-1948	3695.0	118.2
85A81H83	286-818-123-3	5315000919358	Retention strap pin	A19-38098	3695.0	118.2
85A81H83	286-818-123-3	5315000919358	Retention strap pin	A19-38060	3695.0	118.2
85A81H	286-811-154-101	1615010631268	Retention strap	LK-11923	3695.0	118.2
85A81H	286-811-154-101	1615010631268	Retention strap	LK-11919	3695.0	118.2
84A85C	6895653	2915010444551	Pump assembly, fuel	PE6398	4010.0	433.2
84A85G	2524912-2	2915011799734	Governor assembly	86168686	4288.0	711.2
84A85A	2524911-3	2915012510688	Fuel control	337434	4473.0	896.2

TBO – Time before overhaul  
 UIC – Unit identification code  
 WUC – Work unit code

## MAINTENANCE AND SHOP SAFETY INSPECTIONS

5-22. QC inspections of maintenance and shop areas are detailed with the overall goal of establishing sound and disciplined maintenance procedures and practices. A QC inspection focuses on the entire maintenance facility, including maintenance and shop areas to evaluate for safe practices.

5-23. When performing the maintenance and shop safety and equipment inspection, TIs check for cleanliness, serviceability, and absence of corrosion on GSE. The inspection also includes checking for unobstructed fire lanes, serviceability of the hangar, serviceability of the fire extinguishers, and installation and use of equipment safety devices. Additional guidance for fire extinguisher inspections can be found in Section 157, Part 1910, Title 29, Code of Federal Regulations (CFR) (29 CFR 1910.157).

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**Note.** Active duty organizations, full-time United States Army National Guard (ARNG) Army Aviation Support Facilities, and full-time United States Army Reserve (USAR) Aviation Support Facilities conduct these inspections monthly. Part-time ARNG (M-Day) and USAR (TPU) organizations conduct these inspections quarterly.

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5-24. File safety inspection forms are maintained in the QC section according to AR 25-400-2. A copy of the inspection is provided to the appropriate shop or maintenance section NCOIC for corrections of any deficiencies. Inspectors forward copies of the inspection results to the ASO or unit safety manager to incorporate uncorrected deficiencies into the safety information collection and analysis program and hazard log for tracking.

5-25. For aviation safety policies, regulations, and procedures; questions; or concerns related to the Aviation Branch or aircraft accident prevention, the United States Army Combat Readiness Center aviation branch and the aviation branch safety office websites are helpful informational tools.

5-26. ATP 4-43, TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9 manuals outline specific safety precautions, specifically risk management guidelines.

### TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT UTILIZATION

5-27. QC inspectors use TMDE to obtain critical measurements and monitor maintenance procedures. Safe, economical operation of Army aircraft depends on the skilled use of TMDE in a comprehensive maintenance program. TB 43-180 identifies TMDE requiring cyclic calibration or repair support by TMDE users.

### AIRCRAFT WEIGHING REQUIREMENTS

5-28. Flight characteristics and structural limitations of aircraft are directly dependent upon conditions of weight and balance. Gross weight and center of gravity have a bearing on performance, stability, and control of the aircraft. Support company maintenance personnel perform aircraft weight-and-balancing procedures. Aviation maintenance company/troop personnel appointed on aircraft weight-and-balance orders by the aviation maintenance company/troop commander can conduct or assist support company maintenance personnel when weighing their assigned aircraft. To prevent accidents or hazardous conditions, personnel must adhere to policies and procedures outlined in AR 95-1, DA PAM 738-751, and TM 55-1500-342-23.

### WEIGHT-AND-BALANCE RECORDS

5-29. The assigned weight-and-balance technician maintains the aircraft weight-and-balance records. TIs coordinate with the weight-and-balance technician when maintenance on the aircraft could affect weight and balance. Refer to AR 95-1, TM 55-1500-342-23, aircraft operator manual, and aircraft TMs for additional information and guidance. The aircraft operator manual and applicable TM contain weight-and-balance data.

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**Note.** The automated weight-and-balance system authorization and paper methods are the only authorized methods for computing weight and balance.

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5-30. The manufacturer inserts all aircraft-identifying data on the various charts and completes all forms before aircraft delivery. DD Form 365 (*Weight and Balance Personnel, Record of*), DD Form 365-1 (*Weight Checklist Record, Chart A-Basic*), DD Form 365-2 (*Weighing Record, Form B-Aircraft*), DD Form 365-3 (*Weight and Balance Record, Chart C-Basic*), and DD Form 365-4 (*Weight and Balance Clearance Form F-Transport/Tactical*), charts, and other pertinent data pertaining to aircraft weight-and-balance are maintained in a permanent binder. The binder and forms list the aircraft designation and serial number. Weight-and-balance technicians annotate any changes affecting the aircraft weight and balance on these forms.

5-31. Weight-and-balance forms for each aircraft are safeguarded and maintained according to applicable references. The aircraft serial number and information to be inserted on the charts or forms apply only to the

individual aircraft. Weight-and-balance data and related forms for each aircraft are maintained according to AR 95-1 and TM 55-1500-342-23.

## PUBLICATIONS PROGRAM MANAGEMENT

5-32. Aircraft publication management ensures current maintenance procedures are being performed which is critical to the safety and airworthiness of the aircraft. QC, shops, and maintenance personnel establish and maintain a complete, up-to-date set of technical publications for supported aircraft and equipment. These publications provide instructions on operation, maintenance, repair, modification, serviceability standards, testing, inspection, and storage of equipment. Publication personnel are appointed in the unit and responsible for ordering and maintaining unit publication accounts.

5-33. TIs perform a quarterly review of publication files (technical libraries) to ensure completeness and currency. TIs also provide guidance in preparing and submitting recommendations for changes to maintenance and administrative publications. Recommendations for changes are submitted on DA Form 2028. TIs establish and maintain a file of recommended changes according to AR 25-400-2.

## PUBLICATIONS FAMILIARIZATION RECORD

5-34. A publication familiarization record serves as a record listing publications (such as ADPs, ARs, DA PAMs, FMs, SOPs, TCs, and TMs) safety-related messages (such as safety-of-flights or ASAMs) and civilian manufacturer manuals (such as John Deere manuals, Olympus NDI manuals) required by a particular shop or section to perform its mission, duties, responsibilities, and day-to-day functions. The term “reference” is used as a single term synonymous and interchangeable with “publications”, “safety related messages”, and/or “civilian manufacturer manuals”. A familiarization chart must reflect the following minimum data:

- Reference number (such as AR 750-1 or TM 1-1500-204-23-1).
- Reference title.
- Basic/initial issue date.
- Change number or rapid action revision.
- Date of last change or rapid action revision.
- Person or personnel assigned to the shop or section.
- Initials of assigned personnel. (The initials of a person, placed adjacent to a reference, signifies the person validating familiarity with that reference.)
- Quarterly reviews (conducted and documented by a technical inspector).

6-35. QC tracks all computers with maintenance publications installed for the version of the electronic digital publication. The location of each computer is documented. The version of manuals is documented to include the publication number, original 20 October 2020, the latest change number, and latest change number date.

5-36. Shop, sections, and maintenance platoon NCOICs are responsible for tracking and announcing pertinent information updates requiring familiarization. It is the NCOIC’s sole responsibility to keep assigned maintainers familiar with all changes affecting aircraft maintenance TMs and publications.

5-37. Maintenance personnel validate and record their familiarization for each publication to indicate currency. Shops/maintenance personnel validations are deleted as new changes are received and announced.

5-38. After a new change is announced, posted, and reviewed, shops and maintenance personnel record their currency to indicate familiarity with the new change. Each maintenance section or shop maintains separate familiarity records. TIs check the records during publication review to ensure:

- All publications used by maintenance sections or shops are listed and current to include the latest changes.
- All maintenance section or shop personnel are listed.
- All personnel have validated their familiarization with the latest change or revision to the publications.

## FORMS AND RECORDS MANAGEMENT

5-39. TIs manage and monitor all forms and records for accuracy and completeness according to DA PAM 738-751. They monitor aircraft historical records, weight-and-balance records, aircraft maintenance records, blank forms, and product quality deficiency reports. TIs, aircrew members, aviation maintainers, maintenance managers, record clerks, supervisors, and commanders (at all levels of maintenance) including DOD contract support activities, have an equal stake in maintaining forms and records.

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*Note.* TIs ensure a 30-day supply of blank forms is always on-hand to support maintenance operations.

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### AIRCRAFT HISTORICAL RECORDS

5-40. TIs maintain historical records for each aircraft assigned to their unit and ensure all essential historical records are on-file and updated according to published policies and regulations.

### AIRCRAFT MAINTENANCE RECORDS

5-41. TIs check the accuracy of aircraft maintenance records each time they sign off a deficiency and as completed forms are turned into their office. Many units also establish reconciliation between the maneuver platoons and QC to assist in monitoring the accuracy of these records.

### AVIATION MAINTENANCE MANAGEMENT FILE SYSTEM

5-42. Aircraft safety messages are informational or provide critical communication that applies to specific MDS. The most important files maintained by QC personnel are safety-of-flights, ASAM, and maintenance information messages. These messages may ground aircraft, impose operating limitations, or provide information on the execution of aircraft maintenance.

5-43. QC maintains separate message files for each assigned or supported MDS. General aviation messages are maintained in one filing location within the QC shop. For more guidance on SOF messages, ASAMs, and files management, refer to AR 95-1, AR 25-400-2, and DA PAM 738-751.

5-44. The QC section assists with submitting recommendations for corrections or changes relating to technical and administrative publications on a DA Form 2028. The QC sections establishes files and maintains submitted DA Form 2028, according to AR 25-400-2.

### PRODUCT QUALITY DEFICIENCY REPORTS

5-45. An Standard Form (SF) 368 (*Product Quality Deficiency Report*) is submitted to AMCOM, CECOM, and Tank-Automotive and Armaments Command (TACOM) to suggest corrections and improvements to aircraft, UAS subsystems, and aviation associated equipment, including mission-related equipment, and to alert AMCOM, CECOM, and, TACOM to problems encountered by the user due to receipt of defective equipment. Anyone finding quality deficiencies in Government-owned materiel is required to report the defects to the appropriate military service screening point for investigation and resolution, according to DA PAM 738-751.

5-46. TIs submit an SF 368 to the appropriate electronic reporting database according to the instructions as found on the Product Data Reporting and Evaluation Program website. If an exhibit is needed, the TI ensures all applicable forms and records accompany the exhibit (DA PAM 738-751). TIs review applicable aircraft equipment improvement and maintenance digests before submitting the product quality deficiency reports.

### MANAGING RECOMMENDED CHANGES TO PUBLICATIONS

5-47. If a maintenance malfunction occurs as the result of an improper maintenance procedure outlined in a maintenance TM, the TI notifies the PC OIC, maintenance officer, maintenance/shops NCOIC, and the

maintenance personnel who performed the maintenance procedure. The TI provides a detailed description of the problem, the possible effects and, after researching the problem, guidance on how it can be corrected.

5-48. The TI provides guidance to assigned and attached unit maintenance personnel in submitting proposed recommendations to correct deficiencies outlined in the maintenance manual. The DA Form 2028 is prepared and forwarded to the agencies responsible for each manual so corrective action can be taken. The agency responsible for the TM or reference in question is listed in the suggested improvements statement in the heading of applicable manuals and publications, normally the first page.

5-49. TIs manage and track all submitted recommendations for changes to maintenance and administrative publications. Recommendations for changes are submitted on a DA Form 2028. The TIs establish and maintain a file of recommended changes according to AR 25-400-2.

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*Note.* DA Form 2028 is available on the APD website and in aviation technical maintenance manuals. Recommended changes can be submitted electronically at the AMCOM Logistic Center 2028 website; in addition, the status of any recommended changes can be tracked on this website.

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## AVIATION TECHNICAL INSPECTION PROCEDURES

5-50. Technical inspection of aircraft maintenance ensures standards and practices established by applicable publications are followed. It also ensures applicable technical requirements are met, maintenance performed is documented, and quality work is performed efficiently.

5-51. Before performing an inspection, QC personnel review the latest applicable maintenance manual and regulatory policies to ensure the inspection meets current requirements. To ensure crewmember safety and equipment reliability, inspection procedures must be standardized and explicitly followed.

### Status Symbols

5-52. Status symbols are used on forms and records to reflect the seriousness of faults, failures, deficiencies, and related maintenance actions and known safety hazards. The forms and records show the condition, readiness for flight, mission capabilities, operation, service, inspection, and maintenance of the aircraft system, subsystem, or associated equipment. Refer to DA PAM 738-751 for a detailed discussion of status symbols denoting aircraft airworthiness.

### Grounding Condition (X) Authorization

5-53. The TI is the commander-designated representative for aircraft quality assurance and QC management. Authorization to sign off “status symbol X, grounding condition” or “circled X” conditions is designated, in writing according to the unit’s maintenance SOP, typically the first Lieutenant Colonel in the chain of command or a designated representative. This authorization provides the name, rank, and duty position of the TI and authorizes him or her to inspect and sign off “status symbol X, grounding condition” or “circled X” faults on specific aircraft models and components. A copy of the authorization is kept on file in the QC office for six months after the representative departs the unit.

5-54. The TI’s initials and signature/stamp are required to release an aircraft for flight. An official memorandum listing all QC personnel with their initials, signature, and personal identification number next to their name helps eliminate unauthorized use by other unit personnel.

5-55. A TI or maintenance supervisor who works on a “status symbol X, grounding condition” or “circled X” fault cannot perform quality assurance on his or her own work. The work is inspected and signed off by another person designated in writing by the commander.

5-56. If no repair work or maintenance is involved and only an inspection is required, the TI performs the inspection and signs off with no recheck. The parent unit orders are sufficient authority to sign off a “status symbol X, grounding condition” or “circled X” faults on aircraft belonging to another unit (DA PAM 738-751).

### Inspection Stamps

5-57. Although the primary means for technical inspections are now automated, alternate means are still required in the instance that the sustainment information system is rendered inoperable. An inspection stamp may be used to indicate a satisfactory condition. This stamp carries the same authority as a TI signature or personal identification number and must be guarded against unauthorized use. If an inspection stamp is used, it is round and no larger than 1/2 inch in diameter (figure 5-3). It includes the unit designation and TI number.

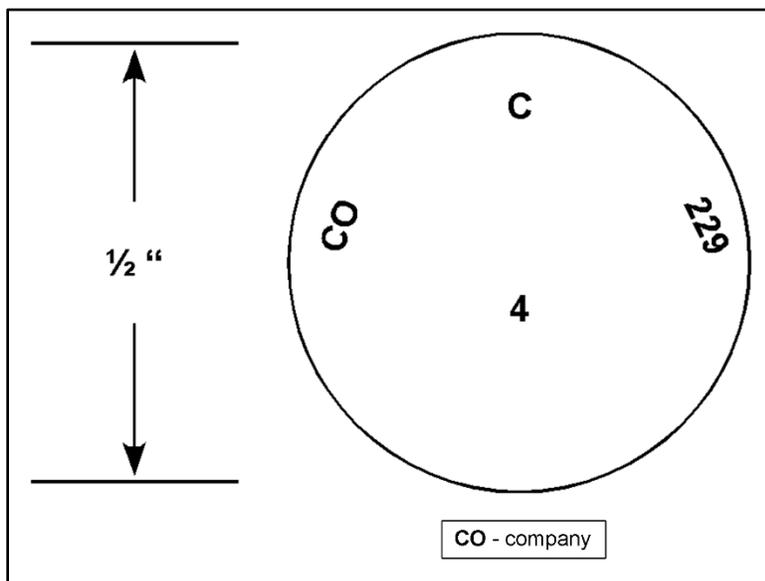


Figure 5-3. Inspection stamp sample

5-58. The following requirements must also be met:

- Keep stamps that have not been issued under lock and key.
- Destroy illegible stamps.
- Do not assign relieved stamps for six months.
- Keep a stamp inventory or register (table 5-2) in the QC section.

Table 5-2. Sample inventory register of inspection stamps

Stamp #	Assigned To	Date Assigned	Date Returned
1	Jerry H. Brown SSG	12-Jan-06	
2	John W. Doe SGT	23-Aug 04	3-Dec-04
3			
4			
5			
6	Stamp destroyed (lost)		
7	Tony L. Salazar SFC	4-Jun-05	
* Account for and include all stamp numbers.			
Aug-August Dec-December Jan- January Jun-June		SFC-Sergeant First Class SGT-Sergeant SSG-Staff Sergeant	

### Technical Inspections

5-59. Technical inspections are a visual, touch-and-feel inspection made by a technically-qualified person (normally a QC TI). These inspections are performed on aircraft and associated equipment according to maintenance standards outlined in the aircraft TM.

5-60. Technical inspections are also conducted on aviation-related equipment, maintenance and shop operations and areas, and supply facilities. The results of all technical inspections are used to—

- Assure quality maintenance is performed and in full compliance with TM.
- Determine serviceability of aircraft systems, subsystems, repair parts, and components.
- Estimate cost of damage resulting from accidents or incidents.
- Determine how many man-hours and repair parts are needed to restore equipment to a serviceable condition.
- Determine the cause of the unserviceable condition of the equipment.
- Determine the economical reparability of unserviceable equipment.

## PROCEDURES

5-61. Inspections procedures are critical to aircraft airworthiness.

### AIRCRAFT INSPECTIONS

5-62. Safety of the aircraft and crew depends on rigorous aircraft inspection and compliance with all applicable maintenance publications and other references. TM 1-1500-328-23 contains information on the preventive maintenance inspection system, acceptance inspection, transfer inspection, and in-storage inspection.

5-63. Aircraft are inspected to ensure published specifications are followed, maintenance requirements are complied with, and quality work is completed efficiently. If a TI is not completely familiar with the area or the item being inspected, they must seek supervisory guidance.

5-64. A TI must review and become familiar with the TMs on the subject area or item being inspecting. A TI never relies solely on their experience to conduct quality assurance on an aircraft system, subsystem, and/or equipment. TIs always use technical references when inspecting Army aircraft and equipment.

### PROCESSING UNIT AIRCRAFT AND MAJOR COMPONENTS FOR MAINTENANCE SUPPORT (AVIATION SUPPORT COMPANY ONLY)

5-65. Owning-unit representatives accompany aircraft work ordered to the support company for maintenance. They review aircraft records with support company personnel, resolve questions, and perform a joint inventory with support company personnel. These representatives accompany support company TIs on the initial and final inspection of the aircraft.

5-66. Upon completion of repairs and before acceptance of the aircraft, inspectors perform a joint inventory with support company personnel, review aircraft records for accuracy and completeness, and inspect aircraft to ensure requested work was properly performed. If repairs are deferred/delayed due to unavailable parts, TIs ensure the repair parts needed to complete required maintenance procedures have valid document numbers.

5-67. TIs monitor maintenance procedures to ensure—

- Proper tools and equipment are used.
- Aircraft and components are maintained according to specific publications.
- Publications used are current.
- Forms and records are complete and accurate.
- Safety precautions are observed.
- Trained and competent maintainers are conducting aircraft maintenance.

5-68. TIs perform certain aircraft inspections at specified times. These inspections include initial, in-progress, final and a 100 percent inspection.

### Initial Inspection

5-69. Support company TIs perform an initial inspection before the aircraft enters the shop for maintenance to verify aircraft or components meet specifications of published maintenance manuals. This inspection determines deficiencies, work required, economical repair of aircraft and components, and accountability of equipment to include sensitive items if installed.

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*Note.* Minor deficiencies identified by support company TIs are not justification for refusal to accept an aircraft.

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5-70. All deficiencies are entered on DA Form 2408-13-3 (*Aircraft Technical Inspection Worksheet*). These forms are returned to PC after the inspection. Only those cowling and access panels necessary to inspect the faults listed on the DA Form 2407 by the support company unit are removed.

### In-Progress Inspection

5-71. The in-progress inspection is a continuing inspection performed periodically while the aircraft or component is in the shop (especially important during phase/periodic inspections). TIs should be available to answer questions and resolve problems. Maintenance team chiefs set up stations, if possible, so the inspector is near the work being performed.

5-72. Equipment at each station should include all items needed to perform the inspection. All necessary forms, maintenance publications, tools, and test equipment should also be available. Aviation support company TIs perform the in-progress inspection to ensure the final product is reliable; areas are inspected before they are covered with access panels or components. Maintenance procedures not performed according to applicable maintenance publications are corrected immediately upon discovery.

5-73. TIs thoroughly review logbook forms and records before performing an in-progress inspection on aircraft in phase or undergoing periodic maintenance. TIs enter deficiencies missed by the maintenance team on DA Form 2408-13-1 (*Aircraft Inspection and Maintenance Record*).

### Final Inspection

5-74. A final inspection is a complete inspection and functional test, if required, of all aircraft or components released after maintenance. This inspection confirms—

- Repairs meet the specifications of the maintenance manuals.
- Work requested on DA Form 2407 was completed.
- Correct tools and equipment were used.
- Entries on DA forms are complete and accurate.
- Aircraft or components conform to standards.

5-75. Major deficiencies are corrected before the aircraft or component leaves the support company. Minor shortcomings are corrected based on the availability of parts and man-hours. All deferred/delayed maintenance have a valid requisition or work-order number in the DA Form 2408-13-1 delay block. The decision to defer/delay maintenance rests with the commander or designated representative, as stated in DA PAM 738-751.

### One Hundred Percent Inspection

5-76. Support company TIs perform a 100 percent inspection if numerous faults are found during other inspections (such as initial inspections) not annotated in the aircraft logbook. QC personnel should coordinate with the PC OIC or maintenance officer before performing a 100 percent inspection.

5-77. The TI performs the 100 percent inspection by removing all cowling and access panels and inspecting the entire aircraft, including all systems and components. During the inspection components, repair parts, and items are checked for (to include installation on the airframe)—

- Correct assembly.

- Proper safety techniques (use of safety wire and cotter pins).
- Wear.
- Rigging.
- Leaks.
- Structural defects (such as cracks, punctures, loose rivets, and separation in honeycomb panels).
- Security of components.

## FORMS AND RECORDS INSPECTION PROCEDURES

5-78. Forms and records are the first items checked in any aircraft inspection. All form entries follow the policies in DA PAM 738-751, TM 55-1500-342-23, and TB 43-0211. All necessary forms, publications, tools, and test equipment are available at the inspection station. Refer to DA PAM 738-751 for the required locations of various forms. Paragraph 5-79 thru 5-81 captures forms and records inspection information.

5-79. DA Form 2408-12 (*Army Aviator's Flight Record*). Normally the pilot or crewmember fills in the total in each block to include flight hours and landings. TIs ensure hours and landings are correctly totaled and entered on the form.

5-80. DA Form 2408-13 (*Aircraft Status Information Record*), DA Form 2408-13-1, DA Form 2408-13-2 (*Related Maintenance Actions Record*), and DA Form 2408-13-3 (*Aircraft Technical Inspection Worksheet*). The TI ensures the following:

- Hours and landings are accurate and correctly carried forward from the DA Form 2408-12.
- Current aircraft hours, landings, autorotation, auxiliary power unit history, and rounds fired (if applicable) are correctly carried forward from the previous DA Form 2408-12 and DA Form 2408-13.
- The status in block 10 reflects the most serious uncorrected fault listed on DA Form 2408-13 series forms.
- All corrected X and circled X corrective actions were inspected according to applicable maintenance manuals by an authorized inspector.
- All uncorrected entries signed off as carried forward from the previous DA Form 2408-13-1 are entered on the current DA Form 2408-13-1.
- Entries are carried forward word for word and status symbols are correct.
- Inspection times are correctly carried forward from the previous DA Form 2408-13.

5-81. DA Form 2408-18 (*Equipment Inspection List*). The TI ensures all required inspection items are entered. The TI updates the DA Form 2408-18 with correct dates or times when a TM changes or other authorization documents directs the addition or deletion of a given inspection.

## HISTORICAL RECORD LOGBOOK FORMS AND RECORDS INSPECTION

5-82. DA Form 2408-15 (*Historical Record of Aircraft*). The TI ensures—

- DA Form 2408-15 is reviewed for completeness and accuracy.
- Significant historical data is shown as required by DA PAM 738-751.

5-83. DA Form 2408-16 (*Aircraft Component Historical Record*) and DA Form 2408-16-1 (*History Recorder, Component, Module Record*). The TI ensures—

- Required forms as listed in DA PAM 738-751.
- Serial numbers match component serial number on the aircraft.
- Computed replacement due times are correct and not past due.

5-84. DA Form 2408-17 (*Aircraft Inventory Record*). The TI ensures—

- All applicable items on the master inventory guide are listed.
- Property additions and deletions made after aircraft delivered are correctly reflected.
- All equipment checks have a signature in the corresponding numbered block.

- All items added, deleted, or short are explained on the back of the form according to DA PAM 738-751.

5-85. DA Form 2408-19 (*Aircraft Engine Turbine Wheel Historical Record*). The TI ensures the appropriate series numbered forms are completed according to DA PAM 738-751 and applicable publications.

### MANAGING TECHNICAL COMPLIANCE OF AVIATION SAFETY-RELATED MESSAGES

5-86. The QC section monitors and ensures compliance with SOF messages, ASAM, MWO, TB, AWR, and interim statement of airworthiness qualifications. Compliance with all aviation safety-related messages is paramount to the safety of crewmembers, aircraft, and equipment.

5-87. Once safety messages are complied with, TIs make required entries on applicable DA forms according to DA PAM 738-751. All aviation maintenance units submit a safety message compliance status report according to the instructions on their assigned aircraft.

5-88. For a detailed discussion of aviation safety messages and their requirements, refer to AR 750-6 and DA PAM 738-751.

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*Note.* AMCOM maintains consolidated listings, by airframe, of aviation SOF messages. For a comprehensive listing of aviation SOF messages, to include maintenance information messages, visit the AMCOM safety and maintenance message website. Users must have Army knowledge online credentials for access.

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### AMCOM SAFETY AND MAINTENANCE MESSAGES

5-89. SOF and ASAM messages provide information concerning safe operation of an entire type or specific serial numbers of Army aircraft. These messages are transmitted by E-MAIL or the joint technical data integration (JTDI) database to all organizations concerned. The message number indicates general or specific information. General messages apply to all aircraft while specific messages apply only to a specific series of aircraft, such as—

- H-60-06-SOF-02:
  - SOF that applies to the Blackhawk (H-60) aircraft fleet.
  - Published during fiscal year (FY) 2006.
  - Second message published during FY 2006.
- H-64-06-ASAM-03:
  - ASAM message applying to the apache (H-64) aircraft fleet.
  - Published during FY 2006.
  - Third H-64 message sent during FY 2006.

### SAFETY OF FLIGHT MESSAGES

5-90. The three types of SOF messages are emergency, operational, and technical.

#### EMERGENCY

5-91. Emergency messages contain information deemed critical in nature, these messages ground affected aircraft. They usually denote hazardous aircraft conditions that, unless complied with, have the high probability of causing aircraft damage or personal injury. Emergency SOF messages are published as TB or MWO.

#### OPERATIONAL

5-92. Operational messages apply to flight procedures, operating limits, or operational policy. These messages may ground affected aircraft for operational reasons.

## TECHNICAL

5-93. Technical messages are issued by AMCOM and are later published as urgent action TB or MWO. When issued, these messages cause grounding of affected aircraft but allow them to fly with specific limitations.

## SAFETY-OF-USE

5-94. Safety-of-use messages are high-priority notifications pertaining to any defect or hazardous condition or combination of actions, actual or potential, that can cause personal injury, death, or damage to equipment, related system, components, or repair parts. These high priority messages require an immediate action prior to the next operation.

5-95. Safety-of-use messages are developed, prepared, and electronically sent by AMCOM to all users of Army non-aircraft equipment listed in DA PAM 738-751. AR 750-10 and DA PAM 738-751 cover the procedures for issue, compliance, and management of safety-of-use messages, MWO, and TB.

## MAINTENANCE ADVISORY AND INFORMATION MESSAGES

5-96. Aviation maintenance advisory and maintenance information messages are informational messages that apply to aviation maintenance personnel. Normally, these types of messages do not require any entries on forms and records. See DA PAM 738-751 for procedures on aviation maintenance advisory and maintenance information messages.

## SUPPLY BULLETINS

5-97. Supply bulletins provide important supply information to maintenance personnel and include—

- Materiel number changes.
- Direct-exchange list changes.
- Reports on new materiel.

## MODIFICATION WORK ORDERS

5-98. MWOs become mandatory when—

- Providing increased safety to personnel or equipment.
- Significantly raising the operational and support features of equipment.

5-99. Refer to AR 750-10 for definitive priority criteria assigned to MWO. Routine, urgent, and emergency are the three priorities assigned to an MWO.

5-100. Upon receipt of an MWO that applies to corresponding serial numbers of assigned aircraft, TI enter MWO-required information on a DA Form 2408-5 (*Equipment Modification Record*) (refer to DA PAM 738-751). MWOs applied to assigned aircraft normally are accomplished by sustainment-level maintenance activities such as the contract field teams, Corpus Christi Army Depot, or contract maintenance activities performing overhaul/repair. The sustainment-level maintenance activities complete the MWO entry when the MWO is applied. If an MWO is not applied by the specified date on the directive, TIs enter MWO data on DA Form 2408-13-1 (refer to DA PAM 738-751). To gain access to the modification management information system (MMIS) application via the application warehouse, registration must be completed on the Army Enterprise System Integration Portal (AESIP) website.

5-101. MWOs are the only publications that authorize modification or alteration of Army equipment. MWOs are issued to—

- Provide compatibility with newer equipment.
- Prevent serious damage to equipment.
- Increase operational effectiveness.
- Reduce support requirements.

- 5-102. Each MWO contains specific instructions concerning—
- Time limit for compliance.
  - Maintenance category to which the MWO applies.
  - Parts required.
  - Man-hours required.
  - Form entries required.
  - Method for performing the modification.
  - Weight-and-balance data.

### TECHNICAL BULLETINS

5-103. TBs contain technical information on equipment or professional management techniques. TBs, SOF messages, and interim statement of airworthiness qualifications direct one-time or, in special cases, a recurring inspection of an aircraft or component. DA Form 2408-5-1 (*Equipment Modification Record [Component]*), DA Form 2408-13-1, DA Form 2408-15, DA Form 2408-16, and DA Form 2408-18 are used to ensure compliance with TBs.

5-104. TIs are also responsible for two actions: grounding an aircraft, if required by the TB (refer to AR 95-1), and submitting reports required by AR 95-1 to report compliance with TB. Urgent inspection requirements are initially sent to units by messaging that allows wide distribution such as emails and JTDI. The subsequent TB then supersedes the E-MAIL/JTDI. TBs directing one-time inspection are classified by priority as urgent, limited urgent, and normal.

### AIRWORTHINESS RELEASE

5-105. An AWR is a technical document that provides operating instructions and limitations necessary for safe flight of an aircraft system or subsystem or associated equipment. Army airworthiness approval is—

- Based on the results of design analysis, engineering ground test, and/or flight-test.
- Required prior to operation of a new aircraft system or subsystem or associated equipment or a modification to the qualified or standard configuration.

5-106. Aircraft specific AWRs can be located on the JTDI website.

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*Note.* Refer to AR 70-62 for information on AWRs and interim statement of airworthiness qualifications.

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## QUALITY CONTROL EQUIPMENT SUPPORT PROGRAMS

5-107. This section covers ground support equipment and program management.

### GROUND SUPPORT EQUIPMENT

5-108. GSE includes all equipment needed to maintain aircraft and associated equipment. TIs ensure the forms and records used to track maintenance and services for assigned GSE comply with DA PAM 750-8. GSE support personnel seek QC TI guidance when filling out GSE forms and records. Refer to chapter 6 for more information on the GSE program.

### FOREIGN OBJECT DAMAGE PROGRAM

5-109. FOD may cause materiel damage, or it may cause a system or equipment to become inoperable, unsafe, or less efficient. To eliminate potential FOD or malfunction of an aircraft system or subsystem, TIs must take an active role in enforcing the FOD program. TIs closely monitor ongoing maintenance procedures within the scope of their responsibilities to ensure maintenance personnel are consistently practicing sound FOD procedures.

5-110. TIs must enforce FOD directives as outlined in the unit maintenance SOP. They must work diligently with the unit assigned FOD officer/NCOIC to ensure the FOD program designed for their unit is effective, manageable, and observed by all maintainers. FOD prevention countermeasures are integrated throughout the unit SOP.

## ARMY OIL ANALYSIS PROGRAM

5-111. The commander appoints an AOAP monitor who has been properly trained and certified by the supporting laboratory. The AOAP monitor manages and monitors the program in the unit. Refer to chapter 6 for more information on AOAP.

5-112. TIs provide guidance, when called upon, to ensure maintenance personnel are adequately trained in the techniques of drawing oil samples from aircraft components. TIs ensure aircraft and components are entered in the program and required records are maintained. Refer to AR 750-1, TB 43-0211, and DA PAM 738-751 for specific instructions. TIs ensure—

- Oil samples are taken according to TB 43-0211.
- DD Form 2026 (*Oil Analysis Request*) is complete and accurate.
- Samples are dispatched expeditiously to the laboratory.
- Special samples requested by the laboratory are taken immediately.
- Notification is given to the assigned servicing laboratory of replacement or removal of AOAP components.

