Chapter 2

General Recovery and Evacuation Procedures

Battlefield recovery and evacuation of aircraft places unique challenges on commanders. Planning, coordinating, and executing the safe recovery of US Army aviation assets are vital in retaining the persuasive combat power. This chapter focuses on general procedures used to develop, coordinate, and execute aircraft recovery and/or evacuation plans to prevent the loss of expensive assets on the battlefield.

MAINTENANCE EVACUATION

2-1. Maintenance evacuation is the physical act of moving an aircraft from one maintenance location on the battlefield to another. Movement is either by fly-out or aerial/ground recovery means. Evacuation is to effect repair, cross-level maintenance workloads, or relieve units of disabled aircraft during tactical moves.

2-2. Responsibility for coordinating the assets and manpower for an evacuation is shared. It is shared between the commander evacuating the aircraft and the commander receiving the aircraft. Normally, when evacuation is from AVUM to AVIM, the AVIM arranges for lift helicopter assets or ground recovery assets. The evacuation may be from one AVIM to another AVIM. If so, the receiving AVIM coordinates aerial or ground assets beyond the capability of the evacuating AVIM. Nonflyable aircraft may be evacuated from one AVUM to another AVUM. If so, the supporting AVIM coordinates aerial or ground assets beyond the capability of the evacuating and receiving AVUM. The evacuating unit normally rigs the aircraft to prepare for movement. Movement is contingent on the availability of a rigging kit. Examples of rigging kits are the Aircraft Recovery Kit (ARK), Interim-Unit Maintenance Aerial Recovery Kit (I-UMARK), Unit Maintenance Aerial Recovery Kit (UMARK), or the Helicopter Recovery Kit (HERK). The evacuating unit may have no kit available. If so, it will request a kit from the receiving or supporting unit.

2-3. Maintenance evacuation on the battlefield is a recurring maintenance function. It usually is planned for in advance, in conjunction with other maintenance support. Procedures to be followed, to include coordination chains, normally are included in aviation maintenance support plans and unit SOPs.

2-4. Normally, the first team on site to a downed aircraft is the DART focused on BDAR. Most aircraft have a BDAR technical manual. Usage of this manual during battlefield recovery is essentially important as part of the recovery. Use of the manual ensures that the downed aircraft is efficiently recovered.

2-5. Physical procedures for maintenance evacuation and battlefield recovery of aircraft are nearly identical; that is, both require the rigging of the aircraft for lift by helicopter or lift by a crane device to the bed of a vehicle. Therefore, the remainder of this manual, as it pertains to physical procedures and the use of rigging kits, applies to both maintenance evacuation and recovery.

BATTLEFIELD RECOVERY

2-6. Battlefield aircraft recovery is an operation that results from an aircraft having experienced a component-failure-induced or combat-damage-induced forced landing on the battlefield, or the aircraft is disabled because of an accident. Based on an assessment, the aircraft might be destroyed or abandoned, repaired and flown-out, or recovered to a maintenance site either by aerial or ground means.

2-7. The preferred recovery method is to repair the aircraft at the scene of the forced landing. Then the aircraft is returned to service or prepared for evacuation to a maintenance site. Ground recovery remains an option to return an expensive asset to service when the aircraft cannot be repaired at the site or air recovered. The time allotted to repair the aircraft at the scene depends on the tactical situation. The next two methods (based on METT-TC) are to recover the aircraft by—

- Aerial means, using rigging kits and helicopter assets of the owning unit, or assets of supporting or tasked units, or
- Ground means, which take more time and require the aircraft to be in such a location that large tactical vehicles can approach it.

2-8. Recovery operations always require detailed coordination. Manpower and recovery assets must be synchronized in response to time and the tactical situation. Extensive coordination among the battlefield functions of maneuver, fire support, air defense, intelligence, and combat service support also are often required. Command, control, and technical procedures are preplanned; they are included in unit SOPs, contingency plans, operation orders, and air mission briefings.

2-9. Responsibility for a recovery originates with the commander of the unit to which the disabled aircraft is assigned; however, responsibility may pass to a higher echelon when it is beyond the capability of the unit to complete the operation. A recovery operation begins when an aircraft has experienced a forced landing or is otherwise disabled on the battlefield. It ends when the aircraft has been recovered to, and is under the control of, a maintenance facility.

THREAT

2-10. Recovery operations—and to a lesser degree maintenance evacuations—are easily detected and subject to attack by enemy forces, despite combat intensity. Detection can result in hostile actions aimed toward halting or disrupting the operation, inflicting casualties, and destruction of

disabled aircraft and other equipment. Operations are threatened by any of the following:

- Ground force attack.
- Artillery, rockets, and mortar fire.
- Air attack.
- Antiaircraft weapons and small arms fire against air and ground equipment assets and crewmembers.
- Electronic devices used to disrupt communications.
- Directed energy weapons used to register fire, blind personnel, and disrupt electronic components.
- Chemical agents used to deny areas and disable personnel.
- Damaged airframe used as a decoy or to contain boobytraps. The damaged airframe could be rigged to break up in midair, harbor an explosion aboard a vehicle, or carry harmful substances or explosive devices to the repair facility.
- Mines and other barriers.

COMMAND, CONTROL, AND COORDINATION

2-11. Maintenance evacuation is a preplanned operation. It is performed by preparing the aircraft for a one-time evacuation mission to the receiving unit or movement by aerial or ground means. Maintenance evacuations between maintenance units are coordinated between the commanders of the units involved; they are assisted in some cases by the staff maintenance officer to arrange supporting equipment assets. Evacuation of groups of aircraft often are driven by unit relocations on the battlefield or reconstitution of aviation units. These evacuations would likely be controlled by the aviation brigade staff maintenance officer/S-4 in coordination with the division and corps staff. Coordination and tasking of division and corps assets may be necessary also.

2-12. Command, control, and coordination to support aircraft recovery operations are planned for in advance. Planning is within the context of the size of the force and the density of recovery assets at the disposal of commanders. The first commander in the chain of command who controls all the required assets coordinates the assets and manpower for evacuation for the recovery. When an aircraft recovery operation is required, a plan of execution supplements the preplanned procedures. The purpose of the plan is to synchronize personnel and equipment assets within the scheme of maneuver and the tactical situation. Aircraft recovery operations are time sensitive.

2-13. AVUM and AVIM maintenance units form DARTs from within their personnel assets. These teams are skilled in BDAR, the use of rigging kits, and combat expedient recovery techniques (CERTs). The typical composition of a DART includes a maintenance officer/technician, technical inspector, repairer personnel, and vehicle operators. The DART performs any of these functions:

- Assesses repair requirements.
- Repairs the aircraft or prepares it for a one-time evacuation mission.
- Recommends recovery by aerial or ground means.
- Rigs the aircraft for recovery; serves as the ground crew for helicopter lift.
- Serves as the crew to secure the load aboard a vehicle.
- If the aircraft is not repairable—
  - Determines the parts, subsystems, or components that can be salvaged and removes them.
  - Destroys, or takes part in the destruction of, a disabled aircraft that is to be abandoned.

2-14. These teams may respond to the recovery of a downed aircraft from within the unit, a supported unit, an adjacent unit, or any aircraft that is disabled within sector. Normally, these teams are transported with their equipment by air to the scene of the disabled aircraft. They are then extracted by air upon completion of the mission.

2-15. The first line of responsibility for a recovery operation is the air mission commander/aviation unit commander. This commander may have at his disposal (from within the assets of the operation) on-call DART organizations and lift assets capable of recovering the disabled aircraft. In such cases, the commander employs those assets to assess and effect recovery within time and tactical situation constraints.

2-16. If beyond the capability of the air mission or unit commander, the responsibility to coordinate recovery defaults to the RCC. The RCC is a contingency organization in the aviation brigade TOC. Depending on the size of the force, the RCC also may be found in division and corps TOCs. In this case, RCC is primarily a communications mode for staff elements to receive voice, manual, and automated messages; coordinate resources; coordinate battlefield functions of maneuver, fire support, air defense, intelligence and combat service support within tactical priorities and the scheme of maneuver in support of recovery operations. The principal in the RCC is the staff maintenance officer.

2-17. Crash site preparation for aerial extraction may require coordination with pathfinder or engineer units.

2-18. Recovery operations are unique. Each operation is discrete and may involve the initiative and imagination of commanders and staff to synchronize the operation within a range of variables.

2-19. Recovered aircraft normally are transported from the recovery point to a pre-selected maintenance site without intermediate stops. Air recovery (and evacuation) capitalize on back-haul from forward areas to the extent possible to reduce separate demands on aircraft. This is especially true of CH-47 Chinook aircraft, which may be heavily committed to re-supply and other transport missions.

