ATP 3-04.13

Helicopter and Small Aircraft Battle Damage Assessment, Repair, and Recovery

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Contents

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Preface

ATP 3-04.13 describes techniques for aircraft damage assessment, repair, and recovery in all types of Army operations.

The primary audience for ATP 3-04.13 is battalion and company commanders and leaders in aviation battalions, aviation maintenance companies (AMCs), aviation support companies (ASCs), forward support companies (FSCs), and theater aviation support maintenance groups (TASM-Gs). The audience also includes instructors in the institutional training domain, and observer coaches in the operational training domain.

Commanders, staffs, and subordinates must ensure that their decisions and actions comply with applicable United States, international, and in some cases host-nation laws and regulations. Commanders at all levels will ensure that their Soldiers operate according to the Law of Armed Conflict and applicable rules of engagement. (See FM 6-27/MCTP 11-10C.)

ATP 3-04.13 uses joint terms where applicable. Selected joint and Army term definitions appear in both the glossary and the text. For definitions shown in the text, the term is italicized, and the nomenclature of the proponent publication follows the definition. This publication is not the proponent for any Army terms.

The proponent of ATP 3-04.13 is the United States Army Aviation Center of Excellence (USAACE). The preparing agency is the Directorate of Training and Doctrine (DOTD), USAACE. Send comments and recommendations on Department of the Army (DA) Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Director, DOTD, ATTN: ATZQ-TD, 2218 6TH Avenue, Fort Rucker, AL 36362; or by e-mail to usarmy.rucker.avncoe.mbx.doctrine-branch@mail.mil.

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Introduction

ATP 3-04.13 describes techniques for conducting and performing battle damage assessment (BDA), repairing, and recovering helicopters and small aircraft in all types of Army operations.

BDA, repair, and recovery are small unit actions at the tactical level of warfare. They are sustainment and support actions intended to preserve combat power.

Aircraft recovery may occur in any circumstances. Recovery in decisive action is the greatest challenge. This publication is primarily written for decisive action. This revision includes techniques for recovery in a peer threat environment, and command and control techniques for recovery across the operational framework.

ATP 3-04.13 focuses on techniques used by the leaders of field maintenance teams and downed aircraft recovery teams (DARTs). It does not provide standards of repair or repair procedures. It provides techniques for collective training and execution, and directs the reader to technical manuals (TMs) in many cases. This book does not take precedence over any procedure published in a TM.

In large scale combat operations (LSCO), aircrews may be forced to continue to fly an aircraft away from an enemy force despite battle damage. Aircrews attempt to return damaged aircraft to maintenance collection points to reduce the need for recovery operations.

ATP 3-04.13 contains three chapters and three appendices:

- Chapter 1 provides an overview of relevant terms and describes techniques for task organizing companies and platoons into teams to repair and recover aircraft.
- Chapter 2 describes how to plan, prepare, and execute aircraft repair for a division or corps operation.
- Chapter 3 describes techniques for training and executing aircraft recovery for a task-organized team.
- The appendices provide examples and describe resources for leaders and staff.

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Chapter 1

Overview, Organization, and Conflict Continuum

Aircraft recovery and repair are the most complex missions that units conducting field maintenance face. In peer-threat environments, these missions occur regularly and must be well planned and executed to preserve combat power.

When an Army aircraft experiences damage during battle, experiences a materiel failure, or suffers from an accident, field maintenance teams act quickly to return the aircraft to service.

SECTION I – OVERVIEW

1-1. This section describes common terms and provides the aviation-specific perspective for those terms.

BATTLE DAMAGE ASSESSMENT

1-2. *Battle damage assessment* is the estimate of damage composed of physical and functional damage assessment, as well as target system assessment, resulting from the application of lethal or nonlethal military force (JP 3-0). An aircrew may experience damage and land to perform a battle damage assessment (BDA). Depending on the assessment, the mission will then continue. The crew may also decide to fly to a maintenance collection point (MCP) or determine that the aircraft is not safe to fly.

1-3. BDA regularly occurs in conjunction with recovery and repair activities. Information gained in a BDA may aid in the recovery process. All aircrews are trained in BDA for their aircraft. Aviation mission survivability officers (AMSOs) are formally trained in BDA. Other personnel are trained in BDA based on the unit training plan. For more information on BDA and reporting, see TC 3-04.9.

BATTLE DAMAGE REPAIR

1-4. A repair can be performed according to published technical standards using two methods. One method is a normal repair that follows all airworthiness requirements, and has no further effect on aircraft performance. The second method is battle damage repair (BDR). Per JP 4-09, *battle damage repair* is essential repair, which may be improvised, carried out rapidly in a hostile environment in order to return damaged, or disabled equipment to service. BDR follows a more rapid or abbreviated process designed to allow the aircraft to fly for a limited duration.

1-5. When a crewmember performs unscheduled maintenance in order to return an aircraft to service, it is a repair. Crewmembers may perform normal repairs or BDR. A team of maintainers may be necessary for repair work. These are field maintenance teams. See ATP 3-04.7 or ATP 4-33 for more information about field maintenance teams.

1-6. Specific technical instructions for aircraft BDR are provided in technical manuals ending in the letters BD. The following are BDR books for common helicopters:

- TM 1-1520-237-BD.
- TM 1-1520-240-BD.
- TM 1-1520-251-BD.

RECOVERY

1-7. *Recovery* is the action taken to extricate damaged or disabled equipment for return to friendly control or repair at another location (JP 3-34).

1-8. Modern aircraft generally do not perform self-recovery or like-recovery as described in ATP 4-31. All aircraft recovery operations require dedicated recovery forces. Usually, these field-maintenance teams are referred to as DARTs.

PERSONNEL RECOVERY

1-9. *Personnel recovery* is the sum of military, diplomatic, and civil efforts to prepare for and execute the recovery and reintegration of isolated personnel (JP 3-50).

1-10. Personnel recovery (PR) and aircraft recovery are two independent tasks. Many aircraft operate with crew and passengers. When an aircraft is down on the battlefield, PR is a priority over aircraft recovery.

1-11. When mission considerations allow, aircraft and PR may occur simultaneously. Dedicated PR forces may or may not assist with aircraft recovery. These considerations are analyzed in the planning and preparation phases of an operation.

1-12. For more information on PR, see FM 3-50.

MORTUARY AFFAIRS

1-13. This is not a mortuary affairs techniques publication; however, downed aircraft are likely to result in deceased aircrew and passengers. Mortuary affairs specialists may be members of DARTs. See ATP 4-46 for information on mortuary affairs.

ACCIDENT INVESTIGATION BOARD

1-14. During large-scale combat, the commander and staff publish clear guidance on preserving or not preserving accident sites prior to beginning an operation. This allows rapid, decentralized execution for recovery and repair of damaged aircraft.

1-15. The Army has detailed procedures for investigating aircraft accidents. Aircraft repair and recovery teams do not begin work or disturb the site of an aircraft accident until the commander has released the aircraft from investigation. For more information on aircraft accident investigations, see AR 385-10.

DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

1-16. In some cases aircraft are so severely damaged it is not worth the risk of recovery. In peer-threat environments, the tactical risk of recovery may outweigh the value of the aircraft. In both situations, the appropriate commander may decide to destroy the aircraft or systems on the aircraft to prevent enemy use or enemy intelligence collection. See AR 735-5 for administrative procedures for property loss in combat.

1-17. Technical manuals prescribe methods to destroy materiel to prevent enemy use. See operator's manuals and TM 750-244-1-5.

CANNIBALIZATION

1-18. Cannibalization is a potential source of supply, particularly in large-scale combat. Cannibalized aircraft parts are processed according to AR 710-2.

1-19. Aircraft recovery may include moving a severely damaged aircraft to a cannibalization point, established by a supply support activity.

SALVAGE

1-20. *Salvage* is property that has some value in excess of its basic material content but is in such condition that it has no reasonable prospect of use for any purpose as a unit and its repair or rehabilitation for use as a unit is clearly impractical (JP 4-0).

1-21. Aircraft and aircraft components recovered to a cannibalization point may become salvage depending on condition.

DECONTAMINATION OF AIRCRAFT

1-22. Decontamination of aircraft after a chemical, biological, radiological, or nuclear (CBRN) exposure is a consideration for repair and recovery of aircraft. See ATP 3-11.41/MCRP 3-37.2C/NTTP 3-11.24/AFTTP 3-2.37 for more techniques on consequence management.

1-23. Technical manuals for aircraft prescribe or prohibit specific chemicals for decontamination and describe specific instructions for use in decontamination.

FLIGHTS UNDER OPERATIONAL EMERGENCIES

1-24. In operational emergencies, commanders and aircrews may be forced to balance the risk of aircraft material failure against other risk. Operational emergencies include combat and enemy action and environmental emergencies where weather or other environmental factors require flight to evacuate aviation systems, personnel, or essential equipment.

1-25. The technical requirements for executing these procedures are published in TM 1-1500-328-23. Requirements for recording these actions are published in DA PAM 738-751.

INFORMATION SYSTEMS FOR AIRCRAFT MAINTENANCE

1-26. Aircraft airworthiness is highly dependent on records keeping. Information systems are replacing paper copies of aircraft maintenance records. A significant challenge for aviation units in the large-scale combat operations environment is keeping records for maintenance actions.