## SECTION IV – REFERENCES AND PUBLICATIONS MANAGEMENT

5-113. QC ensures TMs and references located in the technical library are current and up to date with the latest changes.

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*Note.* Refer to the aircraft TMs for an expanded list of references and publications used by an aviation maintenance unit. Refer to the index for Army publications for a detailed listing of reference and publication requirements.

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## FEDERAL AVIATION ADMINISTRATION PUBLICATIONS

5-114. The Federal Aviation Administration publishes references and publications on aviation and aircraft maintenance using different standards from those applied to Army Aviation assets. When conducting maintenance on Army Aviation assets, aviation maintainers use only authorized Army-approved publications and references. Do not use Federal Aviation Administrative or any other Federal Agency publications for Army aircraft maintenance unless authorized in writing or as part of a logistic support plan.

## CHANGE, REVISED, AND RESCINDED PUBLICATIONS

5-115. A publication revision is a completely new edition of an existing publication. It supersedes the preceding publication, together with all changes, supplements, and appendices. Likewise, publications are rescinded when the information becomes obsolete. Effective aircraft maintenance requires the latest technical information be on-hand at all times. Changes occur to Army reference and doctrine publications on a continual basis. QC personnel must ensure units have adequate quantities of current publications; therefore, they need to understand how the publications distribution system operates. DA PAM 25-40 provides necessary information for the TI to include the following:

- How initial distribution and resupply occur.
- Required DA forms for ordering publications.
- Where publications can be located.
- How to set up a publication account.

## **POSTING CHANGES**

5-116. When manually posting changes in loose leaf publications, personnel are to follow the guidelines as outlined in DA PAM 25-40.

## **INTERIM CHANGES**

5-117. When there is no time to issue a printed change, an email or JTDI is used to amend a publication. The message is identified as an interim change and prepared in the format of a published change. The message provides the exact language of the changed material. When posting the change, personnel follow the procedures directed by the message.

5-118. A copy of the message is filed in front of the basic publication or the last printed change. If a copy is not available, a cross-reference sheet is inserted, showing where a copy of the message can be found. When the next printed change or revision of the publication is received, the superseded notice is checked. If the notice states the message is rescinded or superseded, the message or cross-reference sheet is removed and destroyed.

## **PUBLICATION RESCISSIONS**

5-119. A publication is rescinded (canceled), then destroyed, when its material becomes obsolete. DA PAM 25-40 contains information on rescinded publications and forms.

## **PUBLICATION DISPOSAL**

5-120. Dispose classified publications according to AR 380-5. Dispose unclassified publications according to instructions from the local disposal officer. Contact the post adjutant general publications point of contact for disposal instructions in instances of uncertainty. Refer to DA PAM 25-40 for further guidance.

## **AVIATION MAINTENANCE COMPANY TECHNICAL LIBRARIES**

5-121. Immediate supervisors provide maintainers with the most current maintenance TMs, doctrine publications, and applicable Army Regulations. Technical libraries are required for all assigned and attached equipment and must be located in a convenient location accessible to all maintenance personnel.

## **MASTER AND SHOPS TECHNICAL LIBRARIES**

5-122. The QC section is responsible for two types of libraries: master and shop. Located in the QC office, the master library is used by all personnel. It contains publications required to maintain all series of aircraft and components owned or supported by the aviation maintenance companies. The shop's library contains manuals on the specific duties of the shop sections. Inspectors ensure these manuals are complete and up to date. The QC section also checks the master and shop libraries quarterly to ensure—

- Libraries are located conveniently to users.
- Libraries are set up alphanumerically.
- All required manuals are on-hand or on-order.
- No unnecessary hardcopy publications are on-hand.
- Changes and index information reflect the status of all publications on hand.
- No superseded or rescinded manuals are used.
- Manage classified manuals according to the AR 380-5.

## **PUBLICATIONS FILING SYSTEM**

5-123. Technical publications files are maintained according to AR 25-400-2. Use APD to locate all required doctrine publications and Army regulations.

**SECTION V – SUSTAINMENT INFORMATION SYSTEM ADMINISTRATION**

5-124. QC personnel are the sustainment information system administrators for the unit on all aircraft related components and equipment. The QC office is responsible for sustainment information system training requirements in collaboration with the PC office.

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*Note.* If the server is down, QC processes logbook entries manually. Once connectivity is restored, manual entries are uploaded to the sustainment information system.

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5-125. Although commissioning and decommissioning of the deployed server are the responsibility of PC, QC personnel assist in the process. The sustainment information system deployed server allows the unit flexibility to push aircraft away from the primary database to support area operations. The deployed server enables TIs to have access to historical records and send information back to PC for flight hours and reporting purposes.

5-126. When the aviation maintenance unit is conducting split-based operations, the deployed server function provides a unit with the capability to deploy aircraft to support operations away from the unit primary database. The deployed server allows QC personnel access to all available QC functions, except program administrator functions.

5-127. The sustainment information system automated QC program provides full-data entry, editing, review, and report-generation capabilities. DA PAM 738-751 required forms and reports are provided in a paperless electronic environment.

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## Chapter 6

# Equipment Support Programs

This chapter provides Army aviation commanders, maintenance officers, maintenance technicians, and maintainers with a how-to on practices, procedures, and guidelines related to Army Aviation programs and equipment.

### SECTION I – PROGRAMS

6-1. The following programs provide the organization with access to personnel who are highly trained, experienced, physically qualified, and well versed in the missions, equipment, and procedures of the unit.

#### AVIATION RESOURCE MANAGEMENT SURVEY PROGRAM

6-2. The ARMS program provides aviation personnel with expert technical assistance and on-site evaluations, as mandated by AR 95-1, to all aviation units assigned to Army Command, Army Service Component Command, and direct reporting units. Evaluated areas of the ARMS program include, but are not limited to, the following:

- Safety.
- Command support programs.
- Maintenance and aviation support equipment operations.
- Petroleum, oils, and lubricants.
- Warehouse, technical, and unit supply.
- Training and command programs.
- Aviation night vision devices.
- Flight operations.
- Aviation life support maintenance (TC 3-04.10).
- Aviation medicine.
- Air traffic services.
- Standardization.
- Tactical operations.
- Shadow UAS units.
- Gray Eagle companies.

6-3. The ARMS program is a comprehensive survey of aviation units conducted every 24 to 36 months according to AR 95-1. These surveys assist aviation unit commanders in evaluating their unit ability to conduct its mission safely and effectively.

6-4. FORSCOM units or units evaluated and inspected by FORSCOM ARMS teams can obtain ARMS information and assistance on the FORSCOM ARMS website. A common access card login and password is required to access this web site. For all other Army command units in need of their corresponding ARMS checklists, see the Army command ARMS inspection team designated POC.

6-5. Commanders of maintenance companies and troops ensure compliance with their Army command ARMS standards and include satisfactory evaluations as a unit MOE goal. Commanders, in cooperation with the support operations section, conduct annual internal ARMS reviews of their units to validate SOPs and operational compliance. Tri-annual (every four months) progress updates are provided to the support

operations section and the command team for analysis and archiving. Assistance from sister units provide a skilled outside look when the formal ARMS team evaluation is off cycle for a particular unit.

## ARMY ENTERPRISE PORTAL

6-6. The USAMC Logistics Support Activity, re-designated as the LDAC, merged its logistics information warehouse capabilities into the new enterprise logistics portal on the Army Enterprise Systems Integration Program Portal. The portal provides both familiar and emerging enterprise capabilities such as the enterprise materiel status reporting, care of supplies in storage (COSIS), and readiness tool.

## LOGISTICS ASSISTANCE PROGRAM

6-7. The LAP consists of logisticians that provide logistics assistance and training to supported units. The LAP responsibilities include providing commanders and unit maintainers with the technical guidance necessary to resolve logistic-based problems. The LAP is responsible for identifying and reporting adverse equipment conditions affecting aircraft readiness. The LAP provides a means for logistic support activity managers to observe and identify materiel and logistic system problems in the field.

6-8. LAP personnel are highly trained, experienced, physically qualified, and well versed in the missions, equipment, and procedures of the unit. LAP personnel are assigned or attached as part of the CAB's brigade logistics support team resource. Logistics assistance personnel are employed by, or under contract to, one of the major subordinate commands under the USAMC. (See AR 700-4 for more information regarding the LAP.)

6-9. The logistics aviation program is an augmentation to the commander's aviation maintenance program. LARs, when available, provides assistance in resolving specific logistical problems. They can also provide limited training to assigned unit personnel when requested. When appropriate, LARs provides logistics support resolution (normally on new equipment) to aviation maintenance units.

6-10. Logistics assistance personnel coordinate actions with the commander and keep him or her fully informed of their findings and recommendations. Some functions of logistics assistance personnel are to—

- Give a hands-on demonstration to show how to perform a given procedure.
- Advise technical and nontechnical personnel.
- Help users replace unserviceable non-repairable equipment.
- Visit aviation maintenance company/troop and support company activities to help improve supply, repair parts distribution, and maintenance support for using organizations.
- Collect, evaluate, and exchange technical information.
- Instruct units in records management and preparing unit supply records, shop stock, and ASL.
- Instruct units in preparing equipment for field exercises and overseas deployment.
- Provide assistance on the care and preservation of stored material.
- Work with the Combat Capabilities Development Command/Aviation and Missile Center liaison engineers to facilitate and authorize non-standard field level repairs using a MECs as well as maintenance to be performed at the unit that would otherwise be performed at a sustainment facility.
- Coordinate with the major support command (MSC) material requirements planning (MRP) representative to expedite repair parts delivery wherever possible.
- Monitor the performance of assigned contractor personnel to ensure the work being performed is according to the statement of work.

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*Note.* Refer to AR 700-4, AR 700-138 and AR 750-1 for more information on the LAP.

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## Logistics Assistance Representatives

6-11. A LAR is a trained and experienced DOD civilian for a specific MDS, generally assigned to support aviation maintenance units in all operational environments.

6-12. A LAR is the direct representative of a MSC such as AMCOM, TACOM, Joint Mission Command, or CECOM. The LAR can provide maintenance and safety messages from the MSC to the unit and assist with the completion of message requirements. The LAR is available to train unit personnel on new equipment or sustainment systems to include support and test equipment managed by the MSC.

6-13. The LAR can coordinate with systems engineers and the MRP representative to authorize sustainment-level repairs and expedite the release and delivery of repair parts managed by the MSC.

## Liaison Engineers

6-14. The Combat Capabilities Development Command Aviation and Missile Center Liaison Engineer is the onsite airworthiness authority for all engineering and technical issue relating to RW aircraft and components.

6-15. The liaison engineer exercises their onsite engineering airworthiness authority through a MEC and maintenance engineering orders with a primary focus on delivery of responsive and effective maintenance engineering support resulting in improved aircraft readiness.

6-16. The liaison engineer maintains communications with local maintenance personnel, maintenance officers, original equipment manufacturer support personnel, and quality assurance personnel regarding engineering and technical issues for assigned aircraft fleet.

6-17. The liaison engineer is responsible for determining the level of capability of the unit or contractor maintenance personnel to perform these repairs in regard to necessary training, tooling and facilities.

## CONTRACTOR ENGINEERING AND TECHNICAL SERVICES

6-18. Technical expertise available to the organization are contract plant services, contract field services, and field service representatives.

### CONTRACT PLANT SERVICES

6-19. Contract plant services are those engineering and technical services provided to DA personnel by a manufacturer. These services are employed by and provided in the manufacturer's facilities.

### CONTRACT FIELD SERVICES

6-20. Contract field services are those engineering and technical services provided to DA personnel by technically qualified contractor representatives. These are generally one-time services such as those provided in the hand-off of equipment, and include information, instruction, formal training and on-the-job training, provided at an Army installation or materiel fielding hand-off site.

### CONTRACTED FIELD SERVICE REPRESENTATIVES

6-21. CFSRs are employees of a manufacturer or supplier of military equipment or components who provide full-time on-site liaison or advisory services between their company and the military users of their company's equipment or components.

## LOGISTICS ASSISTANCE REQUESTS

6-22. When requesting logistic assistance, aviation units should contact their local aviation maintenance company/troop CAB brigade logistics support team. Refer to AR 700-4 for Army field support brigade geographic areas of responsibility.

6-23. Requests for assistance should include the following information:

- Name and location of the aviation maintenance unit requiring assistance.

- Clearly specific the operational need for assistance needed along with type/quantity of equipment.
- Reasons why organic resources are not available.
- Estimated length of time assistance is required, starting date, and POC.
- Type of logistic assistance personnel required.
- Specific requirements for security clearance.

## ARMY OIL ANALYSIS PROGRAM

6-24. AOAP is a condition-monitoring program that improves equipment reliability and readiness by early detection of potential failures. The program applies to aircraft and ground equipment including GSE, material handling equipment, power generation, and prime movers. Leaders must ensure the AOAP in each unit complies with oil-sampling requirements. Units and levels of command designate an AOAP monitor who is trained by the supporting lab or installation AOAP monitor. The AOAP monitor is a unit orders position. The QC section normally oversees day-to-day operations of the program.

6-25. AR 750-1 defines the AOAP objectives, policies, and responsibilities. Aircraft maintenance personnel must be familiar with these references as well as with the AOAP forms in DA PAM 738-751 governing oil samples. To gain access to the AOAP application, users must have access to the AESIP website.

## ARMY WARRANTY PROGRAM

6-26. The Army warranty program covers all items procured for Army use purchased with an accompanying warranty. The Army warranty program includes aircraft, aircraft weapon systems, and aircraft repair parts and components.

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*Note.* Refer to AR 700-139 for additional guidance on the Army warranty program.

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6-27. Aviation units receiving newly fielded equipment and components should check the type of warranty the Army purchased. When newly fielded equipment under warranty experiences malfunction, the unit should request assistance from the LAP office for answers to or resolution of warranty issues or questions.

6-28. Aviation equipment and components covered by the Army warranty program require special handling during the warranty period to keep the warranty valid. Details concerning warranty provisions are published in supply letters. Warranty control officers (WARCOs) or the logistics assistance offices have a copy of the warranty supply letter on items within their area of support. Warranties increase the time required to perform maintenance.

6-29. The logistics assistance offices or LARs provide advice and assistance to the Army WARCO and aviation unit maintainers as part of the service interface established in AR 700-4. Representatives of the LAP—

- Assist in establishing an Army electronic product support account to submit warranty action claims.
- Assist WARCOs in developing local procedures for warranty administration.
- Clarify warranty applications/exclusions and claim/report procedures upon user or WARCO request.
- Provide warranty information to users/WARCOs as a secondary source of information.
- Provide specific assistance as outlined in materiel fielding plans, technical and supply bulletins manuals, and related documents for warranty management.

6-30. Once warranty-related issues are remediated, the unit submits a product quality deficiency reports. Submit reports to AMCOM, CECOM, TACOM, and DLA using aviation SF 368 to suggest corrections and improvements to aircraft systems, subsystems, and associated equipment. SF 368 exhibits are handled according to procedures outlined in DA PAM 738-751. AMCOM, CECOM, TACOM, and DLA are notified of any problems encountered by the user due to receipt of defective equipment.

## FOREIGN OBJECT DAMAGE PROGRAM

6-31. FOD program for maintenance operations is a basic requirement for Army Aviation units improves operational efficiency, provides for a safer operating environment, and reduces maintenance down time. Personnel who operate, maintain, or service aircraft or aviation GSE are responsible for adhering to the commander's FOD program. FOD accidents are an unacceptable impediment to Army operations. The FOD officer and NCOIC, placed on orders by the commander, ensure compliance with applicable regulations, SOPs, and manuals. Utilizing the ARMS checklist assists the FOD program leadership in validating each performance measure of the program.

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*Note.* DA PAM 385-90 contains guidance on developing a FOD program and FOD prevention SOP.

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## AIRCRAFT CONDITION EVALUATION PROGRAM

6-32. An aircraft condition evaluation (ACE) is an annual program that evaluates the condition of all Army RW aircraft. AMCOM, as the NMP, facilitates this mission to develop overhaul programs based on data, funding, and sustainment capability. The data is analyzed to determine if a repair is needed, if so what level of sustainment assistance is required and at what location. (See AR 750-1 for more information on the ACE program.)

## MAINTENANCE ASSISTANCE AND INSTRUCTION TEAM PROGRAM

6-33. The maintenance assistance and instruction team program upgrades Army materiel and units to a state of readiness consistent with assigned goals needed to carry out the Army missions. The maintenance assistance and instruction team provides commanders at all levels with an extended resource to identify and resolve maintenance, maintenance management, or supply challenges occurring within their units.

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*Note.* Refer to AR 750-1 for specific guidance on the maintenance assistance and instruction team program.

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## CORROSION PREVENTION AND CONTROL PROGRAM

6-34. Army TMs outlining procedures for the detection and treatment of corrosion for aircraft and associated equipment must be followed. A CPC program minimizes aircraft and equipment damage, increases operational efficiency, provides for a safer operating environment, and reduces maintenance down time. Evaluation of CPC operations occurs during the ARMS. Personnel who operate, maintain, or service aircraft or GSE are responsible for adhering to the commander's published CPC program. Corrosion damage of aircraft or GSE is an unacceptable impediment to Army operations. Maintenance supervisors, TIs, aircraft crewmembers, and selected aviation maintenance unit personnel receive training in aircraft CPC programs according to table 6-1, page 6-6.

**Table 6-1. Corrosion prevention and control references**

<b>AR 750-1</b>	Army Materiel Maintenance Policies.
<b>AR 750-59</b>	Army Corrosion Prevention and Control Program.
<b>DA PAM 738-751</b>	Functional User's Manual for TAMMS-A.
<b>TM 1-1500-204-23-1; TM 1-1500-204-23-7, and TM 1-1500-204-23-9</b>	General Aircraft Maintenance Manuals.
<b>TM 1-1500-328-23</b>	Aeronautical Equipment Maintenance Management Policies and Procedures.
<b>TM 1-1500-344-23-1</b>	Cleaning and Corrosion Control, Volume I, Corrosion Program and Corrosion Theory.
<b>TM 1-1500-344-23-2</b>	Cleaning and Corrosion Control, Volume II, Aircraft.
<b>TM 1-1500-344-23-3</b>	Cleaning and Corrosion Control, Volume III, Avionics and Electronics.
<b>TM 1-1500-344-23-4</b>	Cleaning and Corrosion Control, Volume IV, Consumable Materials and Equipment for Aircraft and Avionics.
AR-Army regulation DA PAM-Department of the Army pamphlet TM-technical manual TAMMS-A-The Army Maintenance Management System-Aviation	

## COMMAND SUPPLY DISCIPLINE PROGRAM

6-35. The CSDP is a compilation of regulatory requirements requiring implementation for standardizing supply activities throughout the Army (AR 710-2). The goal of this program is the proper care, use, replenishment, and safeguarding of Army property. The commander has command responsibility for this program. Likewise, the platoon leader or section chief has supervisory responsibility for the program. Squad leaders, team chiefs, and staff officers-in-charge and NCOICs incur this same supervisory responsibility. Soldiers have direct responsibility if they have physical control of property or if they have signed for it on a hand receipt. Soldiers who sign a hand receipt are accountable for all components of items listed on the hand receipt unless they receive a valid shortage annex or shortage document listing components not available for issue. Without a valid shortage annex or document, an item is assumed complete. Supply sergeants, supply custodians, supply clerks, or warehouse personnel have custodial responsibility for property in storage awaiting issue or turn-in. Personal responsibility should be inherent in all members of the Army. These responsibilities are a cornerstone of sound leadership; they cannot be delegated, withdrawn, or ignored. These responsibilities are assumed with or without a written hand receipt. The CSDP allows commanders to set a climate in which supply policies are enforced. It establishes an environment in which Soldiers and leaders can manage property proactively and requisition supplies and equipment. Soldiers and leaders who are responsible for equipment must know their equipment, its whereabouts, and its status.

6-36. Commanders and leaders ensure physical resources to accomplish the unit mission remain present and serviceable. Commanders and leaders in maintenance organizations actively pursue elimination of any shortages and establish tracking of shortage reduction by quantity, type, and funding required to eliminate all unit shortages. This tracking is reported to the battalion/squadron logistics officer to enable predictive budget activity. Unserviceable tools and equipment are immediately turned in to the unit supply for incorporation in the replenishment process and not retained by hand-receipt holders for accountability. Special tools purchased with unit funds or acquired by rapid fielding or other means are entered into formal tracking by unit supply personnel and incorporated into sustainment information system. Special tools must be included in the unit's 100 percent inventories, change of command inventory, or change of hand receipt inventory. Shortage reduction and special tool fill levels serve as quantifiable MOE for each maintenance unit.

## CONFINED SPACE AND PROTECTIVE CLOTHING AND EQUIPMENT

6-37. A confined space is large enough and configured for an individual to enter and perform work, has limited or restricted means for entry or exit, and not for continuous employee occupancy.

6-38. Maintenance commanders assign protective clothing and equipment/PPE and a confined space coordinator to ensure compliance with DA PAM 385-90 requirements. Army personnel are prohibited from entering a permit-required confined space without an approved permit, personal protective clothing, monitoring equipment, or use of isolation/lockout/tagout procedures as stated in DA PAM 385-10.

6-39. Units conduct a job hazard analysis to establish protective clothing and equipment requirements. The protective clothing and equipment results appear on safety data sheet (SDS) documents as PPE according to OSHA standards as required in support of the hazardous communication (HAZCOM) program.

### SECTION II – EQUIPMENT

6-40. The section covers management and accounting all tools and calibrated equipment.

## TOOL ACCOUNTABILITY

6-41. Portable toolboxes enable carrying and storing a variety of hand tools. Establishing a process to account for tools used while conducting a maintenance task is important. Common practices such as marking tools by etching the toolbox number helps while conducting post maintenance inventories. Each marked tool coincides with the associated toolbox identity. For example, engrave each tool in toolbox B-1 with “B-1” to associate that tool with the corresponding toolbox or toolboxes that contain shadowed tool positions; if toolboxes/bags cannot be shadowed then units devise an alternate, adequate, or practical means of tool accountability as SOP.

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*Note.* Units develop an SOP that outlines tool accountability procedures, such as lost tools, broken tools, marking of tools, required inventories, and replenishment procedures according to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.

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## TOOL ROOM

6-42. The tool room concept consolidates tools into a location centralized to the maintenance effort. A tool room provides temporary utilization of tools for mission accomplishment without adding low density or bulky items to individual hand receipts. It requires constant oversight and accountability reviews, including frequent inventories to ensure compliance with CSDP procedures. An established, effectively managed tool room facilitates 24-hour operations, allowing repairers access to a diverse range of GSE, TMDE, and special tools. Additional capability exists with the tool set aviation unit maintenance set number 2 airmobile enhanced (A92) that should not be utilized to augment a unit’s tool room.

## TOOL ROOM SUPERVISOR

6-43. The tool room supervisor has direct oversight and responsibility of the tool room. The supervisor ensures the tool room remains in direct compliance with the CSDP, conduct random accountability/serviceability inspection of the tool room, and adheres to all additional procedure outlined in the unit’s tool room SOP. The supervisor is responsible for operating the tool room in support of its diverse customer base and any length of the unit’s operational mission requirements. Assigned or attached aircraft maintenance personnel must adhere to the commander published unit maintenance SOP with regard to tool room operations.

## TOOL ROOM CUSTODIAN

6-44. The tool room custodian is delegated the responsibility of accounting for 100 percent of all hand-receipted tools and equipment controlled by the tool room. The tool room custodian issues and receive tools according to procedures outlined in the unit SOP. All tools or equipment controlled by the tool room must be signed out and in upon return to ensure absolute accountability in support of the command's safety and supply discipline practices.

6-45. The tool room custodian maintains an updated roster of all assigned or attached unit personnel authorized to sign out tools. Tools issued from a tool room are the personal responsibility of the authorized user in receipt of the tool/equipment. When not signed out, special/common-hand tools, tool sets, and kits are secured and controlled according to physical security standards of AR 190-51.

6-46. The tool room custodian inspects all tools and equipment for completeness and serviceability before issue. The custodian conducts a thorough preventive maintenance checks on all items assigned to the tool room as outlined in the unit's SOP. An inventory sheet should be used to account for every tool/equipment that is part of a given set, kits, outfits, and tools. If a tool is issued out of a set, kits, outfits and tools, it is accompanied by a copy of the inventory sheet. The inventory sheet is used every time the item is issued and returned to ensure continuous accountability.

6-47. The custodian performs a tool room inventory monthly using the current supply catalog and any associated special tools documentation. A comprehensive tool room inventory is conducted before change of custodianship. All identified shortages of tools/equipment are annotated on a shortage annex. Shortage annexes are submitted through the tool room supervisor for further actions through the unit command and supply representatives. Unserviceable or damaged tools/equipment are tagged for turned-in through guidance provided by the tool room supervisor to ensure needed items are immediately requisitioned through the supply system.

## TOOL ROOM MANAGEMENT TECHNIQUES

6-48. The tool room is a controlled access area ensuring the safeguarding and accountability of the stored property. The tool room custodian controls internal traffic by limiting access to personnel identified on the tool room's access roster in compliance with the CSDP program. Custodians ensures that tools signed out are returned to the tool room according to the unit's tool room SOP.

6-49. The efficiency of an aircraft maintainer can be connected to the serviceability of the available tools. This makes it important to preventive maintenance checks and services tools, GSE, and TMDE resources are properly pre and post maintenance task execution to maintain the Army's 10/20 standards and COSIS expectations. This is especially true if tools are stored under environmental conditions of extreme humidity or exposed to salt air.

6-50. Tools needed away from garrison are signed for on a temporary hand receipt. Personnel not assigned to the unit may sign out tools after coordination with the NCOIC according to the unit SOP. The tool sign-out register is sufficient for short-term use by unassigned personnel (typically less than 48 hours). Tools signed out to other units for extended periods are hand-receipted on a DA Form 2062 (*Hand Receipt/Annex Number*).

6-51. Maintenance personnel requiring tools in support of an external unit requirements are required to hand receipt the required tools for their respective maintenance support mission. In addition, they are responsible for turning in those tools once redeployed or at the completion of the mission unless other arrangements have been made with the tool room custodian.

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**Note.** At the completion of a maintenance procedure, aircraft maintainers conduct an inventory of their toolbox when used. Complete accountability of assigned tools reduces FOD accidents/incidents. Tools are returned to their rightful place once maintenance is completed or at the end of the business day.

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6-52. Table 6-2 provides tool room references.

Table 6-2. Tool room references

<b>AR 190-51</b>	Security of Unclassified Army Property (Sensitive and Non-Sensitive)
<b>AR 710-2</b>	Supply Policy Below the National Level
<b>AR 735-5</b>	Policies and Procedures for Property Accountability
<b>DA PAM 710-2-1</b>	Using Unit Supply System (Manual Procedures)
<b>TM 1-1500-204-23-9</b>	Manual for General Aircraft Maintenance (Tools and Ground Support Equipment)
AR-Army regulation DA PAM-Department of the Army pamphlet TM-technical manual	

## SPECIAL TOOLS

6-53. Special tools are unique tools not assigned to aviation units by their MTOE or that appear in the MTOE in quantities insufficient to accomplish the volume of tasks associated with that tool. Items not authorized by MTOE but required and found in an aircraft TMs, original equipment manufacturer recommendation, and military supply system or commercially procured can serve as special tools. The use of a special tool assists with the reduction of inefficient utilization of available manpower and supports minimizing damage to an aircraft, component, or a part which supports supply discipline. Special tools can account for millions of dollars in unit property for aviation maintenance organizations and must be tracked tenaciously.

6-54. Special tools that need to be fabricated or made from bulk materials frequently appear in the aircraft TM repair parts and special tools list. Special tools are not components of a set, kits, outfits, and tools and are not authorized in a supply catalog. Consequently, they require special accounting and tracking in the sustainment information system through the unit supply, hand receipt holders, the property book officer, and the commander to prevent loss or refabricating the same item.

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*Note.* If aviation maintenance units lack special tools outlined in the appendix of their respective repair parts and special tools list or demanded by operational needs, they must initiate the process to procure them.

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## TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT

6-55. TMDE includes torque wrenches, testers, test sets, and other test equipment used to verify whether aircraft systems are functioning or malfunctioning according to applicable regulatory policies and published aircraft TMs. Depending on the design, TMDE may be portable or fixed in place.

6-56. Whether a unit contains specific items of equipment depends on its category of maintenance (aviation maintenance company/troop or support company) and its prescribed table of organization and equipment. TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9 contain detailed descriptions and operating instructions for the most common test equipment.

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*Note.* Refer to applicable -23P aircraft repair parts and special tools list for a listing of aircraft-specific TMDE requirements. This list also grants authorization for unit maintenance personnel to procure TMDE.

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6-57. AR 750-43 assigns Army-wide management of the Army TMDE calibration and repair support program to USAMC. In turn, the Army TMDE activity (through USAMC) is responsible for the DA TMDE program execution and management. The National Guard Bureau is assigned management, command, and control over the ARNG maintenance companies and their assigned TMDE. It also controls calibration facilities at combined support maintenance shops. In addition, AR 750-43 prescribes policies and procedures, assigns responsibilities, and establishes goals and objectives applicable to the development, selection, acquisition, management, sustainment, and support of Army TMDE, associated test program sets, embedded diagnostics and prognostics, and interactive electronic TMs. The goal of all unit calibration programs is for

a delinquency rate (failure to submit for required support) of two percent or less according to AR 750-43 and an IMRF match against the unit TMDE inventory of 95 to 100 percent.

### **AREA TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT SUPPORT TEAM CAPABILITIES**

6-58. TMDE designated in TB 43-180 as requiring area test, measurement, and diagnostic equipment support team support must be transported to the location where the TMDE support team is slated to provide calibration and repair services. When justified by sufficient workload or when the size or configuration of the TMDE precludes movement, the TMDE support team is dispatched to the TMDE owner/user site.

6-59. When a designated TMDE support team is unable or not capable of providing calibration or repair service, the TMDE is evacuated as directed by the calibration and repair center. The TMDE support team is responsible for providing the necessary service and returning the repaired and calibrated TMDE to the owner/user. When service external to the TMDE support team is necessary, except for warranty TMDE, the TMDE support team arranges the service and assure the return of the TMDE to the owner/user. See AR 750-43 for more information for an area test, measurement, and diagnostic equipment support team support.

### **AREA CALIBRATION LABORATORIES/UNITED STATES ARMY PRIMARY STANDARDS LABORATORY SUPPORT**

6-60. Transport or ship TMDE requiring support from the area calibration laboratories or United States Army primary standards laboratory are transported or shipped to the area test, measurement, and diagnostic equipment support team, to the calibration laboratories supporting the unit's location, or United States Army primary standards laboratory.

### **SUPPORT**

6-61. TB 43-180 lists most calibration and repair support requirements for instruments used in support of Army materiel. The calibration procedures listed in TB 43-180 are Department of Defense or United States Army Test Measurement and Diagnostic Equipment Activity approved procedures. Address unique special tools requiring civilian or original equipment manufacturer calibration within the unit SOP and TMDE continuity guide.

### **GROUND SUPPORT EQUIPMENT**

6-62. GSE includes equipment and special tools required to maintain aircraft and associated systems. Peculiar GSE supports a single MDS. Hand-receipt holders are overall responsible for its GSE. Aircraft pneudraulics system repairs (15H SL30) are trained on directing operations for GSE.

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*Note.* GSE is stored under cover, in buildings as required, or as specified by the applicable TMs for that specific piece of equipment.

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### **AUTHORIZATION DOCUMENTS**

6-63. Authorization documents allocating GSE to aviation units are MTOEs, TDAs, and commercial off-the-shelf fielding documents. Additionally, command directed notification establishes a valid requirement for GSE. Authorization of GSE and peculiar GSE is frequently contained in the repair parts TM for that specific aircraft. For a complete list of authorized and peculiar GSE, maintainers must review the unit MTOE and applicable supply catalogs for sets, kits, and outfits authorized, as well as repair parts and special tools list manuals for their assigned aircraft. All GSE and peculiar GSE must be brought to record through the organization's property book accountability representative.

### **REQUESTS FOR ADDITIONAL AVIATION GROUND SUPPORT EQUIPMENT**

6-64. Certain conditions result in aviation units requiring GSE or peculiar GSE not identified as authorized or required by the MTOE or TDA. Tropic, desert, or arctic environments often create the need for additional

equipment to supplement authorized equipment listed in the unit MTOE. Units in need of additional GSE should submit an operational need statement through command and supply channels for approval. For peculiar GSE, requests should be submitted through command and supply channels to the appropriate platform program manager (such as utility, Apache, or cargo).

6-65. These requests should include the following information:

- Identification of the specific requesting unit.
- Number of applicable table of organization and equipment (TOE), MTOE, or TDA.
- Complete material description, material number, and quantity of needed items.
- Justification for each item, including a statement that the item can be maintained.
- If the item is nonstandard, the reason for not using a standard item.
- Statement as to whether the additional equipment should be included in the TOE, MTOE, or TDA.

