CHAPTER 10: PERSONNEL TRANSPORT

I. Introduction.

The safe transport of personnel in helicopters is of the highest priority. Using standard procedures for transport outlined in this chapter will ensure, to the extent possible, that agencies meet their objective of transporting personnel safely and efficiently.

In order for personnel to be transported legally in a government aircraft\(^1\), each passenger must meet the definition of authorized passenger.

Refer to the glossary for definitions of flight crew member, air crew member and passenger. Air crew members may be permitted on board aircraft during certain missions (for example, external loads) on which passengers are prohibited.

A. Aircrew/crewmember.

A person working in and around aircraft and is essential to ensure the safety and successful outcome of the mission. Aircrew members are required to either be on board or attend to the loading and unloading of passengers and cargo at all landings and takeoffs, attend to external loads and ensure that passengers have received a pre-flight safety briefing.

B. Authorized/Official Passengers.

Passengers are any persons aboard an aircraft who does not perform the function of a flight crew/pilot or aircrew member. Passengers may be transported in government aircraft only if they meet the definition of an official passenger.

- Officials and employees of the federal government travelling on official business.
- Members of Congress and employees of congressional committee staffs whose work relates to the agency’s programs.
- Non-federal passengers when engaged in missions which enhance accomplishment of an agency program such as personnel of cooperating state, county or local agencies; representatives of foreign governments; and contractor’s representatives to include those employed by such agencies; and private citizens.

C. Unauthorized Passengers.

All personnel who are not official passengers shall be considered unauthorized passengers and are not authorized to be transported in any aircraft owned or operated by or on behalf of the government. A person who is otherwise an official passenger could become unauthorized by performing a function for which that person is not authorized, e.g. a passenger performing pilot duties without proper authorization.

\(^1\) Government aircraft are defined as those owned, bailed, loaned, leased or lease/purchased, rented, chartered, or contracted by a government agency.
D. Carriage of Government Employees Aboard Restricted Category Helicopters.

Government employees may not be passengers or air crew members aboard helicopters operated as restricted category aircraft.

E. OMB Circular A-126 Requirements.

OMB Circular A-126 establishes approval and reporting requirements for both point-to-point administrative travel cost-comparisons and mission flights involving Senior Federal Officials. Refer to agency specific directives for guidance. The local unit aviation manager is usually responsible for meeting these requirements. State and local agencies may have similar direction.

F. News Media as Passengers.

Agency officials may authorize members of accredited news organizations to fly in government aircraft subject to the following requirements:

1. General. A qualified Helicopter Manager or Flight Manager shall be assigned to the mission. All requirements regarding use of personal protective equipment, flight following, load calculations, and hazard analysis shall be followed.

2. Resource/Project Missions. If the mission is special use, a Project Aviation Safety Plan shall be required and approved by line management prior to the flight. It must show that the carriage of news media aboard the aircraft is of an official nature and is advantageous to the agency. Since news media are thereby designated official passengers, no flight release waiver is necessary.

3. Incident Missions. As a general rule, the Incident Commander on Type I or II Incident Management Teams may authorize all flights with media on board. On local unit fires, the line manager or their designee is usually the approving authority. Flights on government aircraft with news media aboard must be in the interest of the government. No flight release waiver is required. This general guidance may be further restricted by agency local unit policy. The air operations staff should check with the local area to ascertain any additional restrictions or necessary approvals.

4. Restricted Category Helicopters. Carriage of news media aboard restricted category aircraft is specifically prohibited.

II. Qualified Personnel.

Helicopter and helibase management personnel must be qualified to supervise and coordinate passenger transport activities on incidents or projects per the requirements in Chapter 2.
III. Load Calculations and Manifesting.

During passenger transport operations, load calculations shall be performed prior to any flight activity in accordance with procedures outlined in Chapter 7 and Appendix A. Personnel manifesting procedures are addressed later in this chapter.

IV. Air Crew Member On Board During External Load Missions.

As a general rule, only the Pilot(s) shall be aboard helicopters when conducting external load operations.

However, FAR 133 authorizes an aircrew member to be aboard the aircraft when conducting external load operations when:

- The safety of a mission can be substantially enhanced, and
- The capability of the helicopter is not significantly reduced, and
- The helicopter is not in the restricted category.

Missions where safety and/or effectiveness may be enhanced by an aircrew member being on board during the conduct of external load missions include, but are not limited to:

- Conditions of visibility (smoke, smog) and/or terrain where the Pilot requests an observer aboard to optimize detection of obstacles and other aircraft.
- Complexity of the incident or project and the cockpit workload, to include large numbers of aircraft operating in the vicinity, close and frequent coordination needed with ground personnel, overloaded radio frequencies, etc.
- Areas of airspace complexity (military training areas such as Special Use Airspace or Military Training Routes; high-density civil operations) where the observer could enhance the ability to avoid collisions with other aircraft.

The Pilot has the final authority regarding carrying an aircrew member during external load operations. Air operations staff should conduct an on-site risk analysis which weighs the benefits of increased safety and efficiency versus the added exposure. The mission(s) must also be adequately planned.

Individual agency exemptions granted by the FAA to FAR 91.119, Minimum Safe Altitudes, may also require an observer on board during specified situations. Consult the Interagency Airspace Coordination Guide.

V. Procedures for Transporting Personnel at Helibases or Helispots.

At project or incident helibases and helispots, large numbers of personnel are often moved via helicopter(s). When preparing for transport of personnel, the following guidelines apply.
A. Arrival of Personnel at the Helibase or Helispot.

- The person in charge of any group of people needing helicopter transportation (for example, Crew Supervisor, Strike Team Leader, Chief-of-Party) shall report to the person in charge of the helibase or helispot.
- The person in charge should give the Helicopter Manager, Flight Manager, or Loadmaster a list of the people to be transported so that a manifest can be completed. Passengers should be appropriately clothed (PPE) and ready for transportation.

B. Manifesting Personnel.

The manifesting process tracks personnel being transported and ensures that allowable payload limitations are not exceeded. Consult Appendix A for instructions on completion of Form HCM-9, Interagency Helicopter Passenger/Cargo Manifest. To complete this form the manifester will need the following.

- Full name of each person being transported
- Weight of each person with personal gear
- Weight of additional tools and equipment
- Destination of personnel and/or cargo
- The person in charge should maintain control of personnel at all times.

**NOTE:** Manifesting of handcrews using their crew manifest is acceptable. If a handcrew provides an accurate manifest, it is not necessary to transfer names to the Interagency Helicopter Passenger/Cargo manifest.

**NOTE:** Weights must be accurate, not estimated. If scales are available, use them. Scales are required at incident or project helibases and, if possible, should be provided at helispots.

C. Other Considerations.

- The Pilot's knowledge of helispot location, hazards, etc. On helibases, the use of Form HBM-2, Aviation Locations Summary, to provide a briefing is required.
- The method of handling and transporting tools, equipment, and supplies (external or internal, hazardous materials requirements, etc.).
- Emergency procedures to be followed.
- Stops to be made en route.
- Procedures for unloading personnel and/or cargo at destination, with the assurance that:
• The destination is staffed by trained personnel or,
• An air or flight crew member is assigned to the flight to assist or,
• One of the passengers is qualified to assist.

D. Passenger Safety Briefings.

Once manifesting has been completed, the safety briefing can be accomplished. Briefings shall be given to every passenger prior to entering the safety circle to board the helicopter. The briefing should follow the format in the Aircraft Safety Briefing. See Exhibit 10-1.

The safety briefing may be given by the Pilot or as delegated by the Pilot to authorized and qualified personnel such as a helicopter manager, flight manager, helicopter crewmember or Loadmaster. The person giving the briefing must:

• Ensure that instructions are clear and understood.
• Ensure in-flight emergency procedures are included.

E. Loading Procedures.

After the safety briefing has been given, consider the following:

• Helicopter crewmembers or other authorized, trained personnel shall assist in the loading operations.
• Personal items carried on board must be adequately secured.
• Prior to approaching the helicopter, remove canteen belts, vests with full pouches, fire shelters, and other items which might impede proper fastening of seat belts/shoulder harnesses. These items must be placed and secured in an appropriate area.
• Stay in safe area prescribed by helicopter crew or other authorized personnel until given the direction to load.
• Wear appropriate head protection as referenced in Chart 9-1.
• First person into the helicopter passenger compartment should move to center seat, or seat assigned by Pilot or helicopter crew personnel.
• Find seat belt and fasten; if unable, advise the helicopter crew person who will assist.
• Ensure that personal protective equipment is properly worn (that is, sleeves rolled down and collars up). See Chapter 9, Charts 9-1 and 9-2, for PPE requirements.
• Large gear such as fire tools should be handled by helicopter crew person.
• Ensure that all personnel understand the instructions given by Pilot or helicopter crew person.
**CAUTION:** When opening hinged doors to embark or disembark, passengers should keep one hand on the door at all times until the door is secured.

F. **In-Flight Precautions.**

- No smoking during flight.
- Keep clear of controls. **DO NOT TOUCH** controls except in an emergency where, if the Pilot is incapacitated, a passenger may shut down the fuel and electrical supply.
- Secure all items, especially when flying with the door(s) off or open.
- Be aware of emergency exits and read instructions pertaining to emergency egress. If in doubt, ask questions.

G. **Unloading Procedures.**

- Wait for Pilot, helicopter crewmember, or other authorized personnel to give a clear signal for offloading.
- Doors should be opened only by helicopter crewmembers, other authorized personnel, or at the direction of the Pilot when no one is available at the landing site.
- Remove seat belts and lay them on the seat. If possible, refasten them before exiting.

**CAUTION:** Ensure that seat belts are inside the aircraft when closing doors. A loose seat belt can cause major damage when the helicopter becomes airborne.

- Maintain control of all personal items. If an item is lost, do not go after it.
- Exit the helicopter slowly and use the departure route indicated by the helicopter crew or the Pilot. When large numbers of passengers are being transported, helicopter personnel will normally accompany passengers from the aircraft to the safety zone.

**CAUTION:** When exiting the aircraft, do not walk toward the tail rotor or uphill. If in doubt, ask the Pilot or helicopter personnel what the approved exit route is.

- After leaving the helicopter, move to an area which is **not** in the departure flight path for the helicopter.
- Once shut-down procedures have been initiated by the pilot, passengers should wait to exit until the rotors have come to a complete stop.
VI. Personnel Transport Using Military Helicopters.

A. Incident Operations.

For aviation operations using Active Duty/Reserve Military helicopters, and National Guard units officially “federalized” by DoD, refer to Chapter 70 of the Military Use Handbook for specific policy and procedural information.

The use of National Guard units for federal firefighting purposes within their state must be outlined in national, regional, state or local agreements and Memorandums of Understanding (MOUs) between federal agencies and the specific National Guard units.

B. Project Operations.

It is recommended that an agency Helicopter Manager be assigned to any military helicopter ordered for a project. Duties and responsibilities are the same as those for incident operations.

VII. Special Law Enforcement Operations.

See Chapter 16 for differences in passenger transport procedures on special law enforcement missions. Unless specifically authorized in Chapter 16, law enforcement missions shall adhere to the procedures outlined in this chapter.

VIII. Special Search and Rescue Operations.

See Chapter 17 for differences in passenger transport procedures on search and rescue missions. Unless specifically authorized in Chapter 17, search and rescue missions shall adhere to the procedures outlined in this chapter.
Exhibit 10-1: Standard Helicopter Safety Briefing Checklist

MANAGER BRIEFING WITH PILOT

1. **Pilot Card**: Qualified and current for aircraft type and mission.

2. **Aircraft Card**: Aircraft approved for mission?

3. **Flight Plan/Resource Tracking**: FAA or Agency Flight plan filed; Resource Tracking procedures identified.

4. **Flight Following/Radio/AFF Equipment**: Flight following procedures in place; radio/AFF equipment is adequate and operational. During takeoffs and landings there should be no radio traffic that might distract the pilot.

5. **Nature of Mission**: Pilot briefed on nature and sequence of mission.

6. **Analysis of Known Hazards**: Known hazards discussed; high-level recon prior to decent to low-level.

7. **PIC Concept**: Pilot shall not be pressured into performing missions beyond pilot’s capability or that of the aircraft.

8. **Hazardous Materials**: Identify any Hazardous Materials that will be transported and notify the Pilot. Take appropriate actions.
HEICOPTER PASSENGER BRIEFING (FRONT)

Pilot or designated Helitack must brief all passengers prior to flight

1. Personal Protective Equipment: See Chart 9-1 for requirements.
   - Nomex Clothing (long-sleeved shirt & pants, or flight suit)
   - Approved Helicopter Flight Helmet
   - All-Leather Boots
   - Hearing Protection
   - Nomex and/or Leather Gloves
   - Survival Equipment as applicable (PFD, Life Rafts, etc.)