1-27. Commanders and leaders anticipating operating without information systems, train to operate without information systems. This is a risk-based decision and all mission variables are relevant. A recovery team operating in large-scale combat is not likely to stop movement to make entries in an aircraft logbook. However, it is important to understand what maintenance actions already occurred, and what actions still need to occur to make damaged aircraft safe to fly again. AR 750-1 describes the requirements for materiel records and reports, and waiver authorities. DA PAM 738-751 describes aircraft logbook forms and records, and waiver authorities.

AIRCRAFT RECOVERY SUPPORT IN THE CONTINENTAL UNITED STATES

1-28. Aviation brigades use their own resources to conduct aircraft recovery in the continental United States. An aircraft downed in a training environment is a collective training opportunity. Organizations repairing damage to aircraft in training environments must also follow procedures outlined in TB 43-0002-3.

1-29. Units may arrange for support from the Aviation and Missile Command Field Maintenance Directorate. The brigade aviation maintenance officer arranges support well in advance of potential need. See more information about Directorate and regional aviation field-maintenance support in ATP 3-04.7.

SECTION II – TASK ORGANIZATION

1-30. Aviation maintenance organizations are described in ATP 3-04.7. This section describes information specific to recovery, and for task organizing recovery teams.

AVIATION BRIGADE STAFF

1-31. The aviation brigade staff maintain running estimates as described in FM 6-0. Estimates relevant to aircraft recovery and BDR include, but are not limited to—

- Subordinate and adjacent unit-aircraft status.
- Subordinate and adjacent unit-recovery vehicle status.
- Subordinate and adjacent unit-recovery team status.
- Locations and status of subordinate headquarters companies, AMCs, ACSs, and FSCs.
- Locations and status of forward arming and refueling points (FARPs), cannibalization points, and MCPs.
- Locations and status of adjacent support forces.
- Locations and status of enemy forces.

1-32. The brigade commander directs subordinate units to conduct recovery operations based on these running estimates. Operations orders describe the tasks to subordinate units, including aircraft recovery.

1-33. In a division or corps operation, the aircraft recovery task may be distributed to multiple subordinate units. The geographic locations of downed aircraft may be a more important factor than the owning unit in deciding who performs recovery.

1-34. The brigade may tailor subordinate forces by creating an aircraft recovery task force.

1-35. All helicopter battalions train and execute BDR and aircraft recovery. The aviation support battalion (ASB) has the greatest capability to conduct aircraft recovery. The general support aviation battalion is the only aviation battalion that can recover aircraft without task organizing.

AVIATION SUPPORT BATTALION STAFF

1-36. The ASB staff is the primary staff for planning and preparing an aviation brigade to execute aircraft recovery and BDR in all types of operations.

1-37. The ASB is responsible for aircraft recovery for the brigade. It designates helicopter MCPs, and sometimes a cannibalization point for aircraft.

1-38. The ASB is equipped with enough ground vehicles and personnel to execute multiple aircraft recoveries simultaneously. The ASB may use vehicles from all its subordinate companies or from a division support organization to recover aircraft over ground. The ASB coordinates with the general support aviation battalion to recover damaged aircraft by air movement.

1-39. The largest crane in the aviation brigade is rated to lift a maximum of 7 1/2 tons. The support operations section is critical for coordinating support when the need for recovery exceeds the aviation brigade's capability.

1-40. ASB staff use this publication for collective training on aircraft recovery and BDR.

THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

1-41. TASM-G is a theater support force with capabilities like an ASB.

1-42. TASM-Gs use this publication for collective training on aircraft recovery and BDR.

HELICOPTER BATTALION STAFF

1-43. When a helicopter battalion is task organized to deploy without an ASB, it becomes the primary staff for planning and preparing for aircraft recovery and BDR.

1-44. All helicopter battalion staffs use this techniques publication for collective training on aircraft recovery and BDR.

AVIATION SUPPORT COMPANY

1-45. All ASCs execute aircraft recovery and BDR.

1-46. ASCs use this publication for collective training on aircraft recovery and BDR.

AVIATION MAINTENANCE COMPANY

1-47. All AMCs execute aircraft recovery and BDR.

1-48. AMCs use this publication for collective training on aircraft recovery and BDR.

FORWARD SUPPORT COMPANY

1-49. FSCs aviation brigades may play an important role in aircraft recovery.

1-50. FARPs are regularly located with, or near maintenance collection points. Soldiers from FSCs train with ASCs and AMCs to improve the unit posture for protection, distribution, and mobility.

DISTRIBUTION COMPANY

1-51. Distribution companies in combat aviation brigades (CABs) are the only organic companies with trucks and trailers large enough to perform aircraft recovery over ground.

1-52. It is critical for AMCs and ASCs to train with distribution companies to enhance mobility over ground.

PLATOONS, SECTIONS, AND TEAMS

1-53. All platoons and sections that normally do field-level maintenance in aviation brigades may be task organized into teams for recovery or repair.

PRODUCTION CONTROL SECTION

1-54. The production control (PC) section coordinates maintenance and supply actions inside AMCs and ASCs. The PC section maintains an estimate of recovery team strength including the number of teams available in a battalion.

1-55. The PC section is not staffed or equipped to be a command post. The section does not direct or control aircraft recovery. It does not have battlefield information systems, or command authority.

1-56. The PC officer, noncommissioned officer (NCO), or a representative moves to the appropriate command post to help the battle staff with coordination during aircraft recovery.

QUALITY CONTROL SECTION

1-57. The quality control (QC) section is responsible for quality assurance and technical expertise in a battalion.

1-58. NCOs from the QC section normally reorganize with the teams performing BDR or recovery. Their experience and expertise allows for quick decisions about aircraft technical procedures.

DOWNED AIRCRAFT RECOVERY TEAM

1-59. DARTs are task organized from companies, platoons, and sections specifically for aircraft recovery. Recovery teams are tailored to a specific situation, and usually include a security force.

1-60. The team moves to the downed aircraft. Rigs and connects the aircraft for sling load or for loading on a trailer. They may also load parts of an aircraft into containers or cargo nets. The recovery team returns to base or continues to recover another downed aircraft (see chapter 3).

FIELD MAINTENANCE TEAM

1-61. Field maintenance teams are task organized for all types of maintenance. They are typically based in support areas, but may be mobilized to repair downed aircraft forward (see chapter 2).

SECTION III – CONFLICT CONTINUUM

1-62. During competition, preceding LSCO field maintenance teams in all maintenance organizations are working to produce the most combat power possible. Scheduled maintenance is at its highest tempo. AMCs and ASCs work to increase aircraft bank-time and readiness to as close to 100 percent as is practical.

1-63. As competition becomes conflict, aviation brigades and battalions conduct force tailoring and transition the focus of field maintenance organizations to recovery and BDR.

CONDUCT LARGE-SCALE GROUND COMBAT

1-64. Aircraft recovery and repair is conducted by organizations spread out over hundreds of kilometers. Commanders must emphasize the Army tenets of centralized planning and decentralized execution.

1-65. Battalion command posts constantly track aircraft. The command post alerts the correct field-maintenance organization when an aircraft is damaged or down. The nearest recovery team may be from a different battalion or even a different brigade. Appendix A provides an example of a command post battle drill.

1-66. The commander with the most information is forced to make difficult decisions about aircraft in terms of combat power. In a peer-threat environment, the battalion staff has war-gamed decision points for—

- Executing recovery for repair or cannibalization.
- Delaying recovery until the forward line of troops moves or the tactical situation improves.
- Destroying downed aircraft to prevent enemy use.

1-67. The command post supporting one or more recovery teams tracks aircraft recovery progress until all aircraft are recovered or the mission is complete. The command post also supports the recovery team with passage of lines and adjacent unit coordination.

1-68. Operational readiness floats are used to preserve combat power when helicopter battalions' equipment readiness does not meet the operational need. The aviation support battalion maintains operational readiness floats as necessary.

CONSOLIDATE GAINS

1-69. In the transition to consolidating gains, field maintenance organizations refocus and reorganize to scheduled maintenance while continuing to repair battle damage. The goal is to produce combat power for the next decisive action.

1-70. Some aircraft that were repaired using BDR criteria are now fully repaired using normal repair criteria. The decision to fully repair aircraft is a risk-decision based on mission variables and airworthiness standards.

STABILITY IN OPERATIONS

1-71. When aviation brigades transition to stability tasks, the maintenance program becomes predictable again. The focus is on maintaining readiness through scheduled maintenance and unscheduled repair work.

1-72. All aircraft that were repaired using BDR criteria are fully repaired using normal repair criteria. In some cases, this requires transferring the aircraft to sustainment-level for repair. To maintain combat power, repair cycle float aircraft replace damaged aircraft in theater. See AR 750-1.

1-73. Commanders in the field do not make decisions about airworthiness in stability operations. Higher authorities, backed by engineers and other experts, when the accidental risk outweighs the tactical and operational risk, make these decisions.

Chapter 2

Battle Damage Repair

This chapter helps prepare task-organized field maintenance teams to repair aircraft at MCPs.

Mobile field maintenance teams may use BDR techniques to recover downed aircraft. Techniques from this chapter complement chapter 3 and vice versa.