6-66. The repair parts and special tools list contained in applicable TMs shows GSE needed to support assigned aircraft. If an item is listed, it can be requested, even if it is not included in the unit TOE, MTOE, or TDA.

## **FORMS AND PUBLICATIONS**

6-67. DA PAM 738-751 lists DA forms to record required data. The following DA and DD forms are used in support of GSE:

- DA Form 2404 (*Equipment Inspection and Maintenance Worksheet*) used to list equipment faults that create an NMCS equipment status.
- DA Label 80 (*United States Army Calibrated Instrument*)-used for equipment requiring calibration.
- DD Form 314 (*Preventive Maintenance Schedule and Record*).
- DD Form 1574 (*Serviceable Tag-Materiel*).
- DD Form 1577 (*Unserviceable [Condemned] Tag-Materiel*).
- DD Form 1577-2 (*Unserviceable [Reparable] Tag-Materiel*).

6-68. A reference library must be established with required publications on-hand to ensure GSE is properly operated and maintained. The reference library contains technical publications, lubrication orders, MWOs, TBs, TMs, and supply catalogs.

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**Note.** TM 1-1500-204-23-9 lists publications required to support GSE.

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## Chapter 7

# Automated Management Systems

This chapter provides aviation maintenance commanders, maintenance officers/technicians, and maintainers with an explanation of the Army automated management systems. Leaders and maintainers are required to anticipate, analyze, and tailor available automated systems for effective and timely support of complex weapon systems and aircraft. The measure of maintenance success in combat continues to be the availability of aircraft that are fully mission capable and RTL.

### SECTION I – ARMY SUSTAINMENT INFORMATION SYSTEMS

7-1. The Army sustainment information system is a functional information management system designed to provide the logistics support infrastructure required for military ground and aviation operations. The technical goal is to establish a seamless and interoperable network. Sustainment information systems are enterprise resource planning systems such as GCSS-Army, general fund enterprise business system, logistics modernization program, integrated personnel and pay system-Army, and aircraft notebook. PC, with assistance from QC personnel, commissions and decommissions the deployed server. The sustainment information system deployed server allows a unit the flexibility to “push” aircraft away from the primary database to support area operations. The deployed server enables maintenance personnel to migrate maintenance-related data back to PC for flight hours and readiness reporting purposes.

### GLOBAL COMBAT SUPPORT SYSTEM-ARMY

7-2. GCSS-Army is a sustainment information system that incorporates finance, supply below national level, property book, unit supply, and ground maintenance functions into one system. This sustainment information system provides an integrated interface capability allowing users to perform their missions with transparency from locations throughout the world. Its core functionality is based upon Army regulations, DA pamphlets, field manuals, TMs, circulars, and bulletins, directives, policies, and procedures governing SSA, unit supply rooms, shop supply rooms, and property book offices.

7-3. Enterprise-wide forecasting, planning, and scheduling tools provide the capability to track transactional data to link customers and suppliers for more efficient supply chain management. Commanders can verify operations readiness in real time and near real time by tracing logistics information originating with the supported unit’s purchase order, through the entire supply chain until the unit receives the requested items. Materiel managers can monitor and/or process on-hand stocks, requirements determination, procurement, maintenance of stock, maintenance, disposal, retrograde, and distribution of materiel.

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*Note.* The GCSS-Army website information is located in the reference section of this publication.

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### AVIATION LOGISTICS INFORMATION SYSTEM

7-4. Aviation maintenance is transitioning to the Army Enterprise Systems Integration Program with aircraft notebook replacing the Unit Level Logistics System-Aviation and the unmanned aircraft system. See FM 4-0 for more information.

## ROLES AND PERMISSIONS

7-5. Security and user roles dictate what an individual can see and do while in the unit's approved sustainment information system. These roles are divided vertically between management and clerical and horizontally between office and warehouse. Roles determine what a user can see or do because the designated representative manages user roles at echelon. For example, an SSA cannot process transactions for a unit's storage location, and a unit cannot process transactions for an SSA storage location. User roles authorize them to execute specific transactions relevant to that user's level of responsibility. In some instances, multiple roles can be assigned to perform duties that does not foster a conflict of interest.

## SUPPLY OPERATIONS ASSESSMENTS

7-6. Materiel managers must continually evaluate supply support through supply operations assessments, to determine trends, isolate deficient areas, and correct deficiencies. An operations assessment is a process that evaluates several categories of performance, including but not limited to, customer service, inventory accuracy, space utilization, facility layout, automation equipment utilization, general housekeeping, and safety. Areas which do not fall within acceptable ranges receive intensive review and management. Commanders and materiel managers can filter and tailor any GCSS-Army report to meet the specific needs for any assessment. The following is a sample listing of tailorable, near real time reports with recommended use of the report for monitoring logistics operations:

- At the brigade level, use the material equipment status report to aggregate supply and maintenance data to give commanders a combat power perspective for readiness.
- Battalions, using a maintenance dashboard, can reference equipment readiness data consisting of supply status, shop stock posture, fault management, and work order management to make critical materiel decisions.
- Commanders, unit supply sergeants, and property book officers can trace supply transactions through a daily activity report. Using the daily activity report capability, commanders can trace whether assets increased or decreased, serial number changes, reason for change, type of movement, beginning dates, ending dates, closed transaction dates, document numbers, form number and document identification codes.
- Commanders, property book officers, unit supply sergeants and the logistics officer at brigade and echelons above brigade use the unit equipment status report to analyze equipment readiness for unit status reporting. Users can tailor this report to view equipment shortages, excess, supply status, document number and planned ship dates.
- SSA accountable officers and SPOs can use the customer satisfaction report to monitor compliance with DA performance metrics and to perform various analytics for monitoring a SSA's performance.
- SSA accountable officers and SPOs can monitor SSA daily performance using the supply performance report. It displays supply statistics for one or more storage locations of SSA.
- SSA accountable officers and SPOs manage overage reparable using the overage reparable/recoverable management report.

## LOGISTICS ANALYSIS PROGRAM

7-7. In order to provide transparent sustainment support, the USAMC has logistics analysis programs to assist aviation units in complex environments. Without the proper analysis and the use of modern technology, sustainers cannot provide commanders with the information needed to make crucial decisions.

## BATTLE COMMAND SUSTAINMENT AND SUPPORT SYSTEM

7-8. BCS3 (formerly combat service support control system) collects and processes selected sustainment data in a seamless manner from the sustainment information system and manual systems/processes, and other related source data and hierarchical automated C2 systems (such as, Force XX1 Battle Command Brigade and Below and GCCS-Army). Based on these inputs, the BCS3 supports the Army Battle Command System COP by—

- Generating and disseminating near-real time sustainment C2 reports.
- Responding to sustainment related ad hoc queries.
- Updating the database an average of every three hours.
- Providing sustainment warfighting function information.

7-9. This system displays a three-dimensional picture using topographic details selected by the user from a menu of audible mapping features. BCS3 provides the logistics portion of the COP on the maneuver control system. It also provides the maneuver sustainment commander with enhanced briefings and data-management capabilities. The current logistic data is augmented with analytical and decision support tools that enable the commander to make well-informed decisions rapidly and effectively.

7-10. BCS3 provides commanders with current and future combat power estimates in what is called the running estimate. BCS3 fuses data from satellites, radio frequency identification tags, interrogators, and transponders enabling BCS3 to track and display locations of vehicles and cargo as they move within an area of operations. BCS3 obtains data and files from the maneuver control system and incorporates operational data with sustainment data providing commanders with a comprehensive and robust view of the area of operations. Tactical units providing electronic feeds to Force XXI Battle Command Brigade and Below are displayed on BCS3. The display provides an aggregated view of icons representing unit locations derived from Blue Force Tracking.

## SECTION II – LOGISTICS SUPPORT ACTIVITY

7-11. The AESIP portal provides the following automated applications to sustainment managers for use to track and manage logistic requirements in support of warfighters.

### ELECTRONIC TECHNICAL MANUALS

7-12. The AESIP portal maintains the Army technical publications repository. Sustainment of the electronic TMs disks is cyclical, occurring either quarterly or semiannually as necessary. The interactive electronic technical manual application is on the AESIP webpage. While units typically download information, disks can be ordered like any other publication. The unit publication account should be updated to receive the latest release.

### SUPPLY-RELATED PRODUCTS AND SERVICES

7-13. Automated systems provide logistic managers a variety of products and services to assist with maintaining a unit's maintenance agility and responsiveness. Products and services such as Federal Logistics (FEDLOG), Federal Logistics Information System (FLIS), routing identifier code (RIC), and parts tracker all provide vital information necessary to locate and track required items.

### FEDERAL LOGISTICS DATA

7-14. FEDLOG is an interactive product available on disk or the world-wide-web. It contains logistical information for the Army, Navy, Air Force, and Marines and the FLIS. FEDLOG is the primary source of the Army master data file information for Army customers worldwide. Refer to chapter 8 for additional information on FEDLOG.

### ROUTING IDENTIFIER CODE

7-15. LDAC is the single responsible organization within the Department of the Army that assigns, changes, and issues RICs. The RIC helps the Soldier get the requested item needed for his or her unit quickly and efficiently by routing the transaction to the corresponding source of supply. RIC routes the request to all inter-service and intra-service agencies interested in the supply transaction on that item.

7-16. The RIC contains the proper history of the requisition and is accessible by all interested agencies. This code identifies a document's creator and recipient for requisition as a follow-up or other transaction.

Primarily, the RIC tells units who supplies the equipment needed to execute their missions (for example, aircraft repair part requisition routing identifier code B17-AMCOM).

## PARTS TRACKER

7-17. Parts tracker is a readiness tool that provides status updates, location information, and supply analytics for material supply process. This application provides visibility of the requisition as it moves through the military or commercial transportation systems. Parts tracker can be found on the AESIP website.

7-18. Parts tracker relates readiness, maintenance, and supply issues to specific spare/repair parts and locates those parts within the Army or joint supply chain or in transit within the sustainment pipeline. Parts tracker can assist aviation maintenance units by tracking unit-generated aircraft requisitions using—

- Material number.
- Document numbers (maximum of five).
- Department of Defense Activity Address Code.
- Transportation control number.
- Class of supply.

## SECTION III – DEFENSE LOGISTICS AGENCY AUTOMATED SYSTEMS

7-19. DLA provides technical and logistics assistance to the warfighter by using automated systems. These systems provide maintenance managers with AV and web-based systems to assist echelons above brigade-level with the combat logistics support for their supported organizations.

## ASSET VISIBILITY

7-20. Asset visibility data comes from many source systems throughout the military. Most sources are updated, on a daily basis, using a ‘behind-the-scenes’ process called extract, translate, load (referred to as ETL for short). The assets tracked in the asset visibility system of record are broken down into these functional areas:

- **Bulk fuel:** Information on the on-hand stock levels of the various types of bulk fuel (such as, jet fuel and diesel fuel) to include DLA/energy (wholesale) locations and service (retail) locations. This also includes bulk fuel onboard Army and Marine Corps prepositioned ships.
- **Wholesale/retail inventory:** Information on wholesale and retail assets. This functional area is associated with the asset category of in-storage and includes all classes of supply.
- **Blood inventory:** Information on blood and blood-related products in DOD medical facilities.
- **Ammunition:** Information on wholesale and retail inventory status levels for Army, Air Force, Navy, and Marine Corps ammunitions.
- **Prepositioned stock/war reserves:** Information on Navy and Marine Corps maritime prepositioned ships, Army prepositioned stocks, and Air Force war reserve material amassed in peacetime to sustain wartime operations.
- **Reference data:** Cross-referencing information to enable users to get more information on pre-defined query data for materiel and facilities.
- **Requisition status:** Information on the status of requisitions.
- **Transportation:** Information on assets in-transit via land, sea, or air moving within the defense transportation system and tracked via the global transportation network through radio frequency identification tags.
- **Unit equipment:** Equipment accounted for and maintained by organizational units within the various military services, which is based upon an authorized allowance. This type of equipment consists of Class VII principal end items and Class II clothing and equipment.

7-21. Asset visibility provides views of assets based upon their status and physical location. These views are not mutually exclusive: for example, an afloat prepositioned item may be considered in-storage and in-theater:

- **In-storage:** In-storage assets are those assets stored (on the shelf) at retail consumer sites, retail intermediate storage sites, disposal activities, or in wholesale inventories, to include ashore and afloat prepositioned assets. In-storage assets encompass all classes of supply.
- **In-process:** In-process assets are those assets on order from the source of supply. These types of assets are at some stage of the procurement process; however, because of potential near-term delivery, they are of great interest to war planners and fighters.
- **In-transit:** In-transit focuses on the movement of assets (materiel and personnel) from origin to destination. DOD identifies the contents of a shipment and monitors movement throughout the asset pipeline. In addition, DOD can reconstitute and re-direct shipments. In-transit personnel queries provide visibility into the status and location of personnel traveling on military aircraft.
- **In-theater:** In-theater focuses upon those assets immediately associated with unit activities. These items may be in-process, in-storage, and/or in-transit and be within one or more theaters.

## WEB VISUAL LOGISTICS INFORMATION PROCESSING SYSTEM

7-22. Web visual logistics information processing system (WEBVLIPS) is a web-based, access-controlled query system usable from any internet-attached computer. It accesses the logistics on-line tracking system, a defense automatic addressing system center relational data base system, which portrays the life cycle of a sustainment (request for issue) action.

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*Note.* To gain access to the defense automatic addressing system center automated logistics systems, aviation maintenance personnel must have a request log-on identification and password, for DLA specific websites.

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7-23. Support company customers can use WEBVLIPS to track requisitions for aircraft repair parts or components from their release into the DOD pipeline until the materiel posted to the accountable records at the SSA. The web visual logistics information processing system also can track reports of excess and movement of those excesses to the destination sustainment facility or disposal.

7-24. The web visual logistics information processing system integrates information on source of supply, DOD project code, transaction status code, unit of issue code, signal code, hold code, advice code, and condition code, among others, to assist the user in tracking a request for issue through its life cycle.

7-25. WEBVLIPS capabilities—

- Allow the defense automatic addressing system center customer to track requisitions with a simple user interface.
- Provide a quick response time to subscriber inquiries.
- Process inquiries by document number, unit activity, project code, transportation control number, or NSN.
- Allow the defense automatic addressing system center customer to process queries regarding life cycle of specific request-for-issue transactions.
- Receive information regarding materiel management actions such as requisitions, supply/shipment status, and customer confirmations.

## SECTION IV – SINGLE STOCK FUND

7-26. Single stock fund extends down to the divisional and non-divisional ASL level. USAMC, as the national manager, capitalized stocks previously maintained in installation retail stock fund and operations and maintenance accounts. The main single stock fund characteristics are a single point of sale, a single credit process, and a NMP management process.

## SINGLE POINT OF SALE

7-27. The single point of sale is the point at which a consumer-funded requisition is satisfied by a nationally controlled Army working capital fund-supply maintenance Army account. The current retail stock fund and

wholesale stock fund points of sale were merged to create a single point of sale. Aviation maintenance unit requisitions for aircraft repair parts and components are obligated upon submission to the Army working capital fund.

7-28. The single point of sale may be in one of two places. If the item is stocked locally, the supporting Army working capital funds fills the request and issues it to the aviation maintenance unit. If the item is not stocked locally, the request is passed to a higher source of supply, and then the wholesale source of supply fills the request and issues the item.

## **SINGLE CREDIT PROCESS**

7-29. Credit from the Army working capital fund-supply maintenance Army to the consumer-funded activity is based on the Army credit policy. Serviceable and unserviceable credit values are computed and corresponding “credit value indicator codes” are assigned annually. Computation of serviceable and unserviceable credit values are performed with the annual price update. Credit is granted at the point of materiel turn-in (serviceable and unserviceable) from the consumer-funded activity to the supporting Army working capital fund-supply maintenance Army activity. These credit rates are stabilized, annualized in the year of execution, and predictable.

## **NATIONAL MAINTENANCE PROGRAM**

7-30. The NMP supports the Army’s strategy to move to a centrally coordinated and controlled, repair-based logistics system. Distribution-based maintenance operations are identified as operator and/or crew maintenance, field maintenance, and sustainment maintenance (formerly known as national maintenance). The Army Materiel Command’s Commanding General is responsible for sustainment maintenance operations. Sustainment maintenance consists of tactical, installation, and depot activities and is characterized by repair to a single standard, that is, the national standard, and returned to stock. The primary focus is sustainment readiness.

7-31. The NMP repair standard is categorized as the standard recognized as the single Army sustainment standard for a reparable national stock number (NSN). It is defined as the highest published standard, and as such may be an AMCOM engineering directive, a TM, a commercial manual, or a scope of work. It is the single standard recognized by the MRP representative as the sustainment repair standard.

7-32. Field maintenance is the first operation of the Army Maintenance System. Field maintenance is characterized by the performance of maintenance tasks 'on system' in a tactical environment using trained personnel, tools, and TMDE. Field maintenance is typically operator and/or crew maintenance and repair and return to user maintenance operations.

7-33. Sustainment maintenance is the second operation of the Army Maintenance System. Sustainment maintenance is characterized by the performance of maintenance tasks, 'off system' in a secure environment using trained personnel, tools, and TMDE. Sustainment maintenance is typically repair and return to stock and depot maintenance operations.

## **SECTION V – CONDITION-BASED MAINTENANCE PLUS**

7-34. The common logistics-operating environment is a process to achieve a technology-enabled force equipped with self-diagnosing equipment platforms that interact with a network sustainment infrastructure supporting condition-based maintenance plus. Common logistics operating environment provides real-time, integrated health management and platform/Soldier status data to optimize equipment readiness and improve battlefield distribution.

7-35. Condition-based maintenance plus is the application and integration of appropriate processes, technologies, and knowledge-based capabilities to improve the target availability, reliability, and operation and support costs of DOD systems and components across their lifecycle. At its core, condition-based maintenance plus is maintenance performed based on evidence of need, integrating analysis with those enabling processes, technologies, and capabilities that enhance the readiness and maintenance effectiveness of DOD systems and components. Condition-based maintenance plus uses a system’s engineering approach

to collect data, enable analysis, and support the decision-making process for system acquisition, modernization, sustainment, and operations

7-36. Conditions-based maintenance plus capabilities include, but are not limited to:

- Rotor smoothing.
- Vibration management.
- Engine monitoring.
- System and component monitoring.
- Structural monitoring.
- Usage monitoring/ TBO adjustment.
- Electronics monitoring.
- Maintenance troubleshooting.
- Electronic logbook interface.
- Exceedance recording.
- Accident safety investigations data.

## DATA MANAGEMENT AND TREND ANALYSIS

7-37. Commanders are responsible for establishing the condition-based maintenance plus process through unit SOPs and ensuring they comply with approved CBM publications and references. Data from the digital source collector, including vibration-monitoring data, is considered airworthiness data and should be placed under operational control of the QC office. The commander should identify a primary and alternate condition-based maintenance plus data custodian and place them on unit orders. The custodian is responsible for—

- Establishing a unit condition-based maintenance plus SOP or annex that ensures compliance of all applicable condition-based maintenance AWRs.
- Ensuring the digital migration of condition-based maintenance plus data to the condition-based maintenance data warehouse per applicable AWR requirements.
- Including airframe specific condition-based maintenance manuals and handbooks as part of the TM familiarization chart.
- Coordinating with the PC office, QC personnel, and maintenance test pilots in reference to condition-based maintenance plus efforts.

7-38. Company MTPs are responsible for ensuring data collection is performed at established intervals and according to condition-based maintenance plus publications and references. They are also responsible for data review, and diagnostic/prognostic implementation.

7-39. PC is also responsible for data review and trend analysis. Early discovery of an impending fault is integral to obtaining the greatest benefit from condition-based maintenance plus and the safe operation of the fleet. By identifying a component prior to failure or before reaching an exceedance threshold, maintenance personnel can apply the P4T3 concept to preventive maintenance actions or for component replacement during a scheduled maintenance event. PC also ensures that condition-based maintenance plus data is transferred in compliance with approved condition-based maintenance publications and references. The PC office should maintain a working relationship with the program manager and condition-based maintenance plus working group as a resource in the maintenance decision process.

## EMBEDDED PROGNOSTICS

7-40. Embedded prognostics detects and reports component degradation prior to failure through the use of sensors, central processing unit, and a user interface integrated (or embedded) into the design of the system (AR 700-127) (see AR 750-43 for additional information).

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*Note.* Diagnostics: prior to failure.

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## EMBEDDED DIAGNOSTICS

7-41. Embedded diagnostics determine and report the cause of a failure by detection of failure symptoms through the use of sensors, central processing unit, and a user interface integrated (or embedded) into the design of the system (AR 700-127) (see AR 750-43 for additional information).

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*Note.* Prognostics: after failure.

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## DATA COLLECTION

7-42. To the Soldier, condition-based maintenance plus is intended to enhance the planning and execution of aircraft maintenance by providing additional tools and data to assist with:

- Troubleshooting aircraft faults and exceedances.
- Proactive maintenance planning by converting unscheduled to scheduled maintenance.
- Reduction of unscheduled maintenance.
- Reduction of scheduled maintenance task and maintenance man-hour requirements.
- Detecting incipient faults within a component.
- Providing full-time vibration, monitoring and management, and reducing wear and fatigue of the airframe and components.

7-43. At the tactical level, condition-based maintenance plus provides tools, test equipment, embedded on-board sensors, embedded diagnostics, and embedded prognostics for monitoring aircraft condition. Condition-based maintenance plus also presents recommended proactive maintenance actions based on actual component wear.

7-44. At the strategic level, condition-based maintenance plus data collected from embedded sensors, such as health and usage monitoring systems, translates into predictive trends and metrics that anticipate system failure based on the actual operating environment. This predictive approach allows for proactive acquisition and delivery of requisite spare parts to perform maintenance before imminent system failure and adjustment of scheduled maintenance tasks based on actual equipment condition. This predictive capability is significantly broadened when health and usage monitoring data is submitted to the appropriate aircraft program management office and the unit is in communication with the condition-based maintenance plus working groups.

7-45. At the Enterprise level, condition-based maintenance plus is a data-centric, platform operating environment, residing within the JTDI structure with the intent of future incorporation into GCSS-Army and the enterprise aviation module. Aviation maintainers from the flight line through the logisticians and analyst in AMCOM logistics center to the condition-based maintenance plus working groups within the program management offices have visibility of component failures and availability across the common logistics-operating. Using algorithms jointly developed by the Aviation Engineering Directorate, industry leaders, academia, and the original equipment manufacturer, condition-based maintenance plus information systems help Army Aviation evaluate the way it designs, builds, and supports future systems with new and dynamic maintenance programs.

7-46. Condition-based maintenance plus enabling technologies include but are not limited to—

- Real-time data migration within the common logistics-operating environment.
- Closed-loop information systems that receive and transmit maintenance actions/instructions from the data warehouse down to the platform level and incorporate all automated systems.
- A common tactical sustainment information system that gather and integrate information obtained from the platform maintenance environment.
- Enterprise data warehouse, capable of recording condition, usage, maintenance, parts tracking, environmental conditions, and intelligent prognostics; this data warehouse must provide detailed data to Aviation Engineering Directorate and original equipment manufacturer engineers while also providing summary programmatic information to program and materiel managers.

- Portable maintenance aids such as automated historical records, cockpit voice recorders, and flight data recorders.
- Health and usage monitoring systems that monitor, transmit, and record operating parameters.
- Components with designed self-diagnosing maintenance status.
- Lightweight multipurpose modular test kits and built-in automatic test equipment.
- Survivability enhancements (active and passive systems) and redundant systems.
- Embedded command, control, and communications for transmitting/data bursting
- Embedded diagnostics and embedded prognostics data from the platform through the common logistics operating environment infrastructure to maintainers, decision-makers, and logisticians.
- Total AV of the sustainment pipeline.
- Parts marking technologies such as item unique identification.

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## Chapter 8

# Supply

Technical supply management involves identifying, procuring, and maintaining minimum assets to meet operational requirements. AR 710-2, DA PAM 710-2-1, DA PAM 710-2-2, and DA PAM 738-751 address aviation sustainment procedures and policies.

### SECTION I – DUTIES AND RESPONSIBILITIES

8-1. Army Aviation maintenance is a primary focus of the aviation commander as it drives the availability of operational aircraft that can be used in support of the ground maneuver commander's operational requirements. An efficient, properly resourced maintenance program provides the maximum number of aircraft available on a consistent basis for mission support.

#### PRODUCTION CONTROL OFFICER

8-2. AMC supply personnel are assigned to the PC section by MTOE. The PC officer manages aviation parts; this management may be delegated to another maintenance officer with oversight provided by the PC officer, if directed by the commander. Supply responsibilities include requisitioning, work ordering for repair, and turn-in procedures for parts evacuation.

#### TECHNICAL AND SHOP SUPPLY OFFICER

8-3. In the ASB, the support company technical supply officer is a chief warrant officer (151A) by MTOE. The officer is responsible for the section's internal management and daily operations of aviation Class IX (Air) repair parts. This includes requesting, processing, issuing, stocking, and turning in aircraft repair parts and components. The officer coordinates high-priority UND A and B parts requests with the unit PC OIC. If authorized by the commander, the technical and shop supply officer certifies and authorizes all high-priority requisitions and reviews the commander's exception report. The technical supply officer balances the unit aviation budget and prepares a periodic report for the logistics officer and maintenance unit commander to review according to AR 710-2, DA PAM 710-2-1, and DA PAM 710-2-2.

#### TECHNICAL SUPPLY NONCOMMISSIONED OFFICER-IN-CHARGE

8-4. The technical supply NCOIC is responsible for the training and operational management of the technical supply section to include the request, issue, stockage, and turn-in of all Class IX (Air) repair parts, special tools, and components. Additionally, the NCOIC coordinates high-priority (UND A and B) requests with the technical supply officer. The technical supply NCOIC directs the work and supervises technical supply actions assigned to the logistics clerks.

8-5. Technical supply personnel require a working knowledge and understanding of supply publications, FEDLOG, and NSN breakdown. Refer to DA PAM 710-2-2 for more information on cataloging and NSN breakdown.

#### PARTS SPECIALIST

8-6. Automated supply specialists assigned to technical supply sections process high-priority (UND A and B) and routine priority (UND C) aircraft requisitions. They request, issue, stock, and turn-in Class IX (Air)

repair parts, special tools, and components. Technical supply clerks maintain logs and files for manually prepared forms.

## **SECTION II – PRINCIPLES**

8-7. Technical supply manages and distributes multiple classes of supply.

### **CLASSES OF SUPPLY**

8-8. AR 710-2 identifies and defines the classes of supply. The classes commonly used by aviation maintenance are Classes II, III, V, and IX (Air). See AR 710-2 for a complete explanation of the classes of supply.

### **CATEGORIES OF SUPPLY**

8-9. Supplies are managed using three categories of supply: scheduled, demanded, and reoccurring demand. See AR 710-2 for a complete explanation of the classes of supply.

#### **SCHEDULED**

8-10. Scheduled supplies may be reasonably predicted and usually do not require a requisition for replenishment. Requirements are based primarily on troop strength, equipment density, mission demands, forecasts, daily usage, or any combination. Scheduled supplies normally are shipped to users based on preplanned distribution schemes.

8-11. Classes I, III (bulk), V, and VI are typically scheduled supplies. Classes I and VI are based on troop strength. Class III (bulk) is based on long-range forecasts, equipment densities, and historic usage factors. Class V is based on densities of weapons and the unit assigned mission. Class IX (Air) is based on aircraft flight hour demands to ascertain predictable repair parts and kits required that support the established scheduled supplies.

#### **DEMANDED**

8-12. A requisition must be submitted for demanded supplies. Classes II, III (packaged), IV, V, and IX (Air) are considered demanded supplies. Aviation repair parts fall into this category and must be requisitioned through the unit's sustainment information system. The unit's sustainment information system automatically records a demand with every processed request. Unit equipment work ordered requests to higher maintenance support, such as radios and line replaceable units, are requisitioned and tracked through the sustainment information system.

#### **REOCCURRING DEMAND**

8-13. Reoccurring demand supplies may be scheduled or demanded. The commander controls these supplies by marking them as regulated because of scarcity, high cost, or mission needs. Any item or group of items may be designated as reoccurring, but the commander usually identifies select items from Classes II, III (bulk), IV, V, and VII as reoccurring. If an item is reoccurring, the commander must approve its release before it is issued. Items designated as demand supported are identified in operation plans and orders.

### **TYPES OF SUPPLIES**

8-14. For accountability purposes, all Army property (except real property) is classified as expendable, nonexpendable, or durable. An accounting requirement code is assigned to each item of supply to identify its specific classification and the degree of accounting and control that must be applied at the user level. Refer to AR 735-5 for regulatory policies and procedural guidance.

## METHODS OF DISTRIBUTION

8-15. Tactical-level supply operations focus on readiness, enabling tactical commanders to fight battles and engagements. Major emphasis is placed on arming and fueling the force and supporting Soldiers and their systems. Tactical commanders must integrate supply support with their concept of operations during the tactical planning phase. Mobile, responsive capabilities are essential for accomplishing the supply mission. The three methods of supply distribution are supply point distribution, unit distribution, and throughput distribution that are conducted in an operational environment.

## SECTION III – GUIDELINES

8-16. Requisition management must comply with CSDP.

## REQUISITION MANAGEMENT

8-17. The Class IX (Air) repair parts appendix/annex to the aviation maintenance company/troop and the support company unit SOP, written and updated by technical supply, outlines procedures and requirements within the unit. Technical supply outlines the sustainment information system automated procedures for assigned/attached unit Soldiers. Appendix A identifies the basic content of an internal and external SOP.

8-18. The SOP reflects the automated system the command uses. The procedures specified in the SOP must conform to applicable guidance in governing regulations, directives, and policies. The SOP should be a day-to-day management tool used by unit personnel. AR 710-2, DA PAM 710-2-1, and DA PAM 710-2-2 are essential references for maintenance officers or technicians when writing an SOP.

## REFERENCE PUBLICATIONS AND DOCUMENTS

8-19. These publications and documents must be available in the unit's technical and shop's supply section:

- AR 710-2.
- AR 725-50.
- AR 750-1.
- AR 750-10.
- DA PAM 710-2-1.
- DA PAM 710-2-2.
- MWO.
- Supply bulletins.
- TBs.
- TMs or commercial equivalent for supported equipment.
- FEDLOG.

## FEDERAL LOGISTICS INFORMATION

8-20. The FEDLOG database provides aircraft maintainers and aviation logisticians with the ability to identify items in the inventory and order the correct aircraft part/component.

8-21. FEDLOG is for official use only products. Cataloging for services has been consolidated under the Defense Logistics Information Service. FEDLOG information is contained on disk. Aircraft maintainers and logisticians can query FEDLOG, using the DVDs, to obtain management data, part and reference number data, freight data, supplier data, characteristics data, and representative drawing data. FEDLOG is also available on a digital video disk and the internet. Aviation unit personnel contact the unit publications officer or NCOIC to request a subscription to FEDLOG. Disks must be rendered unreadable before disposal or recycling.

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*Note.* FEDLOG is available directly through the internet as an application on the AESIP. Users do not need hard copy DVD to access FEDLOG through AESIP.

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- 8-22. With data obtained from FEDLOG, technical supply personnel can—
- Process and edit customer requests.
  - Ensure NSN and part number accuracy of repair parts received.
  - Update stock records.
  - Ensure accuracy of inventories.
  - Process receipt of aircraft repair parts/components.
  - Facilitate Class IX (Air) budget reconciliations by verifying dollar-cost value of newly processed aircraft repair requests, as well as verifying dollar credits received for unserviceable turn-ins.
- 8-23. Subscription information or questions regarding FEDLOG should be direct to USAMC, Logistics Support Activity, ATTN: AMXLS-MLA Building 5307, Redstone Arsenal, AL 35797-7466.

## SECTION IV – PROCEDURES

- 8-24. This section, and AR 710-2, provides procedures to manage aviation supplies.

### FORMS AND RECORDS

- 8-25. DA PAM 710-2-1 provides guidance on the use of forms. DA Form 2064 (*Document Register for Supply Actions*) must be maintained manually if the unit document register is not automated or the sustainment information system server is down.

### BENCH STOCK ITEMS

- 8-26. Bench stock items are authorized for aviation maintenance units. Aviation maintenance officers/technicians, based on experience, should recommend additions, deletions, or stockage-level adjustments to ensure maintenance procedures are not halted due to a shortage of bench stock items.

### MANAGEMENT PROCEDURES

- 8-27. The customer work request priority may be used to request the quantity required to complete the job when stock is at zero balance. Bench stock items are not demand supported. The authorized stockage level is 30 days for units not collocated with a higher-level SSA; if collocated with an SSA, the authorized stockage level is 15 days. SSA bench stock procedures are outlined in DA PAM 710-2-2.

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*Note.* Refer to appendix H for compliance guidance on management, request procedures, and computation and stockage requirements of bench stock items assigned to aviation maintenance units.

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- 8-28. According to AR 710-2, bench stocks are authorized at all aviation maintenance units. Bench stocks are composed of low-cost, high-use consumable Classes II, III (packaged), IV, and IX (Air-not including components) items used by maintenance personnel at an unpredictable rate. Examples of these items are common hardware, resistors, transistors, wire, tubing, hose, thread, welding rods, sandpaper, sheet metal, rivets, seals, oils, grease, and repair kits. The commander or designated representative conducts a semiannual review of the bench stock. No specified demand criteria exists that units must meet to add line items to the bench stock list.