2. NO Smoking: Rules in and around aircraft

3. Approach and departure paths:
   - Always approach and depart from the down slope (lower) side as directed by Pilot/Helitack
   - Approach and depart helicopter in a crouch position, do not run
   - Keep in pilot’s field of vision at all times
   - Stay clear of landing area when helicopters landing or departing
   - Stay away from the main and tail rotors. Do not chase any item that has become unsecured
   - Never go near the tail of helicopters

4. Tools and Equipment:
   - Secure hand tools and equipment awaiting transport
   - Make assignments for carrying tools/equipment to/from helicopter
   - Carry tools/long objects parallel to the ground, never on shoulder
   - All tools and equipment loaded/unloaded by qualified personnel
   - Portable Radios turned off

5. Helicopter Doors: Location and normal operation
Exhibit 10-1: Standard Helicopter Safety Briefing Checklist (continued)

HEICOPTER PASSENGER BRIEING (CONTINUED)

6. In-Flight Discipline:
   • Follow the instructions of pilot
   • Loose items inside of aircraft secured and manageable
   • All baggage secured in aircraft or cargo compartment
   • Never throw any object from the helicopter
   • No movement inside aircraft once seated
   • Keep clear of the flight controls at all times
   • Unbuckle only when directed to do so by Pilot or Helitack
   • Leave doors closed, wait for Helitack personnel to unload
   • Know location of first aid kit, survival kit, fire extinguisher, ELT fuel and battery shutoff switch location and operation, radio operation, oxygen use (if available)

7. In-Flight Emergency Procedures
   • Emergency Exits: Location and normal operation
   • Follow instructions of Pilot/Helitack personnel
   • Snug seat belt and shoulder harness; secure gear
   • Emergency Seating Position WITH SHOULDER HARNESS (four point OR single diagonal strap): sit in full upright position with head and back pressed against seat and use arms to brace in position. If time permits and so equipped, lock the inertial reel
   • Emergency Seating Position WITH LAP BELT ONLY: bend over as far as possible and hold onto your legs
   • Assist any injured person who cannot leave the aircraft
   • Move clear of the aircraft only after rotor blades stop or when instructed to do so by the pilot or helicopter crew
   • Assess situation, follow pilot/helicopter manager instructions, render first aid, remove first aid kit, survival kit, radio, ELT and fire extinguisher
CHAPTER 11: CARGO TRANSPORT

I. Introduction.

When cargo is transported incorrectly, there is the potential for dropped external loads, hazardous materials spillage in the helicopter, overgrossed aircraft, cargo interference with the rotor systems, or other serious safety hazards. Incorrect methods of rigging and transporting cargo has resulted in catastrophic accidents. Use of the standard procedures outlined in this chapter will facilitate a safe and efficient cargo operation.

A. Longline Operations

1. Risk: The first thing to consider prior to any mission.

   Complete risk analysis is a must prior to deciding how a mission is to be accomplished, what equipment is to be used, and if the pilot and helicopter are correct for the job.

2. Height-Velocity Curve: What it means to the Pilot, Ground Crew and management.

   If a helicopter has a catastrophic engine failure while hovering at 100 feet AGL, it will contact the ground in approximately 2.5 seconds at a speed of 50 miles per hour, or 67 feet per second. Keep alert while working under a helicopter doing longline work!

![Height-Velocity Diagram](image)
II. Qualified Personnel.

A. Ground Personnel.

Helicopter and helibase management personnel must be trained and qualified to supervise and coordinate cargo transport activities on incidents or projects per the requirements found in Chapter 2, Chart 2-3.

Trained personnel should be provided at all loading and unloading sites. Any exceptions (for example, longline with remote electric hook transport) are noted in this chapter.

The following minimums are recommended for handling cargo transport (note that these are not related to the minimum fire helicopter staffing level requirements in Chapter 2):

- Four persons for Type 1 and 2 helicopters.
- Three persons per Type 3 helicopter.

These minimums provide for a Parking Tender, Loadmaster(s), and hook-up person.

B. Pilot Qualification.

The Pilot must be qualified for carriage of external loads and, if applicable, for longline (vertical reference).

III. Load Calculations and Manifesting.

During cargo transport operations, load calculations shall be performed prior to any flight activity. Weight of cargo is usually indicated either on the load calculation form or, if manifesting multiple trips under one load calculation, on the manifest form. Refer to Chapter 7, Load Calculations and Manifests, and to Appendix A Forms for detailed information and instructions.

IV. Air Crew Member on Board During External Load Missions.

An air crew member (for example, the Helicopter Manager) is allowed on board during external load operations, provided certain conditions exist or are met. See Chapter 10, Section IV for further information.

V. Hazardous Materials Transport and Handling.

A list of hazardous materials is contained in 49 CFR 172.101, Department of Transportation, Hazardous Materials Table. Some hazardous cargo may be transported via helicopters under special conditions. See 49 CFR.
A list of common hazardous materials, along with the correct transportation procedure for each, can be found in the *Interagency Aviation Transport of Hazardous Materials Guide/Handbook* (for USFS and OAS), or in local or state agency policy.

A. **Exemptions.**

USFS and DOI both have an exemption granted by the United States Department of Transportation (DOT). It exempts USFS and DOI from certain hazardous materials regulations, provided that the materials are transported in conformance with the *Interagency Aviation Transport of Hazardous Materials Guide* or *Handbook*. If an agency does not have an exemption from DOT, then all materials must be transported in accordance with 49 CFR Parts 171-175.

B. **Requirements.**

- Aviation transport of hazardous materials must conform to procedures contained in the *Aviation Transport of Hazardous Materials Guide* or *Handbook*.
- Personnel, including vendors, who engage in the transport of hazardous materials via aircraft must have been trained in Hazmat. They must carry a current letter of exemption, an *Interagency Aviation Transport of Hazardous Materials Guide* or *Handbook* and an *Emergency Response Guide* on board the aircraft at all times.

C. **Transport and Handling During Law Enforcement.**

See Chapter 16.

VI. **Cargo Transport with Military Aircraft.**

External sling load missions may not be possible or practical for all military helicopters for the following reasons:

- Military helicopters may not be equipped with cargo hooks.
- The sling equipment currently used by civilian fire agencies may not be readily adaptable for use on military equipment.

If military helicopters are tasked to perform external cargo transport, use military sling equipment and qualified military personnel. Military personnel engaged in external load operations must be furnished with and wear personal protective equipment according to the requirements found in Chapter 9, Chart 9-2.

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1USFS and OAS publish aviation hazardous materials transport directives. However, with the exception of references to the agency name, language and procedures are the same. The directives are also based upon the same exemption granted these agencies by the United States Department of Transportation. Local and state agencies may have similar direction.
For aviation operations using Active Duty or Reserve Military helicopters, and National Guard units officially “federalized,” refer to Chapter 70 of the Military Use Handbook for specific policy and procedural information.

The use of National Guard units for federal firefighting purposes within their state must be outlined in national, regional, state or local agreements and Memorandums of Understanding (MOUs) between federal agencies and the specific National Guard units.

VII. Cargo Preparation.

Correct cargo preparation is essential to safe completion of the mission.

A. Pilot Approval.

Obtain Pilot approval of all cargo to be transported. Loadmasters and other personnel loading cargo must always inform the Pilot of:

- Hazardous material(s) being transported;
- Packaging of the hazardous material. Has it been correctly packaged and placed in the helicopter in conformance with the Interagency Aviation Transport of Hazardous Materials Guide or Handbook or 49 CFR Parts 171-175?

B. Weighing.

Exhibit 11-1 shows various methods of weighing cargo. Portable scales can be easily set up at remote helibases and helispots. Weigh cargo and inform the Pilot of actual weights. DO NOT EXCEED ALLOWABLE PAYLOAD. If possible, have the cargo weighed, packaged, and marked for destination prior to the arrival of the helicopter.

Exhibit 11-1: Different Types of Scales For Weighing Cargo
C. Methods of Identifying Cargo Destinations.

When a cargo transport operation involves multiple drop off locations, each cargo load should be marked with its destination to ensure it reaches the correct location.

The following are suggested methods:

- Lay out separate cargo areas for each helispot. Identify these areas with markers: “H1”, “H2”, etc. Note that these do not have to be separate cargo pads.
- At the minimum, have the Loadmaster or Supply Unit mark destination clearly on the cargo using a heavy marker, or tag each piece.

VIII. Equipment Inspection.

Prior to the operation, the Helicopter Manager, Loadmaster, or other responsible person should inspect all equipment (e.g., leadlines, swivels, nets, cargo racks, tie-down straps) in accordance with the procedures found in Chapter 9.

IX. Cargo Inspection.

Prior to the operation, the Helicopter Manager, Loadmaster, or other responsible person should inspect all cargo. Inspection should include, as applicable, the following:

- Liquid containers should be boxed or secured in an upright position.
- Boxes should be taped shut and all items tied down or secured, including Sigg and other fuel holding containers.
- All backhaul garbage should be double bagged in plastic garbage bags to prevent leaks inside the aircraft. Garbage may be hauled externally in cargo lift bags or in a net with protective covers such as a burlap sack.
- Cargo should be secured by restraining straps or nets constructed of synthetic webbing; straps or nets should be attached to cargo rings or attachments points specifically designed for restraining purposes.
- Hazardous materials should be marked and the Pilot aware of the items being transported. Transportation of these materials must comply with the Interagency Aviation Transport of Hazardous Materials Guide or Handbook or 49 CFR Parts 171-175.
- Avoid transporting liquid hazardous materials, such as gasoline, with food or personal gear.
- Consider putting personal gear and packs in plastic bags if transporting with other non-hazardous liquid containers and tape the neck of the plastic bags to prevent the plastic from ripping in transit.
- Ensure that sharp tool edges are covered by tool guards or tape to protect the cargo net or other container.
• If multiple loads are to be transported, tag each load with its weight and destination.
• If using the carousel hook system (see Chapter 9), make sure the Pilot is aware of the destination sequence.

X. Establishing the Loading Area.

Chapter 8 provides some general guidance on establishing loading areas. Refer to Chapter 15 for more detailed information.

XI. Loading and Rigging Procedures.

A. Internal Cargo.

• All internal cargo shall be properly stored and secured, regardless of whether passengers are being transported with the cargo.
• All packs must be secured if carried in the passenger compartment. Packs shall not be carried unsecured in a passenger’s lap or on the floor. Packs can be stored separately in the cargo compartment, in external cargo racks or transported in an external sling.
• Do not exceed the weight limit of the cargo compartment or racks. This weight should be placarded within or outside the compartment, usually on the door. If in doubt, ask the Pilot.

B. External Cargo Racks.

• Do not exceed the weight limit for a cargo rack or basket. This weight should be placarded on the rack. With certain makes and models of helicopters with racks on either side, the weight limitation for one may differ from that on the opposite side.
• Cargo should be loaded within the center of gravity (CG) of the aircraft as computed by the Pilot.
• Inspect tie-down devices for rips, tears or cracks.
• When securing cargo in the racks, start at the front of the rack and lace the tie-down strap or bungee cord through pack straps or handles on containers or equipment toward the rear. This will eliminate the possibility of items coming loose from the rack and potentially interfering with the tail or main rotor.

C. Proper Rigging Methods for External Cargo.

• The importance of inspecting equipment prior to rigging cannot be over-emphasized. Chapter 9 contains information on both commonly used and specialized external load equipment.
Ground personnel and Pilots should be thoroughly trained and briefed on rigging and hand signals.

Personnel should never stand under a load, or between the load and an immovable object, when working around operating helicopters.

When working with unstable loads, personnel should avoid placing hands in an area where they can be caught in rigging.

EVERY load gets a swivel to avoid line twisting. When building loads using multiple nets, a swivel should be in place for each net.

With loads comprised of multiple nets, the fragile or lighter loads may be rigged above or below the heavier loads. Consult the Pilot regarding rigging preferences.

It is acceptable to use a longline without a remote hook, provided that qualified personnel are available at both ends of the operation and that the cargo is attached at the bottom of the longline using a swivel.

Some specialized loads, such as helitorches or buckets, may be flown without swivels.

Fiber taping or securely strapping rigid water tanks into the closed position will prevent them from opening in flight.

A single-point sling (choker strap) is not normally the best method to carry a load, except for items such as logs.

A two-point sling with less than a 45 degree angle to the hook or longline is the common method for most loads that will not fit into a cargo net. See Exhibit 11-2.

Use a four-point sling for box-like loads. See Exhibit 11-2.

A spreader bar is useful for stabilizing a load, or where the sling may catch or damage the load if attached conventionally. See Exhibit 11-2.

Properly rolled and secured, empty cargo nets may be flown on the cargo hook, leadline, or a longline. The forward motion of the helicopter may cause the net to trail and drift up towards the tail, with potential to become caught in the tail rotor. Leadlines with empty cargo nets should be shorter or much longer than the distance between the cargo hook and the tail rotor.

Certain loads such as vehicles, crashed aircraft, and other irregular loads, require special rigging including the use of drogue chutes or spoilers. Never attempt to build such loads without prior training and/or experience.

The aerodynamic configuration of a load may cause it to spin and oscillate, which in turn may cause the Pilot to experience control problems with the helicopter. Such difficulties may cause the Pilot to return with the load for re-rigging, or, in extreme cases, to release the load, either intentionally or inadvertently.
There is no way to predict how each load will fly. This is especially true of non-standard loads such as large water guzzlers, cement mixers or pipe. Consult with the helicopter vendor or Pilot, who may be able to supply the necessary expertise and/or equipment.