Reduced downtime is only achieved if BDR procedures are performed rapidly. AMCs and ASCs frequently train for BDR to enhance readiness.

SECTION I – PLAN

2-1. BDR may occur anywhere; however, repairs are not likely to occur in the close area or any area contested by a peer threat. Aircraft may be down for hours or even days to complete repair work.

2-2. Minor repairs sometimes work to get an aircraft back into the fight quickly. When able, field maintenance teams repair aircraft at refueling and rearming points.

2-3. Planning for BDR is like planning for normal aircraft repair. Aviation maintainers follow the problem, plan, people, parts, time, tools, and training (P4T3) model described in ATP 3-04.7.

2-4. Planning for the parts needed for repairing aircraft with battle damage is slightly different from planning for normal repair parts. There are many different repair kits available and listed by aircraft type in technical manuals for BDR. Field maintenance teams resource and train with these kits prior to decisive action.

RECEIVE THE MISSION

2-5. Upon receipt of the mission, field maintenance teams are task organized from AMCs and ASCs. The team members are experts at repairing aircraft.

ISSUE ORDERS

2-6. Written standard operating procedures (SOPs), operations orders, and fragmentary orders serve as the record of planning and decisions for all tasks and missions. When there is no time for planning, SOPs are followed to prepare and execute.

2-7. Part of building a team to repair battle damage is developing SOPs. One way unit leaders assess training is by reviewing SOPs.

CONCEPT OF SUPPORT

2-8. The concept of support includes details describing where MCPs are located or will be located in the future. It also describes which organization is responsible for each collection point.

2-9. Details include how many field maintenance teams are available, where each team is located, and how they are equipped. This information helps get damaged aircraft to the best location for repair.

PLANNING FOR AIRCRAFT DISPOSITION

2-10. Typically, United States Army Aviation and Missile Command provides disposition instructions for severely damaged aircraft. The owning unit coordinates with the fleet manager from the program management office, liaison engineers, and field-level maintenance support units.

2-11. In LSCO, unit commanders and maintenance officers assess aircraft and determine the best course of action. Aircraft may be repaired using normal repair procedures or BDR procedures.

2-12. Commanders make decisions about aircraft disposition before the operation begins. A good technique is to segregate or triage aircraft by estimating how much time is required for repairs. Maintenance allocation charts in technical manuals provide the time required to complete repair work. TB 43-0002-3 provides the technical standards for estimating the cost of damage and determining if the aircraft should be repaired.

2-13. Based on the time required for repair, the recovery team moves the aircraft to the appropriate maintenance collection point. At MCPs in the close area, teams only perform repairs that can be completed in minutes. In the consolidation area, AMCs and ASCs collect aircraft requiring repairs that may take hours or days (figure 2-1).

2-14. In figure 2-1, the TASM-G collects damaged aircraft that require long duration repairs. The TASM-G may spend weeks performing field and sustainment level repair on aircraft. The TASM-G or contract maintainers are usually responsible for intra-theater aircraft intermodal movement.

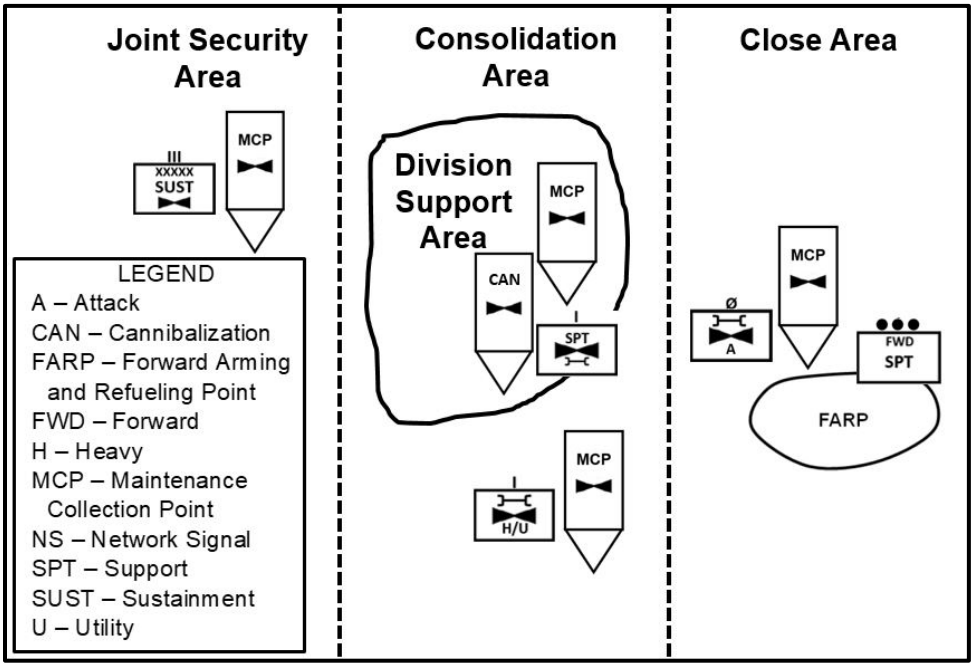

Figure 2-1. Planning for maintenance collection points for aircraft

SECTION II – PREPARE

2-15. The preparation phase for aircraft repair is like other tasks. Training, equipment checks, and rehearsals are necessary for successful execution.

TRAINING FOR BATTLE DAMAGE REPAIR

2-16. Training for BDR occurs at home station, at training centers, and in theaters of operation. The general requirements for airworthiness prohibit Soldiers from regularly performing BDR on aircraft. Units must deliberately plan for and train BDR to gain proficiency. Developing NCOs to lead field maintenance teams is key to success.

2-17. A technique for training field maintenance teams at home station is to organize the team to work together on actual unscheduled aircraft maintenance. The team assesses aircraft faults or damage and rehearses BDR prior to performing the normal repair work. The team gets exposure to BDR, and the aircraft remains airworthy with only a minor delay in repair work (figure 2-2).

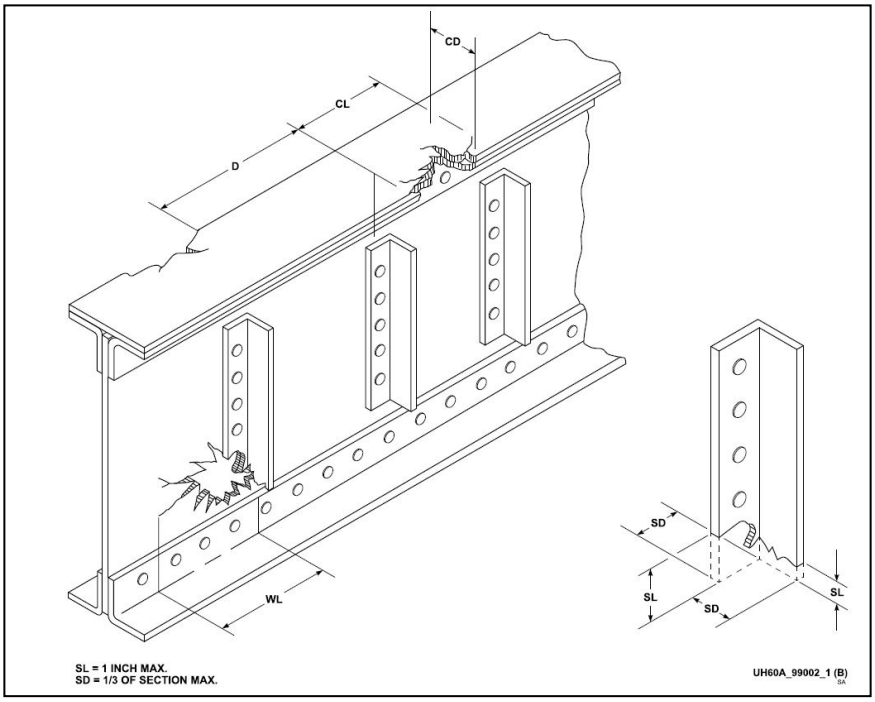

Figure 2-2. Inspecting damage to aircraft airframe

EQUIPMENT AND PRECOMBAT CHECKS

2-18. Part of preparation for BDR includes precombat checks. Checks are equally important on weapons, vehicles, tools, and special tools. Checks also include inspecting repair parts for serviceability. Before an operation begins, containers and kits with repair parts and tools are opened and checked.

2-19. The special equipment used for BDR is described in technical manuals. See appendix C for examples of special equipment.

RISK MANAGEMENT

2-20. Risk management is embedded in Army culture and is part of troop leading procedures. See ATP 5-19 for techniques and risk-based decision-making.

IMPLEMENT CONTROLS

2-21. Leaders identify and assess hazards, then develop and implement controls to prevent injury to personnel and to prevent additional damage to equipment.

ENVIRONMENTAL CONSIDERATIONS

2-22. Leaders assess environmental considerations for fuel, ammunition, or other harmful or dangerous elements in or on damaged aircraft. Technical manuals for each aircraft provide information on materials that may cause injury to personnel and environmental hazards.

SECTION III – EXECUTE

2-23. Field maintenance teams execute BDR in widely varied circumstances influenced by mission variables. Typically, teams repair aircraft at MCPs. Sometimes teams move to aircraft and repair them at unprepared sites.