### MANAGEMENT IN SUPPORT OF SPLIT-BASED OPERATIONS

- 8-29. At the aviation maintenance company/troop, bench stock management can be centralized, collocated with other aircraft repair parts, and internally managed by supply personnel. The supply section is responsible

for coordinating and overseeing accountability procedures, to include regularly scheduled inventories, as outlined in AR 710-2. Aviation operational unit bench stock items can be stored in flyaway containers, or similar containers, to facilitate deployment in support of split-based operations and internal daily use.

8-30. At the support company, bench stock management and accountability is the responsibility of the individual platoon, section, or shop authorized to carry and store bench stock and the company/troop consolidated technical supply. Trained technical supply clerks comply with accountability and inventory requirements for their assigned bench stock in their platoon, section, or shops.

8-31. Support company units also consolidate a select number of assigned technical supply clerks and bench stock from each section or shop at the company/troop level. The company/troop technical supply OIC, consolidated clerks, and bench stock operation of this section report directly to the PC officer, assistant PC OIC, and NCOIC. A support company consolidated bench stock section standardizes the unit bench stock management procedures. The consolidation of personnel and bench stock provides—

- A centralized, single point of issue.
- A combination of the same item held in multiple sections/shops allowing a lower total quantity.
- The most efficient use of personnel to provide split-based and continuous operations.

## SHOP STOCK ITEMS

8-32. Shop stocks are demand-supported repair parts and consumables stocked within a maintenance activity (ASB with a support-level maintenance mission authorized by an MTOE, TDA, or joint table of allowances). SSA shop stock procedures are outlined in DA PAM 710-2-2.

8-33. Shop stock repair parts are used internally to accomplish maintenance requirements or programmed repair. Criteria for the number of demands required and the items authorized for stockage are outlined in AR 710-2.

## AUTHORIZED STOCKAGE LIST

8-34. The ASL is a list of supply authorizations necessary to meet the needs of the customers they support. An SSA accountable officer manages an ASL based on established review processes and procedures as outlined by the Army working capital fund-supply management Army guidelines. The supporting SSA becomes the RIC that facilitates the parts requisitioning and replenishment process for units.

## REPARABLE MANAGEMENT

8-35. The supply and maintenance activity policy for managing and repairing recoverability code (RC) D, F, H, and L items are in DA PAM 710-2-2.

## SECTION V – AIRCRAFT REPAIR PARTS MANAGEMENT

8-36. Commanders and leaders must be fiscally responsible. Leaders should conduct a daily review of maintenance activities to ensure effective and efficient practices are utilized that aid in keeping costs to a minimum and possibly lead to cost reductions. A reduction in maintenance costs means an increase in available resources to support force structure, training, and other high-priority needs. One method of minimizing costs is ensuring the use of all available diagnostic equipment to troubleshoot and repair a system versus multiple component replacement as a troubleshooting method.

## STORAGE OF AIRCRAFT REPAIR PARTS OR COMPONENTS

8-37. Storage of aircraft repair parts or components is a continuation of receiving and preliminary to issuing. Accuracy of records and operations is critical to ensuring stored repair parts are quickly located and made ready for issue. The storage activity provides physical receipt, storage, maintenance-in-storage, and safeguarding of items and records. Supplies received and signed for from an SSA are processed and document registers reconciled.

8-38. After NMCS aircraft repair parts (high-priority requisitions UND A) are received, processed, and document registers reconciled, these repair parts are not stored. Unit technical supply personnel contact owning units for immediate pick up of high-priority requested parts. Aircraft repair parts received and processed but not released to owning units are stored according to guidance outlined in this section.

8-39. Shop stock line items are stored, secured, and protected according to the control inventory item code which is contained on FEDLOG. Care of aircraft repair parts or components in storage are managed and inspected according to AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A. Bench stock and shop stock line items are stored in an area convenient to maintenance personnel, shops, and work sites. Units must emphasize proper storage of aircraft repair parts during field operations. Unprotected repair parts, components, and assemblies can quickly deteriorate if exposed to the elements.

8-40. An inspection schedule must be established for items in storage. Unpackaged and unpreserved items must be inspected for rust, corrosion, and broken packs. Emphasis must be placed on items with an established shelf life (such as rubber gaskets, neoprene seals, and batteries) to ensure expired-date packages are not issued. Storage practices should comply with safety and environmental laws and regulations. Technical supply supervisors must have a rotational plan, outlined in their SOP, for personnel to follow when issuing stocks with an established shelf life.

## **REQUISITION OF AIRCRAFT REPAIR PARTS**

8-41. Supply personnel process aircraft repair parts or component requests. They fill aircraft parts requisitions using internal Class IX (Air) assets consisting of bench stock and shop stock line items. If the item is not stocked or is at zero balance, the requisition is passed to the assigned SSA.

8-42. Supply personnel must review parts catalog to include bench stock and shop stock, for availability before processing a request to a higher source of supply. This review must include verification that the primary NSN being requested has no substitutes.

8-43. Supply personnel refer to the interchangeability and substitutability file of FEDLOG for interchangeable or substitutable aircraft repair parts. This review can help prevent needless aircraft downtime by identifying on-hand interchangeable or substitute repair parts within the installation or command.

## **AIRCRAFT REPAIR PARTS REQUISITION APPROVING AUTHORITY**

8-44. Commanders are responsible for the accurate assignment of the priority designator. The commander reviews or delegates this authority using a memorandum order or DA Form 1687 (*Notice of Delegation of Authority-Receipt for Supplies*). The PC OIC or maintenance officer/technician, operating under a delegation of authority from the commander, certifies high-priority parts requests according to DA PAM 710-2-1.

8-45. Maintenance officers/technicians refer to applicable TMs to verify the source, maintenance, and recoverability codes before authorizing high-priority aircraft repair part or component requests. The maintenance officer/technician certifies the request upon aircraft repair part verification. After request certification and approval, the technical supply personnel process the repair parts request.

8-46. Authorization to perform a higher level of maintenance is approved through a LOA. A LOA authorizes a maintenance action and the ordering of repair parts. Supply personnel do not order repair parts for a higher-level maintenance action until the LOA request is approved.

## **ISSUING AIRCRAFT REPAIR PARTS**

8-47. New aviation maintenance commanders will send a copy of the assumption of command orders or appointment memorandum to each SSA and technical supply section at the support company providing supplies. These documents are authorizations for the commander or accountable officer to request supplies. Additionally, commanders can authorize additional personnel the authorization to sign for and receive aircraft repair parts by submitting a DA Form 1687 to each SSA and technical supply section at the support company providing supplies. DA Form 1687 designates additional personnel the authorization to sign for and receive aircraft repair parts.

8-48. SSAs and technical supply sections at support companies are to have assumption of command orders and a DA Form 1687 on hand from supported aviation unit commanders before aircraft repair parts are released to aviation unit personnel. Logistics personnel immediately notify requesting units when high-priority UND “A” and “B” repair parts are ready for pickup.

## SUPPLY STATUSES

8-49. When an SSA does not fill an aircraft repair part request, a supply status is reflected in the sustainment information system. Supply statuses provide information to technical supply, support operations, and maintenance personnel and leaders for analysis to improve or expedite the requisition and replenishment process. The statuses of supply are shipment and exception. A shipment status displays an estimated or actual shipping date. An exception status displays a supply decision made by the supplier, such as a substitution, back-order, or request rejected. DA PAM 710-2-1 provides a complete listing of supply status codes. Supply statuses are provided by an SSA on automated forms or electronic media.

## DOCUMENT NUMBER RECONCILIATIONS AND VALIDATIONS

8-50. According to AR 710-2, reconciliations are performed monthly and validations quarterly. The purpose of reconciliation is to keep inbound and outbound delivery files synchronized, while validation ensures requests and requisitions are for legitimate requirements. Reconciliation/validation of open document registers is a process that begins when the first source of supply provides its customers with a listing of due-outs requiring validation. The process continues by reconciling the supporting SSA records with the customer’s validated requirements. SSA activities provide supported units with an external SOP outlining the reconciliation and validation process. Customer validation and reconciliation procedures are evaluated during ARMS inspections and command inspection programs.

8-51. Technical and unit supply personnel reconcile and validate open document numbers by—

- Checking TMs or applicable references to validate the authorization for aircraft repair parts or components.
- Checking if requested repair parts or components may have been obtained from another source.
- Determining if there have been any changes to shop stock line items to justify an open document number listed in the assigned document register.

8-52. When items are identified as no longer required or excessive quantities are identified, requests for full or partial cancellation of the requirement are submitted to the SSA. The failure to validate a requisition for two consecutive cycles may result in the cancellation of the requisitions by the SSA, further delaying critical maintenance actions. For further information regarding the requisition process see AR 710-2.

## MANAGEMENT TOOLS

8-53. Proper use and control of the automated supply system enhance supply customer support. At a minimum, commanders at all levels review the following on a regular basis:

- Average customer wait time, the average time between submissions of a customer request receipt of materiel.
- Percentage of shop stock and ASL lines at zero balance.
- Budget expenditure, remaining funds, and flying-hour program dollars relationships.
- Accuracy of readiness reports.
- Accuracy of reconciliation procedures.
- Inventory accuracy.
- Requirement for repair parts needed against NMCS or anticipated-NMCS requirements or needed for normal replacement; document registers should also be checked to see if required items are on-order.
- Number of items above the authorized retention level (excess); excess items increase cost and reduce available storage space.

8-54. Unit document register entries should be compared to the latest customer outbound delivery reconciliation list to ensure all requests are valid. Document register entries identified as not valid should be researched. If the part is still needed, the technical supply clerk should reorder it.

## **SECTION VI – SUSTAINMENT INFORMATION SYSTEM**

8-55. The supply role in the management process for the sustainment information system is requisitioning, tracking, managing, and issuing CL IX repair parts to their supported customers. Supply also reviews specified reports such as document control register and commander exception reports for accuracy.

8-56. The technical and shop supply officer and NCOIC require command-appointed authority in writing to authorize high-priority designator (02 to 06) parts requests. Technical/shops supply personnel are assigned directly to the PC section to improve overall accountability and operability.

## Chapter 9

# Airframe and Component Repair Platoons

Maintenance and repair platoon leaders must manage their team, shop, and section operations daily to obtain optimum productivity from personnel and achieve unit MOE goals.

### SECTION I – DUTIES AND RESPONSIBILITIES

9-1. The airframe and component repair leadership are the principal maintenance manager-coordinators within their platoon, coordinating maintenance and sustainment actions.

#### **PLATOON LEADER**

9-2. Aviation branch lieutenants serve as aircraft maintenance and CRP leaders in an aviation maintenance company/troop. Due to complements of over 100 Soldiers and large equipment hand receipts, Aviation branch captains serve as platoon leaders in the support company. The platoon leader is responsible for internal management of the maintenance functions and activities assigned to his or her platoon. The platoon leader ensures maintenance personnel are trained on the most current assigned maintenance equipment and prepared to operate in any operational environment.

9-3. The platoon leader also coordinates internal actions regarding assigned aircraft, subsystems, and component maintenance work orders. They are responsible for administrative and personnel actions affecting assigned personnel. Additionally, the platoon leader is responsible for the management of assigned sections/shops, to include maintenance procedures performed by aircraft and component repair personnel.

9-4. The platoon leader coordinates priority of work in support of the MOE goals in concert with PC guidance. Work-order priority assignments are determined by PC personnel that coordinate any changes of these priorities with the platoon leader.

#### **PLATOON SERGEANT**

9-5. The platoon sergeant is responsible to the platoon leader and in coordination with the maintenance officer/technician, provides guidance, mentorship and training to assigned repair personnel on troubleshooting procedures for all aircraft systems, subsystems, associated weapons systems, and component repair.

9-6. The platoon sergeant is overall responsible for the training evaluations of all Soldiers in the platoon according to AMTP requirements outlined in TC 3-04.71 and for the status of equipment on-hand and any problems that arise affecting the overall maintenance and repair operation of the sections. They ensure maintenance actions and procedures are performed according to applicable aircraft TM.

9-7. The platoon sergeant ensures that platoon and shop personnel are familiar with the latest aircraft and component TMs and changes affecting maintenance and repair procedures. They coordinate maintenance support and actions in the absence of the platoon leader or maintenance officer/technician. The platoon sergeant assists and advises the platoon leader and maintenance officer ensuring personnel are trained on the most current assigned maintenance equipment and prepared to operate in any operational environment.

## SECTION SERGEANT

9-8. The section sergeant supervises and is responsible for evaluating the training of Soldiers within the section per AMTP requirements outlined in TC 3-04.71 and assigns work within the section. They ensure required publications are on-hand and applicable changes are promptly posted to support the repair functions of his or her assigned section. The sergeant coordinates maintenance actions with the maintenance officer/technician or platoon sergeant to maintain optimum workflow of assigned DA Form 2407.

9-9. The section sergeant is familiar with the capabilities of his or her assigned section personnel, subordinates, and equipment. They ensure subordinates are trained beyond experience and capable of functioning within the unit. Additionally, they manage the workload according to availability of resources and equipment.

9-10. The section sergeant informs the platoon leader, maintenance officer/technician, and platoon sergeant of any significant delay (maintenance, equipment, aircraft repair parts, or personnel) hindering the completion of any maintenance work requests.

9-11. The section sergeant monitors NMCS work order requests to ensure assigned work orders have valid document numbers and supply statuses. The sergeant is responsible for administrative management procedures, to include filing of aircraft required forms and records according to AR 25-400-2. They provide senior leaders with work-order statuses and updates.

## REPAIRER

9-12. Repairers are responsible for following applicable TMs including notes, cautions, and warnings listed when performing component repairs and maintenance procedures on assigned maintenance work orders. They maintain 100 percent accountability and serviceability of assigned tools and equipment. Personnel are familiar with applicable aircraft maintenance manuals and corresponding changes as they are posted.

## SECTION II – PROCEDURES

9-13. Maintenance personnel use only current, applicable aircraft and systems maintenance manuals to conduct inspections and troubleshooting procedures on aircraft systems or subsystems. Using current maintenance TMs ensures maintenance procedures meet current requirements. Troubleshooting of affected aircraft systems and subsystems must take place before any further maintenance action or aircraft component repair begins. Thorough and accurate troubleshooting of affected aircraft systems and subsystems narrows the scope and magnitude of maintenance and repairs, saving man hours and unnecessary component replacement.

9-14. Maintenance personnel conducting approved and authorized repairs of aircraft components strictly adheres to established repair methodologies. These methodologies are outlined in applicable aircraft maintenance TMs.

9-15. Maintenance personnel also use only authorized tools when conducting aircraft maintenance. Maintenance supervisors inventory toolboxes at least monthly in the active component. Maintenance personnel assigned toolboxes inventory their toolbox after each maintenance task to help control FOD.

9-16. The PC and QC OIC must seek authorization from the next higher level of maintenance support when a component repair falls out of the accepted guidelines outlined in aircraft TMs. The United States Army combat capabilities development command (CCDC) Aviation and Missile Center LE grants MECs approving maintenance procedures or component repairs not outlined in aircraft TMs to the repairer. CCDC Aviation and Missile Center LEs can grant a MEC to perform limited, specific sustainment maintenance action.

9-17. While CCDC Aviation and Missile Center LE has the authority to approve nonstandard maintenance procedures, component repairs, or authorize deviations from standard aircraft TMs, the potential for errors can occur. As a result, maintenance personnel should proceed with caution when performing nonstandard, CCDC Aviation and Missile Center LE-approved maintenance procedures or component repairs. During the repair procedure, the entity that granted or facilitated the approval should be present to supervise and inspect the repair.

9-18. Platoon leaders should frequently receive work order status reports to ensure timely progress and identification of serious delays requiring additional resources. The platoon leader ensures the platoon meets required timelines and command MOE associated with work-order backlog reduction to sustain combat power across the brigade and support company.

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*Note.* Work never begins on a component or item to be repaired unless it is accompanied by all required forms and records or otherwise directed by the PC OIC/NCOIC.

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## SECTION III – REPAIR POLICIES

9-19. The following repair policies provide guidance to managing shop operations.

### MAINTENANCE FORMS AND RECORDS POLICIES

9-20. Entering accurate and descriptive data on all forms and records ensures that personnel receive a safe and airworthy aircraft. Personnel at all levels of maintenance, including DOD contract support, have an equal stake in maintaining accurate aircraft maintenance forms and records. QC and TIs ensure that aircraft maintenance forms and records comply with applicable publications and regulations.

### COORDINATING MAINTENANCE ACTIONS AND REPAIRS

9-21. Supported maneuver units request maintenance support for their assigned aircraft through the aviation maintenance company/troop PC office. Supported units indicate the need for scheduled and unscheduled maintenance support according to the aviation maintenance company/troop maintenance SOP, as well as directed during PC meetings. When an aircraft fault exceeds the company/troop maintenance capability, a work order request is initiated in sustainment information system or on a hardcopy DA Form 2407 to the evacuated organization.

### AIRCRAFT COMPONENT REMOVAL POLICIES

9-22. If an aircraft component is unserviceable, the PC office coordinates all maintenance actions. Maintenance actions include coordination for QC assistance and oversight when maintenance personnel remove an unserviceable aircraft component. In addition to generating associated maintenance work requests to remove unserviceable aircraft components, the PC office coordinates sustainment actions with the technical supply officer to procure a serviceable replacement component.

9-23. Unserviceable components, once removed from an airframe, are thoroughly cleaned, preserved, inspected by a TI, tagged, and packaged. DD Form 1577-2 is filled out and attached to the unserviceable component. The unserviceable component and DD Form 1577-2 undergo a technical inspection by a qualified TI before the unserviceable component is work ordered to the AMC, ASC or turned into supply. See appendix F for more information on COSIS.

### TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT REPRESENTATIVE

9-24. Leaders ensure personnel use only prescribed, serviceable, and functional TMDE as outlined in aircraft TMs. When a maintenance procedure requires the use of calibrated items, the calibrated item must be current within the calibration window, not expired and with the applicable label affixed.

9-25. The ARP and CRP platoon leader appoint a platoon calibration program representative. The representative monitors the platoon TMDE and works directly with the unit TMDE coordinator to ensure all calibrations operations are performed to standard. The representative coordinates with the platoon sections to ensure timely submission of items requiring calibration before items are overdue and rendered unusable. They complete and maintain the platoon master listing to include a comprehensive review for accuracy and

serviceability status. Additionally, they also request platoon-level approval to submit items requiring priority calibration.

## NON-DESTRUCTIVE INSPECTION

9-26. NDI is a method used by the powertrain shop to complement a QC inspection. Aircraft components may have suspected flaws that must be confirmed or denied. A defect may be visible, but the severity or extent of the defect is unknown. For example, scratches can look like cracks and hairline cracks can look like scratches. The TI must evaluate the defect to determine whether NDI methods are necessary to further evaluate the extent and severity of a defect.

9-27. NDI testing methods are used to determine the composition, integrity, dimensions, or properties of a component or structure without damaging the item. Some NDI methods include liquid penetrant, magnetic particle, electromagnetic, ultrasonic, and penetrating radiation methods. AR 750-1, TM 1-1500-204-23-7, and TM 1-1500-335-23//T.O. 33B-1-1/NAVAIR 01/1A-16-1 cover NDI details and procedures.

## SPECIAL TOOLS

9-28. The ARP and CRP utilize special tools to accomplish scheduled and unscheduled maintenance. Leaders develop a list of required special tools by type, source, class, price, quantity on-hand, quantity short and funding required as defined in chapter 3 to support every aircraft, system, or component supported by the platoon. Leaders energize the acquisition process through the commander, supply room, and technical supply to achieve a 100 percent fill of the platoon special tool kit. Capture special tools on the organizational property book and track in the applicable sustainment information system. Inventory the special tools annually or during change of hand-receipt holder inventories. Leaders ensure maintenance and serviceability of all special tools in support of the unit MOE. Refer to chapter 6 for detailed information on special tools.

## MAINTENANCE REFERENCE AND PUBLICATION LIBRARIES

9-29. Although the master reference and publications library is located in the QC section, every section, shop, and platoon responsible for conducting aircraft maintenance repairs and procedures is authorized a reference and publications library. Every section, shop, and platoon NCOIC is responsible for researching and verifying technical publications requirements for his assigned maintenance and component repair areas. NCOICs are responsible for ensuring their reference and publications libraries are current and updated with the latest published changes. Timely updates of assigned reference and publications libraries are essential to proper maintenance practices. NCOICs must also train their assigned maintenance personnel in posting reference/publication changes. A fielded change not promptly posted makes those corresponding publications unsafe for use as a reference material.

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*Note.* If a maintenance repair or procedure in an aircraft TM is suspected of an error, submit a DA Form 2028. The section, shops, and platoon NCOIC is responsible for coordinating all DA Form 2028 submission requirements with QC personnel.

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9-30. Assigned maintenance personnel are responsible for familiarizing themselves with the appropriate TMs to include the latest changes, before conducting maintenance procedures. Section, shops, and platoon NCOICs monitor assigned maintenance personnel compliance with aircraft TM familiarization using an updated and current familiarization record. By-the-book maintenance not only includes having the corresponding aircraft TMs open but also using them to conduct maintenance procedures.

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*Note.* Refer to AR 25-30 for posting reference and publications requirements.

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## SECTION IV – SCHEDULED MAINTENANCE OPERATIONS

9-31. Recurring requirements for maintenance allow prediction and early planning. Since these recurring requirements are fixed by regulation, leaders can shape their organizations to efficiently perform these operations and reduce delays. Scheduled maintenance operations are enhanced by—

- Ensuring special tools are serviceable and on-hand in sufficient quantities.
- Isolating team personnel from duty rosters for the duration of the scheduled event.
- Coordinating with technical supply to ensure sufficient Class IX (Air) is on-hand.
- Reviewing the inspection procedure prior to aircraft induction and adjusting sequencing to improve efficiency if applicable (units may submit adjustments for consideration on DA Form 2028).
- Setting measurable progress goals and ensuring on-time completion of daily tasks.
- Tracking phases by percent inspection complete/percent maintenance or tasks completed such as 65 percent inspection/25 percent maintenance.

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## Appendix A

# Safety

This appendix explains the considerations and methods in recognizing and correcting potentially dangerous safety and operational hazards. Personnel must understand the inherent hazards of working in and around aircraft and know and apply the safety principles discussed in this appendix.

### GENERAL

A-1. Aviation operations involve inherently higher risk (higher probability of accidents and more severe consequences) than most ground operations. Historically, when deployed to force application theaters, Army Aviation has suffered more losses to accidents than to enemy action. Aviation accidents in force application environments are typically the same type experienced in peacetime. A sound and effective safety program for maintenance operations is a basic requirement for all Army Aviation maintenance units. Aviation maintenance commanders are responsible for protecting and preserving Army personnel and equipment against accidental loss.

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*Note.* AR 385-10 contains guidance on developing a sound and comprehensive maintenance unit safety program.

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### ACCIDENT CAUSES

A-2. Aviation maintenance commanders, maintenance officers/technicians, and NCOICs (in combination with assigned ASOs) must evaluate maintenance operations to identify potential root causes for accidents. Particular attention must be paid to the five elements—person, task, training, material, and environment—of the system, program, or functional area during the evaluation process to ensure management induced errors receive appropriate corrections. Identifying hazards or potential causes of maintenance-related incidents does not eliminate accidents; however, they may mitigate ongoing maintenance operations while minimizing the potential of mission degradation, injury or loss of personnel, or damage or destruction of equipment as a consequence of aviation operations.

A-3. An aviation accident is seldom caused by a single factor. Accidents are more likely to result from a series of events and a combination of factors such as human error, materiel failure, or environment. This fact must be recognized in developing an aviation accident prevention program. The following areas are not all-inclusive but are examples of those areas requiring constant command attention to prevent aviation accidents:

- Human factors.
- Training, education, and promotion.
- Equipment design, adequacy, and supply.
- Normal and emergency procedures.
- Maintenance.
- Facilities and services.
- Environment.
- Operational pace/tempo.
- Personnel tempo.

A-4. The United States Army Combat Readiness Center has found that human error accounts for approximately 80 percent of total mishaps. Maintenance-related mishaps do account for a percentage of total

mishaps in terms of both human-error related causal factors as well as materiel-related causes. As expected, more complex aircraft have higher maintenance mishap rates; however, accidents caused solely by materiel failure are considerably rarer than human-error accidents. The interface between man and machine during maintenance operations increases the potential for accidents.

A-5. At unit level, commanders and maintenance supervisors must ensure their personnel know of maintenance errors generated in their own units. They can be made aware of those in other units by examples found in the Knowledge publication, the preventative maintenance monthly magazine (PS magazine), and other publications. All maintenance activities and personnel must strictly adhere to published maintenance procedures and apply RM at all levels of operations.

## **SAFETY REGULATIONS**

A-6. Department of Defense Instruction (DODI) 6055.01 provides the underpinnings for safety across the DOD. AR 385-10 regulates overall safety in the Army. This regulation integrates Occupational Safety and Health requirements into the Army safety program. DA PAM 385-90 regulates the Army Aviation accident prevention program. DA PAM 385-40 covers Army accident investigation and reporting. ATP 5-19 provides the doctrine and guidance for applying risk management to all Army operations.

A-7. The following personnel have major responsibilities in the unit aviation accident prevention program: the commander, the maintenance officer/technician, the unit safety officer, aviators, the flight surgeon, the unit safety NCO, and individual Soldiers/civilians. A complete knowledge of aviation personnel, materiel, and maintenance operations is necessary to establish and maintain an effective aviation accident prevention plan. The plan must be tailored to the mission and requirements of the command. Activities affecting aviation operations must be considered.

## **SAFETY RESPONSIBILITIES**

A-8. Accidents and injuries can hamper the unit's ability to complete its required mission. The unit commander must ensure personnel know proper operation and safety-related procedures for aircraft, vehicles, equipment, tools, and machinery. Soldiers/civilians/maintainers are responsible for protecting equipment and the lives of fellow workers; therefore, they must actively participate in safety programs and training.

A-9. The primary safety responsibility for maintenance work performed on the aircraft or on its components rests with the individual performing the work. Peers and the leadership providing oversight are equally responsible for providing an additional measure of protection. The importance of doing the right thing, policing each other, and providing direct supervision regarding safety cannot be overstated.

## **UNIT COMMANDER**

A-10. Commanders are responsible for compliance with DOD, DA, OSHA, National Fire Protection Association, and Environmental Protection Agency requirements. Commanders establish other requirements, as necessary, for protection of personnel and equipment under their control.

A-11. The commander establishes a written commander safety philosophy. The commander also develops current safety goals, objectives, and priorities, and includes them in quarterly training guidance (annually for the reserve component). The commander understands and applies the RM process to the entire spectrum of unit operations, activities, and personnel from a holistic standpoint.

A-12. The commander ensures unit staff, subordinate leaders, individual Soldiers, and civilians are trained on the RM process as a life skill that is applied equally to both on-duty and off-duty activities. The commander integrates identified risk controls into maintenance SOPs (a stand-alone written commander accident prevention plan is no longer required) and ensures written SOPs exist for all functional shop and maintenance areas and all operations within the command.

A-13. Aviation unit commanders are responsible for ensuring activities of their units are conducted according to established safety rules, regulations, and publications. These regulations include the aforementioned DOD instructions, ARs, and DA pamphlets as well as FMs, TBs, TMs, and other required local installation directives and policies.

A-14. Aviation unit commanders are also responsible for determining the cause of accidents and for ensuring measures are taken to prevent their recurrence. They must also be aware of and enforce safety policies and requirements established by higher headquarters.

A-15. Unit commanders are responsible for requesting permission from higher headquarters to deviate from an established safety rule or regulation. This request, including full particulars and detailed plans and specifications, is submitted to the higher headquarters commander for approval; however, unit commanders cannot rely on the safety programs of higher headquarters to ensure the safety of their people. They must also establish their own safety programs and become personally involved in implementing and enforcing them.

## **AVIATION MAINTENANCE OFFICER AND TECHNICIAN**

A-16. The aviation maintenance officer and technician ensure an effective maintenance program is developed and maintained. The aviation maintenance officer/technician—

- Continuously monitors QC through coordination with QC personnel, ensuring QC personnel maintain and manage all applicable forms, references, and publications.
- Ensures adequate training and cross training of maintenance personnel and ensures a formal continuing education program is available to provide maintenance personnel with current information on techniques, procedures, and modifications.
- Ensures proper and timely aircraft inspections.
- Ensures adequate program supervision to guarantee maintenance personnel are aware of, and comply with, all technical directives affecting aircraft operations.
- Ensures discrepancies (write-ups) are correctly identified as to status and they are cleared.
- Monitors and manages the equipment improvement recommendation program and the AOAP.
- Provides maintenance personnel with lessons-to-be-learned from accident summaries that cite maintenance as the accident cause factor.
- Ensures MPs (Army and contractor) meet the requirements of AR 95-1 and TM 1-1500-328-23 to perform MTFs, and ensures MTFs are performed according to appropriate directives.
- Ensures subordinate leaders and maintainers understand and apply the RM process to all maintenance operations.
- Uses the RM process to mitigate or eliminate hazards associated with the personnel and activities that might affect the safe performance of maintenance operations.

## **UNIT NONCOMMISSIONED OFFICERS-IN-CHARGE AND SUPERVISORS**

A-17. Effective supervision is the key to accident prevention. In their daily contact with Soldiers, NCOICs are in a position to personally observe working conditions and potential hazards affecting maintenance procedures. NCOICs must apply established accident prevention measures in the performance of their duties especially when supervising daily maintenance operations.

A-18. They should conduct meetings with their subordinates at regular intervals to brief them on safety procedures, to obtain feedback/suggestions on ways of improving safety practices, and/or to announce any new safety procedures. Such meetings should be held in the work (shop or hangar) area. The agenda should include the following:

- The overall job and the results expected.
- The how, why, and when of the job and any ideas from the group on ways to improve methods and procedures.
- The part each Soldier plays; supervisors must ensure personnel understand the significance of individual roles.
- Existing and anticipated hazards and the action needed to resolve these problems.
- The need for prompt, accurate reporting of injuries, accidents, or near accidents, and the importance of first aid when required.
- The need to search constantly for, detect, and correct unsafe practices and conditions to prevent accidents and injuries.

- The need for maintainers to understand and apply the RM process to maintenance operations.

### AVIATION SAFETY OFFICER AND NONCOMMISSIONED OFFICER

A-19. The unit ASO and NCO assist, advise, and make recommendations to the unit commander regarding aviation accident-prevention matters. The ASO observes aircraft support activities (such as POL, maintenance, operations, and enlisted crewmembers' training) to detect and report unsafe practices or procedures. The ASO and NCO participate in unit safety surveys and inspections.

A-20. The ASO and NCO provides RM training to leaders and maintainers, ensuring unit personnel understand and apply the RM process to operations conducted within the organization. In addition, individuals are encouraged to apply RM to off-duty activities as a life skill.

### SHOP SAFETY

A-21. Maintenance repair section and shop safety is an on-going process. Safety is to be observed not only when conducting maintenance and repair procedures but also in every phase of aviation operations. An aviation maintenance section or shop performing below the established standard (safety hazards, unserviceable tools and equipment, out-of-calibration TMDE, or outdated references/publications) cannot perform quality maintenance. Safety is compromised when maintainers, at any level, deviate from the established maintenance standard or fail to conduct by-the-book maintenance procedures.

A-22. Safety procedures must be adhered to by maintenance personnel during aircraft maintenance procedures. Commanders, officers/technicians, and NCOICs are responsible for providing close supervision and correcting unsafe acts.

A-23. When in a military unique environment, fall protection is defined as maintaining, "three points of contact" (one hand and two feet or two hands and one foot) on the hand holds, foot accesses/recesses, and walking/working surfaces provided while working on an aircraft. When in a non-military unique environment, fall protection must conform to federal guidelines.

A-24. NCOICs are responsible for keeping their assigned sections/shops safe, operational, and within the established standard as outlined in the aviation maintenance commander internal SOP. In addition, it is the TI responsibility to keep assigned sections/shops within the established standard when conducting inspections of the maintenance sections, shops, and work areas, to include the hangar. These inspections are conducted monthly or more frequently when maintenance procedures are conducted.

A-25. Any shortcoming, deficiency, or safety hazard identified during a safety inspection is recorded on DA Form 2404 or unit hazard tracking log with copies given to the NCOIC and the maintenance officer/technician. The original copy of DA Form 2404 is kept by the QC section and filed according to AR 25-400-2. Safety shortcomings, deficiencies, or hazards considered a danger to personnel or equipment are immediately brought to the attention of the NCOIC and maintenance officer/technician for corrective action. Inspectors forward copies of all inspection results to the ASO or unit safety manager.

A-26. Routine or noncritical shortcomings, deficiencies, or hazards found during a maintenance section and shops safety inspection must receive corrective action and achieve compliance within 10 days. A completed DA Form 2404, indicating corrections resulting in compliance or recording deficiencies for future mitigation, is given to the QC section for filing with the original copy. The QC section gives recommendations and guidance to assist in correcting faults. The QC section re-inspects to ensure shortcomings and identified deficiencies are corrected.