If a load does not fly well, rig the next load differently and try again, provided there are no safety issues. If safety will be compromised, other means of transportation should be found, such as ground vehicle, pack train or paracargo.

REMEMBER: The Pilot always has the final say regarding whether or not to conduct the mission. Do not pressure the Pilot, either implicitly or explicitly, into flying a load with which he or she does not feel comfortable.

Exhibit 11-2: Single-, Two-, and Four-Point Loads
1. **Cargo Net.**

   Some considerations when working with cargo nets:

   - Center the weight and make the load as symmetrical as possible. Place heavy items in the center of the net first, with light items on top.
   - Do not weave purse strings through the net. The net will not cinch properly and will be exposed to excessive wear.
   - Pull tension on the purse string(s). If the net has two encircling lines, both should be made even in length before attaching the leadline or swivel.
   - After the net is secured, look for holes or openings where items could slip through.
   - If a leadline is necessary, attach a swivel between the leadline and the cargo hook. See Exhibit 11-13.
   - A swiveling cargo hook may be used in place of a separate swivel on some missions such as bale bombing.
   - The recommended way of carrying multiple nets on one longline is to have one attached to the cargo hook by a leadline (and swivel!) so that it rides below the other. See Exhibit 11-13.
   - Tag each load with destination and total weight of load, including net, swivel and other accessories.

   **CAUTION:** Use of a net with a tarpaulin spread inside is prohibited due to the potential for the tarpaulin or other covering to slip out and become entangled in the rotor systems or airframe.

2. **Cargo Hook/Ring Interface.**

   The connection between the cargo hook and the swivel or leadline ring is a critical interface. Loads can be inadvertently dropped, or can be non-releasable, due to incorrect connections. See Exhibit 11-3.

   The size or shape of the ring is a significant factor in inadvertently released loads. Personnel should be aware of the following:

   - When the ring maximum inside diameter is greater than the “snout” dimension on the cargo hook, there exists a small potential for the ring to ride over the load beam and inadvertently release from the cargo hook. See Exhibit 11-3.
   - Ring shapes other than a circle (e.g., oval- or pear-shape) pose the greatest chance of inadvertent release. However, such release is rare for any rings when properly placed on cargo hooks.
• Use of a swivel reduces the chance of a hung load by limiting the torsional load that can be applied to the ring. Refer to Exhibit 11-4 for incorrect methods of hooking loads.

**Exhibit 11-3: Snout Dimension On a Cargo Hook**

3. Box-Like Loads.

Box-like loads usually fly very poorly, as they tend to spin. Use a “tail” (e.g., tree branch) as shown in the exhibit. Ensure the tail is well-secured to the bottom of the load. See Exhibit 11-4.

**CAUTION:** Use of drogue chutes is prohibited except by trained, experienced personnel. Drogue chutes will only be used on longline loads.

4. Pipe.

Pipe shackles or hooks allow a number of pipes to be carried. See Exhibit 11-5.

Use of chains as the connecting lines will work for loads of a weight that Type 3 helicopters can carry. They are easier to store than cables. However, for loads over 1,000 pounds, chains can bind where they cross and fail to tighten, allowing pipes to slip out. This is especially true if the load spins.

Cables are better, although they have to be replaced when they become kinked. Using a leader will require replacement of only a short length rather than the entire cable.
Exhibit 11-4: Rigging A Box-like load with a Tree Branch as a Tail

Tree Branch Used As Tail

Exhibit 11-5: Rigging Loads of Pipe

CAUTION: Ensure the shackles are hooked on opposite ends of the same pipe.
5. Barrels.

Barrels may be rigged by using a choker as depicted in Exhibit 11-6 or by using barrel hooks or clamps designed specifically for that purpose.

Use the method shown below if barrel hooks are not available or are not preferred. Barrel hooks are made of chain or cable. Two sets are usually used together. A bungee cord with a clip on one end allows the hooks to be dropped off the barrels on touchdown at an unattended landing site.

**Exhibit 11-6: Rigging Barrels Without Barrel Hooks**
6. Plywood or Lumber.

Plywood and lumber are one of the hardest loads to transport because the load’s wing-like shape often causes the load to fly, unfortunately often in a direction independent of the helicopter’s intended flight. See Exhibit 11-7.

**CAUTION:** Use an end stop to prevent pieces on the interior of the load from slipping out. Ensure the material is well-secured to the stack itself.

Exhibit 11-7: Rigging Plywood or Lumber Slings
7. Wire Spools.

The material shown in the illustration below must be fastened securely to the bottom of the spool, while allowing room through which to loop the choker. It should be dimensionally strong enough to bear the weight of the spool when tension is applied. See Exhibit 11-8.

Exhibit 11-8: Rigging Wire Spools
8. Poles and Logs.

Logging operations use a cable choker where a ball on the end clips into a sliding catch further up the cable. The cable then “chokes” down on the log when it is under tension. If this equipment is available, use it. See Exhibits 11-9 and 11-10.

**Exhibit 11-9: Rigging a Single Pole or Log For Flight**

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**CAUTION:** Use of a single choker vertically in a straight line (that is, without one end being looped through the other end), or in a “basket,” U-shaped configuration, is not approved.

For pole setting, a clove hitch can be used (two half-hitches back to back) at the bottom of the pole. Run the rope up to the top and make a half-hitch.

When the load is placed on the ground, the sling will loosen and can be easily removed by ground crew. A remote hook can be useful for releasing chokers, or when you want to retain the lead or longline.

To keep the load from slipping out, wrap the rope or chain twice around the end of the pole when carrying a single pole or log, as shown in the illustration in the exhibit above.
Exhibit 11-10: Rigging Multiple Poles or Logs for Flight

**NOTE:** Multiple poles or logs can be wrapped with heavy wire. Attach the wire to each log with fencing staple and use a choker 1/3 of the way from the end of the logs.

**CAUTION:** With multiple-log loads, use an end stop to prevent interior logs from slipping out. Ensure the material used is well secured to the stack itself.

XII. Hookup Methods.

There are four methods of hooking up loads to the helicopter for transport. These are:

- Hookup while the aircraft is on the ground.
- Hover hookup attaching the rigged load directly to the cargo hook (no leadline).
- Hover hookup using a leadline.
- Hover hookup using a longline with a remote electric hook or carousel.
A. Preparation for the Hookup.

Basic tasks that should be performed prior to performing any external load operation include the following.

- Prepare by removing any items from the helicopter that are not essential.
- If requested, assist the Pilot with the removal of all or any doors and store in a safe location at the Pilot’s direction.
- Check both the rigging of the load and the external load equipment according to the requirements and guidelines discussed in Chapter 9.
- Attach the load to a swivel. Use of a swivel is required in most cases. Attach the swivel to the cargo hook or leadline. If using a longline with remote hook, attach the swivel to the remote hook.

B. Hookup with Helicopter on the Ground.

This method is usually used when the helicopter is shut down, and involves the least amount of risk to those involved.

The Pilot should be present when hooking the load to the aircraft. Once the load is ready, perform a two-point hook check.

- Pilot checks manual release to the cargo hook.
- Pilot checks the electrical release to the cargo hook.
- Check the electrical function of the mission equipment (for example, water bucket release, remote electric hook release, helitorch pump, etc.).
- Run the leadline from the load swivel to the cargo hook, ensuring that the line is not near or looped over any skid.

It is important to test the manual release first before the electrical release. This sequence is necessary because the manual release is usually a cable susceptible to snagging or incorrect rigging.

Some operators want to test the manual release only once per day as more checks may put undue wear on the release. If this is the case, those manual releases may be checked one time per day.

After all checks have been performed, visually inspect the cargo hook to ensure the release arm or knob is fully reset.
C. **Hover Hookup with No Leadline.**

This method involves attaching the load directly to the cargo hook.

The method has disadvantages. There may not be enough slack in the net's perimeter lines to allow the hookup person to attach the load on the cargo hook easily. In extreme cases, the helicopter may have to descend almost on top of the load itself.

D. **Hover Hookup with Leadline.** See Exhibit 11-12.

Hover hookups with leadline are effective:

- When multiple loads need to be transported in a short time frame.
- When the load destination involves terrain on which the helicopter is unable to land.
To determine when and how to use a leadline, consider:

- Pilot preference on length of leadline.
- Cargo to be transported.
- Terrain and surrounding vegetation at the destination or takeoff point.

Additional leadline lengths may be necessary for bulky loads, when doing special projects, or when the hookup person underneath the helicopter may need additional length to perform the hook-up. If the pilot is not carded for vertical reference, the bottom of the load should not be more than 50’ below the cargo hook.

Exhibit 11-12: Performing a Hover Hookup with Leadline
E. Hover Hookup with Longline and Remote Electric Hook.

Hover hookups with longline and remote electric hook are effective:

- When multiple loads need to be transported within short time frames.
- When the load is on terrain on which the helicopter is unable to land or take off.
- When the surrounding vegetation and/or terrain is such that the helicopter is unable to perform a hover hookup with a standard length of leadline.
- When ground personnel are not at the receiving site.
- Use of a longline with remote electric hook carousel allows the Pilot to place loads at different locations during the same mission.

Exhibit 11-13: Daisy Chain Configuration
XIII. General Requirements for External Load Missions.

A. Required Personnel.

1. Hookup with helicopter on the ground. Only one person is necessary for this type of operation, since the Parking Tender can accomplish the hookup, then exit and perform marshalling duties.

2. Hover hookup. Only trained and qualified personnel shall perform hover hookup operations. It is recommended that two individuals perform the operation, a Parking Tender and a hookup person.

3. Longline with remote electric hook. Two people are recommended, a Parking Tender and a hookup person. If circumstances dictate, one person may perform the operation, provided there is positive air-to-ground radio communication between the Pilot and the individual performing the hookup.

B. Radio Communications.

For operations where radio communication is recommended or required, a secure or discrete operating frequency should be established, radios checked during the briefing, and ground contacts identified. Pilot shall receive radio communications from only one person.

1. Hover hookup with or without leadline. For hover hookup operations with or without leadline, it is recommended that the Parking Tender be equipped with a radio. Use of the flight helmet adapter to a handheld radio is optimal, though a headset worn beneath a hard hat, with adapter to a handheld, will work.

2. Hover Hookup with Longline and Remote Electric Hook. Radio communications between the Pilot and Parking Tender or hookup person is required.

C. Briefings.

A pre-mission safety briefing must be conducted with the Pilot, Parking Tender, and hookup person. Hand signals and emergency procedures are an integral part of this briefing.


Although there are rare instances where terrain dictates the need for two individuals to give hand signals, the Pilot should normally receive hand signals from one person. Ensure that the ground crew and Pilot are thoroughly familiar with standard signals. For hover hookups, these should include:

- The helicopter’s height above the hookup person (accomplished by using the Move Downward signal).
- Indication that the helicopter should hold while the hookup person leaves the area (Hold Hover signal).
- Indication of load clearance (accomplished by using the Move Upward signal).
- Clear to take off (Clear to Take Off signal).

Exhibit 11-14: Standard Helicopter Hand Signals

**HELICOPTER HAND SIGNALS**

- **CLEAR TO START ENGINE**: make a circular motion above head with right arm.
- **HOLD ON GROUND**: extend arms out at 45 degrees, thumbs pointing down.
- **MOVE UPWARD**: arms extended, swooping up.
- **MOVE DOWNWARD**: arms extended, sweeping down.
- **HOLD HOVER**: arms extended with clenched fists.
- **CLEAR TO TAKE-OFF**: extend both arms above head in direction of take-off.
- **LAND HERE, MY BACK IS INTO THE WIND**: extend arms toward landing area with wind at your back.
- **MOVE FORWARD**: extend arms forward and wave helicopter toward you.
- **MOVE REARWARD**: arms extended downward using shoving motion.
- **MOVE LEFT**: left arm horizontal, right arm sweeps over head.
- **MOVE RIGHT**: left arm horizontal, right arm sweeps over head.
- **MOVE TAIL ROTOR**: rotate body with one arm extended.
- **SHUT OFF ENGINE**: cross neck with right hand, palm down.
- **FIXED TANK DOORS**: open arms outward, close arms inward.
- **RELEASE SLING LOAD**: contact left forearm with right hand.
- **WAVE OFF DO NOT LAND**: wave arms from horizontal to crossed overhead.
2. Emergency Procedures. Prior to hover hookup operations, emergency procedures must be established between the Pilot and ground crew. The emergency briefing is usually presented by the Pilot and addresses procedures in the event of a mechanical failure.

- The Pilot should indicate that the intent will be to move the helicopter away from the hookup person underneath the aircraft. Generally, this will be to the Pilot’s side of the helicopter, but confirm this with each Pilot.

- The hookup person should move in the opposite direction from that of the helicopter, or fall flat next to the load and attempt to gain as much protection as possible.

D. External Load Operations.

1. The performance of external load missions must be contingent upon proper assessment and preparation of the delivery site by first mitigating hazards.

2. The selection of dip/snorkel sites may require concurrence of agency personnel such as resource advisors. While it may not be feasible to approve every dipsite, check first.

3. In areas of sloping terrain or with obstacles rising to one or more sides of the cargo pickup/delivery area or dipsite, the pilot shall maintain rotor clearance from all obstacles equivalent to the Chart 8-1 landing area safety circle requirements.