2-20. Ground recovery wrecker/cranes and semi-trailers are found in AVIM units. These units deploy these assets to the scene of the disabled aircraft for

recovery operations or to the maintenance site for evacuations. When the AVIM unit is unable to support the required lift within assigned assets, a crane is obtained from another unit. An example is the 20-ton mobile crane, found in division and corps engineer battalions and corps ammunition units.

2-21. Aircraft that cannot be recovered and are in danger of enemy capture are destroyed according to TM 750-224-1-5. The authority for destruction will be included in SOPs and OPORDs. If possible, aircraft are cannibalized before destruction.

2-22. The corps, on a mission basis, accomplishes recovery and evacuation of enemy, allied, and other US services' aircraft using corps assets or by tasking division assets in sector.

2-23. The helicopter lift capability data in Table 2-1 is a guide. Figures may vary considerably, depending on mission distance (fuel load), weather conditions, and aircraft configuration.

2-24. Normally, the smallest lift helicopter is used to transport another aircraft during recovery or evacuation. Table 2-2 illustrates capabilities and can be used as a general guide.

Table 2-1. Helicopter Lift Capability Data (pounds)

Helicopter	Lift Capability
CH-47D (center hook)	26,000 (center hook rating only)
CH-47D (tandem hook)	25,000(tandem hook rating only)
CH-47D (fwd and aft hook)	17,000 (fwd and aft hook rating only)
CH-47D	20,000 (actual lifting capability)
UH-60L	9,000
UH-60A	8,000
UH-1	4,000

Table 2-2. Capabilities of Aircraft During Recovery or Evacuation

Type Aircraft	Transported by
OH-58A/C	UH-1*, UH-60, CH-47
OH-58D	UH-60, CH-47
UH-1	UH-60, CH-47
UH-60A	UH-60*, CH-47
UH-60L	CH-47
EH-60	CH-47
MH-60	CH-47
AH-1	UH-60*, CH-47
AH-64A/D	CH-47
CH-47	CH-47*
RAH-66	CH-47
RC-12	CH-47
C-23	CH-47
UC-35	CH-47

*Depending on atmospheric conditions and configurations, aircraft weight may be reduced by removing components.

2-25. Ground recovery requires wrecker/crane and semi-trailer combinations, or the palletized loading system (PLS) vehicle, which is a combination crane/extended flatbed. (See Table 2-3.)

Table 2-3. Wrecker/Crane and Semi-Trailer Combinations Used in Ground Recovery of Aircraft

Aircraft	Wrecker/Crane	Semi-trailer	Source
OH-58A/C	M543/M984		AVUM
	M246	M172/M270	AVIM
	*Palletized Loading System	*Palletized Loading System	AVIM
OH-58D	M543/M984		AVUM
	M246	M172/M270	AVIM
	*Palletized Loading System	*Palletized Loading System	AVIM
UH-1	M246	M172/M270	AVIM
	*Palletized Loading System	*Palletized Loading System	AVIM
UH-60	20-ton mobile		Engr Units
MH-60		M270	AVIM
EH-60	*Palletized Loading System	*Palletized Loading System	AVIM
AH-1	M543/M984		AVUM
	M246	M172/M270	AVIM
	*Palletized Loading System	*Palletized Loading System	AVIM
AH-64A/ AH-64 Long Bow	20-ton mobile		Engr Units
		M270	AVIM
		*Palletized Loading System	AVIM
RAH-66	M543/M984		AVUM
	M246	M172/M270	AVIM
CH-47 MH-47	Normally, unrecoverable because of size.		
RC-12	TBD		
C-23	TBD		
UC-35	TBD		
	*Currently under development for fielding.	*Currently under development for fielding.	

NOTE: Refer to TB 55-46-1, *Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment)* for Alternate Ground Recovery Equipment.

ACCIDENT INVESTIGATION BOARD

2-26. According to AR 385-40 (Accident Reporting and Records), the commander who first becomes aware of an Army aircraft accident, places a guard at the scene. This prevents anyone from moving or disturbing the aircraft or detaching parts until it is released by the president of the Accident Investigation Board and by the US Army Safety Center, if taking part.

2-27. In the combat environment, it may not be possible to comply fully with this requirement. Further, aircraft damaged as a direct result of hostile fire is considered a "combat loss," rather than an accident.

2-28. Situation permitting, the recovery operation may not begin until one of the following occurs:

- The commander of the unit to which the aircraft is assigned orders that an accident investigation board, as prescribed by AR 385-40 is not required, or
- The president of the board releases the aircraft.

RECOVERY IN THE DIVISION

2-29. The maintenance officer of the unit owning the disabled aircraft manages aircraft recovery in the division. Organizational units prepare aircraft for recovery within their capabilities. Notification of a disabled aircraft follows normal reporting channels to the aviation battalion and aviation brigade. Additional support may be required or the recovery of the aircraft may be beyond the capabilities of the owning unit. If so, the AVIM is notified of required support. The AVIM company is equipped with air and ground recovery kits to assist with recoveries at the AVUM level.

2-30. Supporting AVIM units augment AVUM organizations as required to complete recovery operations. These units may be tasked to complete the operation if the AVUM is heavily committed or preparing to move.

2-31. Aerial recovery may be required, and the tactical situation may permit. If so, the AVUM or the AVIM recovery team rig the aircraft. The recovery teams may not be able to move the disabled aircraft. Then the maintenance officer or the production control officer of the supporting AVIM requests—through the division movement control center—a lifting helicopter from the corps support command (COSCOM) movement control center. Requests are sent through the division movement control center.

2-32. Divisional units may be tasked to support recovery operations, in sector, for other than division units and for allied and other services.

RECOVERY IN ECHELONS ABOVE DIVISION

2-33. The same principles apply to recovery in echelons above division as in the division.

RECOVERY IN A NUCLEAR, BIOLOGICAL, AND CHEMICAL ENVIRONMENT

2-34. Recovery operations in a nuclear, biological, and chemical (NBC) environment pose special risks to personnel. These risks can be minimized through the recovering crew's wearing protective clothing at the scene of the disabled aircraft. Also, the receiving crew at the maintenance site should wear protective clothing because of possible contamination of the disabled aircraft, the recovering aircraft, and rigging kits. See FM 3-11.4(3-4) (NBC Protection) for information on individual and collective protection.

NIGHT RECOVERY

2-35. Generally, night operations increase safety hazards and the need for security. Increased risks must be weighed against the urgency considering time, weather, and the tactical situation. When possible, delay such operations until the beginning of morning twilight.

RECOVERY METHODS

2-36. Three general methods used to recover and evacuate disabled aircraft are one-time evacuation mission, aerial (sling load) recovery, and surface. (See FM 3-04.500 (1-500), Army Aviation Maintenance.) The recovery officer or BDAR assessor determines the method to be used. His main concern is how to move the aircraft to the aircraft maintenance activity without further damage. Information may be needed for disassembly, packing, or shipment of the aircraft during any phase of the mission. If so, the applicable shipping or maintenance manual is used. To ensure a successful mission, personnel should follow the procedures below upon arrival at the site of a disabled aircraft:

- Remove occupants.
- Eliminate fire and safety hazards.
- Disconnect batteries.
- Remove ammunition (if possible and practical).
- Remove weapons (if possible and practical).
- Drain fuel from aircraft, as required.

WARNING

All weapons systems must be cleared before removal to avoid injury or death.

WARNING

Avoid contact with aviation fuel or with water contaminated with aviation fuel. Such contact can result in severe skin burns. In the event of skin burns/irritation, immediately seek medical aid. Contaminated clothing should be removed and cleaned/discarded according to appropriate care manuals.

EVACUATION METHOD

2-37. The evacuation method is accomplished by on-site repair of the disabled aircraft. The aircraft is prepared for a one-time evacuation mission to a regular maintenance area with a minimum flight crew (only the pilot when possible); the pilot should be proficient in all emergency procedures for the particular aircraft. Advantages and disadvantages of the one-time evacuation mission method are as follows:

- Advantages.
  - Speed.
  - Economy.
  - Minimum likelihood of further damage.
- Disadvantages.
  - Requirement for a clear takeoff path.
  - Possibility of unfound damage causing a crash.
  - Requirement for special tools and equipment.
  - Effects of weather conditions.

AERIAL (SLING LOAD)

2-38. Aerial (sling load method) recovery and evacuation involves preparing the disabled aircraft for movement; connecting it to a suitable lift helicopter, with component from an aerial recovery kit; and transporting it to a maintenance area. Advantages and disadvantages of the aerial (sling load method) recovery/evacuation are as follows:

- Advantages.
  - Less disassembly required than for surface transport.
  - Disabled aircraft accessibility.
  - Faster than by surface.
- Disadvantages.
  - Possibility of dropping disabled aircraft/inflicting further damage.
  - Effect of rotor downwash on sling load.
  - Effects of weather conditions.
  - Possibility of loss or damage to lifting helicopter.
  - A cleared approach/departure path for recovery aircraft required.