### INDIVIDUAL SOLDIER/MAINTAINER

A-27. All personnel must be aware of the safety rules established for their individual and collective protection. Each person is responsible for reading and adhering to unit SOPs, instructions, operating procedures, checklists, and other safety-related data. They must observe and apply notes, cautions and warnings found on applicable aircraft maintenance TMs. Personnel must then apply cautions and safeguards in their everyday work areas.

A-28. Soldiers/civilians are responsible for bringing to their supervisor's attention safety voids, hazards, and unsafe or incomplete maintenance procedures. Each person must follow through until the problem is corrected, then cooperate in developing and practicing safe working habits. The unit commander should make certain this spirit of cooperation prevails throughout the unit.

A-29. Soldiers/civilians are responsible for understanding and applying the RM process to all duties and maintenance activities that could result in performance degradation, injury or illness, damage or destruction of equipment or to those off-duty activities or issues affecting their ability to report for duty and perform in a safe and effective manner.

A-30. When in a military unique environment, fall protection is defined as maintaining, "three points of contact" (one hand and two feet or two hands and one foot) on the hand holds, foot accesses/recesses, and walking/working surfaces provided while working on an aircraft. When in a non-military unique environment, fall protection must conform to federal guidelines.

## **OPERATIONAL PROCEDURES**

A-31. Aviation maintenance commanders/leaders, aviation maintenance officers/technicians, and NCOICs ensure physical standards for facilities and equipment meet or exceed safety and health standards established in pertinent host government, federal, state, and local statutes and regulations and in ARs.

A-32. The RM process is incorporated in directives, unit maintenance SOPs, special orders, training plans, and operational plans to minimize accident risk. SOPs are developed for all operations entailing risk of death, serious injury, occupational illness, property loss, or mission degradation.

A-33. Specific plans are established to assure continuity of safety and operational hazard program services during tactical operations or mobilization. These plans address mission definition, organizational concepts, and staffing and operational procedures required to assure maximum safety function support to the force application mission. All aviation units develop such plans.

## **OPERATIONAL HAZARDS**

A-34. An operational hazard is any condition, action, or set of circumstances that compromises the safety of Army aircraft, associated personnel, airfields, or equipment. Operational hazards should be corrected at the lowest level possible. These hazards include inadequacies, deficiencies, or unsafe practices pertaining to aircraft operations, aircraft maintenance or inspections, or flight and maintenance training and education.

## **OPERATIONAL HAZARD REPORT**

A-35. Operational hazard reports (OHRs) are available on the Army electronic library and the USAPA web site. Blank copies of the report forms are placed in areas where they are readily available to aviation-related personnel.

## **SUBMITTING OPERATIONAL HAZARD REPORTS**

A-36. Any person—military or civilian—may submit an OHR. The signature and address of the individual submitting the forms are desirable but not mandatory unless the individual wishes to have a copy of the completed report returned. An OHR is not required when an aircraft accident report is prepared according to DA PAM 385-40 or when a deficiency report is submitted according to DA PAM 738-751.

## **ROUTING THE OPERATIONAL HAZARD REPORT**

A-37. The OHR is submitted to an ASO or Army flight operations office. A report sent to an operations office is promptly forwarded to the organization ASO.

## **HAZARD COMMUNICATION**

A-38. Aviation unit commanders develop and implement a unit HAZCOM program to ensure compliance with 29 CFR 1910.1200 (OSHA Standard) and DODI 6050.05 directives. Commanders ensure an accurate

inventory is maintained of all hazardous chemicals used by unit maintenance personnel. Additionally, units comply with 29 CFR 1910.1200 (OSHA Standard) when identifying hazards present in the environment or facility that unit personnel may contact. Personnel must know the location of the SDSs for each hazard present, not just contained in POL or HAZMAT program storage.

A-39. The HAZCOM officer ensures SDSs are readily available for and used by personnel handling or contacting hazardous chemicals. They ensure personnel handling hazardous chemicals receive training as specified by DOD and federal statute. They also ensure hazardous chemicals receive proper labels, storage, use, and disposal.

## **SHOP SAFETY**

A-40. Heavy metals exposure above permissible limits is likely during several aviation maintenance functions unless proper procedures are in place to minimize exposure and monitor the work environment. The job hazard analyses must be completed and utilized by leadership in order to ensure occupational safety and health of personnel. Daily, thorough cleaning of work areas and clothing limits the spreading of heavy metals outside of the work areas of concern. Safety officers coordinate with supporting industrial and occupational health professionals to ensure implemented controls are effective and leadership are made aware of all heavy metal exposure hazards.

A-41. A substandard shop cannot put out high standard, quality work. To ensure shops/sections maintain a high safety standard, TIs conduct an informal inspection of the various shops/sections periodically. Any deficiencies or shortcomings, identified as below-standard maintenance practices or safety hazards, are brought to the attention of the shop maintenance technician/supervisor immediately. A file of safety inspections is kept in the QC section, and a file copy is kept in the subject area inspected. Inspectors forward copies of inspection results to the ASO or unit safety manager for inclusion in the unit hazard analysis and tracking program.

## **MAINTENANCE FACILITIES**

A-42. The NCOIC supervisor responsible for facility safety emphasizes accident-prevention measures and shop equipment safety. To minimize shop-related accidents, the facility NCOIC satisfactorily addresses the following questions:

- Does the facility NCOIC or supervisor emphasize accident prevention measures and check for marking and width of personnel safety aisles, safety and warning posters, and smoking and nonsmoking areas? (Refer to this publication, TM 1-1500-204-23-1, and DA PAM 385-1.)
- Is all stationary and portable shop electrical equipment properly grounded? (Refer to TM 1-1500-204-23-1 and national electrical codes.)
- Is there a program in effect to encourage reporting of problem areas such as hazards, near accidents, and unsafe practices? (Refer to AR 95-1, AR 385-10, DA PAM 385-40, and DA PAM 385-90.)
- Are equipment and vehicle operators thoroughly familiar with the equipment operation, handling, care, and preventive maintenance? (For example, do operators have permits? [Refer to AR 600-55]. Is the maintenance manual near equipment? [Refer to this publication]. Is the equipment or vehicle maintained according to organizational and operator manuals?)
- When parts or items are removed from aircraft, are they marked and stored in plain sight? (Refer to this publication.)
- Are proper safety procedures practiced to prevent FOD when maintenance is performed on turbine engines?
- Are run-up and exhaust areas policed? Are containers available for trash and loose objects? Are loose hardware and other foreign objects removed? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are grounding cables provided for aircraft in hangars? Are they used? Has an initial electrical resistance test been performed and recorded on grounding points? (Refer to national fire codes, (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, TM 1-1500-204-23-9, and ATP 4-43).
- Are grounding safety wires visible? Are they bright yellow?

- Is adequate lighting provided for maintenance facilities and hangars?
- Are parts removed from aircraft immediately written up on appropriate forms? (Refer to DA PAM 738-751.)
- Are required numbers and types of fire extinguishers available? Are aircraft and ground fire extinguishers checked as required? Are personnel trained to use fire-fighting equipment? (Refer to this publication, TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are trained specialists available to maintain special equipment, such as ejection seat and armament, when installed in unit aircraft? (Refer to this publication and AR 95-1.)
- Are facilities clean and floors grease-free? (Refer to this publication.)
- Do personnel using power tools (for example, drills, grinders, lathes, and torches) wear safety goggles and noise-attenuating devices as required? Do repairers remove jewelry while performing maintenance? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, TM 1-1500-204-23-9, AR 40-5, and AR 385-10.)
- Are hoisting instructions for lifting aircraft components or aircraft followed? Are cranes, hoists, cables, slings, and forklift trucks inspected, weight-tested, and stenciled with the load rating? (Refer to TB 43-0142.)
- Are cranes, hoists, cables, slings, and forklift trucks stenciled with the date of the next required load test? (Refer to TB 43-0142 and this publication.)
- Are aircraft on jacks labeled, and is access to them restricted? Are aircraft jacks marked with the maximum lifting capacity? (Refer to this publication, TM 1-1500-204-23-1, TM 1-1500-204-23-7, TM 1-1500-204-23-9, and 29 CFR 1910.244 [OSHA Standard].)
- Do personnel in the instrument shop know the procedures for cleaning up mercury spills?
- Are oily rags stored in closed metal containers? Are containers properly labeled? (Refer to this manual, TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are hydraulic, fuel, and oil lines protected from dirt while disconnected? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are all ammunition and pyrotechnics removed from aircraft before maintenance and before putting aircraft in hangars? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are engine, hydraulic, propeller and rotor, technical supply, and other work areas clean and well arranged? (Refer to this publication, TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are oxygen gaseous storage areas properly marked? Are oxygen gaseous cylinders stored in a separate building (area) from aircraft servicing and maintenance areas? Are empty and full cylinders stored separately? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are sample bottles available to check fuel contamination in aircraft fuel tanks during preflight? (Refer to ATP 4-43 for information on sampling procedures).
- Are proper containers used and stored? Are containers clean and adequate? Are samples properly discarded? Is a fire point nearby? Are complete daily inspections conducted? (Use preventive maintenance services cards and DA Form 2408-13 and DA Form 2408-13-1.)
- Are tops of booths, shelves, and other surfaces in the paint shop clean to prevent lint accumulation? Are dope or paint deposits removed from the floor? Are there fire blankets at strategic points and the required number (and correct type) of fire extinguishers provided throughout the paint shop? Is electrical equipment in the paint shop explosion-proof? Are smoking restrictions enforced? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are unsealed hydraulic fluid containers considered contaminated and destroyed? (Refer to T TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)
- Are the assigned aircraft marked and painted to include warnings?
- Are necessary accident prevention signs posted in the shop area? (Refer to TM 1-1500-204-23-1, TM 1-1500-204-23-7, and TM 1-1500-204-23-9.)

- Are aircraft parked in hangars? Are aircraft batteries disconnected? Are static ground cables attached? Are drip pans placed beneath aircraft?
- Does gasoline-powered equipment (such as tugs and AGPU) parked in hangars overnight have full fuel tanks?

### HAND TOOLS AND EQUIPMENT

A-43. The NCOIC supervisor, responsible for hand tools and equipment safety, emphasizes accident prevention measures and hand-tool and equipment safety. To minimize hand tools and equipment accidents, the NCOIC satisfactorily addresses the following questions:

- Are racks, shelves, or toolboxes provided for tools not in use?
- Are precautions taken to prevent tools from dropping or falling from ladders, scaffolds, platforms, or other elevations?
- Are tools frequently inspected by responsible personnel? Are defective tools turned in for repair or salvage?
- Are tools with sharp cutting edges carried in protective covers?
- Are power tools equipped with guards? Are electrical contacts enclosed? Is wiring well insulated and grounded?
- Are exposed sharp edges smoothed down when work is completed?
- Are ladders used, rather than improvised ladders, such as packing cases or barrels?
- Are parts and items removed from the aircraft stowed out of the way or marked so they are visible day or night?
- Are tools stored so sharp edges do not protrude?
- Are electrical tools used inside the aircraft?
- Are nuts and bolts torqued as specified in the appropriate TM?
- Are items stored in the tool room cleaned and lubricated to prevent rust? Are they within the calibration due date if calibration is required? (Refer to TB 43-180.)
- Are grease guns labeled with contents?

### WELDING EQUIPMENT

A-44. The shop NCOIC supervisor responsible for welding equipment safety emphasizes accident-prevention measures and welding equipment safety. To minimize welding equipment accidents, the shop NCOIC satisfactorily addresses the following questions:

- During welding or cutting operations, is caution observed to prevent sparks from starting fires? Is a fire extinguisher available?
- Are safety goggles provided for operators using oxyacetylene equipment?
- During electric welding operations, is the operator wearing a face shield or helmet with shaded falter glass, protective sleeves, gloves, and apron? Are welding operations screened off when other personnel are nearby?

### GENERAL HOUSEKEEPING

A-45. The NCOIC supervisor responsible for general housekeeping of the work area emphasizes accident-prevention measures and housekeeping. To minimize housekeeping-related accidents, the NCOIC satisfactorily addresses the following questions:

- Are covered, fire-resistant rubbish cans used in work areas?
- Are self-closing covered metal waste cans conveniently located to dispose of oil rags and waste?
- Are volatile flammable liquids used for washing or cleaning parts? Are they stored in open containers? Are working quantities of such liquids confined to approved containers?
- Is dripping or spilling of oil prevented? Are drip pans or other suitable means provided to collect excess oil?

- Are conspicuously marked fire extinguishers of the appropriate type provided in armament, maintenance, and training areas?
- Are fire extinguishers properly charged, periodically tested, and ready for instant use?
- Are unit personnel trained to use fire extinguishers?

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## **Appendix B**

# **Unit Deployment and Redeployment**

This appendix addresses deployment of ground vehicles, equipment, and aircraft. The ability to deploy a unit and its assets is of highest importance for any commander. Successful deployment and redeployment operations occur because of thorough before, during, and after planning initiatives, extensive training, and a scrutinized validation of the unit's movement plan. (ATP 3-35)

### **DEPLOYMENT RESPONSIBILITIES**

B-1. A unit movement officer (UMO) and alternate are appointed, in writing, for each aviation maintenance unit. The alternate UMO is normally an NCO. Training for the UMO occurs institutionally or within the unit via a mobile training team. The UMO—

- Develops, prepares, and maintains unit movement and deployment plans and documentation including unit movement data used to generate the organizational equipment list.
- Creates and processes the unit deployment list.
- Supervises the preparation and execution of unit load plans, including vehicle load plans.
- Trains unit load teams.
- Ensures unit personnel authorized to certify HAZMATs are available.
- Prepares and maintains documentation needed for unit movements.
- Assists in preparation of unit passenger and cargo manifests and inspects manifests for accuracy.
- Coordinates with higher headquarters and supporting units for unit movements.
- Plans convoy movements.
- Requests commercial and military transportation.
- Coordinates with the arrival/departure airfield control group and contingency response element at the aerial ports of embarkation and aerial ports of debarkation.
- Coordinates with surface deployment and distribution command representatives at the seaports of embarkation and seaports of debarkation.
- Obtains 463L pallets, containers, and blocking, bracing, packing, crating, and tie-down materials.
- Ensures all cargo is properly labeled with military shipping labels and radio frequency tags when directed.
- Ensures packing lists are prepared for containers.
- Maintains a UMO movement and deployment binder.

### **HAZARDOUS CARGO CERTIFYING OFFICIAL**

B-2. Each aviation unit requires at least one DOD-approved, school-trained hazardous cargo certifying official. The commander designates the hazardous cargo-certifying official in writing. The designation must include the scope of the hazardous cargo certifying official authority. The hazardous cargo certifying official—

- Certifies documents for commercial and military truck, rail, sea, and air shipment.
- Ensures properly prepared, packaged, and marked shipments.
- Inspects the item, then certifies and signs the HAZMAT documentation.

B-3. The hazardous cargo certifying official training must be within the past 24 months and/or completed refresher training every two years to continue to certify shipments of HAZMAT for transportation.

## LOAD TEAMS

B-4. Units are required to have an appropriate number of personnel trained in vehicle, aircraft, ship/vessel, and railcar loading/unloading techniques. Units arrange training through the installation unit movement coordinator or division transportation officer. Load teams—

- Prepare vehicle, air, container, and rail load plans.
- Prepare vehicles for shipment (purging, protecting fragile components, weighing, and marking for air and rail movement).
- Perform aircraft and railcar tie-down procedures.
- Load and unload unit vehicles.
- Load cargo into aircraft.
- Palletize cargo on 463L pallets.

B-5. The tailoring of load teams determined by the type, quantity, and time available for loading. The following guidelines are provided for planning purposes:

- Rail movement load-teams generally consists of five personnel trained on the proper use of prefabricated tie-down devices and on how to load and lash equipment positioned on a chain-equipped flat car.
- Aircraft load teams generally consists of six personnel trained on the proper techniques and safe practices to move, load and tie-down equipment on the designated mode of transportation. Depending on the aircraft type, more than one team may be required. The team should include personnel trained and qualified on military ground support equipment, SCAMP and Forklift (10K and below) operations. Air load planners are appointed, trained to prepare, check, and sign off on unit aircraft load plans and to plan and execute airlift operations. See ATP 3-35 for more information.

## MOVEMENT PLANNING

B-6. To meet contingency support requirements, aviation maintenance units must develop deployment movement plans and SOPs. An effective movement plan contains sufficient detail to prepare units to execute strategic deployments. The unit movement SOP is a generic document outlining functions that should occur automatically upon notification of a unit movement. In addition to movement plans and SOPs, units often maintain movement binders and battle books, which contain movement information and instructions. Movement plans can be mobilization movement plans/deployment movement plans.

## UNIT MOVEMENT STANDARD OPERATING PROCEDURE

B-7. A unit's SOP addresses the following functions:

- Unit property disposition.
- Supply draw (unit basic load).
- Equipment maintenance.
- Vehicle and container loading.
- Security.
- Marshaling procedures.
- Purchasing authorities.
- Unit briefings.
- Other unit specific deployment requirements.

B-8. For deployment preparation and execution, units may use a readiness SOP or supplement their higher headquarters readiness SOP/deployment SOP. The readiness SOP normally addresses the overall deployment concept, force packages, training requirements, the alert notification system, logistics support, personnel, and equipment readiness; out-load support, Soldier readiness program, and C2 at critical points (ATP 3-91). This document is essential for the orderly execution of rapid force deployments in response to crises.

## MOVEMENT AND DEPLOYMENT BINDER

B-9. The UMO should maintain a movement and deployment binder for reference and continuity (ATP 3-35). The recommended contents for a deployment binder (Defense Transportation Regulation [DTR] 4500.9-R, Parts I-VI) include the following:

- Administrative section:
  - Index.
  - Unit movement SOP, including notes from previous operations.
  - Appointment orders and training certificates for UMO, load teams, and HAZMAT certifiers.
  - List of pertinent references.
  - POC, telephone numbers, and email addresses for key personnel to remediate issues that arise.
  - Recall rosters and instructions.
- Operational section:
  - Index.
  - Air movement planning work sheet.
  - Weight and dimensions data on unit aircraft, vehicles, and equipment.
  - Manifest forms with copies.
  - Planning data on transport aircraft, ships, rail cars, and trucks.
  - Current automated unit equipment list.
  - Copies of load cards and container packing lists.
  - Prepared copies of transportation requests, convoy movement requests and special handling permits.
  - Blocking, bracing, packing, crating, and tie-down requirements.
  - Maps of convoy routes.
  - Plans and locations for drawing Army pre-positioned stocks.
  - Any other data required for movement of the unit.

## DEPLOYMENT

B-10. Aviation units' deployment activities encompasses all activities from fort-to-port operations including pre-deployment readiness to deployment location requirements.

### PRE-DEPLOYMENT ACTIVITIES

B-11. Pre-deployment activities prepare individual Soldiers, units and materiel for deployment. During pre-deployment activities, the commander establishes movement priorities such as advance party, main body, and trail party requirements. Movement of unit personnel depends on the situation and is based on a thorough mission, enemy, terrain and weather, troops and support available, time available, and civil considerations assessment.

B-12. If personnel are required to travel with equipment, coordinating with the outbound shipping agency and SPO (for host country requirements) could lessen the probability of equipment being frustrated cargo.

### MOVEMENT TO PORT OF EMBARKATION

B-13. After receiving movement orders, along with any additional guidance, deploying units validate and configure for movement to the port of embarkation (POE).

B-14. The port call message identifies the date the unit must have equipment at the POE to meet the available to load dates. The deploying unit higher headquarters or the installation prepares a movement schedule or order containing unit movement times and modes for movement to the POE.

B-15. The deployment transportation mode from the POE determines how a unit's equipment is prepared for deployment. In an overseas deployment, transport of unit equipment by sea occurs two to three weeks before the unit main body personnel depart for the AO by air.

B-16. Deploying units configure for deployment, reduce and prepare aircraft and vehicles for movement, properly stow and tie down secondary loads, construct 463L pallets, and prepare required documentation as required. Based on the unit proximity to the POE, availability of transport, and type of unit equipment; the unit moves to the POE by convoy, rail, commercial truck or bus, or a combination. Army RW aircraft typically self-deploy to the POE. Personnel move to the POE by organic vehicles or military/commercial buses. The two commonly used transportation modes for moving equipment to the POE are by highway or rail.

B-17. Equipment designated for deployment such as aircraft self-deploying to an aerial/sea POE or vehicles conveying from home station to a POE remains in its correct configuration for safe movement. Upon reaching the aerial/sea POE staging/marshaling area, units configure the assets to the correct specification to meet aerial/sea movement requirements.

## **DEBARKATION (RECEPTION, STAGING, ONWARD MOVEMENT, AND INTEGRATION)**

B-18. RSOI is the process that delivers combat power to the joint force commander in the operational theater. RSOI support occurs through a number of different resources such as theater support contracts, external support contracts such as the Army Logistics Civil Augmentation Program, regionally available commercial host nation support, or through military assets provided by the sustainment command. RSOI efforts assist with processing personnel and equipment through facilities on or near the aerial ports of debarkation to include the reception, staging and preparation of personnel and resources. Requirements for aviation units offloading aircraft and equipment at an aerial/sea port begins with finding sufficient allocation of aircraft parking space.

B-19. The TSC is the Army logistics headquarters responsible sustainment requirements in a theater of operations. The TSC is responsible for executing port opening, theater opening, theater surface distribution, and sustainment functions in support of Army forces. The TSC is also responsible for establishing and synchronizing the intra-theater segment of the surface distribution system. The TSC establishes C2 of operational level logistics in a specified area of operations by employing one or more Expeditionary Sustainment Commands.

B-20. Prior to the deployment of a unit arriving into a port of debarkation, sustainment planners within the S-4/SPO identify specific requirements necessary for the arriving aviation assets so that the supporting organization has adequate time to action the requirement. This includes an area identified at the ISB big enough to stage aircraft for reconfiguration, the requirement for fuel so that it is readily available if contracted, or required GSE such as ramps, AGPU, and tugs.

B-21. Debarkation requires a detailed plan to clear the port quickly. Towing an aircraft for a mile or more to a location to reconfigure it for flight may be required. The plan includes building teams for—

- Unloading the strategic aircraft or vessel.
- Moving the CAB's aircraft to an appropriate maintenance staging area.
- Reconfiguring the aircraft for flight.
- Conducting unscheduled maintenance.

B-22. The CAB does not plan to conduct scheduled maintenance during embarking or debarking operations. All scheduled maintenance required to get the aircraft from home stations into the consolidation area is completed prior to deployment. This does not include pre-flight checks, daily inspections, or other operator maintenance.

B-23. Significant challenges during aerial ports of debarkation requirements surround protecting aircraft from environmental impacts such as corrosion. When the aircraft arrive in theater, many of the calendar-based inspections designed to protect the aircraft from corrosion may be due or overdue. Water for cleaning or washing aircraft is rarely available. Maintainers and operators must be prepared to clean corrosion with

abrasive pads, brushes, rags, and package petroleum, oils, and lubricants in order to mitigate the corrosion and get the aircraft into service.

## **REDEPLOYMENT**

B-24. Redeployment transfers forces and materiel to support joint force commander operational requirements, or returns personnel, equipment, and materiel to the home and/or demobilization stations for reintegrating and/or out-processing.

## **PROCEDURES**

B-25. Installations have assigned redeployment responsibilities for supporting Army forces stationed in the United States. For foreign-based forces, the foreign home installation and the area support group have redeployment responsibilities. Upon initiation of redeployment operations, installations begin preparatory actions to receive units at the aerial ports of debarkation/ seaports of debarkation and move them to their home/demobilization station.

B-26. Movement guidance to redeploying units addresses the following:

- Preparing subordinate unit movement plans.
- Updating unit movement documentation.
- Identifying and coordinating channels for any additional transportation support needed to move unit personnel and equipment to POEs.
- Preparing and submitting redeployment/deployment equipment list.

## **ROUTING**

B-27. The redeployment plan designates redeploying unit routing to POEs. After completion of military operations, redeploying forces move to designated assembly areas. Based on the redeployment scenario, redeploying units could then move from the assembly area directly to the POE marshaling areas for loading.

B-28. The routing of units to their final destination depends on the following:

- Strategic lift asset availability.
- Theater transportation facilities and their throughput capacities.
- Distance/geography between unit location and POE.
- Potential for hostile action.
- Force size.
- Time available.
- Follow-on destination and mission.

B-29. Upon receiving a warning order, the unit starts the redeployment process. Units evaluate the assigned mission, current unit status, and requirements to accomplish the redeployment mission. If the unit is redeploying to another theater, it must also plan for employment in that theater. Depending on their mission and redeployment scenario, redeploying units may perform the following functions as a part of the movement to POE phase:

- **Move to assembly areas.** The unit normally conducts a movement to the tactical assembly area and continues to receive sustainment through normal support channels.
- **Reorganize.** Unit reconstitution for redeployment involves those actions required to assemble and organize the unit and to cross-level personnel, supplies, and equipment as necessary; units are consolidated under their unit identification code.
- **Process personnel and equipment for redeployment.** This process includes actions that can be completed at the assembly area, assuming availability of support assets and supplies.

B-30. Commanders/leaders should complete the following key items as early as possible in the redeployment process:

- Identify Soldiers and civilians who deploy as individuals to supporting personnel managers.
- Conduct medical screening.

- Perform equipment checks and services according to TM.
- Conduct an equipment inventory (Class VII, organizational clothing and individual equipment, and BII).
- Refine the organizational equipment list and verify unit line number data.
- Requisition required parts.
- Schedule or defer/delay required maintenance.
- Identify Soldiers to redeploy with equipment as required by shipping agency.
- Identify teams for transport down load form air and sea transport if required.

B-31. The unit completes all documentation (hazardous shipping declarations, papers, labels, placards, secondary cargo load plans/cards, packing lists, and military shipping labels) before loading. The organizational equipment list is completed with actual weights, dimensions, and final destination before producing labels and applying them to equipment and containers.

## REFERENCES

B-32. Table B-1 lists unit movement references.

**Table B-1. Unit movement references**

<b>AR 220-1</b>	Unit Status Reporting.
<b>AR 600-8-101</b>	Personnel Processing (In-, Out-, Soldier Readiness, Mobilization and Deployment Processing).
<b>AR 600-55</b>	The Army Driver and Operator Standardization Program (Selection, Training, Testing and Licensing).
<b>AR 710-2</b>	Supply Policy Below Wholesale Level.
<b>DTR 4500.9-R</b>	Part I through VI as located on the USTRANSCOM website.
<b>ADP 3-0</b>	Operations.
<b>ATP 3-35</b>	Army Deployment and Redeployment.
<b>ATP 3-35.1</b>	Army Prepositioned Operations.
<b>ATP 4-16</b>	Movement Control.
<b>JP 3-35, ATP 3-35</b>	Deployment and Redeployment Operations.
<b>AFMAN 24-204/TM 38-250/NAVSUP PUB 505/DLAI 4145.3</b>	Preparing Hazardous Materials for Military Air Shipments.
ADP-Army Doctrine Publication AFMAN-Air Force Manual AR-Army regulation ATP-Army Tactics Publication	DTR-defense transportation regulation JP-joint publication TM-technical manual

## **Appendix C**

# **Environmental Management**

This appendix identifies environmental issues and compliance requirements that commanders and leaders must be familiar with and adhere to in order to be successful on the battlefield. Environmental damage, in most cases, is an unavoidable consequence of force application. Commanders and their staff must identify, during the planning process, ways and means to mitigate environmental damage wherever possible. These actions ensure deployed forces conform to the environmental protection requirements of the theater commander without impairing force application effectiveness.

### **ENVIRONMENTAL COMPLIANCE AS A REGULATORY REQUIREMENT**

C-1. The Army and its units comply with all environmental laws and regulations that apply to installations or theaters of operation. AR 200-1 and ATP 3-34.5 provide an overview of the key environmental laws, regulations, and treaties that apply to unit-level operations. These come from a variety of sources to include federal, state, local host-nation, executive order, DOD policies and directives, and international agreements.

### **ENVIRONMENTAL RESPONSIBILITIES**

C-2. Commanders, leaders, aviation maintenance officers/technicians, NCOIC, and maintainers must understand their individual duties and responsibilities for environmental protection and become environmental stewards. To practice stewardship, personnel must understand the basic environmental management responsibilities that apply to their work area or assigned duties.

### **COMMANDERS**

C-3. The commander's role in environmental stewardship centers on instilling an environmental ethic in his or her Soldiers and civilian contractors. Commanders train their subordinate leaders on stewardship, counsel them on doing what is right, lead by example, and enforce compliance with laws and regulations. ATP 3-34.5 identifies sources of environmental assistance available to commanders.

C-4. Commanders meet with key installation environmental personnel to obtain assistance or information regarding environmental protection issues. Commanders may delegate this authority to their staff, but they are ultimately responsible for environmental protection.

C-5. The primary POC is located at the installation environmental office. This office is normally part of the Directorate of Public Works at most Army installations.

### **MAINTENANCE OFFICER/TECHNICIAN**

C-6. The maintenance officer/technician plans, coordinates, and supervises maintenance and repair activities. In many instances, these activities use significant quantities of HAZMAT and generate hazardous waste (HW). The maintenance officer/technician ensures safe use, storage, and disposal of these materials, including the operation of temporary storage areas for products such as used oils, contaminated fuels, paint residues, spill cleanup residues, and solvents. Disposal of HAZMAT and HW is accomplished according to the unit maintenance SOP and with the guidance of the installation environmental office.

C-7. The maintenance officer/technician ensures all personnel comply with HAZCOM requirements. The maintenance officer/technician ensures a valid and current unit environmental plan SOP is available and unit personnel are familiar with its contents. ATP 3-34.5 contains a sample unit environmental plan SOP.

## **MAINTENANCE PERSONNEL**

C-8. Aviation maintenance personnel have the inherent professional and personal responsibility to understand and support their unit environmental program by—

- Complying with environmental requirements in unit and installation SOP.
- Maintaining environmental awareness throughout daily activities and maintenance procedures.
- Providing recommendations to the chain of command on techniques to ensure compliance with environmental regulatory requirements.
- Identifying the environmental risks associated with individual and team tasks.
- Supporting recycling programs.
- Reporting HAZMAT and HW spills immediately.
- Making sound environmental decisions based on guidance from the chain of command and training.

## **ESTABLISHING A UNIT-LEVEL PROGRAM**

C-9. The unit commander, with assistance from the HW coordinator, environmental compliance officer, and environmental compliance NCO, establishes an effective aviation maintenance unit environmental program by—

- Designating, in writing, a properly trained and qualified HW coordinator, environmental compliance officer, and environmental compliance NCO.
- Identifying the requirements for environmental training, qualifications, and certification of unit personnel.
- Ensuring all unit personnel received or are scheduled to receive environmental awareness training.
- Meeting with battalion/squadron operations officer, logistics officer, and installation personnel who deal with environmental issues.
- Scheduling environmental compliance assessment system inspections that identify unit and common environmental problem areas and how to avoid them.
- Ensuring the unit's environmental SOP adequately addresses environmental issues and procedures.
- Coordinating environmental requirements with appropriate installation and chain of command personnel.

C-10. The environmental compliance officer and environmental compliance NCO is the unit POCs and responsible for environmental education, SOP updates, preparation of environmental risk assessments, and incident reporting. The environmental compliance officer coordinates with environmental personnel and ensures unit compliance with environmental laws and regulations.

## **ARMY ENVIRONMENTAL COMPLIANCE ASSESSMENT SYSTEM**

C-11. Compliance with environmental regulations is a command responsibility. All aviation maintenance units must be familiar with the regulations and publications governing environmental protection. Units also comply with the environmental compliance achievement program protocol and are periodically inspected. Units obtain the environmental compliance achievement program protocols from the environmental division of the installation Directorate of Public Works.

C-12. Units report alleged violations of local, state, or federal environmental laws or regulations to the commander, unit safety officer, environmental division, environmental law attorney, or the Office of the Staff Judge Advocate. Personnel report any notice of tax, penalty, fee, fine, sanction, or other compliance order arising from local, state, or federal environmental requirements or enforcement activities to the commander, environmental division, environmental law attorney, or at the Office of the Staff Judge Advocate.

## **HAZARDOUS MATERIALS**

C-13. The Army objective is to minimize health hazards and environmental damage caused by the use and misuse of HAZMAT. A HAZMAT is one that, because of its quantity, concentration, physical, chemical, or infectious characteristics, may do the following:

- Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness.
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

## **HAZARDOUS WASTE**

C-14. The presence of HW is a cause for concern among installation personnel and nearby residential populations. Yet, hazardous substances are an unavoidable part of Army maintenance functions and activities and ultimately result in some waste generation. The proper handling and disposal of HW minimizes danger and ensures the safety of people and the environment.

## **HAZARDOUS COMMUNICATION**

C-15. An effective HAZCOM program assists leaders in determining which hazardous chemicals are present in their units, how to protect their Soldiers from the hazards that those chemicals present, and how to properly store and use those chemicals. The unit and installation safety officer is the POC for most HAZCOM matters, the MSDS program, and the HAZCOM training program.