MAINTENANCE COLLECTION POINTS

2-24. Damaged aircraft are flown, trucked, or moved as a sling-load into MCPs.

2-25. Aircraft MCPs differ slightly from ground vehicle collection points. Figure 2-3 is an example of a maintenance company footprint and MCP for ground vehicles from ATP 4-33.

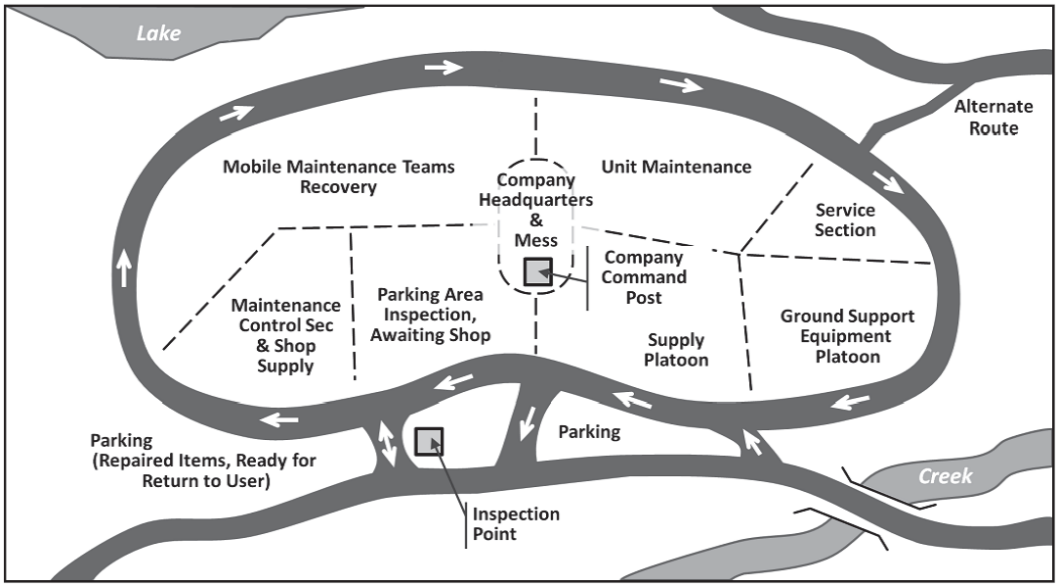

Figure 2-3. Maintenance collection point

2-26. Some of the differences between typical MCPs and helicopter MCPs include—

- A landing zone.
- An area to receive sling-load cargo with heavy rotor downwash.
- An area to safely handle aircraft with rocket and missile armament.
- Room for fuel trucks to remove or add fuel from aircraft before and after repair work.

2-27. An MCP is an assembly area for an AMC or ASC. Figure 2-4, page 2-5, depicts a typical helicopter MCP.

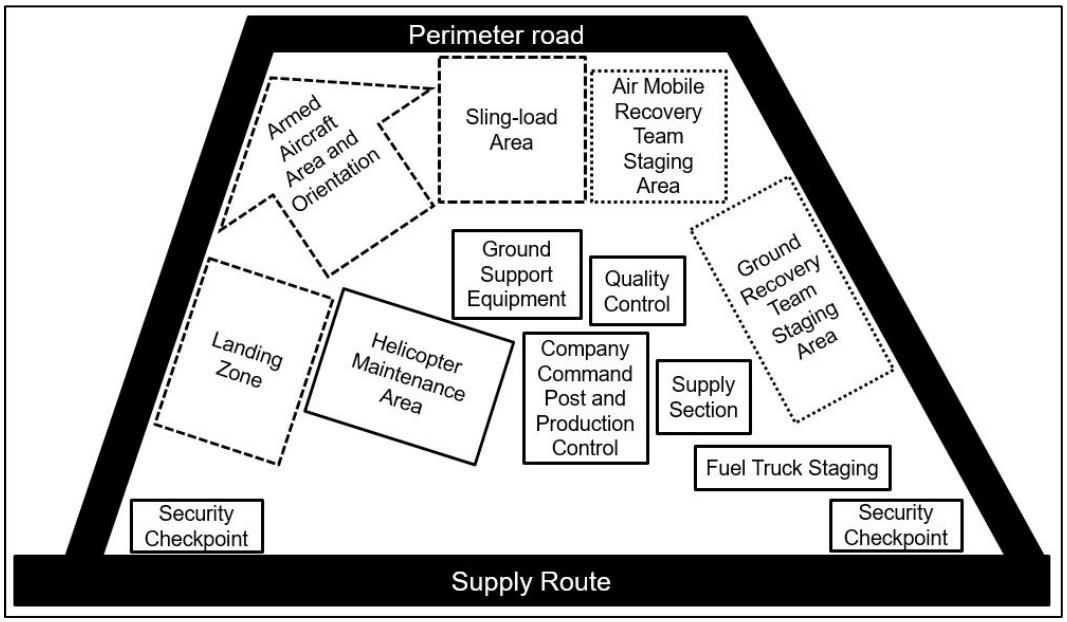

Figure 2-4. Helicopter maintenance collection point

2-28. The terrain may allow an ASC/AMC to set up on an improved surface. The advantages of operating a MCP from improved surfaces are like any landing zone. They include—

- Landing and takeoff without degraded visibility.
- Preventing landing gear mire and dynamic rollover during takeoff and landing.
- The ability to move a damaged aircraft by towing.

2-29. Once aircraft are repaired, aircrews move them out of the MCP to reduce the footprint and improve traffic flow.

2-30. Repair teams plan to use information systems at MCPs. Repair teams may use paper copies of maintenance records when approved by the commander. After decisive actions, aircraft records are corrected and entered into information systems at the first opportunity.

MOBILE FIELD MAINTENANCE

2-31. Mobilizing field maintenance teams for aircraft repair is difficult and time consuming. Aircraft parts, special tools, and ground support equipment are hard to move. They are usually only available in limited supply. The need for special tools is also hard to predict.

2-32. A mobilized field maintenance team executes like a DART (see chapter 3).

2-34. Field maintenance teams are readily mobile over short distances. Helicopter battalions typically park aircraft within a few kilometers of maintenance collection points (figure 2-5).

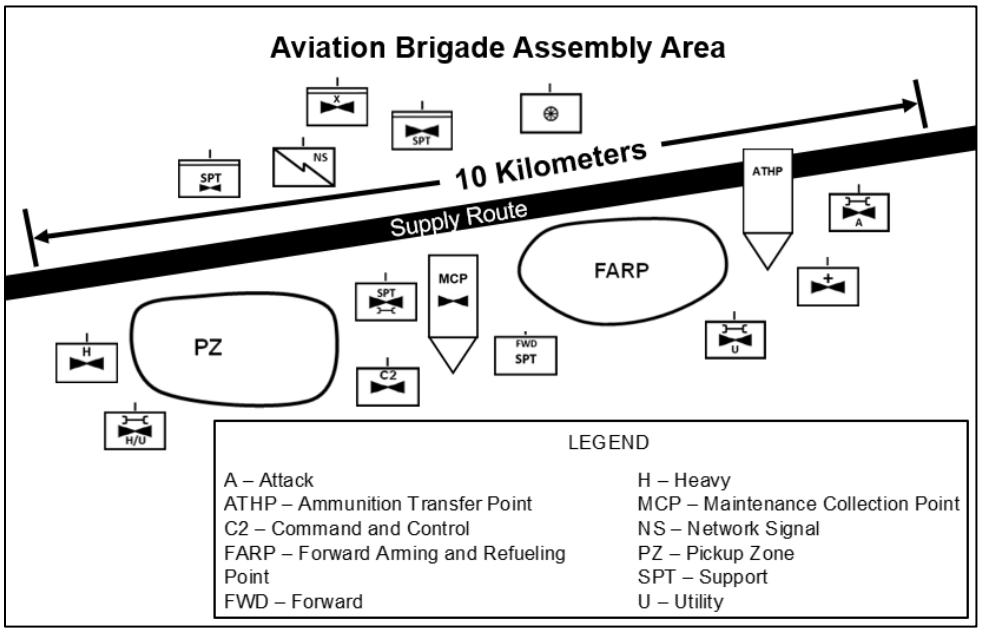

Figure 2-5. Helicopter maintenance collection point in a brigade assembly area

THREAT AND SECURITY CONSIDERATIONS

2-35. Field maintenance teams perform BDR in the consolidation area. They rely on the division wide area defense plan, small arms, and a few truck mounted weapon systems.

2-36. Commanders plan helicopter MCPs in the support area, consolidation area, or in the joint security area.

2-37. Field maintenance teams typically cannot provide for their own security with organic members.

ASSESSING BATTLE DAMAGE REPAIR

2-38. Assessment is part of all operations and tasks. ADP 5-0 describes the fundamentals of assessment.

2-39. Assessing a task at this level is like preparing for the task. Additionally, staff and teams record new or revised information in SOPs or battle drills. The recovery team—

- Performs before and after checks (precombat checks) on equipment using technical manuals.
- Prepares the team to rapidly mobilize again by loading ammo, rations, and other supplies.
- Leaders receive direct feedback from team members.
- Leaders provide direct feedback to commanders and staff.
- Leaders update the SOP or request changes to the operations order.
- Commanders and staff send lessons learned to the Center for Army Lessons Learned or to the proponent for this book (see Preface).