SURFACE

2-39. The surface method of recovery and evacuation involves preparing the disabled aircraft for movement, lifting it onto a suitable transportation vehicle, and transporting it to a maintenance area. Advantages and disadvantages of the surface recovery method are as follows:

- Advantages.
  - Restricts the enemy's ability to detect movement of recovery assets to an area relatively close to the movement routes.
  - Use possible when weather conditions prohibit flight.
  - Threat of total loss of the aircraft during transport because of recovery and malfunction is low.
- Disadvantages.
  - Route security assets badly needed somewhere else may be tied up. Time needed for surface recovery is much greater than for aerial recovery.
  - Recovery personnel and equipment assets are tied up for long periods.
  - Relatively high exposure time on the battlefield with slow-moving equipment increases the threat.
  - Significant amount of aircraft disassembly or modification often is required to adapt the aircraft to surface travel.
  - Ground routes must be accessible, and meticulous reconnaissance of the route is required.
  - Loading procedures and travel on rough terrain can cause further damage to the aircraft.

ON-SITE RECOVERY PROCEDURES

2-40. Procedures performed at the site of the disabled aircraft include making the recovery area accessible, using communications correctly, and making the aircraft secure, safe, and ready for stable flight.

CONDITION OF THE PICKUP SITE

2-41. The pickup site must be cleared of all trees, obstacles, and trash. The recovery helicopter pilots must know of conditions that might restrict their visibility, such as dust or snow.

2-42. Trees and obstacles should be cleared from the pickup site. The trees cut to clear an area must fall away from the area. This is done by appropriate tree notching or by a constraint applied to the tree using positioning straps and rope. Tension is applied before starting the cut by stretching the nylon straps or rope as much as possible.

2-43. The pickup area should be thoroughly policed of all trash before the recovery helicopter arrives. Items such as empty field ration cans, empty field ration cases, small pieces of the disabled aircraft, small tree limbs, tree roots,

and loose recovery equipment can all become airborne missiles, which endanger both the recovery helicopter and the ground crew.

2-44. The recovery helicopter pilots should be warned if the pickup area is dusty. This enables them to plan for a rapid climb out if visibility drops to a point that they will lose ground reference. A variety of dust control agents exists. However, natural turf is the best dust control measure; therefore, all possible efforts should be made to preserve the natural turf cover while working in the pickup area.

2-45. Snow, like dust, is primarily dangerous to a recovery mission. The reason is that snow can dangerously restrict the visibility of recovery helicopter pilots. An attempt should be made to pack the loose snow, if possible. In all cases, the recovery helicopter pilots should be warned of the condition of the snow.

RADIO COMMUNICATION

2-46. Communication must be established between the ground recovery crew and the recovery helicopter. The recovery helicopter usually will not proceed to the recovery site until the ground crew advises that they have rigged the disabled aircraft, and it is ready for hookup. In a tactical situation, this precludes endangering the recovery helicopter for a longer period than is necessary. In all situations, this minimizes flight time for the recovery helicopter. Although there maybe space for radio stowage in the recovery kit container, the radio and a fresh battery must be obtained from the unit communications section before each mission.

2-47. The ground crew also should include a radio operator co-located with the signalman. This individual should be in direct contact with the recovery aircraft to advise the aircrew on the status of the aircraft extraction.

NOTE: Pilots of recovery aircraft will be taking directions from the onboard crew chief. Air-to-ground communications procedures should be coordinated in advance and included in the pre-mission brief to minimize confusion.

AIRCRAFT BATTERY

2-48. The aircraft battery must be disconnected before performing any work on the disabled aircraft.

WARNING

Turn off the battery switch and all power switches before detaching battery leads. Sparks or arcs may ignite the hydrogen generated in charging and discharging. Spilled fuel or fuel vapors may be present in the vicinity of the crashed aircraft. Exercise good judgment when disconnecting batteries or electrical leads under these condition to avoid arcing of battery connection. The electrolyte used in nickel-cadmium (NICAD) batteries contains potassium hydroxide (KOH), which is a caustic chemical agent. Serious flesh burns result if the electrolyte comes in contact with any part of the body. Personnel should use rubber gloves, rubber aprons, and protective goggles when handling NICAD batteries or electrolyte. If they spill any electrolyte (potassium hydroxide) on their skin, they must immediately wash the area with cold water and seek medical aid.

COMBUSTIBLE GAS DETECTION

2-49. In explosive atmosphere is detected, ventilation must be provided. Open doors and access hatches or panels before entering the aircraft. Do not puncture the structural skin of the aircraft to provide ventilation. However, if necessary, use a nonmetallic object to break out fixed windows and jammed canopies.

AIRCRAFT EXPLOSIVE DEVICES

2-50. Ammunition, signal flares, and all other explosive devices, which are on the downed aircraft, must be removed. The ejection seat, weapons pylons and canopy, when fitted, must be disarmed. Refer to the applicable technical manual for disarming procedures.

WARNING

Aircraft explosive devices must be removed and disarmed. Extreme caution should be used when removing ammunition, signal flares, and all other explosive devices. Disarm explosive devices according to the applicable manual before moving aircraft.

REMOVAL AND SALVAGE OF BASIC AND CLASSIFIED EQUIPMENT

2-51. Loose equipment may have to be removed. Such items include troop seats, litters, radios, and other basic components. These items are necessary to reduce the weight or shift the center of gravity (CG) of the disabled

aircraft. They usually are removed when recovering the heavier aircraft. Tools in the general aircraft mechanic's tool kit usually are adequate.

2-52. Classified equipment should be retrieved if possible. The appropriate salvage or disposal instructions for classified components should be reviewed. Any required dismantled equipment or components to be salvaged with the aircraft and small enough to be stowed internally in the aircraft should be positioned in the aircraft to yield corrective ballast for aircraft CG position. These components should be padded and tied securely in place. Other corrective ballast may be used as required for recovery of the specific aircraft.

WHEELED LANDING GEAR BRAKE SETTING

2-53. The decision to set the brake on wheeled landing gear systems should be made depending on the condition of the downed aircraft. The outcome of this decision will directly affect planning considerations for the reception of the aircraft at recovery site.

USE OF GUST LOCKS

2-54. To ensure stable flight loads, all flight controls of the disabled aircraft must be securely locked in their neutral position. The controls are locked using the integral control locks usually available for most fixed-wing aircraft. If these locks are unavailable, specially designed gust locks provided with the aerial recovery kit can be used. Integral control locks in the aircraft and gust locks may be unavailable. If so, the stick or wheel control and rudder pedals must be tied down. If control linkage damage prevents locking any of the control surfaces, use either gust locks or remove the control surfaces from the aircraft before sling operations.

FLAP POSITION

2-55. If possible, the flaps must be retracted; if this is not possible, they must be removed.

WARNING

Some aircraft use hydraulic systems with accumulators. Hence, lines may be under high hydraulic pressure. Do not operate selector levers unless movable surfaces are clear of personnel. Refer to the applicable technical manual.

USE OF SPOILERS

2-56. Lift spoilers must be used on fixed-wing aircraft to prevent generation of lift by aerodynamic surfaces in flight. Attach spoiler to aerodynamic surfaces as specified in the technical manual for each type of aircraft.

NOTE: The free ends of the spoiler straps should be reassembled led with the buckles and the assembly slipped over the end of the aerodynamic surface when practical**.**

TIE-DOWN OF PROPELLERS OR ROTORS

2-57. Airplane propellers or helicopter rotors are secured to the airframe.

2-58. For two-bladed rotor system helicopters, the tail rotor blades should be aligned with the vertical fin. The main rotor blades must be aligned with the fuselage if possible. Tie-down lines become slack under air loads. Therefore, the forward and aft aligned blades must be tied down to the helicopter structure so that the restraints will not slip off the blades when they are deflected during flight by aerodynamic loading.

2-59. Rotor blades on helicopters with more than two main rotor blades may be removed to prevent damage either to the disabled helicopter or the recovery helicopter and to prevent rotor blades from flexing. Also, the blades may be removed to attach a sling, decrease the weight to be lifted, or stabilize the disabled helicopter. All US Army four-bladed rotor system helicopters have been test aerial evacuated with the main rotor blades installed and tied down.

ATTACHMENT OF DROGUE CHUTES

WARNING

Drogue chutes present a potential hazard to the lifting helicopter during pickup and drop-off. Entangling with the rotors, chafing of the shroud lines, and snagging of the chute on obstacles of the chute on obstacles represent potential hazards.

2-60. Without some types of yaw stabilization devices, recovery flight speeds are limited to 30 to 40 knots. A drogue chute can be used to provide yaw stabilization and increase forward speed.

2-61. The appropriate drogue chute is attached to the tail section of the recovered aircraft. A shackle at the end of the riser line swivel generally provides a convenient point of attachment.