4. When obstacles present a risk of contact with aircraft or rotor blades, the pilot should decline the mission until hazards are removed, additional line can be added, or a better location can be identified. Pilots have the final say in accepting or declining any mission.

5. If the helicopter is within ½ rotor diameter of the highest obstacle, the pilot should consider adding another length of line.

E. Personal Protective Equipment.

See Chapter 9, Chart 9-2.

F. Equipment.

Check equipment according to procedures in Chapter 9. Check serviceability or general condition of equipment. Check the load-carrying capacities of nets, leadlines, swivels, etc.

G. Grounding.

Static electricity may present a problem to the hookup person when attaching loads to hovering helicopters. Allowing the remote hook to touch the ground, use of rubber gloves, grounding the load to the helicopter skid prior to attaching to the cargo hook (never touch the skids or any other part of the helicopter without the Pilot’s permission), Pilot keying the radio prior to the hookup person attaching the load, etc, are ways to reduce static shock.
Unfortunately, there is no method that ensures that the hookup person will not receive some amount of electrical shock when the swivel touches the hook.

XIV. Procedures for Hover Hookups.

A. General.

These are standard procedures for any hover hookup, regardless of whether a leadline or longline is used.

- The load should be placed in front of the helicopter skids, with no potential for lines to become snagged over the skids.
- The cargo net’s perimeter lines should be drawn over the top of the load and laid so that the lines and leadline are prevented from becoming entangled in the net during liftoff.
- The Parking Tender should direct the Pilot by radio or standard hand signals. Placement of loads carried by longline and remote electric hook may be done independently by the Pilot if no ground personnel are available.
- The Parking Tender should be far enough back of the load to remain visible to the Pilot at all times.
- The Parking Tender should be slightly to the side of the load so that they can maintain visual contact with the Pilot. For helicopters that are flown from the right seat, the Parking Tender should be approximately at the Pilot’s “2 o’clock” position.
- The Parking Tender should wear a non-flammable, high-visibility vest to distinguish him or her from other personnel on the deck.
- Measures to prevent static electrical shock may be taken by the hookup person and the Pilot, once agreed upon.
- After the hookup is completed, the hookup person should exit from underneath the helicopter to the front and in full view of the Pilot and proceed to a position that is not in the departure path of the helicopter. Always keep the load between you and the helicopter.

**CAUTION:** When exiting, the hookup person should take care not to become entangled in either the line or the load. WALK, DO NOT RUN.

- When the hookup person is clear, the Parking Tender may signal the Pilot to begin moving the load. The Parking Tender must pay close attention as the helicopter lifts and tension is applied to the line. An improperly rigged or placed load can become snagged at any time. If the load becomes snagged or is improperly rigged or hooked, the Parking Tender must communicate this to the Pilot using the radio or hand signals.
- The hookup person should remain ready to take direction from the Parking Tender.
should the load or line become snagged.

CAUTION: The hookup person should never re-enter the load area beneath the hovering helicopter unless the Parking Tender directs the hookup person to do so, and the pilot is aware of the person’s movement.

The hookup person should never attempt to re-rig a load when tension is still applied to the load by the helicopter. Hands, arms, or other parts of the body could become snagged in the load, causing serious injury.

Water buckets and longlines should be attached to the helicopter while it is on the ground and NOT hover hooked/plugged.

Hover hookups to connect electrical power accessories should not be performed. If an electrical connection is loose or not functioning, the pilot should land and rectify the problem.

B. Longline and Longline with Remote Electric Hook Procedures.

Considerations and requirements for longline with remote electric hook operations include:

- The sling load should be placed on the ground in the center of the loading area.
- On approach, the signal person should advise the Pilot on load clearance from trees, load height above the ground, and any problems that might arise in the pickup or drop zones.
- For safety purposes, the hook should be placed next to the load. The hookup person should not be next to the load at the time the Pilot is placing the hook.
- Once the hook is placed on the ground, the Pilot should then move the helicopter to the side so the hookup person is not directly beneath the hovering helicopter.
- When attaching a load to the remote electric hook, the hookup person should allow the hook to contact the ground before touching it. This grounds the hook and eliminates the possibility of shock from static electricity.
- When attaching a load to a remote hook, take the remote hook to the swivel rather than taking the swivel to the remote hook. This ensures positive control of the hook.
- The hookup person hooks the load to the remote electric hook and leaves the area. On approach or departure to the remote hook, the hook-up person shall not step over the longline when attaching the load.
- Helicopter is then positioned above the load and the load is lifted from the ground and flown out.
- When receiving a load, stay clear of the landing area. Let the Pilot set the load on the ground and release it before entering the area. On approach or departure the hookup person shall not step over the longline when detaching the load.
XV. Cargo Letdown

Cargo letdown is a system that allows the controlled descent of lighter cargo loads (water containers, chain saws, backpack pumps, etc.) from a hovering helicopter into areas that preclude landing. See Exhibit 11-15.

For equipment and training requirements and procedures, refer to the *Interagency Helicopter Rappel Guide*.

**Exhibit 11-15: Cargo Letdown Option**
XVI. Cargo Freefall.

The freefall of cargo from a helicopter is another method of delivering cargo to an area where conventional delivery methods will not work.

Rations and other durable items, as well as more fragile items, can be dropped by freefall when properly packaged. Larger loads can be delivered by releasing the cargo net from the cargo hook at a minimum safe altitude and air speed. Drops must be made a safe distance from personnel on the ground.

A. Required Personnel.

All Helicopters. Minimum aircrew will consist of pilot and spotter (spotter will conduct dropping operations). The spotter should be a qualified Helicopter Manager for freefall cargo operations. Some missions may require additional personnel.

B. Criteria For and Situations When Cargo Freefall May Be Used.

Freefall of cargo should only be done after the following criteria have been met and in the following situations:

- The helicopter cannot land safely and the mission has been determined to be tactically essential.
- Other methods of cargo transportation have been considered and cargo freefall has been determined to be the most efficient and economical method.
- A helicopter load calculation has been completed using the helicopter hovering out of ground effect chart. Consideration must be given to weight of cargo and maintaining center of gravity limits.
- There is adequate clearance from obstructions in the flight path and at the drop zone.
- All personnel involved have been thoroughly briefed. This will include the Pilot, spotter, dropper, and all ground personnel.
- Positive air-to-ground communications are established.

C. Planning for the Drop.

The operation is conducted in two phases. Planning prior to the drop is the first phase.

1. Compliance with Aircraft Flight Manual. All procedures will comply with the aircraft manual (for example, door removal).
2. Line of Authority. The Pilot and spotter must know the contact at the drop zone. The person at the drop zone must be aware of the mission and have established a drop zone.
3. Selection and Packing of Cargo. Packing will depend largely on what materials are available. Cargo must be selected and packed to prevent undue damage.

   a. Little or no packing required. Items that require little or no packing include:

      - Fire hose and sleeping bags. These must be banded with rubber bands, straps, or filament tape. Ends of the hose should be coupled to prevent damage.

      - Hand tools. These should be taped together with heads protected and appropriately packaged (for example, padded with several layers of cardboard).

      - Rations.

   b. Packing of fragile or items. Without access to large quantities of packing material, the only fragile items that are practical to drop are water, batteries, and other inexpensive items. Fragile items will have to be appropriately packaged to prevent damage. It is suggested that bases intending to use cargo freefall stock packing material and boxes both at the base and in the helicopter chase truck.

4. Equipment Required. An approved restraint harness fastened to a hard point must be worn by any individual (spotter and/or dropper) who will not be normally restrained by a seatbelt. The tether must be adjusted so that the individual cannot break the plane of the doorway.

5. Selecting the Drop Site. When selecting the drop site, consider the items you are delivering and at what height you will have to release them. Site selection is not as critical for items such as tools or sleeping bags which can withstand more impact.

   Fragile and breakable items such as radios and power saws require special consideration. Look for areas where a lower drop can be accomplished. If available, a patch of brush serves as a good cushion.
D. **Drop Procedure.**

The following procedures must be followed.

1. Air-to-ground communications shall be established before drop zone is selected.
2. The drop zone shall be identified on the ground (marker, ribbon, flagging).
3. Two reconnaissance runs, one high-level and one low-level, shall be made over the drop zone.
4. A high-level reconnaissance of the drop zone shall be made to determine:
   - If the drop is feasible at the selected site.
   - That ground personnel have moved a safe distance out of the drop zone.
   - Wind conditions, including direction and speed.
   - Location and nature of ground and aerial hazards.
5. A low-level reconnaissance of the drop zone shall be made. At this time, the Pilot and dropper shall:
   - Reconfirm hazards in the drop zone
   - Determine approach and departure routes.
   - Check for personnel too near the drop zone and/or approach-departure path.
   - Confirm with the ground contact that the area is clear.
   - Make final check of cargo to be delivered.
   - Both agree to proceed.
6. On the drop pass, the cargo will be delivered if there are no changes in conditions.
   - Remember to anticipate the forward speed of the helicopter.
   - Drop cargo laterally out and away from the helicopter and not toward the tail rotor or skids.

CAUTION: Do not hesitate to suspend dropping operations when conditions are marginal or unsafe.
CHAPTER 12: FIRE PROTECTION AND CRASH RESCUE.

I. Introduction.

Despite the best efforts of all involved in helicopter operations, it is recognized that accidents can and do occur. Even with the limits inherent in operating at remote heli bases, an accident demands an immediate and correct response to prevent serious injury or property damage.

The purpose and objectives of this chapter are to provide safe, cost-efficient, and effective fire protection and crash rescue procedures for incident and project helibase operations. It prescribes minimum firefighting and crash rescue operating requirements.

The guidance and requirements in this chapter are not intended to cover every contingency, nor does it detail every rule of crash rescue safety and practice. Specialized, basic aircraft firefighting training should be sought to supplement the information contained herein.

It is not the intent of this guide, or of most agencies involved in helicopter operations, to train helicopter and helibase management personnel to respond to a fully-involved aircraft fire. The intent is to train personnel to respond to small fires within their capability and training, and to be able to rescue survivors of a crash in a safe, efficient manner.

To this end, it is recommended that personnel assigned to the positions of Parking Tender or Deck Coordinator be trained in the proper use of fire extinguishers and crash rescue tools for aircraft fires. This training should include practical exercises extinguishing several small Class A and B fires with different types of extinguishers.¹

CAUTION: Flammable liquids are classified as hazardous materials, and approved training facilities (for example, local fire departments) must be used for practical exercises.

II. On-Site Accident Preparedness Planning.

This chapter addresses on-site fire protection and crash rescue preparedness. Agency specific policy and directives usually require the local unit to develop an aircraft accident preparedness plan or aircraft emergency response guide. The unit preparedness plan usually addresses the large geographic area of a local unit’s administrative boundaries, and is not site-specific.

However, some of the information required for site-specific accident preparedness planning at heli bases should be available in the local unit preparedness or accident preparedness plan. Information commonly available in the local unit plan includes:

- Name and location of hospitals and burn units within or near the unit’s administrative boundaries.

¹ The National Fire Protection Association video “Fighting Fires With Portable Extinguishers” (# NB-VC-31V) is recommended as a training aid.
• Name, location, and method of contact for helicopter ambulance services.

The Helibase Manager or other air operations staff must obtain this information and incorporate it into the site-specific plan. Specific checklists and forms have been developed to assist in on-site planning for emergency response and briefing Pilots on hazards. These include:

• Form HJA-4A, Emergency Rescue Information (becomes part of the Medical Unit Plan on incidents)
• Form HJA-4B, Emergency Medevac/Medical Transport Request
• Form HBM-10, Helibase Diagram
• Form HBM-2, Aviation Locations Summary
• Form HJA-1 Daily Helicopter Operations Briefing (Appendix F)
• Form HJA-2 Helibase Manager’s Reminders List (Appendix H)

Use of these forms and checklists enhances the ability of the incident or project air operations staff to respond to an accident or other emergency in an organized, coordinated fashion.

The Crash Rescue Plan Checklist shown in Exhibit 12-1 asks very specific questions regarding the readiness of helibase and other personnel to respond to a crash rescue situation. It may be used by the Helibase Manager, Pilots, and other personnel, in conjunction with the other job aids mentioned, as a means of ensuring crash rescue preparedness.

Developing an accident preparedness plan for a specific site is not an end in itself, nor is it a guarantee that the emergency response will be effective. Preparedness must go beyond merely having a plan. Preparedness planning must be supplemented with briefings and drills to help reduce the confusion that often exists during crash rescue operations.

Exhibit 12-1: Crash Rescue Plan Checklist

CRASH / RESCUE PLAN CHECKLIST

1. Are the crash rescue equipment, fire extinguishers, and tool kits adequate?
2. Has the responsibility for the supervision of crash rescue activities been clearly defined?
3. Are crash rescue personnel assigned specific duties?
4. Can crash rescue equipment readily reach all portions of the helibase area?
5. Are helibase personnel familiar with procedures pertaining to crash rescue activities?
6. Have contacts and plans been made with cooperators for crash rescue assistance if needed?
7. Are crash rescue personnel instructed on the importance of not unnecessarily disturbing the aircraft wreckage for accident investigation purposes?
8. Are crash rescue personnel trained in first aid?
9. Have provisions been made to dispatch a second helicopter to the crash rescue scene for possible air evacuation?