Chapter 3
Recovery Operations

Aircraft are recovered by ground or air to MCPs for security, and ease of maintenance. Recovery allows field maintenance organizations to consolidate people, damaged aircraft, tools, and parts increasing the capability to repair aircraft.

These techniques for aircraft recovery are focused on the division close area and consolidation area in LSCO.

SECTION I – PLAN

3-1. Every time an aircraft flies a mission, the owning unit has a plan for recovery. Field maintenance organizations are not surprised by downed aircraft. Battalion staffs plan for aircraft recovery as a common planning consideration, see ATP 3-04.1. The plan is recorded in the sustainment annex of operations orders, see FM 6-0.

3-2. Recovery is planned by battalion staffs, and battalions help prepare companies and echelons below the company to execute recovery. Leaders in recovery actions are familiar with troop leading procedures and with the aviation maintenance model—P4T3. FM 6-0 covers troop leading procedures in detail; ATP 3-04.7 provides more information on the aviation maintenance model.

3-3. Aviation brigades plan to recover all aircraft. The recovery plan merges with the BDR plan when determining where to collect aircraft for maintenance, for cannibalization, and for salvage (see chapter 2).

3-4. The aviation support battalion's support operations section plans for additional ground recovery equipment such as cranes, large trucks, and trailers. They also coordinate with other sustainment organizations prior to decisive actions.

RECEIVE THE MISSION

3-5. A company commander in a maintenance or support company receives the mission to recover downed aircraft, and delegates the direct-leader role to a platoon leader. Recovery teams are usually made up of technical experts in aircraft repair. They must also be able to meet the enemy in an ambush at a downed aircraft site. Recovery is a tactical action. In large-scale combat, it is more likely an officer will be in charge of more than one recovery team operating in support of a decisive operation.

3-6. Building a DART begins by force tailoring. The teams are task organized from AMCs, ASCs, FSCs, distribution companies, helicopter companies, rifle platoons, and other organizations depending on mission variables and available forces.

3-7. Recovery teams are task organized from any available personnel in the battalion or brigade. There is no required military occupational specialty (MOS) for aircraft recovery. The list below describes the most likely team members:

- Recovery team leader (usually MOS qualified on the downed aircraft).
- Convoy commander.
- NCO in charge of protection and security.
- NCO in charge of rigging downed aircraft (usually MOS qualified on the downed aircraft).
- At least three additional Soldiers for rigging (usually MOS qualified on the downed aircraft).
- Additional Soldiers for drivers, security, and others as necessary.

3-8. The team may include Soldiers with the following specialties:

- Communications specialist-trained in over-the-horizon communications.
- Combat medic specialist-trained for medical service.
- Petroleum specialists-trained to handle aircraft fuel.
- Armament specialists-trained to safe aircraft armament systems.
- Chemical, biological, radiological, or nuclear specialist-trained in decontamination.
- Mortuary affairs specialist-trained to handle human remains.
- Safety officer or NCO-trained for accident investigation.
- AMSO-trained in shoot-down investigation.
- Others, depending on forces available.

DOWNED AIRCRAFT RECOVERY TEAM TRAINING

3-9. Individual critical tasks from several different MOSs support the collective task to perform aircraft recovery. The members of recovery teams are trained to perform in combat, see TC 3-21.75. They also train to perform technical tasks related to their MOS using individual critical tasks lists, see TC 3-04.71.

3-10. Developing NCOs to lead field maintenance teams is key to success. Training for recovery occurs at home station, at training centers, and in theaters of operation. Members of the recovery team benefit from the air assault course, pathfinder course, and other Army schools or courses.

3-11. Training literature is an important resource for training leaders. Specific reference publications appear throughout this publication, and in the references section. The bullets below are intended to help describe the relationship between technical manuals and other training literature:

- Field manuals to describe broader Army concepts, such as how to train Soldiers in FM 7-0.
- Techniques publications to describe how to apply a broader concept to a specific task, such as how to train teams to recover aircraft in ATP 3-04.13.
- Training circulars used to teach individual skills, such as aircraft maintenance in TC 3-04.71.
- Technical manuals to describe specific equipment, such as the unit maintenance aerial recovery kit in TM 1-1670-260-12&P.

ISSUE A WARNING ORDER

3-12. The brigade or battalion staff writes specific instructions for anticipated scenarios during the planning phase. These instructions may be standing procedures or specific to an operation.

OPERATIONS ORDER

3-13. The operations order or fragmentary orders include air and ground routes, MCPs, cannibalization points, and decontamination points.

3-14. The drivers and aircrews for recovery teams learn the ground and air routes used to recover aircraft. The teams use maps, overlays, and battlefield information systems to learn and understand the terrain, and other mission variables where they operate. Satellite imagery is another common source of information for planning. It provides information on terrain, vegetation, hydrology, manmade features, and obstacles.

3-15. The operations order and concept of support also describe details for success criteria, CBRN contaminated aircraft, aircraft accident investigation, aircraft destruction criteria, and methods of mobility for aircraft recovery teams.

3-16. The most likely success criteria for a recovery team is returning an aircraft to a MCP. Other success criteria include returning an aircraft to a cannibalization point, returning an aircraft for salvage, and preventing enemy use of a downed aircraft.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, OR NUCLEAR CONTAMINATED AIRCRAFT

3-17. A contaminated aircraft is returned to a predetermined location for decontamination. A decontamination point may be located near a MCP. The plan also includes procedures for moving aircraft from decontamination, to maintenance, and back into the fight.

ACCIDENT INVESTIGATION CRITERIA

3-18. The recovery team leaders receive specific instructions from the commander about how the team will handle accident investigations in the planning phase.

3-19. Recovery teams do not delay aircraft recovery for an accident investigation in large-scale combat. Priorities change as the conflict continuum changes. There are times when the accident investigation is more important, and there are times when recovery is more important. The commander and staff publish clear orders in the planning phase.

AIRCRAFT DESTRUCTION CRITERIA

3-20. Recovery teams only destroy aircraft or aircraft systems when there is no other reasonable option. For Army property accountability procedures, including approval authority for destruction of property, see AR 735-5.

3-21. The members of recovery teams understand the aircraft systems well enough to destroy the systems to prevent enemy use. Team leaders and the members of recovery teams are familiar with TM 750-244-1-5.

3-22. Aircrews are more likely to destroy aircraft, or aircraft components to prevent enemy use. They assess this option after a forced landing or crash in close combat. Aircrews are familiar with procedures for destroying aircraft and onboard systems.

MOBILITY

3-23. A tenet of recovery is the mobility of the recovery team; they move by ground or air. All mission variables are relevant to the decision to move by ground or move by air.

3-24. The aviation support battalion typically provides vehicles for ground recovery. Some considerations for moving the team over ground are as follows:

- Vehicle limitations.
  - Length.
  - Width.
  - Gross weight.
- Obstacles for an aircraft on a trailer.
  - Bridges.
  - Overhead utilities.
  - Tunnels.
  - Twisting or poorly maintained roads.
- Vehicle access to the downed aircraft in poor terrain, like a swamp or rocky cliffs.
- Ground route availability and security.
- Other unit and other traffic priorities for ground routes.
- Downed aircraft configuration or damage that inhibits loading.
- Weather conditions effecting mobility over ground.

3-25. The general support aviation battalion typically provides air movement support to a recovery team. Some considerations for air movements are as follows:

- Aircraft availability and cargo/weight capacity.
- Air route security.
- Downed aircraft configuration or damage that inhibits sling-load.

- Weather and environmental conditions effecting air movement.

SECTION II – PREPARE

3-26. Aircraft recovery does not begin with a downed aircraft. Preparation begins before decisive actions start. Aviation brigades continuously assess recovery capability, and continuously improve through planning and preparation.

INITIATE MOVEMENT

3-27. The team leader for an aircraft recovery team initiates movement with a verbal order to perform precombat checks on vehicles and equipment. This includes staging vehicles and tools as close as possible to anticipated downed aircraft locations.

3-28. Precombat checks for aircraft recovery are like the checks for any task. They include the checks prescribed in operators' technical manuals for all Army equipment.

3-29. Leaders supervise precombat checks by enforcing standards described in technical manuals. Special equipment required for aircraft recovery is described in appendix C.

3-30. The team stages vehicles and equipment in an assembly area. Recovery teams may execute with little or no advance notice (figure 3-1).

Figure 3-1. Staging an aircraft recovery team

RISK MANAGEMENT

3-31. Risk management is embedded in all Army tasks and operations. Team leaders and the staffs that support recovery teams maintain risk assessment matrixes as running estimates to aid decision making and control implementation. ATP 5-19 describes these techniques in greater detail.

SAFETY CONSIDERATIONS

3-32. Team members in aircraft recovery operations are exposed to many hazards. Some of them include the following:

- Driving hazards.
- Lifting heavy equipment overhead.
- High intensity noise.
- Rotor downwash and blowing debris.
- Static electricity discharge during sling-load hookup.
- Ammunition and armament.
- Petroleum products and other contaminants.