BREAKAWAY TECHNIQUE

2-62. If it looks like the rigging equipment may become entangled, the affected items should be clustered and taped together as close to the rigged aircraft as possible and individually taped to the aircraft structure itself. (Examples of affected items are bellyband sling assembly, pendant assembly, and so forth.) The breakaway technique is to secure the legs of the rigging equipment to the aircraft and/or to each other with a low-strength item (for example, 2.0-inch pressure-sensitive tape) to hold the rigging in a desired position until lift-off. At lift-off, the tape breaks, and the rigging assumes its proper flight configuration.

CRASH SITE HAZARDS

2-63. The CH-47 is the only aircraft model that requires fuel drainage to achieve weight reduction. Fuel can be drained by using existing drain fittings or by siphoning. If the fuel tanks and/or lines are ruptured during a crash, the remaining fuel should be drained. This prevents leaking fuel from creating a fire hazard in or near the maintenance facility receiving the recovered aircraft. In the case of CH-47 aircraft, contingency plans must be made for portable, collapsible fuel cells to reduce aircraft weight for recovery.

WARNING

Exercise extreme caution when de-fueling any aircraft. Fire-protective clothing, fire extinguishing equipment, and electrical grounding apparatus must be available.

WARNING

Some particulate matter is highly toxic. The air surrounding a fuel fire, for example, contains particulate matter that, if inhaled, can cause fluid buildup in the lungs to the extent that death can occur.

2-64. Aircraft are manufactured from various types of materials. Of these materials, some can become a hazard during an aircraft accident. Contamination from fumes, toxins, liquids, composite, and solid materials can cause serious illness or injury if protective equipment is not worn.

WARNING

Exercise extreme caution when handling any aircraft materials. Protective clothing, gloves, respirators, and equipment must be available.

HOOKUP

2-65. The ground crew must take certain precautions and perform specific functions when hooking up the rigged aircraft to the recovery helicopter.

WARNING

Recovery crew members may be required to stand on the rigged aircraft during hookup. In this case, additional caution must be exercised to prevent being pinned between the disabled aircraft and the recovery aircraft.

GROUND CREW GENERAL PROCEDURES

2-66. Ground crew teamwork and proficiency are the most important parts of an aerial recovery operation. How well ground crew personnel are trained and how familiar they are with their equipment determine the final outcome of the mission. All units should have an ongoing training program to keep their ground crews current on unit equipment and to train new ground crew personnel. The command is responsible for implementing a training program for the ground crew.

NUMBER OF GROUND CREWS

2-67. The number of personnel in a ground crew may vary depending on the situation, type of aircraft, and size of the pickup zone. The unit commander determines how many crews need to be trained. Generally, three people make up a ground crew: the signalman, the hookup man, and an assistant. The commander also must provide local security for the operation. (The ground crew is not responsible for this task.) Although each member of the crew has specific duties during the operation, each person should be trained in how to perform all duties.

GROUND CREW EQUIPMENT

2-68. The ground crew members involved in helicopter aerial recovery operations are exposed to the hazards of helicopter noise and rotor downwash. Therefore, they should wear protective equipment when performing their duties. Depending on the mission, they may need additional equipment. Figures 2-1 and 2-2 show the equipment that is normally needed. The national stock numbers (NSNs) help to prepare supply requisitions for the items needed.

STATIC ELECTRICITY DISCHARGE WAND

2-69. In flight, a helicopter generates and stores a charge of static electricity. When the helicopter lands, this charge is grounded. While the helicopter is in flight, however, this charge remains stored unless a path is provided to channel it into the earth. A ground crew member provides this path by contacting the helicopter cargo hook when it is positioned over a cargo hookup point. Although this charge may not cause an electrical burn, it can cause a muscular reaction, which may, if the individual concerned is on unsure footing, result in a fall. An individual shocked by the electricity also may suffer delayed discomfort from muscular cramps or spasms.

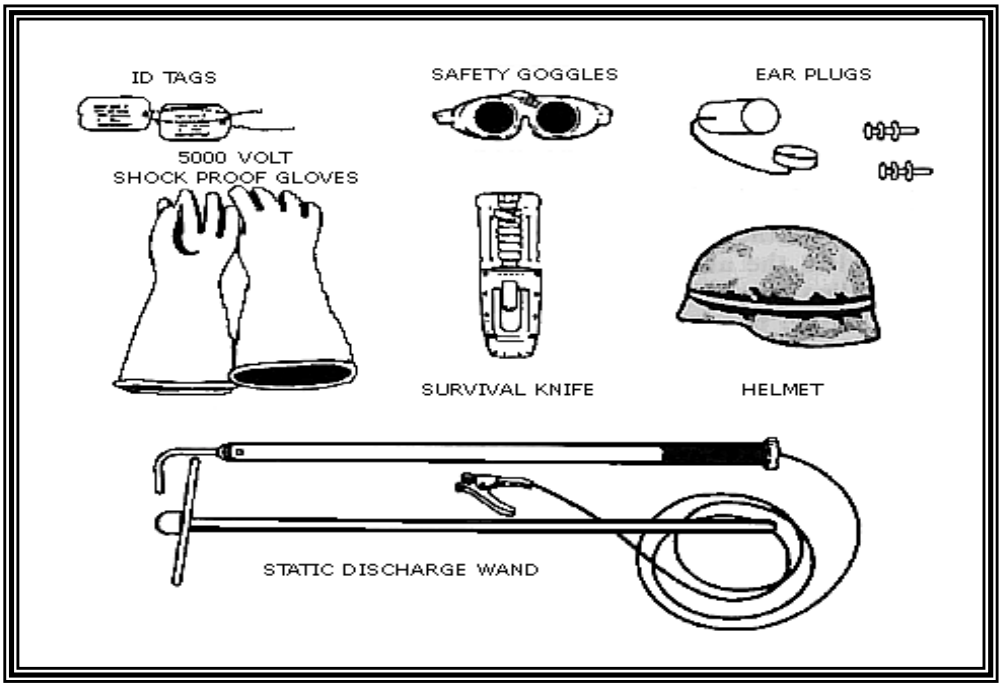

Figure 2-1. Ground Crew Protective Equipment

NOTE: If a wand is not available, one will have to be made locally.

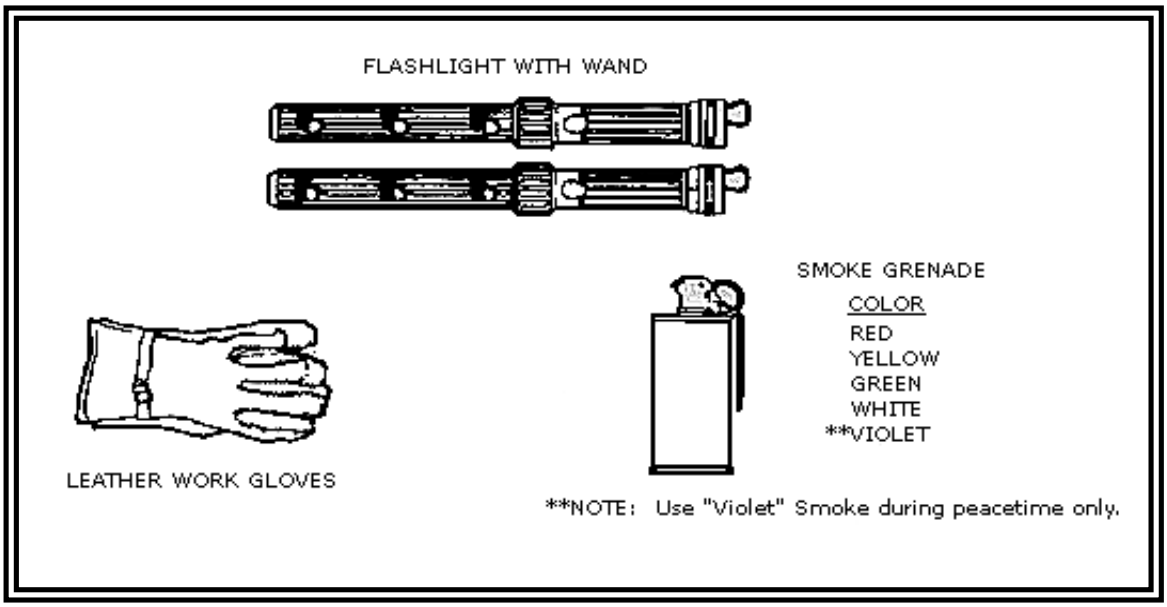

Figure 2-2. Additional Ground Crew Equipment (Depending on Mission)

2-70. To prevent static electricity shock, the ground crew member uses a discharge wand to ground the cargo hook. For added protection, the ground crew member should also wear 5000-volt shockproof gloves, if available, when using the wand.

2-71. The wand consists basically of an insulated plastic tube with a metal hook on one end with a wire attached leading to a ground rod. The entire length of wire must be insulated. The wire could cause a severe shock if it comes in contact with personnel. In use, the ground rod is driven into the earth, and a ground crew member holds the wand. As the helicopter hovers over the load, the assistant hookup man holds the wand against the cargo hook; this grounds the stored electrical charge. Meanwhile, the hookup man places the clevis on the hook.