10. Are fire suppression crews instructed to stand by while crash rescue helicopter is landing or taking off?

11. Do helibase personnel understand their specific duties?

12. Are minimum levels of crash rescue training completed for assigned crews?

13. Have the Pilots been informed of the crash rescue plan?

14. Are all helibase personnel briefed on the plan?

The effectiveness of crash rescue operations depends on:

- How well the planning for various known and unknown factors in the accident has been performed;
- How well those involved understand the plan; and,
- How well it is executed.

As a minimum, the helibase preparedness plan should address:

- Who will respond, by assignment
- What equipment and other facilities are available
- When the plan will be implemented
- Where equipment and medical facilities are located
- How the plan will be implemented (notification)

Form HJA-4A, Helibase Emergency Response Plan, will contain much of this information, once it is completed.

NOTE: All plans must be reviewed and updated daily as conditions, resources, and/or other personnel on the operating base change.

III. Types of Emergencies.

Consideration must be given to the type of aircraft emergencies that might occur and where they might happen. Experience shows that few helicopter accidents occur on the helibase itself. Helibase personnel should be aware that they may also be involved in responding to a fixed-wing airplane accident, or to a ground accident involving vehicles and/or personnel.

The accident preparedness plan must include a comprehensive response to emergencies, regardless of where they happen or who might be involved.

Types of aviation emergencies might include, but are not limited to, the following:
A. **In-Flight Emergency.**

These types can include engine failure, fuel exhaustion, or dynamic flight component failure (for example, failure of the tail rotor).

Planning to cover these emergencies should include answers to the following:

- Are passengers being regularly briefed on in-flight emergencies?
- Have emergency landing areas near the helibase and on the incident or project area been identified and made known in the morning briefing?
- Are these areas accessible by ground or by the identified medevac aircraft?
- Are there limitations to ground access (bridges, gates) that will require that the entire response be by air?
- Has an emergency response team and aircraft been identified?
- Have helibase ground crews been briefed in the event the helicopter makes an emergency landing at the helibase?
- Have helispot crews been briefed in the event the helicopter makes an emergency landing at the helispot?

B. **Fueling Area Emergency.**

The most likely emergency in the fueling area involves fuel spills, with the potential hazard of ignition. Prevention measures are discussed in detail in Chapter 13.

Preparedness planning to cover these emergencies should include answers to the following:

- Are Parking Tenders aware of their responsibilities to have a fire extinguisher readily available during fueling operations?
- Is there a spill plan in effect for the area of operation, and is it known?
- Are spill notification procedures known (for example, to the local agency’s hazardous materials specialist)?
- Are resources available to deal with a fuel spill?

C. **Helicopter Start-Up Emergency.**

The most likely start-up emergencies include failure to untie the main rotor, doors or cowling not secured, or an engine over-temperature condition during start.

Preparedness planning to cover these emergencies should include answers to the following:
• Are Parking Tenders in position during helicopter start up?
• Have Parking Tenders been briefed on start-up emergencies and responses?

D. **Approach-Departure or External Load Operations Emergency.**

Many helicopter accidents occur during approach to or departure from a remote landing area (helispot or unimproved landing site). Usual causes are obstructions to flight (wire, cable, or snag), an engine or dynamic flight control failure, or inadequate clearances.

Preparedness planning to cover these emergencies should include answers to the following:

• Are extinguishers available at all helispots?
• Is the site accessible (if not immediately adjacent to the landing area)?
• Does the site have interface issues (building, schools, houses, etc.)?
• Is flight following adequate so that aircraft location is always known?
• Have Pilots been briefed on area-wide hazards as identified on the incident or project map?
• Have Pilots been briefed on hazards in the vicinity of each helispot using Form HBM-2, Helispot Information Summary.

E. **Other Hazards to Helicopters at Landing Sites.**

Other landing area emergencies might involve vehicle or personnel movement when helicopters are operating, as well as other aircraft in the vicinity.

Preparedness planning to cover these emergencies should include answers to the following:

• Have adequate safeguards been provided to control vehicle and personnel movement on the landing area?
• Are there warning signs posted?
• Are Parking Tenders and other deck personnel alert to vehicle and/or personnel movement?
• Are flight routes and hazards posted on the Helibase Facilities, Hazard, and Flight Route Map?
IV. Classes of Fire.

Fire is a result of a chemical chain reaction between fuel, heat and oxygen. This relationship is known as the fire tetrahedron. See Exhibit 12-2.

If one interrupts the chemical chain reaction, or takes away any of the other three elements, the fire is extinguished. This is what a fire extinguisher does.

Fire can develop with any number of different fuels, and extinguishers for one type of fuel are not always effective on other types of fuels. Fire is divided into four classifications depending on the type of fuel burning. Extinguishers are available for each type.

A. Class A Fires.

Class A fires involve wood, cloth, paper, rubber, and/or plastics. Water is often used to cool the fuels and extinguish the fire. Extinguishers suitable for Class A fires are identified by a triangle containing the letter “A”. The triangle is colored green. See Chart 12-1.

B. Class B Fires.

Class B fires involve flammable or combustible liquids such as jet fuel, gasoline, oil, hydraulic fluids, solvents or similar materials. These fires require extinguishers like carbon dioxide, foam, dry chemicals, or halon. These extinguishing agents act to deprive the fire of oxygen or interfere with the chemical chain reaction. Extinguishers suitable for Class B fires are identified by a square containing the letter “B”. The square is colored red. See Chart 12-1.

C. Class C Fires.

Class C fires involve energized electrical equipment that may present a shock hazard. These fires require de-energizing the electrical equipment and applying carbon dioxide (CO2) or halon. Extinguishers suitable for “Class C” fires are identified by a circle containing the letter “C”. The circle is colored blue. See Chart 12-1.

D. Class D Fires.

Class D fires involve combustible metals such as magnesium or lithium. These fires require a dry powder, which smothers the fire and doesn’t react with the burning metal.
Extinguishers suitable for Class D fires are identified by a five-point star containing the letter “D”. The star is colored yellow. See Chart 12-1.

**CAUTION:** A dry chemical extinguisher should not be confused with a dry powder extinguisher. They are not the same.

### Chart 12-1: Class of Fires

<table>
<thead>
<tr>
<th>Class of Fire</th>
<th>Types of Materials</th>
<th>Type of Extinguisher</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Wood, cloth, paper, rubber, and plastics</td>
<td>Water</td>
<td>Green Triangle containing the letter “A”</td>
</tr>
<tr>
<td>B</td>
<td>Flammable or combustible liquids such as jet fuel, gasoline, oil, hydraulic fluids, solvents or similar materials</td>
<td>Carbon dioxide, foam, dry chemicals, or halon</td>
<td>Red Square containing the letter “B”</td>
</tr>
<tr>
<td>C</td>
<td>Energized electrical equipment that may present a shock hazard</td>
<td>Carbon dioxide (CO2) or halon</td>
<td>Blue Circle containing the letter “C”</td>
</tr>
<tr>
<td>D</td>
<td>Combustible metals such as magnesium or lithium</td>
<td>Dry powder</td>
<td>Yellow five-point star containing the letter “D”</td>
</tr>
</tbody>
</table>

### V. Extinguishing Agents.

The grouping of fires into classes is important because the agents used to fight one class of fire may not be effective on fires of other classes. Extinguishers designed for one class of fire may be extremely dangerous when used on other classes of fires. For example, a water extinguisher is not recommended for use on Class B or flammable liquid fires, since it may spread the fire.

While certain extinguishers such as multi-purpose dry chemical extinguishers can be used on Class A, B, and C fires, no extinguisher is effective on all four classes of fire.

Portable fire extinguishers come in a variety of weights and sizes. However, the effectiveness of an extinguisher is not solely determined by its weight or size. It is also determined by the training and knowledge of the person using it. The single most critical element in firefighting is response time. This means the person closest to the accident must know what to do, and do it immediately. Portable fire extinguishers are considered the first line of defense when a fire occurs, and are effective firefighting tools if used properly and on the fires for which they have been designed.
Types of extinguishers most commonly used are:

A. **Water.**

Water is very effective on Class A fires involving ordinary combustible materials. It may be applied from engines, portable hand pumps, or stored pressure extinguishers. Water must not be used on Class C fires as water applied to energized electrical equipment presents a hazard from electric shock.

B. **Foam or Aqueous Film Forming Foam (AFFF).**

AFFF, commonly referred to as “A-Triple F”, should not be confused with Class A wildland fire foams. AFFF is designed to extinguish Class B flammable liquid fires, but can also be effective on Class A fires. The foam creates a blanket which smothers the fire. An aqueous solution from the foam bubbles creates a vapor barrier over the fuel surface, preventing re-ignition of the fuel. Foam must not be used on Class C fires as foam applied to energized electrical equipment presents a hazard from electric shock.

C. **Carbon Dioxide.**

Carbon dioxide (CO2) is a gas 12 times heavier than air. It is non-poisonous and will not support combustion nor sustain life. Carbon dioxide extinguishers are suitable for Class B and C fires. It is discharged in a gaseous form and is easily affected by drafts or wind. It is non-corrosive, non-damaging, and leaves no residue. The danger from CO2 is the possibility of losing consciousness or being suffocated in an enclosed space or low-lying place.

D. **Dry Chemical.**

Dry chemicals consist principally of bicarbonate of soda, potassium bicarbonate or ammonia phosphate and are used to smother the fire. Dry chemical extinguishers are of two basic types. One type is pressurized by dry nitrogen or dry air, and the other type has a cartridge with CO2 under pressure. When the cartridge of the second type is punctured, CO2 pressure expels the agent.

Danger from the dry chemical extinguisher lies in discharging it into an occupied crew or passenger compartment, or directing the stream into the escape path of occupants, causing a visual impairment. Dry chemical extinguishers are normally rated for Class B and C fires, but some are rated A, B, and C.

Some dry chemical extinguishers have a tendency to pack solid from their own weight and vibration. They need to be removed periodically and inverted so they may be discharged properly.
E. Halon.

Halon extinguishers are generally rated for Class B and C fires. Some may have a Class A rating as well. Halon, like CO2, is a gas and will be affected by wind. Halon use on fires may produce toxic by-products. Use these extinguishers in well ventilated areas and avoid breathing the gas.

F. Dry Powder.

Two extinguishing agents are listed for use on Class D (combustible metal) fires.

1. G-1 Powder. G-1 Powder is a screened graphitized foundry coke with various phosphates added. The material acts as a heat conductor to lower the temperature of the burning metal. It forms a coating to smother the fire by excluding air, and may be used in magnesium and magnesium alloy fires.

2. Met-L-X Powder. Met-L-X Powder has a sodium chloride base with additives. An additive fuses at high temperatures to aid in forming an air-tight coating. It may be used on magnesium, sodium, potassium, and sodium-potassium alloy fires.

VI. Requirements.

A. Extinguishing Agent for Helicopter Landing Areas.

The required extinguisher for helicopter landing areas is a 20-pound, dry chemical, 40 B:C rated extinguisher.

This size extinguisher is lightweight, portable, self-contained, and highly effective on Class B (flammable liquid) fires. However, its effectiveness will always depend on the training and knowledge of the person using it.

B. Personal Protective Equipment.

Except in rare instances when the Pilot has recognized and/or declared an in-flight emergency, ground support personnel will have no advanced notice of a helicopter emergency. Therefore, personal protective equipment shall be worn at all times by helibase support personnel so as not to delay an immediate response to an accident.

CAUTION: Clothing, either regular or fire resistant, affords little thermal protection from the radiated heat of aviation fuel fires. Extreme caution must be used by personnel approaching a burning aircraft.

Additionally, smoke from aircraft fires may contain toxic gases and/or minute particulates of combustion. Exposure without a self-contained breathing apparatus must be avoided.
Given the limitations and hazards outlined above, personnel must be trained to respond appropriately.

C. **Emergency Tools and Equipment.**

Emergency tools and equipment should be prominently positioned adjacent to the landing area(s). All helibase ground support and flight crews should be made aware of these locations. Crash rescue equipment is required at helibases and at helispots which will see continued use over the course of an incident or project. Chapter 9 outlines the minimum requirements for fire extinguishers, evacuation kits, and crash rescue kits at helicopter landing areas.

1. **Fire Extinguisher.** One (1) fire extinguisher per landing pad, located immediately adjacent to the safety circle for that pad.

2. **Crash rescue Kit.** One (1) crash rescue kit or equivalent per every five (5) helicopters using the landing area. The kit contains crash axes, hacksaw with blade, bolt cutter, seat belt cutter, and door opener tool. It is used to gain access to the crew and passenger compartments if normal exits are rendered unusable in the accident.

3. **Evacuation Kit.** One (1) evacuation kit per every five (5) helicopters using the landing area. The kit contains a first aid kit, splints, blanket, ground marker, head lamp, and stretcher to provide for evacuation of injured personnel from the accident scene.

   Check kits upon receipt to ensure content, condition, and suitability of tools and equipment.