## **GOOD HOUSEKEEPING**

C-16. Good housekeeping is another basic management practice and involves a number of activities in areas such as maintenance, operations, and training. For instance, preventing spills is a good housekeeping practice for both safety and environmental reasons. Keeping noise to a minimum is good OPSEC and reduces noise pollution. Recycling diminishes solid waste and helps eliminate unauthorized disposal of some types of HW.

## **UNIT MAINTENANCE**

C-17. Unit maintenance activities may significantly affect the environment, so most Army environmental programs directly affect maintenance operations. Two specific areas of concern are spill prevention and response, and HAZMAT storage and handling. Maintenance being conducted outside the continental United States should be in compliance with all host-nation laws, as well as with Army environmental programs.

## **SPILL PREVENTION AND RESPONSE**

C-18. Army policy, as well as federal law, requires units to prevent spills of oil and hazardous substances and to provide prompt response to contain and clean up such spills. These laws, regulations, and policies prohibit any discharge of oil or hazardous substance from installations, vehicles, aircraft, and watercraft into the environment without a discharge permit.

C-19. Installation requirements shape spill prevention and response plans for units within their jurisdiction and command. During deployments, the deployment order directs spill prevention and response procedures. During contingency operations or in a force application environment, spill prevention and response procedures are defined by the host-nation or theater guidance and unit SOP.

## **HAZARDOUS MATERIAL STORAGE AND HANDLING**

C-20. Maintenance personnel work with a variety of HAZMAT and HW. Depending on the class of supply, the supply section or technical supply section controls requisitions and receipts for HAZMAT and prepares documentation for turn-in of HW. Maintenance personnel generate HW by lubricating, servicing, and repairing aviation and ground equipment. Maintenance personnel must—

- Requisition only the minimum amount of HAZMAT needed; when possible, substitute nonhazardous materials.
- Practice inventory control of all HAZMAT and HW (monitor HAZMAT shelf life and HW accumulation dates).
- Store HAZMAT and HW in approved containers and locations.
- Maintain an SDS for each HAZMAT used.

## SUPPLY

C-21. Unit supply and technical supply personnel account for all materials during HAZMAT and HW requisition, transportation, storage, and disposal. Unit commanders and leaders ensure supply personnel observe stringent HAZMAT supply economy measures. Units order only the minimum amount of HAZMAT needed. When possible, supply personnel order biodegradable, environmentally safe materials.

C-22. When storing products, supply personnel ensure first-in, first-out stock rotation to minimize the turn-in of out-of-date material. They also follow installation storage guidelines for marking materials, maintaining SDSs, and turning in excess materials. Finally, unit leaders ensure supply personnel turn-in or dispose of HAZMAT and HW according to local regulations. Compliance includes coordinating with the local environmental office and DRMO.

## PLANNING

C-23. Environmental awareness is incorporated into the unit training program with minimal additional planning. Most topics can be obtained by contacting the environmental division, unit or installation safety office, natural resources branch, Staff Judge Advocate, and/or range control.

C-24. Table C-1 is a general point-of-contact matrix to assist personnel with environmental concerns. When overseas, refer to the United States agencies providing liaison with the equivalent of the points of contact. If there is no host-nation equivalent, all training and maintenance are conducted under United States policies and requirements. Units coordinate with these organizations to provide a briefing before deployments.

**Table C-1. Environmental point of contact matrix**

<i>Topic</i>	<i>Point of Contact</i>
Air pollution	Environmental Division.
Archaeological and historic sites	Environmental Division and Natural Resources Branch.
Clean and safe water	Environmental Division.
Legal considerations	Environmental Law Attorney, Office of the Staff Judge Advocate.
Hazardous material and waste	Directorate of Logistics, Defense Reutilization and Marketing Office, Environmental Division, and the fire department.
Noise pollution	Environmental Division, Range Control (Directorate of Plans, Training, and Mobilization).
Range clearances and restrictions	Range Control (Directorate of Plans, Training, and Mobilization).
Standard operating procedures	Environmental Division.
Spill reporting	Environmental Division.
Threatened/endangered species	Natural Resources Branch.
Water pollution	Environmental Division.
Wetland protection	Natural Resources Branch, Range Control.

## UNIT-LEVEL ENVIRONMENTAL PROGRAMS

C-25. Unit personnel must be familiar with the various environmental programs found at the unit level. ATP 3-34.5 provides information on these unit or installation programs:

- HAZMAT management.
- HW management.
- HAZCOM.
- Pollution prevention and HW minimization.

- Recycling.
- Spill prevention and response plan.

## **ARMY NATIONAL GUARD AND RESERVE COMPONENT CONSIDERATIONS**

C-26. When collocated with active Army units or when activated, United States ARNG or USAR adheres to the same stringent handling, storage, and disposal criteria. When ARNG or USAR are not on active-duty status or collocated with active-duty units or their supporting HQs, their requirements may differ. ARNG units routinely operate under environmental regulations and laws of a particular state. ARNG units coordinate through their state area command for environmental guidance when deploying to installations in other states.

C-27. USAR units with subordinate units residing in different states comply with substantially different environmental laws. The supporting HQ develops policies that account for differences in state and local laws and regulations. Units separated from their supporting installation must ensure SOPs and contingency plans adequately address local laws and regulations.

C-28. Given the distances between ARNG and USAR units and their supporting HQ, HAZMAT or HW turn-in may require alternative methods such as line haul or contractor removal. The cost of HAZMAT and HW turn-in may warrant pollution prevention initiatives to reduce, reuse, or recycle HAZMAT and HW on-site. Solvent distillation, for example, may provide significant cost savings over conventional disposal.

C-29. Disaster-relief missions present units with challenging environmental protection requirements. Units must not add their own HAZMAT and HW to the existing environmental problem. ECOs in ARNG units coordinate with their state area command HQ for HAZMAT and HW support. Unit ECOs also coordinate regularly with disaster relief HQ to determine threats from HAZMAT or HW exposure, such as polychlorinated biphenyls from transformers, POL, or decaying bodies. Unit leaders ensure Soldiers have appropriate protective clothing and equipment/PPE when exposed to HAZMAT or HW in the disaster area.

## **AWARENESS AND COMPLIANCE**

C-30. AR 200-1 explains the Army environmental programs and references the additional documents that should be reviewed. Another good reference for environmental issues are graphic training aids that can be found at your local training support center.

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## Appendix D

# Aviation Maintenance in Extreme and Demanding Environments

This appendix provides a discussion of the impact on aviation maintenance operations within the various environments. Each environment brings unique challenges that must be anticipated and planned for by the commander and staff. Some maintenance procedures work consistently regardless of the environment; however, the majority of maintenance activities are directly affected by the environment.

## GENERAL

D-1. Missions may be conducted in desert, jungle, mountain, or cold weather environments. At a minimum, considerations should be given to following factors during the unit's maintenance planning:

- Modifications to the normal materiel stock levels such as increased numbers of filters, bearings, and seals.
- Communications restrictions.
- Special facility requirements for equipment and material.
- Specialized equipment and clothing requirements.
- Additional maintenance support personnel requirements in extreme heat or cold environments.
- Fighter management requirements (Soldiers work/rest cycles).
- Modifications to normal scheduled and preventive maintenance.
- Training requirements for aircraft specific or GSE equipment.

D-2. Preventive maintenance action may change or increase in extreme and demanding environments. Leaders and personnel must monitor the daily environmental effects on aircraft and equipment to determine and apply the most effective methods of maintenance. Enclosed maintenance facilities provide the best conditions for efficient and productive maintenance to occur. If a permanent facility is unavailable, then a lightweight maintenance enclosure (LME), erected around that portion of the aircraft requiring maintenance is a recommended alternative. LMEs are typically part of a unit TOE and cataloged in sufficient number to be readily available to maintenance personnel. Equipment maintenance, conducted in an exposed, unprotected environment places Soldiers at a higher risk for injuries and invites the potential to allow environmental contamination for items receiving maintenance.

D-3. Supply quantities must anticipate and reflect increased requirements for those parts that deteriorate or experience increased wear.

## DESERT ENVIRONMENT

D-4. Maintenance personnel have additional risks involved within a desert environment, specifically around aircraft that undergo maintenance, arming, and fueling at the FARP. These risks include the following:

- Static electricity from an operating rotor system can shock personnel or cause ammunition and fuel to ignite.
- Proper grounding is more difficult in dry, sandy soil requiring longer grounding rods and water to be poured on the grounding points.
- Brown out conditions can drastically reduce or eliminate situational awareness and impair the crew's view of ground obstacles and personnel.

- Heat off the aircraft fuselage in a desert environment can cause burns to personnel. Supervisors should ensure gloves are available and used.

D-5. High temperatures and low humidity are major causes of equipment failure. Wind action lifts and spreads sand and dust, affecting moving parts. Aircraft, sensors, and weapons are also affected. Rubber components, such as gaskets and seals, become brittle, and oil leaks are more frequent. For more detail on operations in desert operations, refer to FM 90-3/Fleet Marine Force Manual (FMFM) 7-27.

### ENVIRONMENTAL CONSIDERATIONS

D-6. The following characteristics are commonly found in a desert environment and likely contribute to equipment degradation and/or failure:

- Heat.
- Sand, dirt, and dust.
- Wind.
- Extreme temperature variations.
- Static electricity.

#### Heat

D-7. A helicopter's performance degrades during times of increases with heat and humidity. Heating of sensitive electronic components creates an environment that increases failure rates and places higher demands on aircraft cooling systems and replacement material. Sufficient time should be allocated during maintenance events to allow the aircraft cooling systems to cool all electronic components and subsystems prior to them being energized.

#### Sand, Dirt, and Dust

D-8. Sand, dirt, and dust cause failures in electrical switches, digital entry keyboards, radio tuning knobs, and circuit breakers. Sand erosion causes steady wear on rotor heads, leading edges of rotor blades, Teflon® bearings, and all turbine engine blades. Blowing sand gradually degrades optical instruments and windscreens by pitting and scratching. Sand, dirt, and dust accumulation on oil cooler/heat exchange and ECS evaporator's surfaces creates loss of cooling efficiency. Electronic components should only be accessed in environmentally controlled areas when feasible, to minimize sand and dust intrusion.

D-9. Sand mixed with oil forms an abrasive paste. Lube fittings and bearing seals require frequent monitoring and inspections; if they are damaged or missing, sand enters the housing and causes bearing failure.

#### Wind

D-10. High winds can be destructive to large and relatively light materiel such as aircraft, tentage, and antenna systems. To minimize the possibility of wind damage, maintainers should provide a method of protection from high wind or be firmly secured to the ground such as parking aircraft into the wind, ground staking or using natural or manmade barriers to block the wind.

#### Extreme Temperature Variations

D-11. In deserts with relatively high-dew points and/or high humidity, overnight condensation can occur wherever surfaces such as metal exposed to air are cooler than the air temperature. Condensation can affect such items as optics and fuel lines. Clean optics and weapons frequently. Weapons systems, even if not lubricated, accumulate sand and dirt caused by condensation.

#### Static Electricity

D-12. Static electricity occurs due to friction against the aircraft as it moves through the air. This friction strips electrons from the atmosphere and causes them to build up on the skin of the aircraft. Static electricity

tends to accumulate near sharp edges such as the trailing edges of wings, rotor blades, or tail stabilizer surfaces.

D-13. Static electricity considerations and precautions include—

- Properly ground all equipment.
- Tape all sharp edges (tips) of antennas.
- Wear an anti-static wristband, and if available install an anti-static mat under the workbench when working on electronic equipment away from the aircraft.

## **PROTECTING AIRCRAFT AND EQUIPMENT**

D-14. Protective covers designed to cover the aircraft or specific points on the aircraft should be used at all times. Windscreens, blade covers, nose covers, and engine inlet covers are installed when aircraft are not in use. Protective covers are securely fastened to prevent flapping and minimize movement that may damage the item covered. All foreign material is removed from component surfaces prior to covering, especially those items easily susceptible to scratching such as windscreens and optical lens.

D-15. At a minimum, aircraft should be stored in a hangar whenever possible or the aircraft covered as much as possible to avoid damage caused by blowing sand, dust, dirt, and heat.

D-16. During aircraft operations, optics can be provided a measure of protection by placing the device in the stow position when not in use.

D-17. Units should cover and protect computers, diagnostic devices, and all system components that are removed from an aircraft when items are not in use.

## **INCREASED MAINTENANCE PROCEDURES**

D-18. Rotor blade wear and turbine engine compressor blade degradation is normal in all aircraft but is greatly increased in a sandy environment causing a corresponding increase in maintenance requirements and parts replacement. Two factors that may reduce the degradation of equipment are airfield conditions and flying techniques. Component degradation can be slightly reduced by minimizing the time spent hovering over a sandy, unimproved surface or through staging and operating from airfields with improved surfaces.

D-19. Rotor-blade erosion is controlled by FMTs through paint application, manufacturing modifications, and erosion tape. Field-level methods require frequent inspections and reapplications and are short-term solutions that are time-consuming. Manufacturing modifications are more permanent but still require preventative maintenance actions.

D-20. Aircraft rely on an inlet particle separator system to reduce engine wear, but this system is less efficient at idle speed. Additionally, while operating at low altitude and low airspeed, particle separator systems may be unable to remove particulates in sufficient quantity.

D-21. Engine flush intervals are increased to remove ingested particulates, clean internal seals, and prolong engine component life.

## **AIRCRAFT SURVIVABILITY EQUIPMENT**

D-22. All sensors should be cleaned frequently and covered when the aircraft is not in use.

## **REVERSE CYCLE**

D-23. Maintenance personnel consume more water and require frequent monitoring during the heat of the day. Productivity decreases as environmental extremes increase. Reverse-cycle (nighttime) maintenance is a solution to adverse day-time environmental conditions.

D-24. Commanders should consider risks versus benefits when conducting night MTF operations. In hot, high-altitude, and mountainous environments, night-track and balance can significantly reduce vibrations caused by thermal turbulence over rough terrain and reduce track-time requirements.

## JUNGLE ENVIRONMENT

D-25. The jungle environment is common in tropical areas of the world. Hot and humid best describe a jungle environment. Jungle climate varies with location; near the equator, seasons are characterized with rain occurring throughout the year, whereas, seasons become distinctly dryer farther from the equator. For more details on jungle environments, refer to FM 90-5.

D-26. In a jungle environment, some considerations and precautions include:

- Lenses and dials quickly fog over with internal moisture.
- Electrical connections corrode and battery life is shorter than normal.
- Weapons tend to rust quickly and must be cleaned and oiled frequently.
- Avionics are particularly sensitive to moisture, condensation, and corrosion.

## CORROSION PREVENTION

D-27. An aggressive and comprehensive corrosion-prevention program should be initiated. Material and systems are susceptible to corrosion and this susceptibility is magnified in hot and humid environments. A comprehensive corrosion preventive program should be part of the unit SOP and applied daily to maintenance activities. The unit SOP provides preventive measures and guidance to minimize the destructive effects of corrosion on unit aircraft and equipment. Coordinating with the corrosion PM can be useful in developing a comprehensive corrosion plan designed specifically for the operational location.

## FIELD SITES

D-28. Some form of engineer support is required to prepare a field site as a suitable location to conduct aircraft maintenance. In areas where heavy and/or frequent rains occur, areas suitable for aircraft maintenance may be so limited as to require the collocation with other units. Collocating units has the added benefit of sharing security requirements and the detriment of concentrating personnel and equipment.

## MOUNTAINOUS ENVIRONMENT

D-29. Operations in mountainous environments present many challenges to leaders and maintenance personnel that require specialized equipment, specialized training, and acclimatization. Rugged terrain and abrupt changes in elevations limit the reliability of roads and suitable areas for maintenance operations. High altitudes and weather affect the performance of personnel and equipment. Personnel must be trained and acclimate to higher altitudes, and equipment may need adjustment to operate efficiently at higher elevations. For more detail on operations in mountainous environments, refer to ATP 3-90.97.

D-30. In a mountainous environment, some considerations and precautions include the following:

- Aircraft may be the most efficient means to move repair parts, contact teams, and evacuate unserviceable items.
- The ASC must be located as close as practical to the AMC/AMT that it supports.
- Maintenance turn-around time increases due to high altitude effects on maintenance personnel.
- Stockpiling and caching supplies decrease resupply risks due to transportation limitations.
- Rugged terrain requires increased engineer effort to prepare area for maintenance activity and improve security measures.
- Locally obtained animals and indigenous personnel may be required to move supplies from roads and trails to unit positions. (See ATP 3-18.13 for more information).

## COLD-WEATHER ENVIRONMENT

D-31. Cold weather operations require a considerable amount of specialized equipment, such as tracked vehicles, sleds, heated shelters, heated facilities, and aircraft modifications. Every item of equipment is affected by extreme cold and snow in the winter and by mud and water in the summer. Extreme conditions increase wear and tear on equipment and increase the quantity and variety of parts required for maintenance. (For more detail on operations in cold weather/northern environments, refer to ATP 3-90.97.)

D-32. Helicopter operations, particularly with their inherent vibrations, in temperatures below -35 degrees Fahrenheit results in a marked increase in metal fatigue. All metals become increasingly brittle as the temperature decreases. Aircraft fatigue is evidenced by an increased number of skin cracks and popped rivets in stress areas. Careful attention must be devoted to these areas in all stages of maintenance operations. Areas to inspect on a more frequent basis for stress cracks, as a direct result of the environment include but are not limited to engine decks, tail-boom hard points, and gearbox mounting points.

D-33. Operation of aircraft at temperatures below -50 degrees Fahrenheit should not be attempted except in emergencies, unless the aircraft has the appropriate winterization kit and auxiliary systems that have proven reliable at lower temperatures. Lubrication products must be examined to determine if they are sufficient for operations in extreme cold environments.

D-34. Unit leaders must ensure personnel and equipment can withstand the challenges of cold weather. Soldiers and their leaders must understand the effects of cold weather and adapt operations and maintenance to overcome environmental conditions. Operations in snow, ice, and extremely cold conditions require special training, personnel acclimation, and special operational techniques.

D-35. Trafficability is an issue during spring break up, and in summer when the ground thaws and ice in streams and lakes melt. Track-laying vehicles of the low-ground-pressure type may provide the only means of cross-country mobility. Mud, muskeg, swamp, marsh, and open water hamper ground movement in spring and summer.

D-36. In a cold-weather environment, some considerations and precautions include the following:

- All tasks require more time and effort due to cold-weather effects on equipment and personnel requirements to wear cold-weather clothing and gloves. At temperatures below -20 degrees Fahrenheit, maintenance tasks may take five times as long to complete.
- Maintenance units usually require additional personnel to offset the increased time necessary to complete maintenance tasks.
- Extreme cold-weather conditions may limit the use of aircraft.
- Maintainers must allow equipment to thaw out and warm up before making repairs.
- A portable combustion type of heater, incorporating a blower and flexible hoses for application of heat to localized areas, may be used for preheating aircraft components and systems before starting.
- Heaters may be used to heat specific portions of the aircraft so maintenance personnel can work without gloves.
- When temperatures remain below freezing, aircraft batteries not in use should be removed and stored in a warm place.
- Required installation of cold-weather auxiliary equipment, such as, winter cowls, oil dilution systems, personnel heaters, and covers add time to normal maintenance operations.

## **MAINTENANCE ACTIVITY**

D-37. Bulky clothing worn in extremely cold environments reduces personnel efficiency. Operators/maintainers must wear mittens or gloves at all times due to the dangers associated with handling metal objects with bare hands. Losing the sense of touch further reduces the Soldier efficiency. Even a routine operation, such as handling latches or opening engine compartments, becomes a focused and time-consuming task when performed with protected hands. Complete winterization, diligent maintenance, and well-trained maintenance teams are crucial in reducing the adverse effects of cold weather and performing maintenance in a timely manner.

D-38. In cold weather environments, maintenance personnel have additional risks involved while operating on or around aircraft at the FARP:

- White out conditions can cause a loss of situational awareness and impair the crew's view of ground obstacles and personnel.
- Static electricity in cold, dry conditions increases the risk of accidents involving fuel and ammunition.
- Moving aviation ground support equipment.

## MAINTENANCE FACILITIES

D-39. The availability of proper maintenance facilities can be critical to the maintenance mission. Without some type of permanent or temporary shelter, even routine maintenance can become extremely difficult, if not impossible to perform.

D-40. Heated buildings or shelters are a necessity for conducting aircraft maintenance in a cold weather environment. Proper and satisfactory aircraft preventive maintenance checks and services requires personnel to work in moderate temperatures within an enclosed structure. Maintenance of many components requires careful and precise servicing and inspections, which is not possible while wearing cold-weather clothing.

D-41. When buildings are not available, LMEs are a temporary and expedient method to use for maintenance. If possible, LMEs should have wood flooring and be heated. Leaders and supervisors closely monitor personnel working in these conditions, responding immediately to the first indication(s) of any cold-related symptoms or injuries.

D-42. During certain times of the year, hours of daylight in a northern environment are short. Lighting equipment must be available and in sufficient quantity to furnish adequate illumination for maintenance services. Lights with ample cable extensions, attachment plugs, connectors, and spare bulbs are a necessity.

## NIGHT OPERATIONS

D-43. Aircraft maintenance performed at night on aircraft flown that day has the potential to ensure those aircraft are available the next day. Leaders must establish an efficient maintenance schedule that cycles aircraft through inspection, repair, and placement back on the flight line while avoiding a stacking or lining-up of aircraft awaiting maintenance. An SOP that is understood and practiced by all personnel and a sound fighter management program provides for the consistent and continued success of the unit maintenance program.

D-44. During night-time maintenance, some considerations and precautions include the following:

- Night-time work performance is not equal with daytime because of mental fatigue associated with disruptions in the body internal clock, known as shift lag. Shift lag is a disruption of the circadian cycle affecting personnel that have a changed work/sleep schedule.
- Work performance is restricted when working in subdued (red or green) lighting, compared to white light.
- Risk versus benefit analysis to determine if MOCs and MTFs should wait for daylight.
- The potential for “missing something” increases as light levels diminish and the fatigue level of night workers increases.

## TRANSITION BETWEEN SHIFTS

D-45. The chances of an incomplete or inadequate maintenance task occurring increases during shift changes. Supervisors must avoid the tendency to complete a specific task quickly in order to reach a point that permits a smoother shift change transition. A detailed coordination between shift supervisors avoids the potential for incomplete or inadequate maintenance.

## PHYSIOLOGICAL FACTORS

D-46. Vision is obviously reduced at night; however, other human factors affect night maintenance. Supervisors and maintenance personnel should receive instruction on physiological factors affecting night operations. The commander can institute a program that provides training in conjunction with personnel shifting to a night-time work cycle as part of an adjustment period.

D-47. Physiological factors that must be considered in night aircraft maintenance include:

- Eyes require about 40 minutes to fully adapt to darkness.
- Adjustment to a new work schedule requires about one day for each hour of shift change.
- Forward shift rotations (days to evenings to nights) allow faster adjustment than backward rotations (nights to evenings to days).

- The body clock is set by exposure to the daylight, most night workers never fully adjust.
- Fatigue affects personnel night vision, muscular actions, and mental abilities.
- Personnel experience a loss of depth perception and color distinction at night.
- Smoking three cigarettes in rapid succession or 20 to 30 cigarettes a day reduces night vision by approximately 20 percent.
- Diet affects night vision; individuals should eat only nutritious foods, avoiding “junk foods.”

## **CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR OPERATIONS**

D-48. Aircraft maintenance personnel have the potential to be exposed to or work on aircraft exposed to CBRN agents. The use of chemical or biological agents against United States maintenance facilities and units by threat forces has the tactical advantages of isolating important battlefield systems and demoralizing personnel.

### **LEADER RESPONSIBILITY**

D-49. Commander and leaders must consider ways to resume operations at the earliest opportunity. CBRN defense, avoidance, protection, and decontamination of unit personnel, equipment, supplies, and operating areas is a time-consuming task requiring careful, realistic planning (ATP 3-11.32/MCWP 10-10E.8/NTTP 3-11.37/AFTTP 3-2.46).

D-50. Units should establish SOPs for contaminated aircraft and equipment maintenance procedures as follows:

- Inspection and contaminated maintenance collection point procedures.
- Contamination mitigation actions to take pre-attack, during attack and post attack to include avoiding contamination, protection, controlling exposure, containing contamination, and decontamination.
- Procedures for performing immediate and operational decontamination or requesting detailed equipment decontamination from a CBRN defense company.
- Procedures for repair without electronic test equipment (if equipment is destroyed by blast or electromagnetic pulse).
- Responsibilities and procedures for establishing and operating a contaminated equipment holding area.

D-51. Maintenance on contaminated equipment considerations and precautions include the following:

- Petroleum products tend to trap chemical contaminants.
- An aircraft that is safe for an operator to use without mission-oriented protective posture-level 4 (MOPP-4) protection may be unsafe for maintenance personnel to repair.
- CBRN contaminants may collect in bolt threads, hydraulic fluids, and closed assemblies. Maintenance personnel could open a component and be exposed to lethal concentrations of hazardous vapors or particles. Injuries or casualties could occur unless all repairs and preventive maintenance on previously contaminated aircraft and components are done in MOPP-4.
- Oil, grease, and dirt seriously degrade the protective qualities of the chemical protective suit; maintenance personnel must keep themselves as clean as possible. Extra protective suits should be on-hand to replace dirty ones.
- Wet-weather gear helps keep protective suits clean but increases heat buildup and eventually be penetrated. The combination of protective gear and wet-weather gear provides good protection from a combination of toxic chemicals, grease, and oil contamination; fuel handler aprons, and field-expedient rubber sleeves can provide some added protection with less heat buildup.

## CONTAMINATION CONTROL

D-52. Contamination must not be spread. Contaminated equipment is not taken into a clean area. Maintenance personnel repair contaminated equipment only in an area specified for contaminated aircraft and/or equipment. Repaired, contaminated equipment is marked and returned to contaminated units only.

D-53. Equipment immediately decontaminated can still be hazardous to handle. A previously contaminated unit conducting periodic contamination checks is able to use the equipment safely because of the precautions being taken.

D-54. After tools and equipment are used on contaminated aircraft or equipment, they are marked and treated as contaminated from that point. Segregate contaminated tools and equipment from uncontaminated tools and equipment. Protection from contaminated equipment is mandatory. Contaminated tools and equipment must be stored at a separate location downwind of clean areas. Every effort must be made to minimize and control the spread of contamination.

D-55. Contaminated aircraft and equipment should not be evacuated for repairs. If aviation maintenance company/troop or support company maintenance is required, a maintenance team in MOPP-4 is sent forward to effect repairs in the contaminated aircraft area and must test the equipment for contamination. If contamination exists, the maintenance team must decide whether repairs can be made in MOPP-4. If they cannot, the equipment must be decontaminated. Safeguards must be taken to protect personnel inside and outside contaminated areas. Detection equipment should be operated while contaminated equipment is being repaired. The testing must be a continuous process.

D-56. Mark contaminated aircraft and equipment. Aircraft and equipment that are contaminated or that have been decontaminated to low-risk levels for operators and crews could still present a serious hazard to mechanics.

D-57. Contaminated aircraft must be identified with standard triangular contamination signs on all four sides and at the flight controls. Write the type and date of contamination on the signs, which should be easily visible from the outside of the aircraft. For non-persistent agents, signs may not be removed until decontamination has been verified by a detailed inspection. Contamination signs on aircraft and equipment contaminated with persistent agents is not removed even after decontamination.

D-58. Any surfaces the maintenance team must touch to repair or recover the aircraft must be given an operator spray down with an approved decontamination apparatus. This spray down does not reduce the level of MOPP needed but offers some additional protection and limits spread. Maintenance teams must carry extra onboard decontaminants for this purpose. The objective is to limit transferring liquid contamination from the equipment being repaired to the maintenance or recovery team or its equipment.

D-59. Support from a contaminated area is limited to the amount of time Soldiers can operate in MOPP-4. This time restriction severely limits the maintenance support within a contaminated area. It may be possible to extend the time the unit can continue to support from the contaminated location by scheduling periodic withdrawal of personnel to a clean area for complete personnel decontamination and a rest period at a reduced MOPP-level. For continued effectiveness, however, the unit must leave the area, go through a thorough decontamination and set up shop in a clean area.

D-60. Maintenance personnel repairing equipment contaminated with radiation should wear dosimeters and be closely monitored for exposure. They must never exceed exposure levels. When the highest acceptable levels are reached, personnel should be replaced, mission permitting. The amount of radiological contamination that personnel can be exposed to varies. It depends on operational exposure guidance and the tactical situation.

## Appendix E

# Aviation Support Equipment Section

Aviation maintenance tasks require a wide range of support equipment that must be properly stored, accounted for, and maintained in accordance to the Army's established regulations for logistics and sustainability requirements. Due to the vast amount of support equipment organically located within an aviation unit's footprint, it is necessary to have trained personnel identified and in place to track and manage this category of important equipment.

E-1. Aviation support equipment section (ASES) model is a concept that consolidates several support functions under one organization increasing performance and readiness. Placing the tool room, HAZMAT, TMDE, GSE, MHE, and DART under the leadership of a single formation, the commander ensures a higher level of training, readiness, performance, and regulatory compliance. ASES preserves combat power by allowing the HQ, ARP, and CRP to focus exclusively on aviation maintenance. ASES provides routine aviation maintenance support to the aviation maintenance company/troop under the direction of the PC section to ensure accomplishment of the aviation maintenance company/troop customer support goals. To function effectively, ASES at the aviation maintenance company/troop usually consists of six to twelve Soldiers including an NCOIC appointed on orders by the commander. Due to its rotational nature, this is a non-MTOE section built from Soldiers within the unit. Soldiers are rotated into the ASES from the platoons within the company/troop and returned after serving approximately one year. This timeline can be shorter in the focused mission-saturation environment of unaccompanied short tours or combat. Commanders and first sergeants should time rotations to ensure a majority of experienced ASES Soldiers remain in the section to train newly assigned Soldiers. ASES Soldiers in the aviation maintenance company/troop perform six functions:

- Tool-room operations.
- GSE maintenance and support.
- TMDE coordination management.
- MHE operations.
- Package POL and HAZMAT operations and planning.
- Deliberate recovery DART support (unit maintenance aircraft recovery kit operations) and training.

E-2. ASES maintains the aviation maintenance company/troop compliment of AGPUs, generic aviation nitrogen generators, pressure washers, cranes, hoists, tractors, tugs, forklifts, aviation electrical power generators, jacks and recovery assets (unit maintenance aircraft recovery kit, DART trucks), as well as the tool room. ASES coordinates calibrations tracking, as well as equipment turn-in and receipt for the entire company/troop. ASES also maintains the aviation maintenance company/troop spill contingency plan and manages the company/troop HAZMAT storage and disposal operations.

E-3. In the support company, large quantities of aviation support equipment and DART responsibilities mandates an ASES with 15 to 35 Soldiers including an OIC and NCOIC (both appointed on orders by the commander) to function efficiently and effectively. The support company ASES Soldiers are rotated into the ASES from the platoons within the company and returned after serving approximately one year. This timeline can be shorter in the focused mission-saturation environment of unaccompanied short tours or combat. Commanders and first sergeants should time rotations to ensure a majority of experienced ASES Soldiers remain in the section to train new Soldiers before their subsequent replacement.

E-4. The support company ASES is a combination of the tool room section, the POL section, and augmented aviation Soldiers from within the company/troop to perform six functions:

- Tool room operations.
- AGSE maintenance and support.
- TMDE coordination management.
- MHE operations.
- Deliberate air and ground DART operations.
- Aircraft fueling/defueling operations, package POL support, and HAZMAT operations and planning.

E-5. ASES provides routine aviation maintenance support to the support company under the guidance of the PC section to ensure accomplishment of the support company customer support goals. However, because of its combat DART responsibilities to the entire CAB and diverse capabilities, the support company ASES reports directly to the commander. ASES maintains the support company compliment of AGPUs, generic aviation nitrogen generators, pressure washers, cranes, hoists, tractors, tugs, forklifts, aviation electrical power generators, jacks and recovery assets (prime movers and trailers), as well as the tool room. ASES leads and executes support company aircraft recovery operations, and coordinates calibrations tracking, turn-in, and receipt of equipment for the entire company. ASES also maintains the support company spill contingency plan and manages the company/troop HAZMAT storage and disposal. Using its cranes, forklift, trailers, and prime movers, ASES can perform MHE missions in support of the support company, ASB, or the CAB.

## **Appendix F**

# **Care of Supplies in Storage SOP**

### **GENERAL**

F-1. Appendix F is established as the SOP for all unit personnel (including maintenance and supply) who routinely work with Class IX (Air). It establishes local procedures for organizational level care of supplies in storage (COSIS) processes to ensure stock readiness. Close coordination of supply and maintenance personnel is required to ensure COSIS steps are completed on ready-for-issue and retrograde turn-in parts. COSIS supports the CSDP according to AR 710-2; steps are fully implemented at the organizational level.