FIELD EXPEDIENT STATIC-DISCHARGE WAND

2-72. Discharging static electricity is an important step to ensure the overall safety of the hookup team. You can assemble a field expedient static-discharge wand using the following components:

- Grounding rod, NSN 5975-00-878-3791. You will be able to make three static-discharge wands from this 5/8- by 108-inch generator grounding rod.
- Grounding cable, NSN 4010-00-286-2681. If you do not want to order this 1000-yard roll of cable, contact the nearest petroleum handling or ground power section to obtain a length of grounding cable.
- Electrical clip, NSN 5999-00-260-0447. You will receive electrical clips for five static-discharge wand.
- Rubber hose, NSN 4720-00-277-8985. Order enough of this 5/8-inch inside diameter rubber hose to cut a 12-inch section for each static-discharge wand.

2-73. The following steps should be taken to assemble the static-discharge wand:

- Step 1. Cut a section of grounding cable about 20 feet long. Strip 1 inch of insulation off both ends of the cable.
- Step 2. Cut a 20-inch and a 16-inch section from the generator-grounding rod. The 20-inch section will be the static-discharge wand, and the 16-inch section will be the grounding rod.
- Step 3. Clamp one end of the cable to the 20-inch section of rod about 12 inches from the end of the rod (Figure 2-3).
- Step 4. Slide the section of rubber hose over the cable and ground rod so that the rod is about 1 inch from the end of the rubber hose. Fill the end of the hose with silicone sealant to provide insulation protection from the bare end of the rod. If a rubber hose is not available, wrap electrical tape or pressure-sensitive tape around the clamp and the lower portion of the rod so that the tape is about ½ inch thick (Figure 2-4).

- Step 5. Bend the last 2 inches of the rod 90 degrees to form a hook to connect to the helicopter cargo hook (Figure 2-5.).

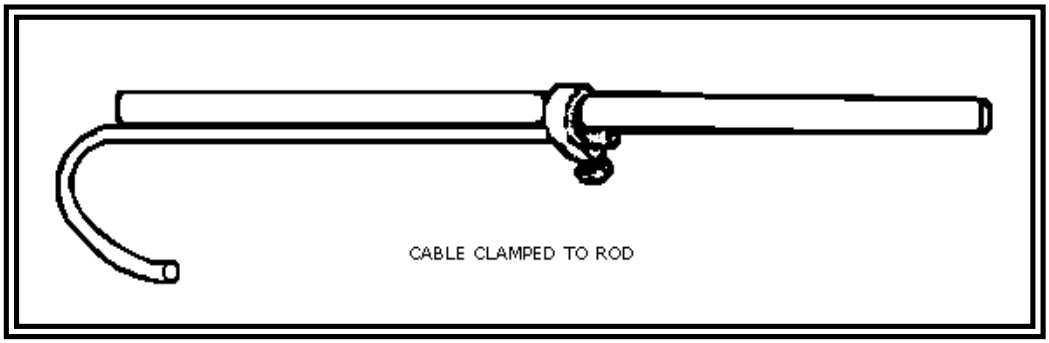

Figure 2-3. Cable Clamped to Rod

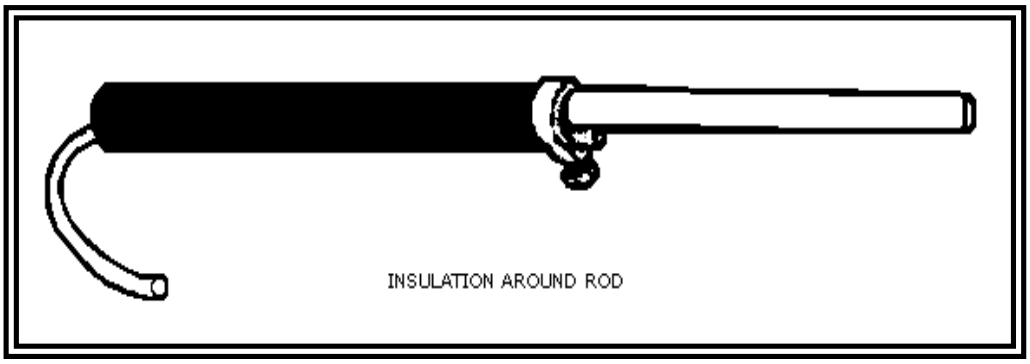

Figure 2-4. Insulation Around Rod

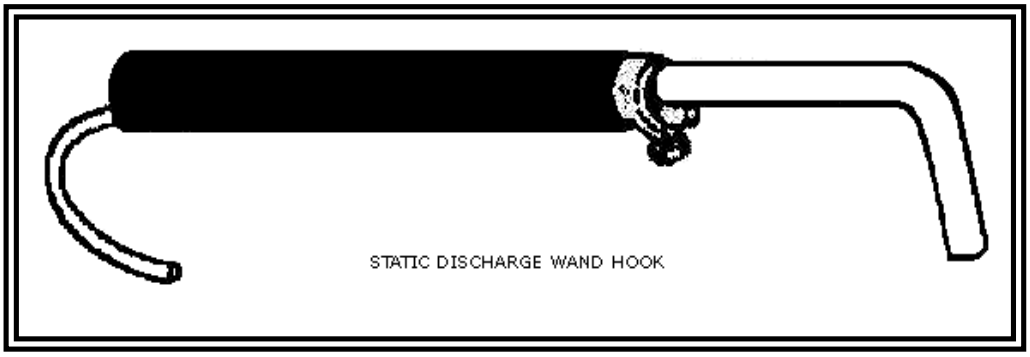

Figure 2-5. Static-Discharge Wand Hook

CAUTION

Keep hands away from the bare metal portion of the static-discharge wand when contacting the cargo hook to discharge the static electricity. Severe electrical shock can result from improper static-discharge wand operation.

- Step 6. Sharpen a point on one end of the 16-inch section of rod to make it easier to drive the grounding rod into the ground.
- Step 7. Attach an electrical clip to the other end of the 20-foot cable. Connect the clip to the grounding rod made in step 6 (Figure 2-6.).
- Step 8. Perform an electrical continuity check between the hook end of the static-discharge wand and the electrical clip on the grounding rod. Isolate and repair or replace the affected part. Lack of electrical continuity can be a safety hazard to the hookup team.

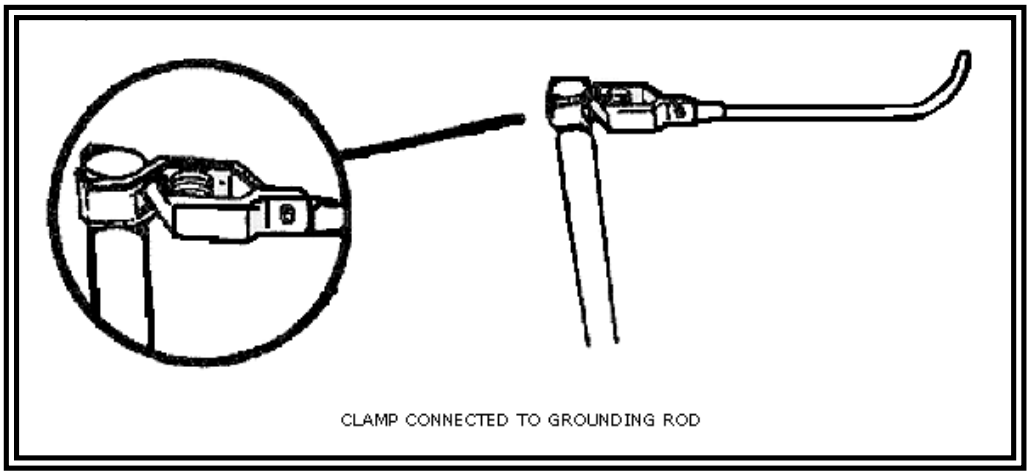

Figure 2-6. Clamp Connected to Grounding Rod

GROUNDING TO AIRCRAFT TECHNIQUE

2-74. Ground the helicopter cargo hook by touching the wand to the cargo hook (Figure 2-7.). Maintain continuous grounding contact. Wear 5000-volt shockproof gloves, if available, when using the static-discharge wand. These gloves are not repairable. They will not protect against static electricity if damaged.

2-75. Even though the helicopter has been grounded and because the grounding contact could somehow be broken, the ground crew should not touch the cargo hook. Never grasp the NO HOLD area of the wand during grounding.

2-76. Since the helicopter can recharge in less than 1 second, the wand operator must maintain continuous grounding contact. Connection of the cargo sling to the helicopter cargo hook alone does not provide good grounding.