D. **Additional Crash Rescue Resources at Helibases.**

The basic extinguisher requirement may be supplemented by foam-equipped engines, a plumbed system, or other methods. Emergency equipment should be placed to allow immediate access, but must not hinder normal flight or ground operations.

Trained personnel and equipment are often available from fire departments and military bases. Air operations staff must weigh the cost of such resources versus the probability of an aircraft emergency occurring. Another factor to consider is the proximity of the helibase to urban development. In this case, ordering fully-equipped crash rescue services may be prudent.

**CAUTION:** It is not recommended that agency personnel in a foam-equipped engine be assigned helibase crash rescue duties unless they have received advanced aircraft firefighting training and are equipped (turnouts and SCBAs) to respond safely.
VII. Strategy and Tactics.

A. Strategy.

The primary objective of helicopter or helibase ground support personnel participating in crash rescue activities is to prevent loss of life or property. If needed, firefighting action should provide maximum fuselage integrity and an escape path for occupants. To the extent possible, crash rescue personnel should assist in evacuation of the helicopter using normal or emergency means of egress.

The most important factors involved in effective rescue and firefighting efforts in a survivable helicopter accident are:

- Training received.
- The response time of crash rescue personnel and equipment.
- The effectiveness of crash rescue and extrication equipment.

All actions taken must be aimed at providing care to survivors as quickly as possible.

B. Tactics.

One of the most important skills in crash rescue is the ability to improvise. Every emergency response is unique, and accident sequences often occur in an unforeseen manner. Being able to adjust the response to fit the situation is an absolute necessity.

The likelihood of the need to improvise is never a valid reason for not learning and drilling in the fundamentals. Without basic skills, the individual or crash rescue team has no foundation upon which to improvise. Without experience in using those skills, they will lack the judgment necessary for safe, effective crash rescue.

Before effective action may be taken, personnel must be familiar with the various characteristics of the helicopter(s) involved in the accident.

1. Helicopter Makes and Models. Crash rescue diagrams of many frequently used helicopters are provided in Appendix M of this guide. These diagrams provide general features of a model of helicopter. Some of the diagrams have emergency procedures information, including the location of fuel and battery shutoffs, attached.

2. Briefings. Since the diagrams provide only information generic to a model, they must be supplemented by on-site review or briefings which address the specific features of each helicopter assigned. Briefing material should include, but is not limited to:
   - Door operation
   - Location and operation of emergency exits
• Location and operation of the Emergency Locator Transmitter (ELT)
• Location of the first aid kit and fire extinguisher(s)
• Operation of crew/passenger restraint devices
• Emergency shut-down procedures for the battery, fuel, and other aircraft systems.

All of the above items are part of the Aircraft Safety Briefing required to be given to all passengers. Prior to the commencement of operations, it is particularly important that all crash rescue personnel be given a more in-depth briefing on these items.

3. Factors Influencing Tactics. Tactics employed at the accident scene are dependent on many factors, including but not limited to:

• Terrain and obstacles
• Wind direction
• Type of helicopter(s) involved
• Crew stations and passenger locations within the helicopter
• If a fire results, its location and the degree of fire involvement
• Other mission-specific equipment attached (for example, helitorch, plastic sphere dispenser, external cargo, hazardous materials, etc.)

4. Sequence of Actions. Recognizing that accidents are all different, there is a general sequence of actions that can usually be followed.

a. Approach. After an alarm has been received, or a crash has occurred, the most direct route offering the fewest obstacles should be used. The normal precautions on approaching helicopters should be taken. These include, but are not limited to:

• Approach from the front or side
• Approach from ground that is lower than that on which the helicopter is resting
• Carry all equipment horizontally at waist level, not over the shoulder
• Do not approach until the rotors and other moving components are at rest

CAUTION: It is not unusual during a crash for the rotor blades to strike obstacles or the ground, with debris thrown a considerable distance from the accident site. Evaluate the situation before approaching. It is usually wise to take the nearest available cover, or lie prone, as an accident is occurring.

The first person responding (“first responder”) will need to evaluate the best approach to the helicopter if the rotor blades or other components are still moving. The first responder should consider:

• Will moving components soon come to rest?
• Is the Pilot or other occupant attempting to shut the helicopter down?
• Is it a survivable accident?
• Is a fire, or the potential for fire, present?
• Can the helicopter be approached safely?

If the decision is made that the first responder will shut down the aircraft, other responders should stand by until that task is accomplished. Do not expose more personnel to a hazard than absolutely necessary.

If a fire is present, the best approach is usually from upwind so that the responder is not hindered by smoke or heat. Extinguishing agents are also more effective when applied from upwind. However, all responder(s) need to evaluate conditions before approaching.

When approaching the helicopter with extinguishers, engines, or other apparatus, do not block the escape path of the occupants. Do not direct streams of extinguishing agents at them which could cause them to become disoriented.

CAUTION: Helicopter structures damaged by fire or impact forces are often very unstable and are subject to collapse or rollover. If these conditions are suspected to exist, precautions in the form of blocking or shoring should begin as soon as possible to ensure the safety of personnel working on evacuation.

b. Entry. When the helicopter can be safely approached and entered, the first responder should assist the survivors in leaving the aircraft. Depending upon make and model, an entry/exit door or doors may be found on each side of the helicopter.

Smaller helicopters have doors that usually open outward and are hinged on the forward side. The inside is fastened by a latch that is usually operated by pulling the latch mechanism.

Larger helicopters usually have front flight crew doors similar to those on smaller helicopters. However, the doors on the passenger compartment(s) are usually the sliding type. Most often they slide from front to rear.

On most helicopters, an emergency release mechanism is installed at the hinge side and is operated by pulling on the jettison handle.

Escape hatches or escape panels are provided on some helicopters and are made of either plexiglass or metal. The hatches should have an external release handle, with the location and operating procedures marked on the adjacent surface of the fuselage.

If access is hindered for whatever reason, emergency cut-in using a crash axe should be in the area of the doors, windows, or windscreen. Avoid structural
areas of the fuselage where use of the axe or other tools might rupture fuel, electrical, or oxygen lines, causing an explosion and/or fire.

CAUTION: Extreme care should be used when cutting into an aircraft. Occupants might be injured by tools penetrating too far into the aircraft. Also be aware that cutting actions may create sparks which might ignite fuel vapors. Evaluate the situation carefully.

c. Rescue of Occupants. After entrance to the flight and/or passenger compartments is achieved, crash rescue personnel should perform the following, in order:

(i) Locate and then determine the condition of the occupants.
(ii) Evacuate uninjured occupants first, if possible.
(iii) Evacuate injured occupants.

CAUTION: Extreme care must be taken when moving injured personnel to prevent aggravation of existing injuries or causing additional ones. Due to the high vertical deceleration forces experienced in a helicopter hard landing or accident, assume lower back injuries are present. Assistance from trained medical personnel should be obtained before moving injured personnel.

If immediate evacuation is not possible due to wreckage configuration or occupants being trapped within the compartment, and fire is present, responders should attempt to keep the fire away from the area where personnel are trapped.

All helicopter seats have seat belts that include shoulder harnesses. Both belts and harnesses are constructed of very strong material and are difficult to cut. Crash rescue personnel must be knowledgeable of release procedures.

Release configurations vary among make and model of helicopter, and may even vary among seats in the same helicopter. If the belt or harness cannot be released normally, use the seat belt cutter included in the crash rescue kit. See Exhibit 12-3.
d. Fatalities. In an emergency triage situation, common sense dictates that personnel who have been fatally injured receive lower priority for evacuation than those still living.

Responders should not attempt to remove a fatally injured individual from an aircraft if they will be at risk from existing fire or other hazards. In an accident involving fatalities, remember:

- Contact the local Coroner to make the legal determination of death.
- Do not release the name(s) of the victims. The local Public Information Officer (PIO) should be informed as soon as possible to deal with media inquiries.

Fatalities are also discussed at the end of this chapter.

e. Evacuation. After all occupants have been accounted for, medical injuries should be treated to the extent possible and only within the skill level of those present. Injured personnel should be prepared for transport to the appropriate medical facility.
While crash rescue personnel are performing the evacuation, it is critical that the helibase Aircraft Base Radio Operator (ABRO) or other individual assigned be making the contacts identified in the Medical Unit Plan and/or in Form HJA-4, Helibase Emergency Rescue Plan. Note that for project operations, initial contact is usually made with the local dispatch office, who will implement the unit accident preparedness plan.

If the accident is not at a location with known conditions, the ABRO should use Form HJA-4B, Emergency Medical Services - Helicopter Ambulance Request Information, to obtain and relay information. See Appendix B for further information and discussion. In order to avoid delays in what may be a life-threatening situation, it is essential that the ABRO obtain as much information on this form as possible.

The need for emergency evacuation of injured personnel should be considered before operations begin. It is impossible to detail all possible evacuation situations that could exist. Nonetheless, these situations can be planned for, to some extent.

• Evaluate all assigned helicopters for evacuation capabilities and designate a primary and, if possible, backup medevac ship.
• Brief all Pilots, crews, and helibase personnel on roles, responsibilities, and procedures.
• Coordinate closely with the local dispatch or other responsible office both in preparedness planning and during any evacuation.

Inclement conditions (weather, nighttime) may affect aerial medevacs. Remember the Pilot has the final authority on performing the mission.

VIII. Preservation of the Accident Scene.

Following extrication and evacuation of the occupants, preservation of the accident scene and documentation of actions taken is vitally important to the accident investigation that will follow.

The accident scene and perimeter should be immediately roped or flagged off. Security should be provided to prevent entry by unauthorized personnel. Any person not actively engaged in the rescue or firefighting operation should be denied entry to the area. The Incident Command Staff or the Project Aviation Manager should be briefed away from the immediate accident scene.

The Helibase Manager or other official in charge should ensure that crash rescue and other helibase personnel immediately document the following:
• Condition and position of the aircraft prior to any significant cutting or alteration, including its initial position before the accident, position when it came to rest, and position after evacuation and extrication was performed. Use written statements, sketches, and photos or video. Personnel should document sounds heard, their actions, actions of others, etc.

**IMPORTANT NOTE:** It is essential to an investigation team that personnel involved in an accident, or accident response, not coordinate their statements. Each individual should independently document their experience.

• Preserve and secure all helibase documentation for that operational period, including Helibase Mission Request Logs, Flight Following Logs, load calculations, manifests, Unit Logs, Helibase Organization Chart, Daily Helicopter Operations Briefing/Debriefing Checklist, and other relevant material.

• Removal of the bodies of fatally injured occupants from the wreckage should be accomplished only by, or under the direction of, the responsible medical examiner (coroner). Premature removal can interfere with identification and/or destroy required pathological evidence. If body removal is necessary to prevent further incineration, the original location of the body and the body itself should be tagged or otherwise identified, and the facts reported to the investigation team.

**BE AWARE AND BE PREPARED. SOMEONE’S LIFE MAY DEPEND ON YOUR ACTIONS.**
CHAPTER 13: FUELING OPERATIONS.

I. Introduction.

Fueling operations, whether conducted by government or vendor personnel, could potentially result in environmental damages or catastrophic accidents.

It is the responsibility of all personnel, both vendor and government, to ensure that fueling operations are conducted in accordance with procurement document specifications, agency fueling directives, and all other applicable local, state, and federal regulations. Special attention must be paid to federal, state, and local hazardous materials regulations and to agency-specific fuel spill avoidance requirements.

Appendix I, Remote Fuel Site Reminders List, is a job aid that can be used by Helibase Managers and Fueling Specialists.

II. Responsibilities.

A. Management.

Agency heads are responsible for the management and effective implementation of a Fuel Quality Control Program within their respective agency. Supervisors and managers at all levels are responsible for the safe delivery of fuel during aviation operations under their jurisdiction or control. Within this responsibility is the practical requirement to provide safe working conditions, prevention of injury to persons, and the protection of property.

B. Employees.

To enhance safety, employees of participating agencies who become aware of any fuel-related mishaps (for example, fuel spills, fires, damage to aircraft or fueling facilities or vehicles, incorrect fueling of aircraft, incorrect fuel put in an aircraft, etc.) should report such occurrences using the agency incident/hazard report. In situations where imminent danger exists, the operation should be suspended immediately.

C. Fuel Vendors.

Vendors conducting business for the transportation, storage or dispensing of aviation fuels, including into-aircraft operations, shall adhere to the procurement document provisions and specifications. For the most part, such operations shall be in accordance with the standards and procedures specified in applicable American National Standards Institute (ANSI) or National Fire Protection Association (NFPA) publications.
D. Pilots.

The Pilot is personally responsible for ensuring that the proper type and grade of clean, dry fuel is pumped into the aircraft.

III. Fuel and Oil Pollution Prevention.

Agencies must be informed of the Environmental Protection Agency (EPA) regulations found in 40 CFR 112. Regardless of the size or location of an operation, it is necessary that an assessment be made to determine whether or not provisions of the regulations are applicable.

The basic criterion is if it can be reasonably expected that a discharge of fuel or oil will enter navigable waters, a facility is subject to the regulations. This requires the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan. Exceptions to this requirement are:

- Above-ground facilities having a total storage capacity of 1,320 gallons or less of fuel, provided no single container has a capacity in excess of 660 gallons.
- Underground facilities having a total storage capacity of less than 42,000 gallons.