- Falling from a high point on a vehicle or aircraft being rigged.

3-33. Controls for these hazards and others are described in detail in technical manuals associated with the equipment being recovered and the equipment used for recovery.

ENVIRONMENTAL CONSIDERATIONS

3-34. Downed aircraft recovery includes handling hazardous materials carried onboard the aircraft. All aircraft likely include the following—

- Petroleum based fuel.
- Ammunition in many forms.
- Batteries in many forms.
- Fire suppression systems.
- Heavy metals or other hazardous materials found in optics and sensors.
- Biohazards from downed aircrew injuries.

3-35. Recovery team leaders need information about any hazardous cargo the downed aircraft may have carried. The headquarters staff supporting the recovery team determines hazardous cargo information from the downed aircraft owning unit. The team leader prepares the team to handle hazardous material during preparations.

COMPLETE THE PLAN

3-36. Rehearsals are described in detail in FM 6-0. The recovery team leaders attend company and battalion mission rehearsals. Team leaders then lead rehearsals with their subordinate teams.

3-37. Rehearsing for a ground movement includes a convoy. Convoy operations including staff support are described in ATP 4-01.45/MCRP 3-40F.7/NTTP 4-01.6/AFTTP 3-2.58.

3-38. Rehearsing for an air movement includes an air movement rehearsal. ATP 3-04.1 describes rehearsals for air movement.

3-39. Rehearsals include the controls for accidental and operational risk. Team leaders rehearse the following:

- Routes and alternate routes.
- Recovery vehicle faults or failures.
- Fratricide prevention.
- Downed aircraft site security plan.
- Downed aircraft rigging.
- Special considerations for poor terrain like vegetation, mud, swamp, or slope.
- Actions on enemy contact.

SECTION III - EXECUTE

3-40. Commanders may stage recovery teams at maintenance collection points, forward arming and refueling points, or with other sustainment or support forces located forward of the consolidation area.

3-41. The recovery team receives orders to execute. Headquarters staff transmit downed aircraft information and changes to mission variables through battlefield information systems and voice radio. An example command post battle drill is in appendix A.

COMMUNICATIONS

3-42. Recovery teams regularly operate forward of the consolidation area. Teams are equipped with battlefield information systems and over the horizon communication systems. Commanders also ensure recovery teams have enough information for decision-making and decentralized execution.

LOCATING DOWNED AIRCRAFT

3-43. A difficult task for recovery teams is to locate downed aircraft. Crash-damaged aircraft rarely stand at the full original height, and aircraft on the ground are easily masked by terrain and vegetation. Depending on terrain, the team dismounts for the final approach to the downed aircraft site. Even when the team is moved by air, they may be forced to walk some distance from a suitable landing zone to the downed aircraft.

3-44. Many aircraft are equipped with beacons that are activated manually or automatically during a crash. These transmitters are primarily intended for personnel recovery, and most recovery teams are not equipped with direction finding equipment. However, the recovery team headquarters receives information for downed aircraft locations from multiple sources. The recovery team headquarters provides downed aircraft locations to recovery teams in the grid reference format prescribed for the theater of operations.

3-45. Recovery teams rely on up-to-date maps and global positioning system (GPS) receivers. It is important to use up-to-date maps because roads and terrain can change over time. GPS is invaluable for determining accurate location. However, these systems can fail to function due to enemy action, terrain, and weather. For more information on navigation, see TC 3-25.26.

THREAT AND SECURITY CONDSIDERATIONS

3-46. Recovery teams typically do not have adequate organic security to operate forward of the consolidation area for more than a few hours. As the recovery team moves towards a downed aircraft, they consider actions by enemy forces. Enemy forces may prepare an ambush near a downed aircraft. They may sabotage downed aircraft with the intent to disrupt or destroy the recovery team, or destroy another aircraft used for recovery.

3-47. ATP 3-20.98 describes the fundamentals of security, basic scout skills, actions on contact, and other important information for recovery teams.

3-48. When the commander assesses that a downed aircraft must be recovered, and enemy contact is imminent, the aviation brigade needs a rifle company or larger force to establish a defense at the downed aircraft site. Offensive and defensive tactics are found in other techniques publications such as ATP 3-21.10.

PICKUP ZONES FOR RECOVERY

3-49. Downed aircraft may sometimes land under control or crash into poor terrain. Recovery teams are prepared for all types of terrain and conditions around downed aircraft.

3-50. A recovery team is a supported unit for pick-up and drop-off of internal and external loads for helicopters. See FM 3-21.38. The team may create a pickup zone to recover downed aircraft by air (figure 3-2).

Figure 3-2. Recovery by aircraft

3-51. Depending on mission variables, downed aircraft may be recovered by ground vehicles. The crane and trailer for transportation must be able to move to the downed aircraft site, lift and load the downed aircraft, and return to a MCP (figure 3-3).

Figure 3-3. Recovery by crane

3-52. Aircraft recovery may also include loading parts or components of downed aircraft into containers or cargo nets for internal or external loads (figure 3-4).

Figure 3-4. Recovering aircraft components

RIGGING FOR RECOVERY

3-53. TM 4-48.09/MCRP 4-11.3E, Volume I/NTTP 3-04.11/AFMAN 11-223 (I), Volume I/COMDTINST M13482.2B provides principles of sling loads, aircraft cargo hook systems, sling and net information, and other technical procedures.

3-54. TM 1-1670-260-12&P provides technical procedures for using the recovery kit to rig and sling-load Army helicopters.

3-55. This publication describes conventional equipment deliberately developed for use in Army aircraft recovery. It does not describe all the possible considerations. Well trained aircraft recovery teams are used in creative ways (figure 3-5, page 3-8).

Figure 3-5. Unconventional recovery

ASSESSING AIRCRAFT RECOVERY

3-56. Assessing aircraft recovery is like assessing any task. Additionally, it is important for downed aircraft recovery teams to assess themselves prior to reorganizing back into organic units. The assessment should include, but is not limited to, the following:

- How did the convoy or air movement work to support the rigging team?
- How did the security force communicate with support unit headquarters?
- Was there commonality in equipment for team members from different companies?
- Were verbal communications clear and easy to understand by non-aviation members?
- Was the recovery team organized early in operational planning?
- Were attached specialized individuals made part of the team's preparations?

Appendix A

Example Command Post Battle Drill for Aircraft Recovery

A-1. Any command post with communication systems and battlefield information systems coordinates aircraft recovery. Command posts expecting to coordinate for aircraft recovery teams use a battle drill such as the one in figure A-1.

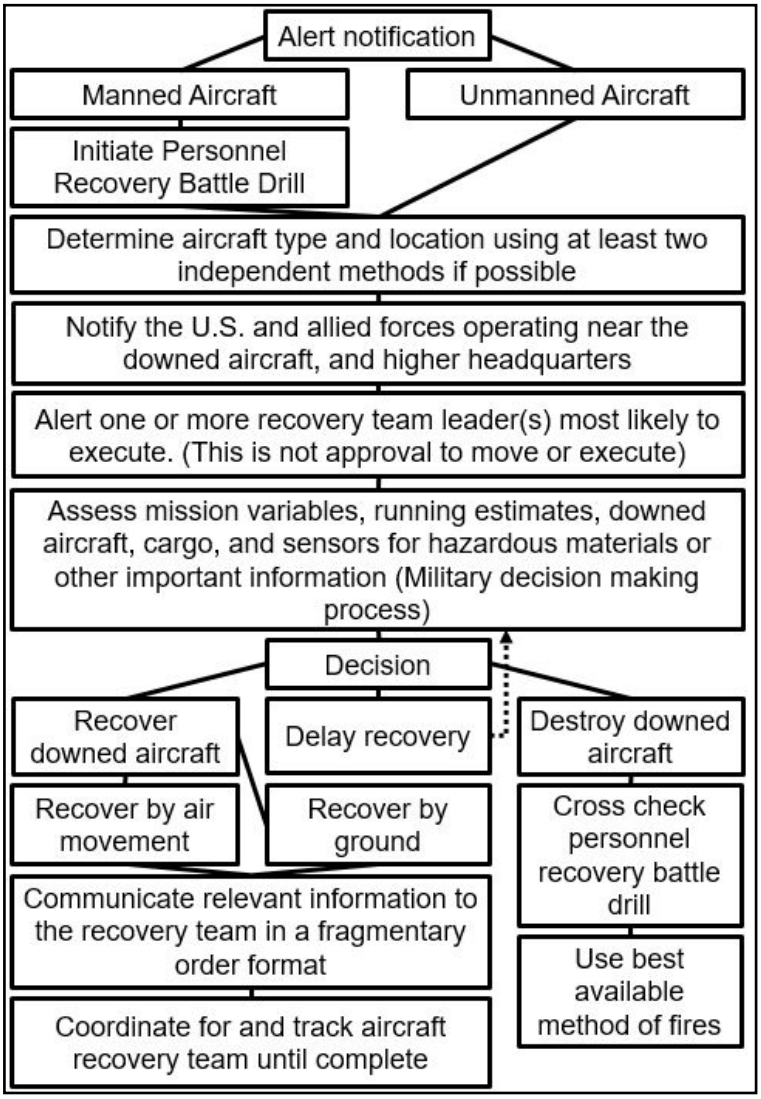

Figure A-1. Example command post battle drill

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Appendix B

Template for Standard Operating Procedures

B-1. This is an example template of an aircraft recovery team SOP. Team leaders write and update an SOP that works for their team. Commanders approve the SOP prior to use. See ATP 3-90.90 for more information on writing SOPs.