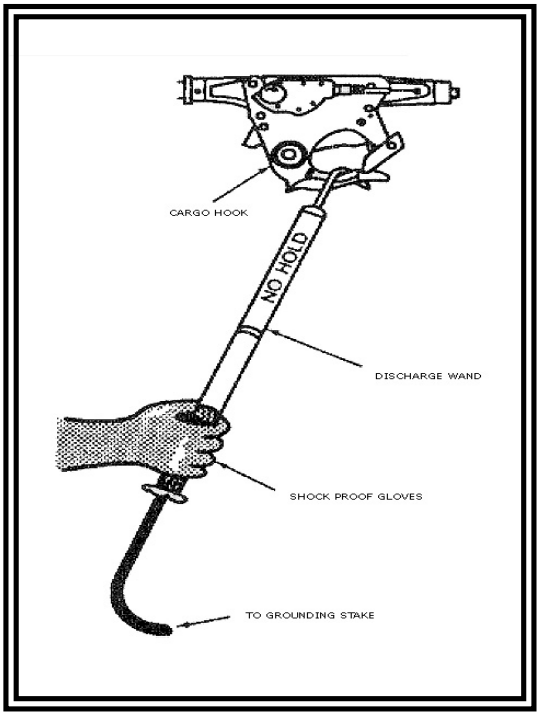

Figure 2-7. Proper Grounding Technique

WARNING

Contact between the discharge wand and the cargo hook must be maintained until the clevis is placed on the hook. If contact between the wand and the hook is not maintained, the ground crew member may receive a serious shock. This does not mean the ground crew should rig a spring clip to hook directly to the aircraft. If contact between the wand and the hook is broken, then contact must again be made before touching the hook. If static shock causes unconsciousness, determine if the victim has a pulse and/or is breathing. If not, immediately begin CPR and/or mouth-to-mouth resuscitation.

WAND MAINTENANCE

2-77. The grounding wand, cable, and clamp are not repairable. If the wand or the first 10 feet of cable (closest to the wand handle) is punctured or cracked, discard the wand. If either of the black plugs on the ends of the wand come out (they are allowed to rotate), discard the wand. Never attach metallic fittings to the wand or cable. To preserve the electrical capability of the wand and cables, remove fuel, grease, or oil from the wand with mineral

spirits; wipe dry. Remove saltwater residue or dirt with fresh water; wipe dry. Store wand in a dry place and out of direct sunlight. Store the cable and wand as shown in Figure 2-8. Turn the wand upside down and coil the cable lariat-style into several 12-inch diameter loops.

2-78. With the last remaining loop, interlace the cable around the loops several times and attach the clamp to the end plug. Hang wand upright by the wand hook.

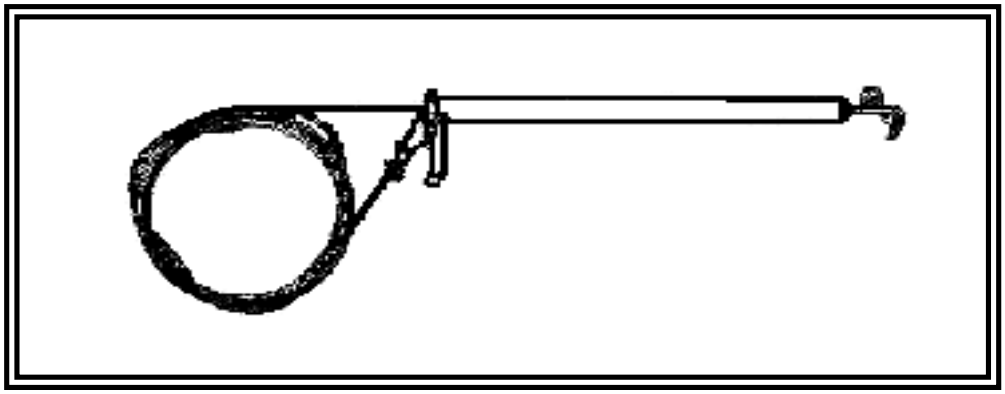

Figure 2-8. Cable and Wand Stowage Method

WARNING

Contaminants on the wand may be conductive. They may allow an electrical discharge to travel the outside surface of the wand and reach the operator.

WAND USE

2-79. The following steps tell how to use the static-discharge wand**:**

- Step 1. Inspect the static-discharge wand and the grounding rod to ensure they are serviceable.
- Step 2. Select the location for the grounding rod, and drive the rod into the ground. The amount of protection from static electricity depends on the depth of the grounding rod. For optimum protection, drive the rod into the ground to the 24-inch weld bead. In sandy or loose soil, drive the rod to within 1 inch of the cross handle. In hard or frozen soil, drive the rod to a practicable depth. The grounding rod should be on the side of the load away from the rendezvous point. Drive it into the ground at a 45-degree angle away from the load. At this angle the rod will cause less injury should a soldier fall on it because the rod will bend under the soldier's weight.
- Step 3. Place the static-discharge ground wire clamp around the vertical shaft (primary) of the grounding rod or the horizontal hand grips (alternate) (Figure 2-9.).

- Step 4. Position soldiers on the disabled aircraft so that the static-discharge man with the static-discharge wand is farthest away from the rendezvous area; the static-discharge man is the last one to leave the load after the hookup is completed.
- Step 5. The static-discharge man places the static-discharge wand on the cargo hook. This dissipates the static electrical shock that has built up in the aircraft. He maintains contact with the load until the hookup is completed.

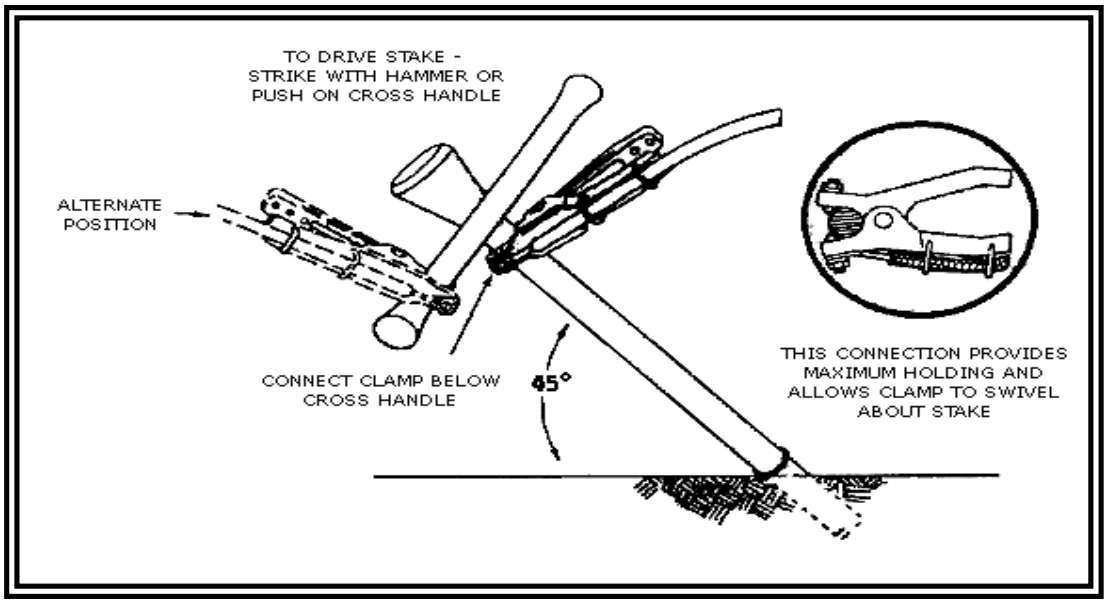

Figure 2-9. Grounding Stake and Clamp Connection

WARNING

Failure to heed the following procedures could result in personal injury or loss of life.

GROUND CREW FUNCTIONS

2-80. Before the recovery operation starts, the ground crew must make sure that the disabled aircraft is correctly prepared and rigged.

WARNING

Welded or unauthorized repairs are not acceptable on items to be airlifted. Only authorized replacement parts are acceptable.

2-81. Break away taping is used to hold lines and sling legs in place before the aircraft arrives in the pickup area. Taping holds the legs. When the aircraft puts pressure on the lifting legs, the tape is pulled off or breaks away from the place where it was taped. Thus, the legs or lines will carry only their allowed weight and will not become tangled or wrapped around any objects.

2-82. The Noncommissioned Officer in Charge identifies a rendezvous point for his ground crew to gather after each lift is completed or during an emergency. A rendezvous point is an easily recognized point on the ground (for example, trees, bunkers, buildings, vehicles, or wooded areas) where the ground crew can gather without being in danger. This point should not be in a large open area where an aircraft can make an emergency landing. It should be located as far away from the emergency landing area as practical.

2-83. In addition, the rendezvous point under emergency procedures, requires coordination with the pilot of the recovery aircraft. This will inform both teams to know which direction (clock position relative to the nose of the aircraft) the other will disperse.