Agencies are encouraged to contact their local EPA office for detailed information concerning these regulations.

A. Fuel Spill Prevention Guidelines and Requirements in Environmentally Sensitive Areas.

Check with the local aviation manager for additional fuel spill prevention guidelines and requirements in place for various geographic locations due to local or national environmental concerns and constraints.

Prior to the start of a project or upon arrival at an incident, the air operations staff should consult with the local Resource Advisor regarding any restrictions that may apply.

Restrictions may include, but are not limited to:

- Establishing fueling sites at predetermined locations, occasionally at some distance from the helibase. Since this may have a significant impact on operations, additional planning and helicopters may be required.
- Prohibitions on fuel vehicles traveling on certain roads (usually adjacent to streams and rivers).
- Requirements for containment dikes around fueling pads.
- Proper containment and disposal of fuel samples.
IV. Types of Fuel.

There are currently two categories of aviation fuel in use. These are aviation gasoline, commonly called AVGAS, and turbine or jet fuel.

A. Aviation Gasoline (AVGAS).

Aviation gasolines are used in reciprocating aircraft engines. There are currently three grades of aviation gasoline in use:

- 80/87
- 100 Low Lead (100 LL)
- 100/130

B. Turbine (Jet) Fuel.

Aviation turbine fuels are used to power turbofan, turbojet, and turboprop aircraft engines. There are two types of turbine fuel in use:

- Blends of gasoline and kerosene (Jet B and JP-4)


V. Requirements for and Methods of Identifying Types of Fuel.

A. By Color.

If sample is not the right color, suspend the operation immediately. The following colors are indicative of the type of fuel:

<table>
<thead>
<tr>
<th>Type</th>
<th>Aviation Gasoline</th>
<th>Turbine Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>80/87</td>
<td>100 Octane Low Lead</td>
</tr>
<tr>
<td>Color</td>
<td>Red</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clear or straw-colored</td>
</tr>
</tbody>
</table>

WARNING: The EPA and Internal Revenue Service (IRS) require that certain types of high and low sulfur diesel be colored blue and red. Aviation grade 100 LL and 80/87 fuels are also colored blue and red, respectively. The potential exists for a supplier to furnish diesel fuel instead of 100 LL. The FAA has issued a Notice to Airmen (NOTAM) and a special alert bulletin to pilots warning of the color conflict.
B. By Markings of Fuel Type and Grade.

A marking and coding system has been adopted to identify the various fuel handling facilities, equipment, containers, inlet-outlet joints, and aircraft fuel filler openings according to the type and grade of fuel they contain.

1. Fuel Servicing Vehicles. Each aircraft fuel servicing vehicle shall be conspicuously and legibly marked with an identification decal to indicate the product contained in the vehicle. The markings shall be on each side and the rear of the vehicle in letters at least 3” high. Vehicles must be marked as follows:
   - JET A - Combustible
   - JET B - Flammable
   - AVGAS - Flammable

Decal color markings are as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Aviation Gasoline</th>
<th>Turbine Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marking</td>
<td>White Letters On A Red Background</td>
<td>White Letters On A Blue Background</td>
</tr>
<tr>
<td></td>
<td>White Letters On A Blue Background</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White Letters On A Green Background</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White Letters On A Green Background</td>
<td></td>
</tr>
</tbody>
</table>

2. Valves and Piping at Permanent Storage Facilities. Valves, loading and unloading connections, switches, and other control equipment shall be color-coded to identify the grade and type of fuel they control. The fuel in piping is identified by name and by painted color bands, or a decal placed around the pipe at intervals along its length.

3. Hose Lines. Hose lines shall be marked by decals or labeled adjacent to the nozzle to indicate the type of fuel dispensed. Reference the API Bulletin footnoted below.

   a. Bulk Collapsible Tanks (Bladders and Rollagons). Large fixed collapsible tanking facilities, as well as their accessory fueling lines and equipment, shall be marked or decal attached in accordance with the requirements for vehicles in Section V.B.1.
   b. 250 and 500 Gallon Collapsible Rollagons. Each end of a rollagon shall be marked in letters at least 4” high with the type and/or grade of fuel in the container.
   c. 55-Gallon Barrels. The top head or sides of a 55-gallon barrel shall be marked in letters no smaller than 3/4” with the type and/or grade of fuel, filling date, vendor, and any other pertinent information.

   NOTE: Agency authorization is required for use of 55-gallon fuel barrels.
d. 5-Gallon and Smaller Containers. All containers shall be marked with the type and/or grade of fuel contained. In many cases the 5-gallon containers are marked by the fuel manufacturer.

**CAUTION:** Portable plastic containers should be used only when the fuel grade is JET A and no alternative exists. If using portable plastic containers, an approved funnel capable of separating water and contaminants, along with bonding capabilities, is required. Portable plastic containers are not authorized for JET B and AVGAS in aircraft refueling operations.

5. Aircraft. Various FARs require that aircraft fuel filler openings be marked with the word “FUEL,” the minimum fuel grade or designation for the engine(s), and the tank capacity. Markings should be kept clean and legible.

VI. Contamination Testing.

The “Clear and Bright” (Dry) Sampling Test should be used by either the vendor or, if government-operated fueling operation, by trained government personnel. This test involves the following steps, in order:

- Collect fuel sample in a clean, clear 1-quart glass jar. Samples are collected from tank and nozzle.
- Check color against the background of the sky. If water is present, free water (water not in solution) will separate and lay in the bottom of the jar.
- Swirl the contents of the jar. Any free water and/or water in solution will cause the color to become cloudy.

**WARNING:** If fuel is found or suspected to be contaminated, suspend all operations immediately (including those of other aircraft that may have been fueled from the same source) and contact agency aviation safety representatives.

- If water is detected in the tank sample, sump and continue to test until no more water is detected in sample jar. Do not allow helicopter fueling until the sample is free of visible contamination.
- If water is detected in the nozzle sample, suspend the operation immediately.
- Particles in the sample can also be visually identified.
- If particles appear in the tank sample, sump tank until sample is clean.
- Do not use fuel if any nozzle sample indicates:
  - Wrong color, not clear or bright.
  - Visible particulates are present.
  - Visible water is present.
VII. Fueling Hazards.

When personnel fuel a helicopter, they transfer extremely combustible liquids from a storage or transportation vessel to the fuel tank(s) of a helicopter. Such operations are hazardous if the proper procedures are not followed.

Personnel should follow servicing instructions and use the proper equipment in accordance with established operating procedures.

While fueling aircraft is not unusually hazardous under normal conditions, certain other conditions may increase the hazard. Fueling personnel should be aware of the potential problems caused by fuel vapors in the presence of ignition sources such as static electricity, certain weather conditions, electromagnetic energy, and open flames.

They should also be aware of other conditions that introduce additional sources of ignition and/or increase the likelihood of fuel or fuel vapors escaping.

A. Fuel Vapors.

Fuel vapors create potentially hazardous situations, so personnel must be sure to follow prescribed procedures.

When fuel is transferred into an aircraft tank, the incoming fuel forces fuel vapors out through tank vents, with an explosive vapor-air mixture formed in the vicinity of the operation. At some point, the escaping fuel vapors will be within explosive limits, depending upon atmospheric conditions and the type of fuel involved.

**WARNING:** Because AVGAS has a flash point of about -50° F, sufficient vapors are liberated to produce a flammable vapor-air mixture under almost all conceivable atmospheric conditions. All that is needed to cause a fire or explosion is a source of ignition.

Additionally, because the rate of vapor generation increases as the temperature of the fuel increases, the risk of fire or explosion increases when atmospheric temperatures rise.

Because fuel vapors are heavier than air, they will settle to the ground and accumulate in ditches, pits, or other depressions and may travel great distances before coming into contact with an ignition source.

B. Ignition Sources.

In any area in which aircraft are parked or operating, there are numerous ignition sources that may ignite fuel vapors. These sources include static electricity, such as that caused by low-conductivity liquids, refueling vehicles, and clothing; adverse weather conditions (lightning); electromagnetic energy (radar); and open flames.
1. Static Electricity. Static electricity is more difficult to control than any other ignition source. The mechanism responsible for this phenomenon is complex, and there are many variables that may increase and decrease the amount of energy generated. Static charges may exceed 50,000 volts and may produce sufficient energy to cause an explosion above the surface of liquid fuel.

When low-conductivity liquids, such as hydrocarbon fuels, flow through a piping system, they tend to become electrostatically charged. Refueling vehicles have developed measurable electrostatic charges exceeding 50,000 volts during filling operations. This high voltage is partially a result of the insulating effect of the vehicle’s rubber tires. To eliminate this insulating effect, the refueling vehicle must be properly bonded to the helicopter during fueling operations.

During windy conditions, the movement of dust particles and air currents may cause parked helicopters and refueling vehicles to develop larger-than-usual charges of static electricity.

**CAUTION:** Personnel should exercise caution when there are thunderstorms or electrical storms in the vicinity. The energy generated by these natural phenomena may ignite flammable fuel vapors.

When the atmosphere is unusually dry, certain fabrics are notorious for accumulating a static charge. Therefore, personnel who operate refueling vehicles should avoid wearing materials made of polyester, nylon, rayon, silk, or wool when working in cold, windy weather.

2. Electromagnetic Energy. Transferring fuels is hazardous within 300 feet of the source of electromagnetic energy such as that created when high-powered radar operates. However, portable and mobile radio equipment may be used safely beyond 10 feet from fuel filler openings and/or vents.

3. Open Flames. Open flames should be strictly controlled or prohibited in aviation operations areas or within 50 feet of any aircraft fueling operation. Open-flame devices include:

   - Lighted smoking materials of any type.

   **NOTE:** “No Smoking” signs should be posted at all entrances to fueling areas. At remote sites (off-airport), pennant-type flagging or other barriers should be used when a single-use fueling area is established.

   - Exposed-flame heaters whether liquid, solid, or gas-fired devices, including portable and wheeled gasoline or kerosene heaters and open-element electric heaters.

   - Welding and cutting torches and blowtorches.

   - Grinding equipment, either portable or stationary.

   - Flare pots or other open-flame lights.
4. Other Conditions. There are other normal and accepted fueling operations that are hazardous and may require additional safety precautions. Some of these operations are:

- Defueling an aircraft that requires fuel to be drained into open drums or containers.
- Defueling an aircraft that requires an auxiliary power unit or the aircraft engine(s) to be operating during the defueling.
- Servicing an aircraft fuel system that has undergone maintenance but has not been functionally tested before being serviced.
- Fueling an aircraft or using systems with which servicing personnel are not thoroughly familiar.
- Performing other potentially hazardous operations, such as maintenance, power plant operation, and energizing the aircraft electrical system, while the aircraft is being fueled/defueled.

VIII. Safety Precautions.

Aircraft batteries, battery chargers, or other electrical equipment should not be connected, disconnected, or operated during fuel servicing. Radios and electronic flash equipment should not be operated with 10 feet of fueling equipment or of the fill or vent points of the aircraft.

A. Grounding Requirements.

The National Fire Protection Association (NFPA) no longer recommends grounding aircraft during refueling operations. Due to the particular difficulty involved in grounding helicopters at off-airport sites, the recommendation of NFPA (not to require grounding) should be followed by participating agencies.

Grounding may be a required procedure at military or civilian airports or by military helicopter crews. Therefore, grounding should be accomplished when required by local regulation.

B. Bonding Requirements and Procedures.

Bonding involves connecting two or more metallic objects together by means of a conductor that equalizes the electrostatic potential between the objects. Although some fuels being used in aircraft have additives that inhibit static electricity generation, bonding aircraft to the fuel nozzle is a required safe practice. See Figure 13-1.

1. Pre-Bonding Inspection. Check condition of the bonding cable and plug. Procurement document language will usually state required bonding equipment condition.
2. Connecting the Bond. Refer to Exhibit 13-1. Bonding must be performed as follows, in order (omit grounding steps if not required):

- Bond the fuel source to a grounding rod (if available and required).
- Bond the helicopter to the grounding rod (if available and required).
- Bond the fuel source to the helicopter.
- Bond the fuel nozzle to the helicopter prior to opening the fuel port.

3. Disconnecting the Bond. Disconnect the bond in reverse order (omit grounding steps if not required):

- Disconnect the fuel nozzle bond from the helicopter after closing the fuel port.
- Disconnect the fuel source bond from the helicopter.
- Disconnect the helicopter from the grounding rod (if used).
- Disconnect the fuel source from the grounding rod (if used).
C. Rapid Refueling.

Hot refueling of helicopters is permitted if requested by the Government. Equipment used for hot refueling operations shall meet all NFPA 407 requirements. Hot refueling operations shall meet provisions contained in NFPA 407.

Review the procurement document for additional requirements prior to any hot refueling operation.

Government personnel shall not refuel contract aircraft unless the pilot requests assistance due to an emergency situation, or when the Government provides the fuel servicing system and dispensing personnel.

IX. Vendor Fueling Operations.

A. Vendor Responsibility.

Vendors are responsible for maintaining equipment and conducting refueling operations in accordance with the procurement document and, when appropriate and when not in conflict with the procurement document, in accordance with the safety procedures stated in this guide.