F-2. COSIS is a program comprised of a set of processes whose purpose is to ensure that materiel in storage is maintained in ready-for-issue condition and to prevent uneconomic deterioration of materiel. COSIS steps taken ensure that supplies and equipment in storage are preserved and maintained in an issuable condition through inspection and actions taken to correct any forms of deterioration and to restore packaging to ready-for-issue condition. COSIS includes the in-storage visual inspection, minor repair, preservation, and packing of materiel, and all intra-unit materiel movement to perform those tasks.

### **CORROSION, PACKAGING, AND STORAGE**

F-3. Corrosion of supplies causes serviceable parts to become unusable. Corrosion also causes losses of condition code (CC) "F" repairable/recoverable turn-in parts when they corrode beyond repairable limits. The Army designs and designates packaging and storage requirements to prevent deterioration (including corrosion) in order to sustain repair parts. This is true for new "ready-for-issue" and recoverable/repairable "turn-in" parts. Opened or damaged packaging exposes Class IX supply parts to humidity/moisture and leads directly to corrosion. Additionally, incorrect (outside) storage of Class IX supply parts (engine, transmission, and rotor-hub "cans", wooden crates) exposes them to the weather (rain and sun damage) and results in corrosion of Class IX supplies.

F-4. Army personnel (Soldiers and civilians) have a vital role in preventing the loss of Class IX repair parts. Perform surveillance of parts (including their containers) to identify packaging and storage problems immediately. Remediate opened/damaged packaging and move Class IX inside under covered storage before these discrepancies lead to corrosion.

### **RESPONSIBILITIES**

F-5. Leaders are responsible for safeguarding all supplies under their control.

### **COMMANDERS**

F-6. Commanders are responsible for safeguarding all supplies under their control according to AR 710-2. Commanders—

- Develop and sustain a high degree of maintenance discipline within their commands, including management of repair parts according to AR 710-2 and AR 750-1.
- Ensure materiel is stored consistent with the material number specific item type of storage code listed in FEDLOG unless a deviation is approved in writing by the individual MRP representative, according to AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A.
- Ensure property is on-hand, serviceable and safeguarded according to AR 710-2.
- Adequately address COSIS, including preservation, packaging, and exercising requirements according to AR 750-59.

- Evaluate all supply operations (including COSIS) using the standards of the CSDP as outlined in AR 710-2.

## UNIT CORROSION PREVENTION AND CONTROL MONITOR

F-7. Unit CPC monitors ensure—

- The unit SOP contains detailed procedures to be followed that address COSIS, stock readiness, and the care of long life re-usable containers (LLRCs) according to AR 750-1.
- LLRC receive routine care and surveillance and that containers equipped with humidity indicators are monitored for appropriate humidity levels per TM 1-1500-328-23; TM 38-400/NAVSUP PUB 592/AFMAN 23-210/MCO 4450-14/DLAM 4145.12; AR 710-2; and AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A.
- Technical supply maintains an on-hand supply of MIL-D-3463, Type I-desiccant bags, and humidity indicator cards.
- COSIS inspections are being conducted by both supply personnel to ensure supplies, aviation components/repair parts, and LLRC are examined for proper storage, serviceable condition, and packaging discrepancies AR 750-59.
- Documentation of COSIS inspections conducted, discrepancies are identified, and corrective actions are taken for all on-hand LLRC according to AR 750-59.
- Military Standard (MIL-STD)-2073-1E-packaging, preserving, and marking of aviation Class IX repair parts (including LLRC), which are in storage or being shipped (retro-grade turn-ins), per the material number specific Army packaging information listed on FEDLOG/FLIS packaging file (tab) according to AR 700-15/NAVSUPINST 4030.28E/AFJMAN 24-206/MCO 4030.33E/DLAR 4145.7; AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A; and AR 750-59.
- Storage space is adequate for on-hand supplies and that all Class IX repair parts are stored in their material number specific type of storage (TOS) as identified on FEDLOG/FLIS according to AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A; AR 750-59; TM 1-1500-328-23; and TM 38-400.
- LLRC are oriented to allow easy access to humidity indicators and pressure relief valves according to AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A; AR 750-59; TM 1-1500-328-23; and TM 38-400.
- Findings of noncompliance for storage, which are beyond the organizational level control, are elevated to the appropriate level capable of resolving the discrepancy according to AR 710-2.

## MAINTENANCE PERSONNEL

F-8. Maintenance personnel ensure—

- Maintenance personnel follow procedures listed in their MDS aircraft TM FOR LLRC.
- Serviceability inspections are performed on LLRC (“can”) prior to component installation into its storage and shipping LLRCs. Only those LLRC that are in condition code (CC) “A” may be used to store or transport Class IX items. According to AR 750-1, if economical repair is not available at the organizational level, notify technical supply and/or SSA for disposition instructions on a replacement LLRC or request a packaging deviation from AMCOM packaging/MRP representative.

## QUALITY CONTROL TECHNICAL INSPECTOR

F-9. QC technical inspectors ensure—

- Class IX repair parts are properly preserved with contact preservative per the appropriate aircraft interactive electronic technical manuals prior to LLRC lid closure and prior to turn-in to technical supply according to AR 750-1.
- The proper amount of fresh activated (dried) desiccant bags have been loaded into desiccant baskets of LLRC. Additional desiccant bags are not placed on the floor of the “can” as this allows

residual POL to be absorbed instead of humidity/moisture. Desiccant bags with tie strings may be hung from cradle/mounts. Do not hang desiccant bags from the Class IX part. Desiccant bags with POL stains are not to be used per and according to AR 750-1.

- LLRC lids are secured (latched) and that humidity indicator (HI) shows “blue” PRIOR TO turn-in to technical supply according to AR 750-1.
- Packaging deviations are requested from the AMCOM packaging/MRP representative for all packaging (for storage and/or shipment) that does not meet the material number (FEDLOG listed) Army packaging requirements; this includes all LLRC not in condition code (CC) “A” that cannot be repaired at the organizational level.

## SUPPLY PERSONNEL

F-10. Supply personnel assigned to packaging duties complete PACK-1A and Pack-1B within 2 years of assignment to their packaging position according to AR 700-37. PACK-1A (online ALMS) should be completed as soon as possible after being assigned to packaging duties. Supply personnel assigned to receiving and/or turn-in perform inspections of each Class IX item handled to determine if packaging meets MIL-STD-2073-1E according to AR 700-15/NAVSUPINST 4030.28E/AFJMAN 24-206/MCO 4030.33E/DLAR 4145.7. Packaging requirements are material number specific and may be found in FEDLOG/FLIS.

## SUPPLY SUPPORT ACTIVITY

F-11. Storage activities are responsible for providing protection from the elements and environmental conditions by providing proper storage facilities, preservation, packing, marking, or a combination of those measures and for the execution of the COSIS program according to DODM 4140.01, Volume 1. To accomplish these, ensure—

- Materials and tools are on-hand to complete DOD MIL-STD-2073-1E packaging according to AR 700-15/NAVSUPINST 4030.28E/AFJMAN 24-206/MCO 4030.33E/DLAR 4145.7.
- Assigned personnel who perform packaging or perform packaging inspections receive packaging training according to AR 700-37.
- Packaging inspections are performed at time of receipt, turn-in and for all on-hand shop stock/ASL (90-day) and document according to AR 710-2.
- Implementation of a system to ensure corrective actions for discrepancies uncovered during inspections are done to restore the items to serviceable condition or protect unserviceable items from deterioration according to DODM 4140.01, Volume 1. As an example, notify maintenance activity with DA Form 2407 for packaging discrepancies that require condition code (CC) verification and/or item serviceability check (includes replacement of humidity indicator).
- Evaluate unit-level storage capability and elevate all instances of non-compliance that are beyond the control of the evaluated organization to the appropriate level capable of resolving the discrepancy according to AR 710-2.

F-12. All supported Department of Defense activity address codes are registered on the DoD WebSDR application, hosted via the DLA website, to allow for timely submission of SF 364 (*Report of Discrepancy [ROD]*) according to Defense Logistics Manual (DLM) 4000.25 information also located on the DLA website.

- **Supply discrepancy reports (SDRs)**-SF 364 are submitted in a timely manner (see DLM 4000.25) for supply discrepancies to support the DOD and Army goals for the SDR Program. These goals include determination of cause, effect corrective action, and prevent recurrence according to DLM 4000.25. Corrective action taken at the organizational level for all discrepancies still require an “Information Only” (action code 1H). Typical shipping and packaging discrepancy codes are found in AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A.
- Per DLM 4000.25, supply personnel are trained in supply discrepancy reporting and familiar with DLA WebSDR.

## TRAINING REQUIREMENTS

F-13. Maintenance and supply personnel should undergo the following for COSIS familiarization:

- Complete initial COSIS familiarization training by reviewing the COSIS Corrosion Training video to familiarize themselves with long life re-usable containers used to transport and store Class IX aviation components.
- Review this COSIS SOP and be familiar with COSIS operations and responsibilities relevant to duty position and MOS according to AR 750-1, AR 750-59, and DA PAM 750-1.

F-14. All unit TI and supply personnel complete Defense Ammunition Center (DAC) PACK 1A–DL, Military Preservation and Packaging for Storage and Shipment (Phase 1)–Distributed Learning via Army Learning Management System.

F-15. All supply personnel assigned to packaging duties complete Military Preservation and Packaging for Storage and Shipment (Phase 2) course in residence at McAlester, OK (80-hours). To register, visit the Defense Ammunition Center (DAC) website. Select “Classroom Training”, then select PACK-1B to see course times and availability for this 80-hour (2 week) course.

## SUPPLEMENTAL PACKAGING TRAINING

F-16. Additional packaging training is listed in AR 700-37, including the following:

- The DOD Shelf-Life Training Course at Navy Supply Weapon Systems Support, Mechanicsburg, PA. Shelf-Life specific training information can be found on the DLA website.
- Defense Acquisition University computer-based shelf-life training (CLL 120) found on the DAU website.
- For a complete list of courses available and eligibility criteria, review AR 700-37.

## CARE OF SUPPLIES IN STORAGE INSPECTION STEPS

F-17. For all supply personnel who perform packaging and/or perform packaging inspections, use MIL-STD-2073-1E to decipher the material number specific packaging requirements listed in FEDLOG/FLIS. Packaging discrepancies lead to deterioration and eventual loss of the Class IX supply part. For ESDS items, poor packaging and/or packaging defects lead to possible item compromise through handling and the resultant electro-static shock.

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*Note.* For ESDS (MOP code “GX”) items: Ensure all items are handled using electro-static discharge (ESD) precautions. When ESD items (all serviceable AND unserviceable) are handled outside of ESD protective packaging, personnel use a grounded wrist strap. ESD field service kits (NSN 5920-01-253-5368) are listed on the packaging starter kit (see enclosure 1, Packaging Starter Kit Info).

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F-18. When possible, remediate packaging at the unit-level with available resources. Packaging discrepancies that compromise method of preservation 40-series or MOP 50-series sealed components require a TI inspection to verify condition code or require a Class IX supply part serviceability inspection according to AR 750-1 and AR 710-2. Use DA Form 2407 to notify PC office of packaging discrepancies that require maintenance and/or TI involvement according to AR 750-59. Once the scope of the packaging and/or Class IX discrepancies are known, supply personnel submit a supply discrepancy report (SDR) via the WebSDR application according to AR 710-2 and DLM 4000.25.

## RECEIPT PACKAGING INSPECTIONS

F-19. When packaged parts arrive at the SSA or technical supply, the supply representative inspects Class IX aviation parts packaging for defects. Packaging is national item identification number specific and may be found on the Army FEDLOG/FLIS under the Army packaging file tab. Packaging file-This file provides the details of cleaning, preserving, and packaging an item or refers to the packaging data sheet, specification, or instructions that contain such data. Refer to the special packaging instruction listed if the method of

preservation is not listed (blank or “ZZ”). The most current special packaging instructions can be retrieved by contacting AMCOM packaging.

### 90-DAY ASL PACKAGING INSPECTIONS

F-20. SSA and technical supply representatives perform quarterly inventory of shop stock and ASL property per AR 710-2. Ensure that the KCC rule is followed. Reviews to verify authorized stockage levels are on hand or on request should be conducted. Inspect on-hand supplies to ensure items are stored in their designated location and appear to be in serviceable condition. Do not open item packaging until ready for use; inspect ONLY the item packaging for discrepancies according to AR 700-15/NAVSUPINST 4030.28E/AFJMAN 24-206/MCO 4030.33E/DLAR 4145.7. Use material number specific packaging information on FEDLOG and MIL-STD-2073-1E to determine minimum packaging and TOS requirements.

### TURN-IN PACKAGING INSPECTIONS

F-21. Turn-in items require the same packaging as new ready-for-issue parts. Turn-in packaging inspections follow the same process as the receipt inspections process.

### AD HOC PACKAGING INSPECTIONS

F-22. All organizational level personnel are encouraged to perform walk-by surveillance of Class IX. Report packaging and/or storage problems; this includes humidity indicator color observations. Use AMCOM CPO LLRC inspection guide to report LLRC storage and/or packaging problems to technical supply or SSA.

### HUMIDITY INDICATOR SURVEILLANCE

F-23. At a minimum, inspections of humidity indicators (HIs) are performed at three distinct times: receipt, turn-in, and 90-day shop stock/ASL inspection intervals. Check HI for a “blue” color. This blue color indicates low (acceptable) humidity level inside container. Indicators turn violet, then pink when humidity (water vapor) is present inside packaging and/or LLRC. White colored HIs indicate extremely high humidity (water is present in LLRC) or that HIs are non-functional due to prolonged exposure to water. Take action by adding and/or replacing desiccant when HIs show violet or pink color (water vapor present). After adding and/or replacing desiccant, re-inspect after 24 hours to confirm HI has returned to “blue”. If HIs are white, notify maintenance personnel to replace the non-functional (white) HIs. Keep a ready supply of HIs on hand to allow for replacement of expired (HIs that have turned white) according to AR 750-59. Table F-1 provides NSN.

**Table F-1. Humidity indicator card and disc NSNs**

(6685) material number	P/N	Material Description	Description	U/I
6685-01-591-2831	TA396-HC-2345S	Card (disc)	20/30/40/50% Humidity	
6685-00-052-1865	TA356-HC-2345S	Card (disc)	20/30/40% Humidity	HD
6685-01-523-0700	TA356-HC-2345P	Card (disc)	Chemical paper	
6685-00-464-4660	MS18013-3	Plug	20/30/40% Humidity	EA
6685-00-526-8526	826004	Card (flat)	10/20/30/40/50/60% Humidity	EA
EA-Each, HD- Hundred, P/N- Part Number, U/I- Unit of Issue				

### DESICCANT

F-24. MIL-D-3464, Type I (General Purpose) is used inside MOP 50-series packaging. This type of desiccant is made from clay particles that are contained in bags that have been dried (activated) to remove moisture. Activated (dry) desiccant, MIL-D-3464, Type I (bags) absorb moisture inside the package in which it is placed. Each container must have the proper amount of desiccant installed. If MDS-specific TMs do not specify the proper amount of desiccant to install, use the appropriate formula (depends on sealed container type) per MIL-STD-2073-1E, method 50-water-vapor-proof protection with desiccant. Some desiccant can

be re-activated (dried) and therefore re-used. For those bags of desiccant that may be reactivated, instructions are located on the front of the desiccant bag. Never re-use desiccant bags that have POL stains. Discard POL stained bags according to local Class 3 Hazmat regulations. Keep a ready supply of desiccant bags on hand. Table F-2 provides NSN info.

**Table F-2. MIL-D-3464, Type I, desiccant activated, bag NSNs**

Material Number	U/I	# of Bags	Unit Size (ounces)
6850-00-264-6571	Drum	300	8
6850-00-264-6572	Drum	150	16
6850-00-264-6573	Can	130	2
6850-00-264-6574	Drum	500	4
6850-00-264-6562	Can	250	1
U/I- Unit of Issue			

*Note.* For some method of protection (MOP) 50-series rigid containers (both metal and non-metal), externally mounted HIs can be seen through ½-inch to 1-inch round inspection windows (ports). Desiccant installed into any container should be dry (activated) when installed. Do not re-use desiccant backs with POL staining.

## PROTECTION OF SUPPLIES FROM ELEMENTS

F-25. Storage is a continuation of receiving and is preliminary to shipping or issuing operations (AR 710-2). Unless otherwise directed by the inventory control point packaging office, materiel is stored in the packaging prescribed by FLIS. New/overhauled materiel is stored in the unopened vendor pack. Commanders ensure that materiel is stored consistent with the item type storage code in FLIS unless a deviation is approved in writing by the ICP according to AR 740-3/DLAI 4145.4/AFMAN 23-125(IP)/NAVSUPINST 4400.100A/MCO 4450.15A.

F-26. **Commander and Accountable Officer (Stock Record Officer)**-When facilities are inadequate to properly store on-hand supplies (not enough covered storage), corrective action needs to be taken. This action includes notification of the discrepancy to the appropriate level able to solve problem. A CSDP review includes an evaluation of storage space, including covered storage. Each command level is required to evaluate the immediate lower level of operations. Notify parent organization of storage problems beyond the supervisor’s ability to control (additional warehouse space needed) according to AR 710-2.

F-27. Army space utilization goals include the efficient use of covered storage by maximizing vertical space with racking and shelving. Forklift use for vertical shelving/racking units is necessary for efficient storage and handling operations per TM 38-400. Shelving units can be a mixture of permanent racking and deployable shelving inserts (VIDMAR® units that slide into BOH® containers). Deployment goals are when selecting racking/shelving. See TM 38-400 for storage and handling operations.

## RESTORE ITEMS TO SERVICEABLE CONDITION

F-28. The following section provides guidance to restoring items to serviceable condition.

### REPAIR OF CLASS IX PARTS

F-29. Technical inspectors—

- Verify serviceability.
- Determine economic reparability of the item.
- Determine the extent of maintenance effort and repair parts required to restore the prescribed serviceable condition.
- Determine if the unserviceable item a rendered unserviceable due to other than fair wear and tear.

- Determine the estimated cost of damage (ECOD).
- Determine if all applicable MWOs have been applied according to AR 750-1.

### **PACKAGING REPAIR**

F-30. All packaging discrepancies are reported to SSA and technical supply supervisors; packaging remediation includes aviation TI CC verification and/or serviceability inspection prior to packaging repair according to AR 750-1 and AR 710-2. All packaging performed (including packaging remediation) are performed according to MIL-STD-2073-1E. Army assigned packaging is material number specific and is listed on Army FEDLOG/FLIS on the Army packaging tab. Use MIL-STD-2073-1E to decipher the packaging codes listed on FEDLOG /FLIS.

### **LIFE-LONG REUSABLE CONTAINER REPAIR (UNIT MAINTENANCE)**

F-31. Aviation-specific (special design) LLRC are designated as direct-support level of repair by their specific source, maintenance, and recoverability (SMR) code; "PAOFD" SMR code is listed for these special design LLRCs. The fourth alphanumeric "F" designates the lowest maintenance level capable of complete repair of the support item is DS level. Aircraft TIs apply the same standards for serviceability and/or repair as all other Class IX aviation supply parts according to AR 750-1.

### **WOOD PACKAGING MATERIAL**

F-32. The United Nations guidelines protecting forests worldwide against pest infestations have imposed phytosanitary measures for all WPM shipped between nations. WPM includes pallets, crates, boxes, reels, and dunnage composed of non-manufactured wood. Manufactured wood products are not affected-for example, plywood, particleboard, oriented strand board, and finished woods used in furniture. Army activities engaged in packaging of materiel for transnational shipments comply with the procedures contained within DA PAM 700-32 and DODM 4140.01, Volume 1, to gain access to aerial and water ports. Failure to follow these procedures creates a strong risk that uncertified, unmarked, or improperly marked materiel become frustrated cargo and destroyed at the port of debarkation, or are required to be repacked at the port or consolidation and containerization point, causing increased cost and time delays to the Army.

### **PEST DAMAGE DETECTION**

F-33. Any pest damage detected is reported to the SSA or technical supply supervisor. Determination of requirement for an SDR is made and submitted as determined by the supply accountable officer and aircraft TI. Contact AMCOM Packaging for WPM disposition instructions.

F-34. Solid wood pieces (non-manufactured) of a thickness greater than 6mm require International Standard for Phytosanitary Measures-15 (ISPM-15) compliant stamps for trans-national shipments. ISPM-15 stamps indicate the WPM has been heat treated or fumigated to kill all insects/pests. ISPM-15 stamps in the United States are controlled and issued by the United States Department of Agriculture (USDA). Only licensed facilities are authorized to stamp WPM that has been ISPM-15 treated.

F-35. Units located on Army installations contact their Installation Logistics Readiness Center (LRC) for WPM needing repair or replacement. Solid (non-manufactured) wood pieces comply with ISPM-15 and be marked with the same according to AR 700-37. All other Army units that are non-located with their supporting LRC contact AMCOM Packaging for disposition instructions.

### **WORK ORDER REQUESTS**

F-36. For all Class IX supply parts with packaging discrepancies, the supply activity (SSA) and/or technical supply submits a work order request to the unit PC office to request aircraft TI assistance in the form of a condition code (CC) verification and/or serviceability inspection according to AR 750-1.

F-37. Reporting and processing of SDRs is performed according to DLM 4000.25. Once the scope of the packaging and/or Class IX discrepancy is known (verified by an aircraft TI), submit a supply discrepancy

report (SDR) via the WebSDR application according to AR 710-2 and DLM 4000.25. Types of discrepancy reports and reporting timeline requirements are listed in DLM 4000.25.

**PACKAGING**

F-38. **Maintenance personnel**-Military preservation is the application of materials and/or methods designed to protect and item during shipment, handling, storage, and distribution worldwide. For turn-in items, maintenance activities—

- Apply contact preservatives (corrosion preventive compounds) per the aircraft TMs according to AR 750-1. Use MIL-STD-2073-1E to decipher the packaging codes listed on FEDLOG/FLIS.
- Ensure complete preservation (adding fresh desiccant packs/bags, latching and sealing containers) is accomplished per the specific aircraft TM.

F-39. **Supply personnel**- Packing is accomplished per the instructions provided on the Army FEDLOG (Army Packaging tab) and MIL-STD-2073-1E.

F-40. **Supply and maintenance personnel**-MIL-STD-129P provides the minimum requirements for uniform military marking and procedures for their application. The publication is intended for use only for the application of military specific markings to items intended for transportation and storage within the military distribution system, such as for marking of materiel not intended for immediate use and material that is stored and/or moved within or between DOD facilities. MIL-STD-129P should be readily available to all personnel performing packaging operations. Common rules for marking and labeling include the following:

- Marking must be legible and contrasting.
- Making surface must be clean and dry.
- Old markings must be obliterated.
- Use approved marking materials.

F-41. For additional information or assistance contact the AMCOM Corrosion team by emailing [ucat@amrdec.army.mil](mailto:ucat@amrdec.army.mil) or through the websites listed in the reference section of this publication. Table F-3 provides packaging-starter kit information.

**Table F-3. Packaging-starter kit info**

Stock Readiness Packaging Starter Kit									
	Material Description	SPEC/PN	NSN	U/I	SOS	SCMC	Unit Price	QTY	Description
<b>TOOLS</b>									
1	Sealing Machine	DOBOY HS-BII	3540-01-456-4286	EA	GSA	CL2	\$3,540.47	1	Heat Sealer, Rotary
2	Vacuum Cleaner	MARK225-7910	7910-01-423-9525	EA	GSA	CL2	\$72.27	1	.75 HP VAC w/19" flex hose
3	ESD Field Service Kit	WS-9015-1 or ASGK-MIL	5920-01-253-5368	KT	SMS	CL9	\$83.51	1	Grounding mat with wrist strap
<b>WRAPS</b>									
4	Paper, Wrapping, Chem Neutral, Crepe	MIL-DTL-17667, Type II	8135-00-558-1245	RO	GSA	CL2	\$109.58	1	36" Width X 600' Length Roll
5	Barrier Matl, Greaseproof, Waterproof, Flexible, Heat-Seal	MIL-PRF-121, Type I Medium Duty	8135-00-233-3871	RO	GSA	CL2	\$176.05	1	36" Width X 600' Length Roll
6	Barrier Matl, Waterproof, Greaseproof, Flexible, Heat-Seal	MIL-PRF-131, CL 1	8135-00-282-0565	RO	GSA	CL2	\$221.16	1	36" Width X 600' Length Roll

Table F-3. Packaging-starter kit info cont'd

Stock Readiness Packaging Starter Kit									
	Material Description	SPEC/P N	NSN	U/I	SOS	SCMC	Unit Price	QTY	Description
7	Barrier Matl, Water/vapor proof, Flexible, Heat, Electro Static Discharge (ESD)	MIL-PRF-81705, Type I	8135-01-185-6816	RO	GSA	CL2	\$121.55	1	36" Width X 150' length Roll
<b>CUSHIONING</b>									
8	Cushioning, antistatic bubble wrap	PPP-C-795D, CL 2	8135-01-235-8057	?	GSA	CL?	\$59.95	2	
9	Cushioning, anti-static open cell	A-A-3129, Type I, Grd B	8135-01-088-3846	BD	GSA	CL2	\$620.16	1	1250' Length Bundle
10	Cushioning Material, Low Density, Foam	PPP-C-1797, Type I	8135-00-300-4905	BD	GSA	CL4	\$277.73	1	30" Width X 225' Length Roll
<b>TAPE</b>									
12	Tape, Pressure-Sensitive	ASTM-D-5486 Type I, CL 2	7510-00-266-6715	RO	GSA	CL2	\$2.97	4	2" Width X 180' Length Roll
<b>DESSICANTS</b>									
13	Desiccant, Activated (CN contains 250ea)	MIL-D-3464E, Type I	6850-00-264-6562	CN	SMS	CL3	\$57.00	1	1 Oz/Unit bags
14	Desiccant, Activated (DR contains 150ea)	MIL-D-3464E, Type I	6850-00-264-6572	DR	SMS	CL3	\$178.20	1	16 Oz/Unit Bags
<b>HUMIDITY INDICATORS</b>									
15	Indicator, Humidity (CN contains 125ea)	MS20003-2	6685-00-752-8240	CN	SMS	CL9	\$11.69	1	Card, Flat. 30%, 40%, 50%
16	Indicator, Humidity (HD contains 100ea)	TA356-HC-2345S	6685-00-052-1865	HD	SMS	CL9	\$300.09	1	Disc, Indicator 20/30/40/50 % Spot
<b>Total Costs</b>									
							\$5901.24		

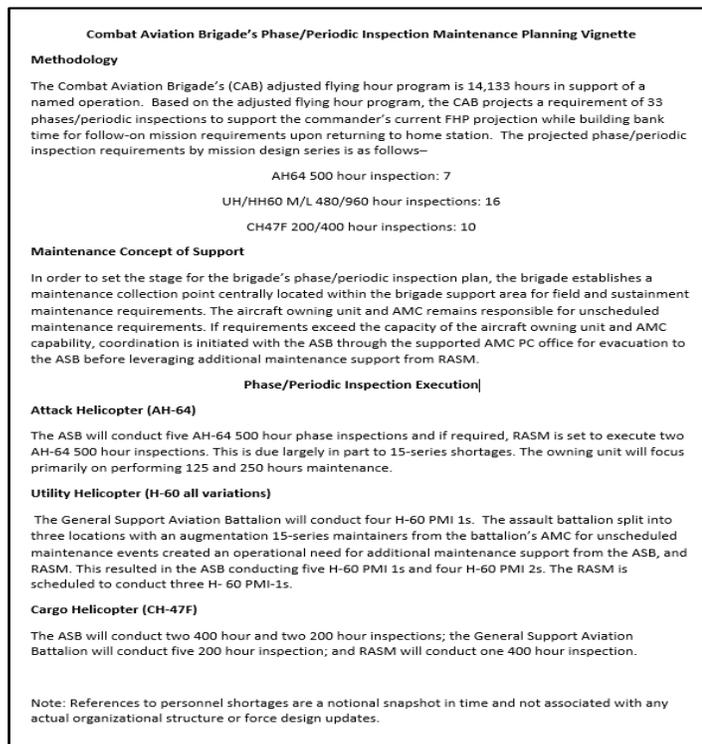
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## Appendix G

# Phase/Periodic Inspection Techniques

### GENERAL

G-1. Aviation organizations execute a unique maintenance action called phase maintenance. Phase maintenance involves the thorough disassembly and inspection of an aircraft. Each phase or periodic inspection is part of a total cycle; a cycle is a major scheduled maintenance collaboration requiring detailed planning using the P4T3 concept. While the battalion/squadron and company/troop are responsible for planning and managing the organization's phase flow plan, the overall responsibility begins at brigade level. During the brigade maintenance readiness review meeting or a similarly named meeting, the battalion/squadron leadership reviews its overall phase/periodic inspection schedule and identifies any impacts that require adjustment. Once adjustments have been made, the battalion/squadron include all phases/periodic inspections onto the battalion/squadron training schedule and provide the training schedule to the brigade. When situations exist that could potentially impact the brigade's overall fly hour program's mission because of aircraft maintenance adjustments, the battalion/squadron must immediately notify the BAMO or designated brigade-level representative. Figure G-1 provides an example of a brigade/periodic inspection.



**Figure G-1. Brigade phase/periodic inspection vignette**

### BRIGADE PLANNING

G-2. The BAMO, in coordination with the ASB CDR, develops an annual brigade-level phase and periodic inspection plan, approved by the brigade CDR. This plan identifies the total number of phases and periodic inspections required to support the brigade flying hour program, and then allocates phases between the

aviation maintenance company/troop and support company. The brigade phase calendar should take into consideration when maintenance units need breaks from phases for field training exercises (FTXs), CTC rotations, or when an organization’s manning capacity cannot facilitate the uninterrupted execution. The brigade-level phase and periodic inspections plan is managed by the BAMO and/or ASB CDR using a calendar with PC meetings used to ensure that the right aircraft are flying to adhere to the brigade phase plan. All phases must be added to the brigade’s overall training calendar. Figure G-2 provides an example brigade phase plan.

		T-44		1 Aug to 5 Aug		T-45		8 Aug to 12 Aug		T-46		15 Aug to 19 Aug		
MDS	UNIT	Serial #	PHASE TYPE	START DATE	FINISH DATE	Serial #	PHASE TYPE	START DATE	FINISH DATE	Serial #	PHASE TYPE	START DATE	FINISH DATE	
H-64	AMC	AH-574	250Hr		6 Jun - 12 Aug									
	ASC													
H-47	AMC													
	ASC	CH-052	400Hr	2-May	12-May									
H-64	AMC	60M-287	PMI-2	1 Jun - 12 Aug										
	AMC	HH-380	PMI-2	15-Mar	8-Aug									
	ASC													
	ASC	60L-421	PMI-2	27 Jun - 11 Aug										
		T-48		29 Aug to 2 Sep		T-49		5 Sep to 9 Sep		T-50		12 Sep to 16 Sep		
MDS	UNIT	Serial #	PHASE TYPE	START DATE	FINISH DATE	Serial #	PHASE TYPE	START DATE	FINISH DATE	Serial #	PHASE TYPE	START DATE	FINISH DATE	
H-64	AMC													
	ASC													
H-47	AMC					LABOR DAY				AH-538	250Hr	12-Sep	26-Sep	
	ASC													
H-64	AMC													
	ASC	60M-273	PMI-2	15-Aug	27-Sep									
	ASC	HH-407	PMI-2	29-Aug	13-Oct									

AMC- aviation maintenance company  
ASC- aviation support company  
MDS- mission design series  
PMI- phase maintenance inspection

Figure G-2. Example brigade phase plan

## BATTALION/SQUADRON PLANNING

G-3. The maneuver battalion/squadron is responsible for formulating the battalion/squadron’s phase plan based on the established flying hour program requirements. The maneuver battalion/squadron’s AMO is the maintenance conduit during the brigade’s phase/periodic inspection planning. The AMO works with the PC OIC to identify well in advance all additional deferred/opportunity maintenance requirements requiring completion during the phase/periodic inspection that exceeds the established phase goal for both internal and external phase support requirements. The AMO provides this information to the BAMO and ASB CDR for consideration and/or inclusion into the phase/periodic inspection phase plan. Situations may exist that negates the possibility for a requested deferred/opportunity maintenance action to occur if the ASB is performing the phase/periodic phase based on priorities established by the brigade. All phases must be added to the battalion and below training calendars.

## PHASE MAINTENANCE PLANNING

G-4. Phase maintenance planning is a series of collaborative efforts managed by the PC section and includes pre-phase planning, coordinating internal maintenance inspections, identifying deferred maintenance requirements, scheduling external resources, tracking maintenance and supply delays, and establishing and tracking maintenance matrixes. These categories are all necessary to track, manage, and produce safe and reliable aircraft. The following section covers some techniques to assist a unit with its phase maintenance planning.

## PRODUCTION CONTROL

G-5. The aviation maintenance company/troop PC uses the brigade phase/periodic inspection tracker to assist with managing aircraft scheduled for phase during the daily production control meeting. In doing this, the aviation maintenance company/troop provides oversight over the aviation maneuver company’s bank time flow chart to keep on glide path with the brigade phase/periodic inspection plan. The aviation maintenance company/troop PC must therefore develop an organized method for planning and conducting each phase and periodic maintenance inspection to ensure equipment readiness.