2-84. The area must be policed to prevent a flying object hazard. Any object that the rotor wash can lift could become a missile and cause damage to equipment or injury to personnel.

NOTE: Although signal smoke is often used in the pickup zone to show wind direction and identify the proper landing zone, it can reduce the pilot's vision. Obstructed pilot vision could result in an aircraft crash. Smoke should only be used during the initial approach; it should be well dissipated during the lift operation.

2-85. As the helicopter approaches the pickup site, the ground crew members put on their equipment and—

- The signalman takes a position upwind from the load. This means that the wind should be at or blowing towards his back with the load between him and the helicopter. Figure 2-10 shows the proper distance for the signalman during a hookup using an UH-1 Huey. Distances will be greater for larger helicopters (about 100 feet for the UH-60 and 150 feet for the CH-47).
- The hookup man and static-discharge man go to their positions beside or on top of the load.

NOTE: Any extra personnel, such as equipment operators, are positioned so that they are clear of the hookup area and away from the landing and takeoff zones.

2-86. The signalman gives signal directions to the pilot as soon as the pilot can clearly see him. He must move with the aircraft to stay within the pilot's view. The signals must be precise to prevent any misunderstanding between the signalman and the pilot. (See para entitled "Hand and Arm Signals.")

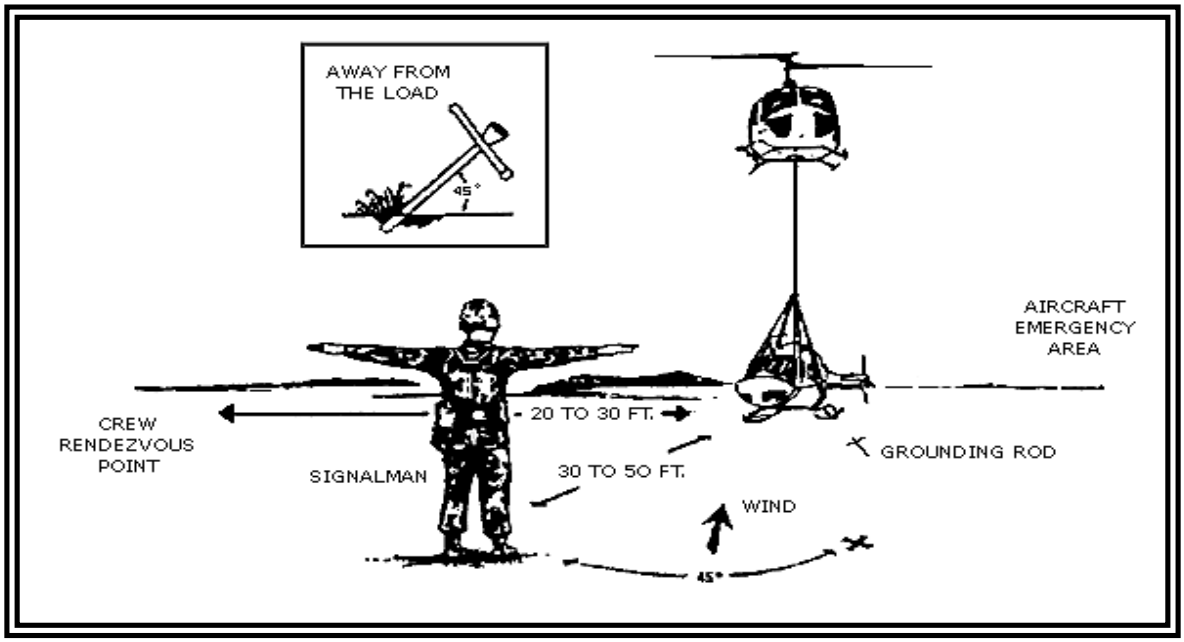

Figure 2-10. During Helicopter Hookup

2-87. While the helicopter is moving, the signalman is responsible for the safety of the hookup crew.

NOTE: During hookup of the downed aircraft, recovery personnel should maintain additional hardware (nuts, bolts, cotter keys, and pins) with them in the event that they drop the primary devices during hookup.

2-88. When the aircraft is correctly positioned, the ground crew starts the hookup. The signalman must keep his eyes on the hookup team and the cargo hook. Any mistakes at this point could cause a hazard to anyone below the aircraft. The pilot cannot see the hookup team during the hookup. The pilot must concentrate on maintaining a steady hover. The hookup team must do its jobs as fast and as safely as possible. The steps for performing a hookup are as follows:

- Step 1. The signalman signals the pilot to maintain a hover once the hook is in position.
- Step 2. The static-discharge man then places the static-discharge wand on the cargo hook. The hookup man places the apex fitting on the cargo hook keeping the sling legs straight.
- Step 3. The hookup man uses hand signals to let the signalman know if there is anything wrong with the hook or the load. After attaching the apex fitting to the cargo hook, the hookup man climbs off the aircraft. The static-discharge man then drops the static-discharge wand to the ground, clear of the aircraft in the vicinity of the grounding rod. The hookup team then departs to the rendezvous point. The signalman

gives the signal that the load is hooked up and slowly gives the pilot the "raise up" signal.

- Step 4. As the aircraft rises, the signalman visually checks the load to make sure the sling legs have not become entangled. Proper clustering and taping techniques prevent the sling legs from being entangled. The hookup team must watch the signalman to see if any problems arise with the sling legs. If the load is correct, the signalman gives the pilot the "thumb up" signal.

WARNING

Coordinate the evacuation route of the ground crew to a rendezvous point with the liaison officer or helicopter crew before the start of the operation. Proper coordination will prevent any mixup. Helicopter emergency procedures depend on terrain, wind direction, and pilot choice. Good prior coordination will prevent the helicopter and the ground crew from moving in the same direction.

- Step 5. If the load is not correct (tangled sling, hook open, damaged slings, and so forth), follow these procedures:
  - Give the pilot the "hookup" signal followed by the "negative" or "thumb down" signal.
  - Direct the aircraft downward until the hookup men can correct the rigging.
  - Once the rigging has been corrected, direct the aircraft up again to check the load before giving the "thumb up" signal.
- Step 6. The signalman then makes a circular motion with his arm extended over his head and points to the direction in which the pilot should depart the pickup zone. When pointing, the signalman steps off in the same direction that he is pointing to make his signal more pronounced to the pilot (Figure 2-11).

EXTENDED SLING SYSTEM OPERATIONS

2-89. Units may conduct aerial recovery operations with the UH-60 Black Hawk and CH-47 Chinook helicopters using the extended sling system. The ground crew consists of the signalman and the hookup man. Since the helicopter lands beside the load, a static-discharge man is not needed.

2-90. The signalman directs the aircraft to land up-slope from the load. The hookup man crawls under the helicopter, attaches the apex fitting to the cargo hook, and boards the aircraft. The signalman and other personnel wait for the aircrew member to signal them to approach and board the aircraft. All personnel must follow the directions from the aircrew. The aircraft crew member gives direction to the pilot to center the aircraft over the load and to prevent entanglement of the sling.