DOWNED AIRCRAFT RECOVERY TEAM PROCEDURES

B-2. Insert a short summary and unit information.

REFERENCES

B-3. For fast access and training, list specific references your team uses:

- Battalion or company SOP.
- ATP 3-04.13.
- TM 1-1520-240-BD.

PURPOSE AND SCOPE

B-4. The purpose of this tactical SOP is to provide clear instructions to each member of the downed aircraft recovery team. It applies to every team member and is enforced by the commander.

RESPONSIBILITIES

B-5. The company commander—

- Approves this SOP.
- Enforces this SOP.

B-6. Platoon leaders, platoon sergeants, unit maintenance officer, unit safety officer, and unit aviation mission survivability officers—

- Reads and understands this SOP
- Prepares risk assessments, implements controls, and supervises.
- Assists the recovery team leader.

B-7. The recovery team leader—

- Leads the recovery team.
- Maintains this SOP.
- Maintains a recovery team alert roster as an enclosure to this SOP.
- Reports to the maintenance platoon sergeant or production control NCO when the recovery team has faulty equipment or other problems that hinder the recovery task.

B-8. The protection and security NCO—

- Teaches and trains team members on warrior task, weapons, communications, and other equipment.
- Reports to the team leader when weapons or night vision equipment is faulty.
- Maintains a weapons/sights roster for the team as an enclosure to this SOP.

B-9. The convoy commander—

- Monitors the vehicle status for all vehicles and vehicle-mounted equipment for the recovery team.

- Reports to the recovery team leader when vehicles or systems are faulty.
- Maintains a driver and bumper number roster as an enclosure to this SOP.

B-10. The downed aircraft rigging specialist—

- Maintains the aircraft recovery kit in accordance with technical manuals.
- Reports to the team leader when the recovery kit or other equipment is faulty.

B-11. The communications specialist—

- Maintains communications equipment in accordance with technical manuals.
- Reports to the team leader when communications equipment is faulty.
- Maintains voice and digital report formats as enclosures to this SOP.

B-12. The combat medic—

- Maintains medical equipment in accordance with technical manuals.
- Reports to the team leader when equipment is faulty.

B-13. Drivers—

- Maintain their vehicles and vehicle systems in accordance with operators' manuals.
- Know the equipment load plan for their vehicle.
- Understand how to operate all their vehicle systems.

B-14. All members subordinate to the recovery team leader—

- Read and understand this SOP.
- Provide their physical location including sleeping area or other off-duty area to the team leader.
- Are prepared to move to recovery vehicles and execute with less than (determine the time) number of minutes notice.
- Report any problems to the recovery team leader.

COMMUNICATIONS

B-15. Describe on-hand equipment and methods for how the team communicates with higher headquarters. This section may also include standing requirements from the commander, such as the following:

- Report enemy contact.
- Report any disabled vehicle.
- Report any life, limb, or eyesight injury.
- Report arrival at the downed aircraft site.
- Report departure from the downed aircraft site.

B-16. Describe on-hand equipment and methods for internal communications.

B-17. The headquarters for the recovery team must have clear and specific information about people and equipment. Use higher headquarters' format that includes team position/call sign, name, DOD ID, blood type, weapon type and serial number, night vision type and serial number, radio type and serial number, and other lines as necessary.

STAGING EQUIPMENT

B-18. This section describes where and how all equipment and supplies are loaded to rapidly mobilize the recovery team, to include the following:

- Weapons.
- All classes of supply for (determine the number) number of days.
- Tools and special tools.
- Unit maintenance aircraft recovery kit.
- Individual equipment (Soldier basic load).

B-19. Describe any special items each Soldier is required to carry.

B-20. Describe each vehicle load plan by bumper number and include pictures if possible.

B-21. Describe how the team's recovery tools and equipment are loaded on a UH-60; include pictures if possible.

B-22. Describe how the team's recovery tools and equipment are loaded on a CH-47; include pictures if possible.

CONVOY PROCEDURES

B-23. Describe standard vehicle order and responsibilities of each vehicle crew.

B-24. Describe when and how to map the route to the downed aircraft using on-hand equipment or maps.

AIR LOAD PROCEDURES

B-25. Describe standard air load order and what each team member does during air load.

DOWNED AIRCRAFT SITE SECURITY

B-26. Describe what the team members providing security do on arrival at the downed aircraft site.

RIGGING DOWN AIRCRAFT

B-27. Describe what the team members rigging the downed aircraft do on arrival at the site.

ENCLOSURES

B-28. Set up the following enclosures for easy and quick updating or printing:

- Alert roster.
- Drivers and bumper numbers.
- Team weapons roster and convoy sector sketch.
- Commander's critical information requirements.
- Formats for radio reports.
- Formats for digital reports.

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Appendix C

Vehicles, Aircraft, Kits, and Equipment

C-1. This appendix describes some of the vehicles, aircraft, kits, and equipment for BDR and aircraft recovery.

VEHICLES

C-2. Wheeled and tracked wreckers, cranes, trucks, and trailers provide different options for recovering aircraft. Aviation brigades have a 25-ton capability for tractor and trailer. The largest crane in aviation brigades is the 7 1/2-ton crane.

C-3. M88A2 recovery vehicles, and AT422 22-ton cranes are equipped in some divisions. The support operations section coordinates for support vehicles for recovery.

C-4. Information for the 7 1/2-ton wheel mounted crane is in TM 5-3810-305-10 (figure C-1).

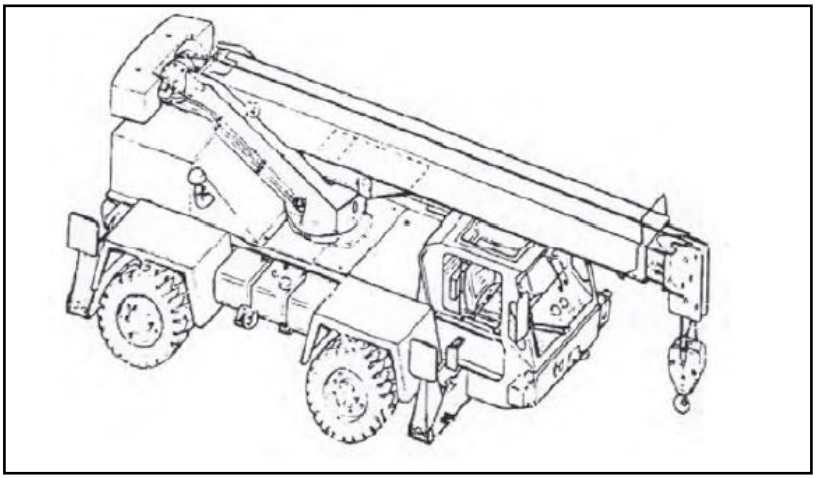

Figure C-1. 7-1/2-ton crane

C-5. Information for the M984A4 8x8 wrecker is in TM 9-2320-342-10-1 (figure C-2).

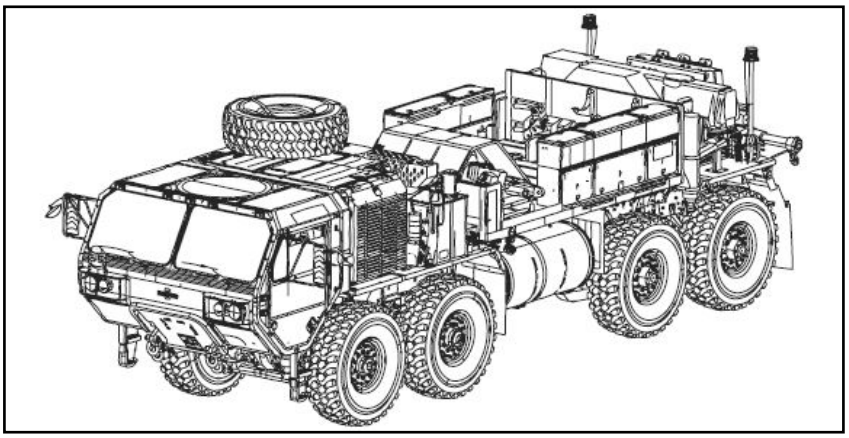

Figure C-2. 8x8 recovery wrecker

C-6. Damaged aircraft are loaded on tractor-trailers for ground recovery. Information for the M1088A1 truck is in TM 9-2320-333-10-1, and for the M172A1 25-ton trailer is in TM 9-2330-211-13&P (figure C-3).