**PRE-PHASE PLANNING**

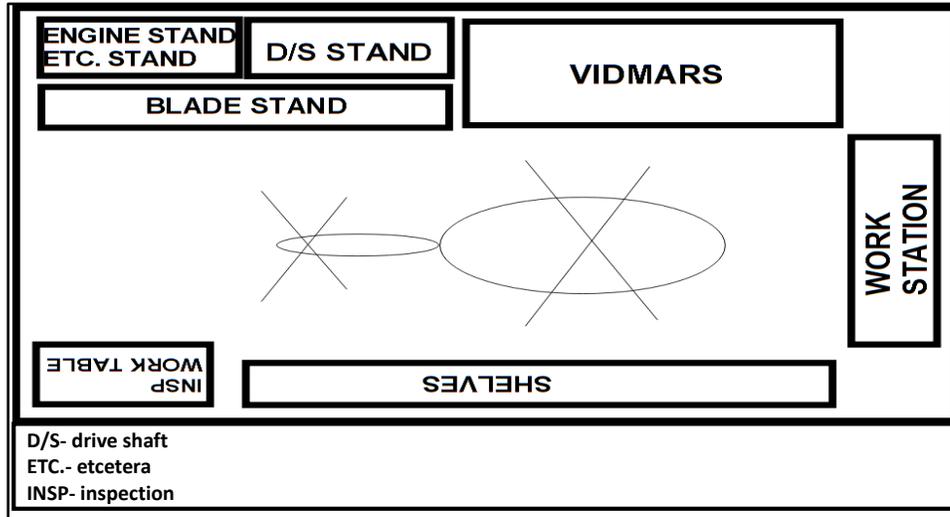
G-6. The aviation maintenance company/troop commander and first sergeant, with assistance from the PC, QC, and maintenance supervisors, carefully select the phase team and then shield them from all other training and administrative requirements. A common technique among successful units is the assignment of the owning unit’s aircraft crew chief or flight engineer as a member of the phase/periodic inspection team. The phase team leader is the overseer of the phase and the most experienced maintainer. The phase/periodic team members consist of a balance of experience as supervised by the phase team leader. The size of each phase/periodic inspection team varies depending on the following:

- Complexity of deferred maintenance.
- Time-change component replacement due.
- Equipment location.
- Facility availability.

G-7. The designated phase team leader, using the P4T3 concept, plans and manages phases/periodic inspections. The unit’s leadership (commander, first sergeant, PC, QC, and maintenance supervisor) assists by providing review and recommendations on the proposed plan prior to the designated phase team leader’s phase/periodic inspection P4T3 brief to the brigade commander. During the initial phase/periodic planning phase, the PC office identifies the location in which the phase/periodic inspection maintenance is scheduled to occur. This allows the phase team leader to begin efficiently organizing the work area in a manner that keeps important repair parts and equipment readily available for use. See figure G-3 for phase/periodic inspection roll call example, and figure G-4, page G-4, for a phase/periodic inspection bay example.

<b>Phase/Periodic Inspection Roll Call</b>	
Brigade Commander or designated representative Commanders (If ASC is the executor, Owning unit and ASC are present) BAMO AMO First Sergeant PC OIC or NCOIC (If ASC is the executor, AMC and ASC are present) QC OIC or NCOIC (If ASC is the executor, AMC and ASC are present) Technical Supply OIC or NCOIC (If ASC is the executor, AMC and ASC area present) Phase team maintenance supervisor Phase team leader Phase team members (all) Phase team designated TI Phase team designated MTP SSA AO (If applicable)	
<b>Agenda/notes</b>	
<p><b>Problem:</b> Team leader clearly identifies the maintenance task.</p> <ul style="list-style-type: none"> <li>● What phase/periodic inspection is being executed?</li> <li>● What additional maintenance actions above the phase will be accomplished that will potentially cause more time to complete the task such as MWOs, fuel cell repairs, 48 month cabin tub inspections?</li> </ul> <p><b>Plan:</b> Team leader implements measures and devices to correct the problem.</p> <ul style="list-style-type: none"> <li>● What unit is performing the phase/periodic inspection?</li> <li>● What maintenance resources are required for the phase/periodic inspection?</li> <li>● What is the phase/periodic inspection work schedule?</li> <li>● Are there any holidays that will disrupt the phase/periodic inspection?</li> </ul> <p><b>People:</b> What is the phase/periodic inspection team’s composition?</p> <ul style="list-style-type: none"> <li>● How many will be on the team for the duration?</li> <li>● What are the MOS specialties are required for the phase/periodic inspection.</li> </ul> <p><b>Parts:</b> What parts have been identified for the phase/periodic inspection?</p> <ul style="list-style-type: none"> <li>● Are there any time before overhaul parts required? If so, what is the status of that part?</li> </ul> <p><b>Time:</b> What is the planned duration for the phase/periodic inspection?</p> <p><b>Tools:</b> Are there enough maintenance stands, lifting devices, ground support equipment? Are the needed TMDE calibrated and on hand at the unit?</p> <p><b>Training:</b> What additional training is required prior to beginning the phase/periodic inspection?</p> <ul style="list-style-type: none"> <li>● What is the experience level of the phase/periodic inspection team?</li> <li>● How will the inexperience be paired with the more experienced maintainer as a training opportunity?</li> </ul> <p>Note 1: Phase/Periodic Inspection brief will following the P4T3 concept as outlined in Chapter 1 and other guidance covered in this publication.</p> <p>Note 2: If the phase/periodic inspection is executed by contracted maintenance support, designated representatives equal to PC, QC, phase team maintenance supervisor, phase team leader, phase team members and designated TI will be present during the P4T3 brief in addition to the identified Army leadership.</p>	
ASC- aviation support company AMC- aviation maintenance company AMO- aviation maintenance officer AO- accountable officer BAMO- brigade aviation maintenance officer MTP- maintenance test pilot MOS- military occupational specialty MWO- modification work order NCOIC- noncommissioned officer-in-charge OIC- officer-in-charge PC- production control P4T3- problem, plan, people, parts, time, tools, and training QC- quality control	SSA- supply support activity TI- technical inspector TMDE- test, measurement and diagnostic equipment

**Figure G-3. Phase/periodic inspection roll call/agenda**



**Figure G-4. Example phase/periodic inspection bay**

G-8. At a minimum, if the aviation maintenance company/troop is facilitating the phase/periodic inspection, the following members are required to attend the phase brief—

- Brigade commander (or designated representative).
- Battalion commander (or designated representative).
- BAMO.
- Battalion AMO.
- Phase team (all maintenance members).
- Company commander (owning unit).
- Company commander (AMC).
- PC OIC (AMC).
- SPO aviation materiel officer.
- Designated TI.
- Designated MTP.
- Owning unit’s aircraft crew chief or flight engineer.
- If conducted by contract, maintenance support supervisor and all maintenance members.

G-9. If the support company is facilitating the phase/periodic inspection, the following members are required to attend the phase brief—

- Brigade commander (or designated representative).
- Battalion commander (or designated representative).
- BAMO.
- Battalion AMO.
- Phase team (all maintenance members).
- Company commander (owning unit).
- Company commander (AMC/ASC).
- PC OIC (AMC/ASC).
- SPO aviation materiel officer.
- Designated TI.
- Designated MTP.
- Owning unit crew chief or flight engineer.
- If conducted by contract, maintenance support supervisor and all maintenance members.

## COORDINATING PHASE/PERIODIC INSPECTIONS

G-10. Internal coordination between PC, QC, shops, technical supply, the aircraft crew chief/flight engineer, and the phase team is crucial to ensure a smooth workflow during a phase inspection. This entails the PC section works closely with QC personnel when preparing inter-shop DA Form 2407 and accompanying forms and records. DA Form 2407, DA Form 2408-13-1, DA Form 2408-13-2, and DA Form 2408-13-3 should specify in detail all work required or inspections to be performed. The following sequence typically applies to a phase/periodic inspection maintenance process (TM 1-1500-328-23):

- Logbook review and phase parts requisition.
- Pre-phase brief.
- Pre-phase MTF.
- Aircraft arrival.
- Forms and records flow.
- Final inspection.
- Post-phase MTF inspection.
- Release of aircraft.

## LOGBOOK REVIEW AND PARTS REQUISITION

G-11. Prior to induction and near the five-percent system hours remaining point, the accepting unit conducts a thorough logbook review of entries, deferrals/delayed entries, and historical data to prepare for induction. This allows supply and management anticipation for components, parts, stock, and special tools.

## PRE-PHASE/PERIODIC INSPECTION MAINTENANCE TEST FLIGHT

G-12. During the pre-phase test flight inspection, maintenance personnel should conduct the following actions:

- Whenever practical, MPs should perform a pre-phase test flight on aircraft scheduled for phase.
- The maintenance and PC officers should review the results to determine the platoon and/or section work assignments.
- All faults discovered during the MTF or MOC event are entered on DA Form 2408-13-1 with the appropriate aircraft status symbol.
- The assigned TI should participate in the test flight when possible.

## AIRCRAFT ARRIVAL

G-13. Upon aircraft arrival at the maintenance facility, the—

- QC personnel and the owning unit crew chief or representative perform a joint DA Form 2408-17 inventory.
- PC accepts the aircraft and logs it on DA Form 2405 (*Maintenance Request Register*).
- PC, along with QC, receives and reviews aircraft forms and records to include DA Form 2407, the aircraft equipment logbook, historical files, and sustainment information system.
- QC personnel conduct a joint aircraft inventory with the supported unit before acceptance is considered complete.

## FORMS AND RECORDS

G-14. When reviewing forms and records, PC and QC personnel conduct the following reviews:

- PC personnel complete DA Form 2407. A copy of the receipt and inventory sheet go to the supported unit representative.
- PC assigns and directs the workflow through the various platoons and/or shops, entering all maintenance requirements on the PC board and sustainment information system.
- As work progresses through the platoons, shops, and sections, QC personnel conduct in-progress inspections.

- QC personnel conduct inspections on inter-shop DA Form 2407 as they are completed, routing them to the PC shop.

## **FINAL INSPECTION**

G-15. Before and during final inspection, the following occurs:

- PC personnel receive and consolidate all documents relating to the aircraft maintenance performed to ensure all required maintenance was completed.
- The phase team NCOIC notifies QC the aircraft is ready for final inspection; the phase team NCOIC provides necessary forms and records. This inspection—
  - In addition to recorded in-progress inspections, ensures thorough, quality maintenance has occurred, and an airworthy aircraft is presented to the owning unit.
  - Verifies inspection plates and panels have been correctly reinstalled and the aircraft has been properly serviced and cleaned.
- QC personnel check forms and records in the aircraft equipment log assembly (records) to ensure all entries are neat, correct, and up to date.

G-16. After final inspection, the following occurs:

- The TI signs DA Form 2407.
- The TI determines whether an MOC or MTF is required according to TM 1-1500-328-23 or appropriate aircraft manuals; if an MOC or MTF is required, PC is notified.
- Maintenance personnel annotate in the aircraft logbook if an MOC or MTF is required.
- Authorized maintenance personnel make appropriate entries in the sustainment information system.

## **POST-PHASE/PERIODIC INSPECTION MAINTENANCE TEST FLIGHT**

G-17. After phase inspection completion, an MTF inspection is conducted—

- During the test flight, a qualified MTP performs the post-phase test flight inspection of the aircraft.
- If the MTP does not release the aircraft after the test flight, he or she makes the required entry on DA Form 2408-13-1. The deficiency or fault is corrected, and another test flight is conducted. This cycle continues until the aircraft test flight is acceptable.
- Maintenance personnel ensure all inventoried equipment is inside and properly stored in the aircraft after the test flight, and then the aircraft is ready for release.
- QC personnel return the completed paperwork, forms, and records to the PC shop.
- PC personnel notify the owning unit the aircraft is ready for delivery.

## **RELEASE OF AIRCRAFT**

G-18. When releasing the aircraft to the owning unit, the following occurs:

- QC personnel and the owning unit crew chief or representative perform a joint DA Form 2408-17.
- The PC clerk enters the Julian date on the form when the aircraft maintenance was completed.
- The owning unit representative completes DA Form 2407, signifying acceptance and delivery of the aircraft.
- Authorized maintenance personnel make appropriate entries in the sustainment information system.

## **DEFERRED MAINTENANCE**

G-19. Aviation maintenance company/troop units often postpone time-consuming repairs until phase. For example, they defer sheet metal repairs that are not critical to flight safety or more extensive repairs such as 48 months cabin tub inspection and fuel cell repairs. While there is no absolute rule as to which deferred or

opportunity-based maintenance task occurs during phase, workload should not over extend the maintenance capability or capacity of the facility requirement nor maintenance team.

## SCHEDULING RESOURCES

G-20. Problems of resource scheduling vary in type and severity depending on METT-TC and the organizational setting. Key resources such as overhead hoists or a test set may bottleneck a phase/periodic inspection execution. Deferred maintenance executed during the phase may require many resources, most of which are available in the limited quantities. Scheduling activities, such as ensuring the necessary TMDE does not exceed its calibration window or ensuring that the people, parts, and equipment are on hand so that resource availability is not exceeded and priorities are not violated is exceedingly difficult for most PM/PE inspections.

G-21. The aviation maintenance company/troop PC officer should make advance arrangements for all required resources for the phase/periodic inspection and deferred/opportunity maintenance requirements. Such resources include MOS specific specialties, facilities, components, required test equipment, MWO/ACE requirements, maintenance engineer calls and GSE. Additional personnel or equipment resources not on hand at the unit should be coordinated with through the supporting support company or other collocated units in the AO. If the support company facilitates the phase/periodic inspection, the responsibility to coordinate resources such as MOS specific specialties, material (parts/components) and maintenance engineer calls resides with the owning unit's aviation maintenance company/troop PC office.

G-22. PC must coordinate any external support required. The best usable technique to use is the P4T3 concept that can assist with capturing, planning and coordinating necessary maintenance requirements. The aviation maintenance company/troop PC office informs the support company PC office of all coordinating efforts required well in advance of the start date. Additionally, the management of the battalion to brigade/ASB phase execution timeline is paramount to the efficient use of resources. Aircraft slippage to the right or left of the phase timeline due to poor flying hour program management, or aircraft hard down over extended periods can hugely impact the ASB's overall maintenance support mission. For instances such as the aforementioned, the aviation maintenance company/troop PC OIC must communicate all potential changes well in advance to the support company PC OIC to allow enough time for needed adjustments.

G-23. An important phase/periodic inspection scheduling requirement is the execution of a pre-phase MTF and pre and post phase joint TI to assist with establishing and solidifying efficient maintenance expectations. The joint aspect of these MTFs and TIs emphasize that both the owing unit and maintenance activity are involved and are synchronized with all efforts.

## MAINTENANCE AND SUPPLY DELAYS

G-24. Delays in completing a maintenance action or requisitioning required material can potentially result in extended periods or phase/periodic inspection delays. Leaders should conduct a thorough review of the phase/periodic inspection maintenance records well in advance to negate potential detrimental disruptions for support to the maneuver commander missions. In the instances that the phase/periodic inspection team experience any not-mission capable maintenance or NMCS conditions, the phase team leader ensures that a detailed tracking system either through the system of record or manually is in place. Figure G-5, page G-8, is an example of a by-date and type of delay.

Not Mission Capable Maintenance and Not Mission Capable Supply Delay Tracker		
DATE	STATUS	ACTION
21-Jan-20		Received tail rotor blade from maintenance company.
22-Jan-20	Delay	Tail rotor blade from aviation support company received with water damage.
23-Jan-20		Horizontal stabilator installed.
23-Jan-20		Engine awaiting paperwork for technical inspector.
23-Jan-20		Nose gearbox awaiting paperwork for technical inspector.
24-Jan-20	Delay	Received 4th tail rotor blade from maintenance company condemned.
24-Jan-20		Engine #1 complete.
24-Jan-20		Engine #2 seals need redoing.
27-Jan-20	Delay	Leak found on ground support equipment utility pressure coupling.
27-Jan-20		Tail rotor blade awaiting quality deficiency report.
27-Jan-20	Delay	Mixer bolts torque requires re-torquing.

Figure G-5. Sample of not mission capable maintenance/NMCS delay tracker

## PHASE MAINTENANCE MATRIX

G-25. A usable tracking resource is the use of a matrix to track and manage daily maintenance challenges or to establish milestones during the phase/periodic inspection process (figure G-6). Actions such as the induction, teardown, inspections, reassembly, rig and power on checks, ground runs, maintenance test flight, post phase maintenance and return to unit start and end dates can be established to keep the phase/periodic inspection on glide path (figure G-7, page G-9).

H-60 (PMI 1) Milestone Tracker Aircraft Tail Number: 718			H-60 (PMI 2) Milestone Tracker Aircraft Tail Number: 662		
TASK	Start Date	End Date	TASK	Start Date	End Date
Induction	02/03/20		Induction	02/03/20	
Teardown	02/03/20	02/11/20	Teardown	02/03/20	02/14/20
Inspections	02/03/20	02/11/20	Inspections	02/03/20	02/14/20
Drag Beam Reinstallation	02/12/20	02/12/20	Stabilator Assembly Reinstallation	02/17/20	02/17/20
Spindles/Blades Reinstallation	02/13/20	02/14/20	Engines Reinstallation	02/18/20	02/18/20
Reassembly/RIG/Power On Checks	02/17/20	02/21/20	Spindles/Blades Reinstallation	02/19/20	02/20/20
Ground Runs	02/24/20	02/25/20	Reassembly/RIG/Power On Checks	02/21/20	03/06/20
MTF	02/26/20	02/27/20	Ground Runs	03/09/20	03/10/20
MTF & Phase Complete	02/28/20	03/03/20	MTF	03/11/20	02/13/20
Post Phase MTF/Maintenance	02/04/20	02/06/20	MTF & Phase Complete	02/13/20	02/13/20
Return to Unit		03/09/20	Post Phase Maintenance/MTF	02/16/20	02/17/20
			Return to Unit		02/18/20

MTF- maintenance test flight      PMI - phase maintenance inspection

Figure G-6. Sample milestone tracker

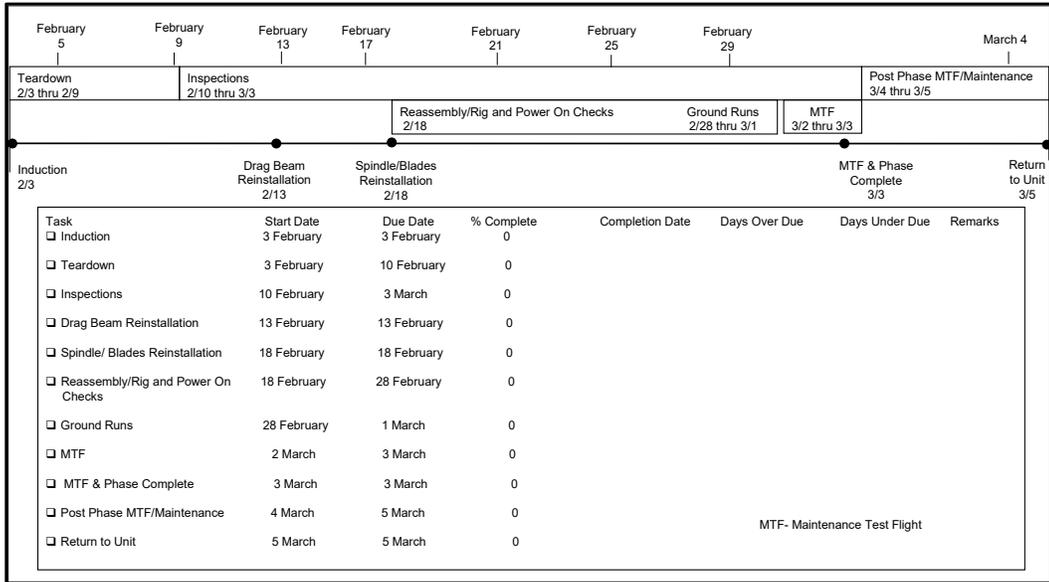


Figure G-7. Example phase progress timeline

## POST-PHASE AFTER ACTION REVIEW

G-26. At the completion of the phase or periodic inspection, the organization facilitating the action conducts a post phase after action review (figure G-8, page G-10). The post-phase AAR documents recommendations for sustained actions, actions requiring improvement, and lessons learned by the phase team during the entire phase/periodic inspection maintenance process. These are documented in a memorandum for record format and filed in the PC office for review during subsequent phase/periodic inspection P4T3 planning processes.

<b>After Action Review Roll Call</b>	
Commanders (If ASC is the executor, Owning unit and ASC are present) BAMO AMO First Sergeant PC OIC or NCOIC (If ASC is the executor, AMC and ASC are present) QC OIC or NCOIC (If ASC is the executor, AMC and ASC are present) Technical Supply OIC or NCOIC (If ASC is the executor, AMC and ASC area present) Phase team maintenance supervisor Phase team leader Phase team members (all) Phase team designated TI Phase team designated MTP SSA AO (If applicable)	
<b>Agenda/notes</b>	
<p><b>Problem:</b> Team leader clearly identifies the maintenance task.</p> <p><b>Plan:</b> Team leader restates the intended corrective measures and devices to correct identified problems for the phase/periodic inspection.</p> <ul style="list-style-type: none"> <li>• Was the phase/periodic inspection executed as planned?</li> <li>• What are three sustains and three improves in this area?</li> </ul> <p><b>People:</b> What is the phase/periodic inspection team's composition?</p> <ul style="list-style-type: none"> <li>• Was the established phase/periodic inspection team composition adequate?</li> <li>• Was there any additional maintainer related resources required and not available?</li> <li>• What are three sustains and three improves in this area?</li> </ul> <p><b>Parts:</b> What sustainment related challenges did the team experience during phase/periodic inspection?</p> <ul style="list-style-type: none"> <li>• Was there any repair part challenges experienced by the phase/periodic inspection team?</li> <li>• What are three sustains and three improves in this area?</li> </ul> <p><b>Time:</b> Was the phase/periodic inspection completed as initially planned?</p> <ul style="list-style-type: none"> <li>• Was there any delays that hindered the execution of the phase/periodic inspection?</li> <li>• What are three sustains and three improves in this area?</li> </ul> <p><b>Tools:</b> Was the necessary tools, equipment and TMDE on hand for the completion of the phase/periodic inspection as initially briefed?</p> <ul style="list-style-type: none"> <li>• Was there and equipment delays that hindered the execution of the phase/periodic inspection?</li> <li>• What are three sustains and three improves in this area?</li> </ul> <p><b>Training:</b> Was there any maintenance training challenges?</p> <ul style="list-style-type: none"> <li>• What are three sustains and three improves in this area?</li> </ul> <p>Note : If the phase/periodic inspection is executed by contracted maintenance support, designated representatives equal to PC, QC, phase team maintenance supervisor, phase team leader, phase team members and designated TI will be present during the P4T3 brief in addition to the identified Army leadership.</p>	
ASC- aviation support company AMC- aviation maintenance company AMO- aviation maintenance officer AO- accountable officer BAMO- brigade aviation maintenance officer MTP- maintenance test pilot MWO- modification work order NCOIC- noncommissioned officer-in-charge OIC- officer-in-charge PC- production control P4T3- problem, plan, people, parts, time, tools, and training QC- quality control	SSA- supply support activity TI- technical inspector TMDE- test, measurement and diagnostic equipment

Figure G-8. Sample after action review attendees

## COMBAT PHASE MAINTENANCE

G-27. The shift from counterinsurgency operations to LSCO presents a particularly challenging situation for aviation unit commanders. This is due to complexities involved with maintaining aircraft at established technical intervals for weeks at a time in a rapidly changing operational environment, such as LSCO. Aviation units are typically split equipment and maintainer wise across multiple locations, usually under extremely high operational tempo conditions. LSCO reignites the necessity for commanders to have the availability of combat phase maintenance options. Combat phase maintenance is an abbreviated phase maintenance inspection, used only during combat or under extreme emergency conditions as outlined in TM 1-1500-328-23 and the aircraft-specific TM. It is important to note that the option to execute a combat phase must be supported by the individual aircraft's technical manual.

# Glossary

## SECTION I – ACRONYMS AND ABBREVIATIONS

<b>AFMD</b>	Aviation and Field Maintenance Directorate
<b>AGPU</b>	aviation ground power unit
<b>AGSE</b>	aviation ground support equipment
<b>AMC</b>	aviation maintenance company
<b>AMCOM</b>	Aviation and Missile Command
<b>AMO</b>	aviation maintenance officer
<b>AMT</b>	aviation maintenance troop
<b>AMTP</b>	Aviation Maintenance Training Program
<b>AOAP</b>	Army oil analysis program
<b>ARMS</b>	aviation resource management survey
<b>ARNG</b>	Army National Guard
<b>ARP</b>	airframe repair platoon
<b>ASAM</b>	aviation safety action message
<b>ASB</b>	aviation support battalion
<b>ASC</b>	aviation support company
<b>ASES</b>	aviation support equipment section
<b>ASL</b>	authorized stockage list
<b>ASO</b>	aviation safety officer
<b>AWR</b>	airworthiness release
<b>BAMO</b>	brigade aviation maintenance officer
<b>BCS3</b>	Battle Command Sustainment Support System
<b>BDAR</b>	battle damage assessment and repair
<b>C2</b>	command and control
<b>CAB</b>	combat aviation brigade
<b>CBRN</b>	chemical, biological, radiological, and nuclear
<b>CCDC</b>	Combat Capabilities Development Command
<b>CECOM</b>	Communications-Electronics Command
<b>CFSR</b>	contractor field service representative
<b>COR</b>	contracting officer representative
<b>COSIS</b>	care of supplies in storage
<b>CPC</b>	corrosion prevention and control
<b>CRP</b>	component repair platoon
<b>CSDP</b>	command supply discipline program
<b>DA</b>	Department of the Army
<b>DA PAM</b>	Department of the Army pamphlet
<b>DLA</b>	Defense Logistics Agency

<b>DLM</b>	Defense Logistics Manual
<b>DOD</b>	Department of Defense
<b>DODI</b>	Department of Defense Instruction
<b>FARP</b>	forward arming and refueling point
<b>FEDLOG</b>	Federal Logistics
<b>FLIS</b>	Federal Logistics Information System
<b>FMT</b>	field maintenance team
<b>FOD</b>	foreign object damage
<b>FORSCOM</b>	Forces Command
<b>FY</b>	fiscal year
<b>GCSS-Army</b>	Global Combat Support System-Army
<b>GSA</b>	General Services Administration
<b>GSE</b>	ground support equipment
<b>HAZCOM</b>	hazardous communication
<b>HAZMAT</b>	hazardous material
<b>HQ</b>	headquarters
<b>HW</b>	hazardous waste
<b>IMRF</b>	instrument master record file
<b>LAP</b>	logistics assistance program
<b>LDAC</b>	Logistics Data Analysis Center
<b>LLRC</b>	long life re-usable container
<b>LOA</b>	letter of authorization
<b>LSCO</b>	large-scale combat operations
<b>MDS</b>	mission design series
<b>ME</b>	maintenance examiner
<b>MEC</b>	maintenance engineering call
<b>METT-TC</b>	mission, enemy, terrain, troops available, time and civilian considerations
<b>MHE</b>	materials handling equipment
<b>MOC</b>	maintenance operational check
<b>MOE</b>	measures of effectiveness
<b>MOPP-4</b>	mission-oriented protective posture-level 4
<b>MOS</b>	military occupational specialty
<b>MRP</b>	material requirements planning
<b>MSC</b>	major support command
<b>MTF</b>	maintenance test flight
<b>MTOE</b>	modified table of organization and equipment
<b>MTP</b>	maintenance test pilot
<b>MWO</b>	modification work order
<b>NCO</b>	noncommissioned officer
<b>NCOIC</b>	noncommissioned officer in charge
<b>NMCS</b>	not mission capable-supply

<b>NMP</b>	national maintenance program
<b>NSN</b>	national stock number
<b>OHR</b>	operational hazard report
<b>OIC</b>	officer in charge
<b>OR</b>	operational readiness
<b>P4T3</b>	problem, plan, people, parts, time, tools, and training
<b>PC</b>	production control
<b>POC</b>	point of contact
<b>POE</b>	port of embarkation
<b>POL</b>	petroleum, oils, and lubricants
<b>PPE</b>	personal protective equipment
<b>QC</b>	quality control
<b>RASM</b>	regional aviation sustainment manager
<b>RIC</b>	routing identifier code
<b>RSOI</b>	reception, staging, onward movement, and integration
<b>RTL</b>	ready-to-launch
<b>SOF</b>	safety-of-flight
<b>SOP</b>	standard operating procedure
<b>SPO</b>	support operations officer
<b>SSA</b>	supply support activity
<b>TASMG</b>	theater aviation sustainment maintenance group
<b>TB</b>	technical bulletin
<b>TDA</b>	table of distribution and allowance
<b>TI</b>	technical inspector
<b>TM</b>	technical manual
<b>TMDE</b>	test, measurement, and diagnostic equipment
<b>TOE</b>	table of organization and equipment
<b>TRADOC</b>	United States Army Training and Doctrine Command
<b>UAS</b>	unmanned aircraft systems
<b>UMO</b>	unit movement officer
<b>UND</b>	urgency of need designator
<b>USAMC</b>	United States Army Materiel Command
<b>USAR</b>	United States Army Reserve
<b>WARCO</b>	warranty control officer

## SECTION II – TERMS

### aerial port

(DOD) An airfield that has been designated for the sustained air movement of personnel and materiel as well as an authorized port for entrance into or departure from the country where located. Also called APORT. See also port of debarkation, port of embarkation. (JP 3-17)

**basic load**

(DOD) The quantity of supplies required to be on hand within, and which can be moved by, a unit or formation. It is expressed according to the wartime organization of the unit or formation and maintained at the prescribed levels (JP 4-09).

**customer wait time**

The total elapsed time between issuance of a customer order and satisfaction of that order. Also called CWT. (JP 4-09)

**large-scale combat operations**

Extensive joint combat operations in terms of scope and size of forces committed, conducted as a campaign aimed at achieving operational and strategic objectives. (ADP 3-0)

**maintenance collection point**

A temporary location established within the battalion echelon for the collection of equipment needing or undergoing field maintenance. (ATP 4-33)

**maneuver**

Employment of forces in the operational area through movement in combination with fires to achieve a position of advantage in respect to the enemy. (JP 3-0)

**materiel**

(DOD) All items necessary to equip, operate, maintain, and support military activities without distinction as to its application for administrative or combat purposes. (JP 3-02)

**measure of effectiveness**

(DOD) An indicator used to measure a current system state, with change indicated by comparing multiple observations over time. Also called MOE. (JP 5-0)

**measure of performance**

(DOD) An indicator used to measure a friendly action that is tied to measuring task accomplishment. Also called MOP. (JP 5-0)

**operational control**

(DOD) The authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Also called OPCON. (JP 1)

**operational environment**

(DOD) A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. Also called OE. (JP 3-0)

**operational reach**

(DOD) The distance and duration across which a joint force can successfully employ military capabilities. (JP 3-0)

**platoon**

A subdivision of a company or troop consisting of two or more squads or sections. (ADP 3-90)

**port of debarkation**

(DOD) The geographic point at which cargo or personnel are discharged. Also called POD. (JP 4-0)

**port of embarkation**

(DOD) The geographic point in a routing scheme from which cargo or personnel depart. Also called POE. See also port of debarkation.

**supply**

(DOD) The procurement, distribution, maintenance while in storage, and salvage of supplies, including the determination of kind and quantity of supplies. a. producer phase—That phase of military supply that extends from determination of procurement schedules to acceptance of finished supplies by the Services. b. consumer phase—That phase of military supply that extends from receipt of finished supplies by the Services through issue for use or consumption. (JP 4-0)

**support operations**

The staff function of planning, coordinating, and synchronizing sustainment in support of units conducting decisive action in an area of operations. (ATP 4-93)

**supply support activity**

Activities assigned a Department of Defense activity address code and that have a supply support mission. Also called SSA. (JP 4-09)

**sustainment**

(DOD) The provision of logistics and personnel services required to maintain and prolong operations until successful mission accomplishment. (JP 3-0) (Army) The provision of logistics, financial management, personnel services, and health service support necessary to maintain operations until successful mission completion. (ADP 4-0)

**sustainment maintenance**

Off -system component repair and/or end item repair and return to the supply system or by exception to the owning unit, performed by national level maintenance providers. (FM 4-30)

**two-level maintenance**

Tiered maintenance system comprised of field and sustainment maintenance. (FM 4-30)

**unmanned aircraft systems**

(DOD) That system whose components include the necessary equipment, network, and personnel to control an unmanned aircraft. Also called UAS. (JP 3-30)

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### DEPARTMENT OF THE ARMY FORMS

DA Form 1687. *Notice of Delegation of Authority-Receipt for Supplies.*  
DA Form 2028. *Recommended Changes to Publications and Blank Forms.*  
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DA Form 2064. *Document Register for Supply Actions.*  
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AMCOM Logistic Center: <https://amcom2028.redstone.army.mil>  
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**20 October 2020**

By Order of the Secretary of the Army:

**JAMES C. MCCONVILLE**  
*General, United States Army*  
*Chief of Staff*

Official:



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