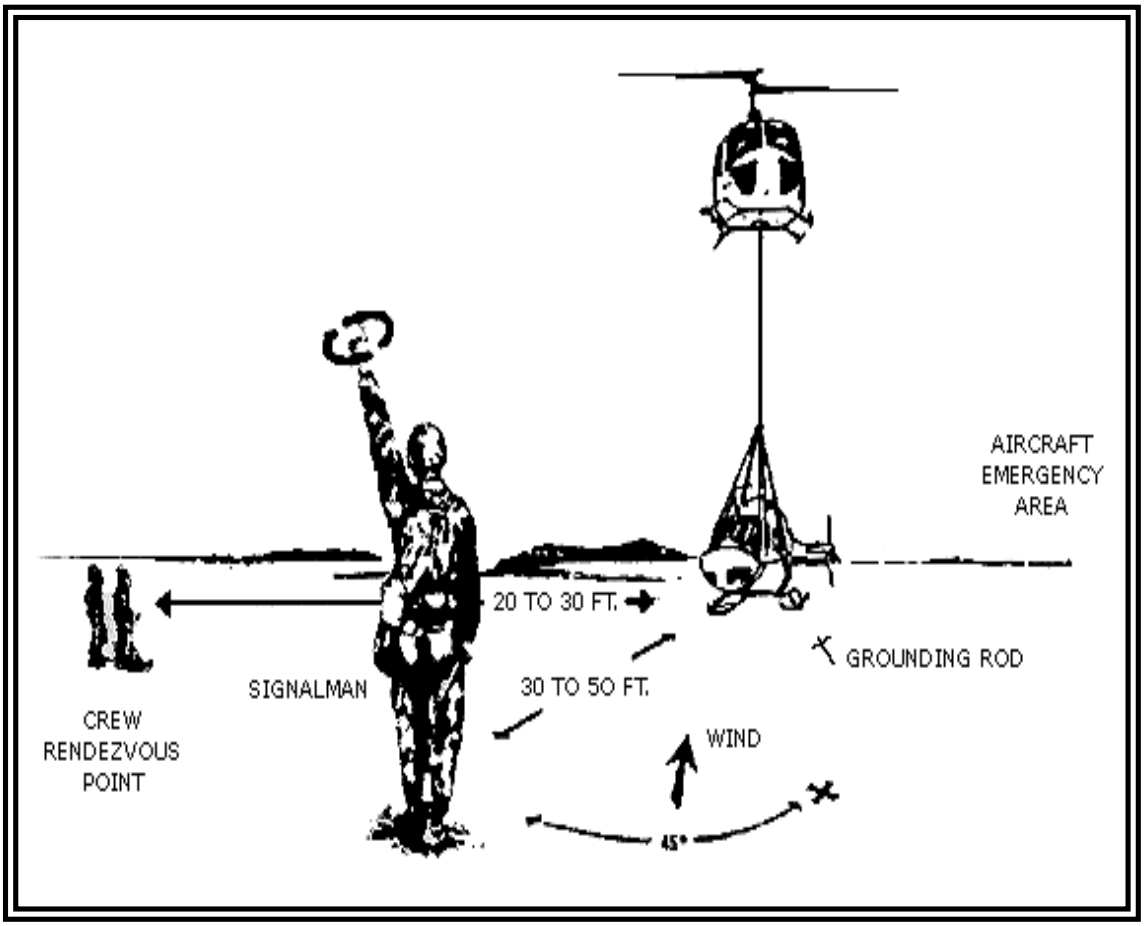

Figure 2-11. Performing Hookup

WARNING

Aircraft must land when using the extended sling system. If the disabled aircraft is on a slope, make sure the area up-slope of the load is clear to allow the helicopter to land beside the aircraft.

2-91. Extended slings may be used in areas that restrict the recovery aircraft's approach to a direct hookup or landing for the purpose of an extended sling hookup. In cases where the downed aircraft is surrounded by obstacles, it may become necessary to lower the extended sling down from the recovery aircraft to the ground crew for hookup.

RADIO SECURITY

2-92. Radio security is an important part of ground crew training. In a hostile area the safety of both the helicopter and ground crew is at stake if the enemy determines your position.

NOTE: Do not use proper names (for example, CPT Ashcom, 34th Cavalry, and so on).

2-93. Remember, the signal operating instructions (SOI) have only one purpose: to save one's life by keeping information from the enemy. Also, keeping radios in the frequency hopping, low-power mode, reduces the probability of detection.

HAZARDS

2-94. Along with other duties, the ground crew should also become safety experts. The hazards found in operating under a hovering helicopter are real. Only trained crews should be used to rig disabled aircraft and connect them to the recovery helicopter. Crew members should be aware of the electrical shock associated with connecting the web ring or the metal clevis to the cargo hook. The static-discharge wand must be used when performing load hookup.

2-95. When operating in snow, dry dust, or light rain, the hookup personnel should also know that the electrical shock might constantly be passed to them by the snowflakes, dry dust or the rain spray. Other hazards to consider and avoid are—

- Chemical hazards due to fragmented composite materials and discharged toxic chemicals may become airborne during hookup operations. Skin, nose, mouth, and eyes should be protected against potential contamination.
- Flying debris (loose items on the pickup zone or landing zone).
- Entanglement in cargo slings.
- Sharp objects protruding from the aircraft.
- Top-heavy and unbalanced loads.
- Being caught between the load and the aircraft. (Always stands or crouches beside or on top of the load so that you can move quickly out of the way of the aircraft.)
- Protruding parts of the aircraft such as struts, wheels, and cargo hooks.
- Swinging cargo hooks and cargo.
- Tripping over the static-discharge wand ground cable.

WARNING

Some particulate matter is highly toxic. The air surrounding a fuel fire, for example, contains particulate matter that, if inhaled, can cause fluid buildup in the lungs to the extent that death can occur.

CAUTIONS

2-96. Observing the following cautions will minimize the chances of the ground crew getting injured during a hookup operation. Read them and practice them. Think of these cautions whenever you are around an aircraft and remind your fellow crew members of them.

- Stay clear of rotor blades and the tail section of the aircraft.
- Use all required safety equipment.
- Use all safety procedures.
- Be conscious of what you are doing; what you are going to do next.
- Always use the static-discharge wand when hooking up loads.
    - Watch for obstacles on the ground that you could trip over.
    - Keep an eye on your fellow crewmembers; their safety is important too.
    - Check and double-check the load.
    - Know your position in relation to the helicopter at all times.
    - Stay clear of moving cargo hooks.
    - Follow the SOI if used.
    - Follow established emergency procedures.
    - Do not smoke, except in designated areas.
    - Know where your rendezvous point is in case of an emergency.
    - Know the rendezvous point of recovery aircraft in case of an emergency.

HAND AND ARM SIGNALS

2-97. The correct hand and arm signals (Appendix B) must be practiced and performed with care. There can be no misunderstanding between the signalman and the pilot.

2-98. The best way to learn these signals is to do them. Practice each signal in front of a mirror or with a friend. Two or more people working together will speed up this part of the ground crew training. In Appendix B, the man on the right is using a lighted wand. This is a standard Army flashlight with a plastic wand attached to the end. Using a flashlight in decreased visibility will help the pilot see the signals.

ACTIONS AT THE LANDING ZONE

2-99. It is just as important to plan the arrival of the downed aircraft at the recovery site as it is for its extraction. Site selection is important depending upon the extent of damage to the downed aircraft. If the main gear is damaged, it may become necessary to place the aircraft in a location that affords the loading of the aircraft on some sort of ground handling equipment for onward movement. Equally important is availability of a ground reception crew to receive the aircraft and prevent further damage to the

downed aircraft. Reception crews require training and a briefing on the operation, which should include oscillation control, aircraft hazards, and procedures in case of an emergency. A brake or chock man should be included on the team if the brakes are not set during extraction and a drogue chute is used. The drogue chute can effect the aircraft once it is on the ground and poses a potential hazard. Plans for aircraft reception should include the control and quick release of the drogue chute once the aircraft is on the ground.

GROUND RECOVERY RESPONSIBILITIES

2-100. Ground crew responsibilities remain basically the same despite the type or model aircraft being ground recovered. The aircraft is assembled or components are removed to accommodate loading the aircraft onto the transport vehicle using procedures outlined in the appropriate aircraft maintenance manual. Aircraft are rigged for lifting onto the recovery vehicle using the equipment and procedures used for aerial recovery. The ground crew will prepare the recovery vehicle load surface for transport of the aircraft. If the lighting gear has been severely damaged or removed from the aircraft, position cushioning material (mattresses, foam rubber matting, etc.) under the aircraft to minimize further damage.

2-101. The ground crew (maintenance personnel) assist in loading the disabled aircraft onto the ground recovery vehicle. They hook up the lifting device to the equipment used to lift the aircraft. They ensure that the lifting device remains properly rigged as the aircraft is raised from the ground. The ground crew minimize oscillation of the aircraft as it is moved into position over the transport vehicle and guide the aircraft into the proper position as it is lowered. They attach guide ropes to hard structures on the aircraft (towing lugs, landing gear, skids, etc.). The ropes control oscillation and positioning of the aircraft without requiring personnel to be under or in direct contact with the aircraft.

POST-RECOVERY INSPECTION AND PACKAGING

2-102. After a recovery mission is completed, the equipment is readied for the next time it will be needed.

CLEANING OF EQUIPMENT

2-103. All recovery equipment should be cleaned and dried before repackaging into the container. Refer to appropriate recovery kit manuals on how to care for and inspect the equipment.

REPACKING OF DROGUE CHUTES

2-104. Refer to appropriate recovery kit manuals on how to repack the drogue chutes.

REMOVAL OF FLASHLIGHT AND RADIO BATTERIES

2-105. Batteries should be removed from the radio and flashlights used in the recovery operation to prevent corrosion damage.

REPLACEMENT OF EQUIPMENT

2-106. Place all components of the aerial recovery kit in their appropriate compartment within the kit container. The kit container should then be locked and stored for a subsequent recovery mission. The tools, flashlight, radio, and so forth, used in the recovery mission should be cleaned and returned to the appropriate location.

ADMINISTRATIVE REQUIREMENTS

2-107. The goal of the US Army Aviation Center (USAAVNC) and the US Army Aviation and Missile Command (AMCOM) is to provide timely and accurate guidance in aircraft recovery of disabled aircraft. Therefore, upon completion of any aerial recovery mission, besides the data requested by Appendix A, respondents are urged to comment in detail on shortcomings or the failure of any components of the current kit. Send the survey to the Commander, US Army Aviation Center, ATTN: ATZQ-TDS-DB, Fort Rucker, Alabama 36362-5000. The USAAVNC will forward a copy of the report, along with comments, to AMCOM.