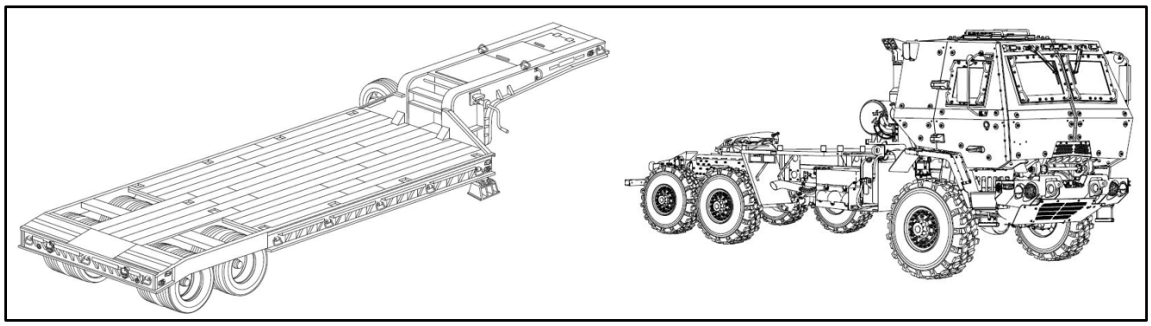

Figure C-3. M1088 Truck and M172 Trailer

AIRCRAFT

C-7. Cargo aircraft are used to move the recovery team, and recover aircraft by sling-load. Information for the CH-47F is in TM 1-1520-271-10.

C-8. Utility aircraft are used to move the recovery team, and recover small aircraft. Information for the UH-60M is in TM 1-1520-280-10.

KITS

C-9. Aircraft-specific parts and special tools are shipped in man-portable containers intended for rapid action and mobility. All BDR kits are listed in aircraft technical manuals. Figure C-4 is an example repair kit.

Figure C-4. Battle damage repair kit

C-10. The unit maintenance aerial recovery kit is used to rig Army helicopters for recovery. See TM 1-1670-260-12&P or TM 1-1670-261-23&P. Figure C-5 shows a layout of a recovery kit.

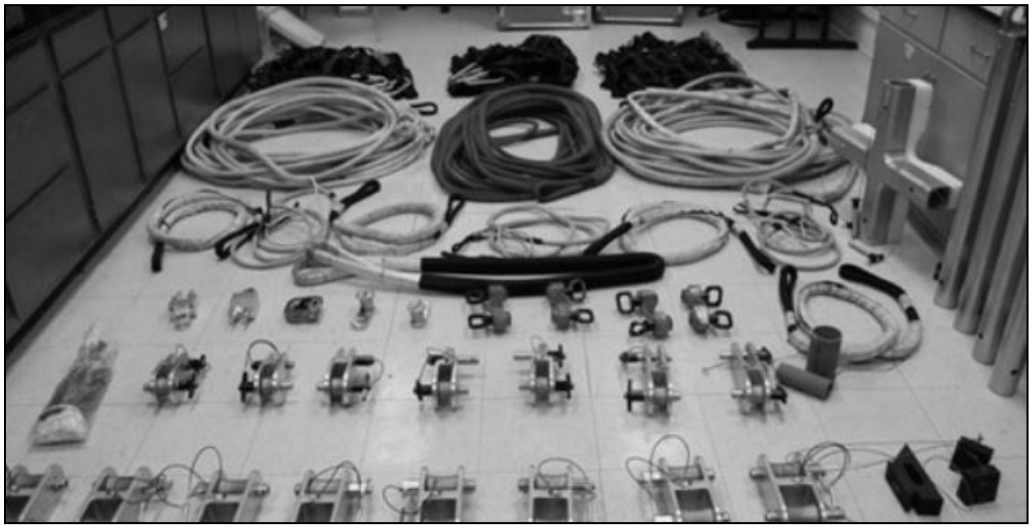

Figure C-5. Unit maintenance aerial recovery kit

EQUIPMENT

C-11. A rescue saw or reciprocating saw may be used to rapidly reduce damaged aircraft for cannibalization or salvage (figure C-6). It can also be used to rapidly cut off damaged rotor blades or other aerodynamic drag such as a damaged stabilator. This creates better conditions for sling load. See TM 5-5180-220-12&P for pioneer tools.

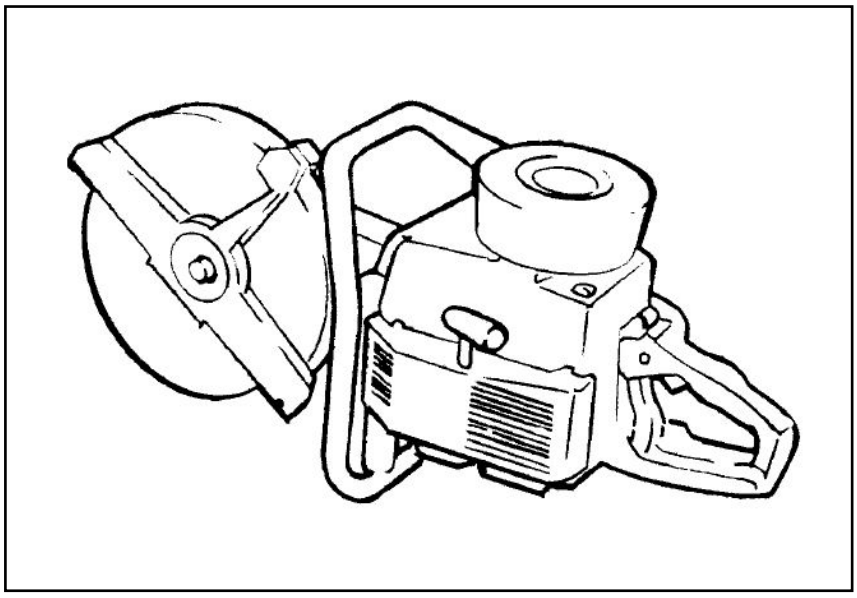

Figure C-6. Rescue saw

C-12. Cargo slings and nets may be used for recovery (figure C-7). TM 4-48.09/MCRP 4-11.3E, Volume I/NTTP 3-04.11/AFMAN 11-223 (I), Volume I/COMDTINST M13482.2B prescribes technical information for cargo slings and nets.

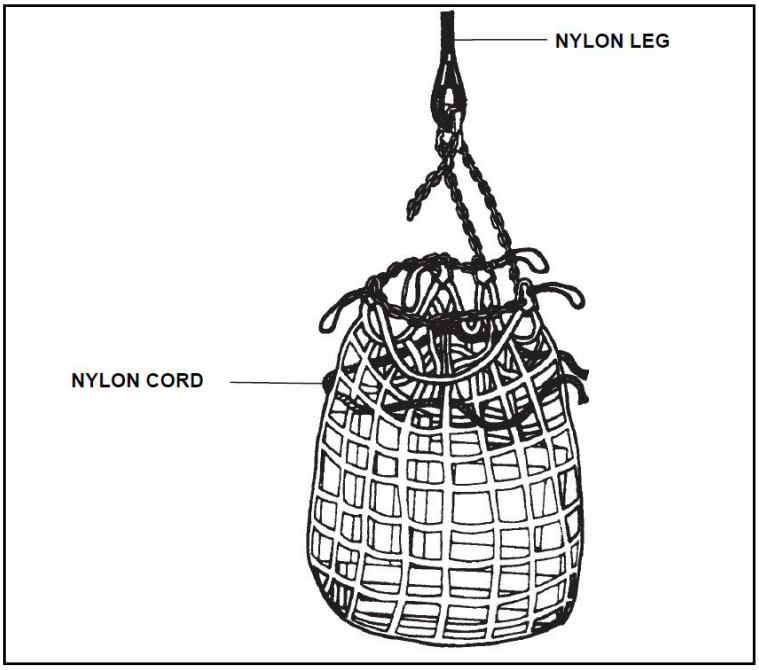

Figure C-7. Cargo net

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

AMC	aviation maintenance company
AMSO	aviation mission survivability officer
ASB	aviation support battalion
ASC	aviation support company
BDA	battle damage assessment
BDR	battle damage repair
CAB	combat support brigade
CBRN	chemical, biological, radiological, and nuclear
DA	Department of the Army
DART	downed aircraft recovery team
DOD	Department of Defense
DOTD	Directorate of Training and Doctrine
FARP	forward arming and refueling point
FSC	forward support company
GPS	global positioning system
ID	identification
LSCO	large scale combat operations
MCP	maintenance control point
MOS	military occupational specialty
NCO	noncommissioned officer
P4T3	problem, plan, people, parts, tools, time, and training
PR	personnel recovery
QC	quality control
SOP	standard operating procedure
TASM-G	Theater Aviation Sustainment Maintenance Group
USAACE	United States Army Aviation Center of Excellence

SECTION II – TERMS

Battle damage assessment

The estimate of damage composed of physical and functional damage assessment, as well as target system assessment, resulting from the application of lethal or nonlethal military force. (JP 3-0)

Battle damage repair

Essential repair, which may be improvised, carried out rapidly in a hostile environment in order to return damaged or disabled equipment to service. (JP 4-09)

Personnel recovery

The sum of military, diplomatic, and civil efforts to prepare for and execute the recovery and reintegration of isolated personnel. (JP 3-50)

Recovery

Action taken to extricate damaged or disabled equipment for return to friendly control or repair at another location. (JP 3-34)

Salvage

Property that has some value in excess of its basic material content but is in such condition that it has no reasonable prospect of use for any purpose as a unit and its repair or rehabilitation for use as a unit is clearly impractical. (JP 4-0)

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These documents must be available to the intended users of this publication.

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