B. Government Responsibility.

The government representative (for example, Helicopter Manager or Helibase Manager) is responsible for ensuring that:

- Vendor equipment meets specifications and is correctly maintained in accordance with the procurement document; and
- Fueling operations are conducted in accordance with the procurement document and, when appropriate and when not in conflict with the procurement document, in accordance with the safety procedures stated in this guide.

C. Government Participation.

The government shall not participate in vendor fueling operations. Personnel shall maintain a distance of at least 50 feet from the fueling site until such time as the operation is completed. A “fire guard” (for example, a Parking Tender with fire extinguisher) may be posted at the edge of this 50-foot safety circle.
D. Vendor Service Truck Requirements and Specifications.

It is essential that the government representative ensures that all fueling operations involving a service truck are conducted in accordance with the procurement document. The following is provided as a guide only. For specific requirements, each individual procurement document must be consulted. Procurement documents usually contain the following requirements.

- An approved service truck is provided with each helicopter.
- The service truck is suitable for and capable of handling the terrain encountered (e.g., mountainous roads).
- The service truck meets the licensing criteria of each individual state in which they travel. This requirement can result in delays in arrival of the service truck if not anticipated in advance.
- For fire, the service truck tank capacity is usually required to be able to sustain 8 hours of flight (14 hours when a two or more Pilot crew is required). For projects, this requirement may be adjusted according to local need.
- The service truck is properly maintained, clean and reliable. Tanks, plumbing, filters, and other required equipment should be free of rust, scale, dirt, and other contaminants. A trailer used for storage and transport of fuel is usually required to have an effective wheel braking system.
- Spare filters, seals, and other components of the service truck filtering system are stored in a clean, dry area. (A minimum of one set is usually required.)
- All tanks are securely fastened to the truck bed. Tanks shall have a sump or sediment settling area to allow water and particulate accumulation and subsequent removal.
- A 10-gallon-per-minute filter and pump is usually the minimum size acceptable. Filter and pump system sizes should be compatible with the helicopter being serviced.
- The filter manufacturer’s Operating, Installation and Service Manual is available with the service truck.
- Gasoline engine driven pumps shall be UL listed for flammable liquid transfer. Physical indicators of UL listed pumps are shielded ignition systems and spark arrestors.
- Tanks erected for above-ground storage and tanks mounted on trucks are equipped with a sump drain valve at the lowest point.
- Only hoses meeting procurement document specifications shall be used for dispensing aviation fuel. Hoses should be kept in good repair.
- The fuel nozzle should include a 100-micron or finer screen, a dust protection device and a bonding clip or plug. Except for Wiggin closed-circuit nozzles, no hold-open devices are permitted.
• An accurate fuel metering device for registering quantities in U.S. gallons of fuel pumped is provided. The meter shall be positioned in full view of the fuel handler while fueling the helicopter.

• The service truck has bonding cables, and, when required, grounding cables.

• Fire extinguisher is mounted in a manner to make it readily available at all times.

• Fire extinguishers should be provided as specified in the procurement document and in accordance with NFPA 10, Standards for Portable Fire Extinguishers.

• Each fuel servicing vehicle should have “NO SMOKING” signs with 3-inch minimum letters visible from both sides and rear of truck.

• Each vehicle be conspicuously and legibly placarded and marked according to the requirements in Section V.B to indicate the nature of the fuel.

• The first and third stage elements of a three-stage system and the elements of a single-stage system should be new and installed by the contract start or during the annual inspection; the separator element (teflon screen) of the three-stage system should be inspected and tested as prescribed by the manufacturer during the inspection; and the filter assembly must be placarded with that data.

• The bottom of the filter assembly should be mounted to allow room for at least a quart size jar to be inserted under the drain for taking fuel samples. Piping for draining and pressure flushing of the unit must be clear of truck wheels and exhaust systems. Water sight gauge must be visible in filter vessels using them.

• Depending on whether it is a single or three-stage (coalescer, water separator, and monitor) system, specific pumps and monitor systems are usually specified. Filters must meet specifications of the procurement document.

E. Fuel Servicing Vehicle Driver Qualifications:

Fuel servicing vehicle drivers shall comply with Department of Transportation Safety Regulation Part 390-399, and any duty limitations imposed by the helicopter procurement document. Refer to the appropriate procurement document for specific requirements.

X. Government Fueling Operations.

There are situations, especially in Alaska, where the government is responsible for supplying fuel and a government-operated fueling operation must be set up to accommodate refueling needs. There may be other situations where the government, though not responsible for supplying fuel, must do so. An example would be an incident so remote, or where helibases have no road access, that the government is supplying fuel via aerial delivery.
A. **General Guidance and Requirements.**

- Prior to the start of operations, the manager of the refueling site (for example, Fueling Specialist) may use the Remote Fuel Site Reminders List in Appendix I to ensure that operations are set up and conducted correctly. Parts of the Reminders List may also be used by Helibase Managers to correctly locate fueling pads and to monitor vendor refueling operations.
- Minimizing ground time of both the helicopter and of the service truck in close proximity to other helicopters in the refueling area or on the helibase is important to minimize exposure and risk.
- Refer to the Aviation Fuel Handling Handbook for additional information.

B. **Personnel Requirements at a Government-Operated Fueling Site.**

The following personnel are required on a government-operated fueling site:

- Two people are required to conduct the actual refueling of the aircraft (one may be the Fueling Specialist). One person operates the fuel nozzle; the other is required to be near the emergency fuel shutoff valve.
- Depending on the size of the operation, the fueling operation may also require an Aircraft Base Radio Operator and a Parking Tender.

C. **Personal Protective Equipment.**

Government fuelers shall wear protective clothing as required in Chapter 9. Vendor fuelers shall wear protective clothing as required in the procurement document.

D. **Fueling Site Layout.**

Fueling sites should be laid out according to the following general guidelines (see *Aviation Fuel Handling Handbook* for additional information):

- The fueling site should be separate from the main area of helicopter operations.
- There should be a minimum of 200 feet pad-to-pad separation between Type 1 helicopters.
- There should be a minimum of 125 feet pad-to-pad separation between Type 2 helicopters.
- There should be a minimum of 90 feet pad-to-pad separation between Type 3 helicopters.
- The fueling equipment at a fixed fueling site (pump, fuel source) should be at least 25 feet outside the rotor disk of the nearest helicopter.
Wind direction must be considered when setting up refueling points. Landing and takeoff paths must be selected to provide a direct or quartering head wind.

Fueling activities generate a considerable amount of vapor. Because the vapor is an explosive hazard, the fueling activity should be situated to allow vapors to be dispersed by the prevailing wind.

Exhibit 13-2: Government Fueling Site Layout

E. Equipment Required.

Equipment at the typical fueling site consists of the following:

- A fuel source, which may consist of 55-gallon drum(s), 500-gallon collapsible fuel bladders, permanent or temporary tanks, or a fuel tanker.
- Pump assembly.
- Filter and separator unit. The filter and the separator must be compatible with the pump assembly.
- Hoses, fittings, valves and nozzles. Enough equipment must be available to support the refueling setup that is planned; for example a one-point, two-point, three-point or four point set-up.
- Support equipment. This equipment will include items such as fire extinguishers, grounding rods, waste pans, five gallon containers of water, and absorbent material.
- Fuel sampling kit.
- Fire extinguishers should be located at each refueling nozzle and at the pump and filter assembly.
A waste fuel pan should be located at each refueling point to wash dirt off the nozzles. The waste fuel pan or barrel is required to limit fuel spillage. Fuel spills should be handled according to the procedures outlined later in this chapter.

F. Equipment Setup.

1. Distances.
   - As stated above, the fueling equipment (pump, fuel source) at a fixed fueling site should be at least 25 feet outside the rotor disk of the nearest helicopter.
   - The fuel source should be downwind of the aircraft exhaust to reduce the fire hazard.

2. Pump Assembly
   - The pump assembly and filter separator must be properly grounded and checked for leaks before operation.
   - Fittings should be properly sealed and free of cracks.
   - Sandbags should be used to elevate the fittings to facilitate pre-operational checks and detection of fuel leaks.
   - Hose clamps should be checked for proper fit.
   - All shutoff valves should be serviceable and properly in place.

G. Equipment Checks.

Checks should be made for fueling operations conducted by the government. Some, but not all, may be applicable per the procurement document for vendor fueling operations.

1. Aviation Fuel Nozzle Requirements (see Exhibit 13-3). If all of these items are not present and in good condition, discontinue the operation until corrected:
   - Non-locking discharge lever
   - Bonding cable with plug
   - Brass or aluminum nozzle
   - 100-micron screen in nozzle
   - Serviceable dust cap for nozzle spout
   - For government-operated fueling operations, it is advantageous if each nozzle has all fittings needed to conduct both closed-circuit and open-port fueling.
   - Each nozzle has two ground wires (not a procurement document requirement).

One wire has an alligator clip on the end of it and the other wire should have a plug. These wires are used to bond the aircraft to a grounded 5-foot grounding rod (if
available; not mandatory). The nozzle can be kept off the ground by hanging it on the grounding rod.

**WARNING:** As an aircraft moves through the air, static electricity builds up. This also occurs when fuel moves through hoses. The aircraft, fuel nozzle, and pump assembly must be bonded to prevent sparks and explosions. Additionally, static electricity builds up more quickly in cold, dry air than in warm, moist air.

Exhibit 13-3: Fuel Nozzle Requirements

2. Nozzle Spout Screen. Check for cleanliness by:
   - Unscrewing nozzle spout and removing screen.
   - Tapping screen and collecting contents (if any) for indication of filter by-pass debris or hose deterioration.

3. Portable Fueling Equipment Pressure Differential Gauge(s). When this gauge is installed, check the pressure difference between the inlet side of filter (high psi) and the outlet side (low psi). Perform the following test:
   - Re-circulate fuel through the nozzle into the tank at maximum flow rate and note the difference. Some use two gauges, which requires that the operator perform mathematical calculations. Others use a single gauge, allowing a direct differential reading.
   - When pressure differentials are at or exceed the manufacturer’s recommendations, there is cause for concern. It is a very good indication the filter is holding back water and/or particles. The following should be performed:
   - Sample fuel in tank.
4. Flow Rate. Per specification on pump rating, determine flow rate in gallons per minute (GPM) by re-circulating fuel through the nozzle into the tank and timing the GPM. Substantially reduced flow rates from the minimum specified may be a good indication of a restriction in the element caused by particulate or water contamination. Considered that the pump may not meet specifications or the filter may need to be changed.

- Remove the filter element in the single cartridge Velcon or the monitor from a three-stage system (inside the Teflon screen) and replace with new element.

**CAUTION:** When changing elements, do not touch elements with dirty hands or gloves. Use clean gloves. Leave new element in package until the last step of placing element in canister.

- Re-check the GPM flow.
- While re-circulating, check total system for leaks.

H. **Inspections and Quality Control.**

Every precaution must be taken to maintain quality assurance for fuel. Items which must be checked and maintained on a daily, weekly, monthly, annual, or as-needed basis are covered in the discussion of Form HCM-3, Aircraft Fuel Facility Inspection Log in Appendix A. Inspections must be performed on the required basis, unless this is not feasible due to the remote location and infrequent use of a fueling site. In that case, a combination daily, weekly, and monthly inspection shall be performed prior to each use of the fueling site.

1. Daily Inspections. Fuel site and equipment must be visually checked daily for leaks. If found, local procedures for hazardous materials spills should be followed. In addition, check for water or particulate contamination in the fuel source by:

- Checking the bottom of storage facility tanks for water, using water draw-off connections (sumps) and a visual test on a water-finding paste (allow the paste to remain in contact with the fuel for 30 seconds). Look for paste to change colors.
- Checking for and removing any water from fuel vehicle tanks. A water check should also be performed after every reloading of the fuel container, washing of equipment, and after a heavy rain or snowstorm. Use the “clear and bright” test explained earlier in this chapter.
- Visually checking for particulates.
- Checking all three-stage and Velcon filter/sePARATOR manual water drains for water and other contaminants after each receipt of fuel, as well as on a daily basis. Draw off any accumulation of water.
• Checking and recording all fixed filter and filter/separator differential pressures while under full flow conditions. A graph-type log may be used in plotting differential pressure daily. Any sudden change or decrease in pressure differential may indicate a ruptured filter.

• Visually inspecting fuel vehicle and storage facilities, pumps, valves, and pipelines for leaks.

• Checking and cleaning hose nozzle screens, and if breaks are found, replacing the screens.

• Inspecting all hoses for abrasions, separations, or soft spots. Weak hoses should be replaced.

• Drawing off a sample daily from the downstream side of the filter. Sample should be collected in a clean, clear glass container and examined visually. Any visible water, dirt or filter fibers is unacceptable.

• Checking that dust caps are in place.

2. Weekly Inspections. All of the daily inspections, plus:

• Inspect all fire extinguishers for broken seals, proper pressure, and recharge date. Recharge as necessary.

• Check fuel flow rate GPM to nearest 1/10 gallon.

3. Monthly Inspections. All of the daily and weekly inspections, plus:

• Check the condition of bonding and grounding wires, grounding clips, jacks and bonds.

• Check condition of pumps, motors, and valves.

• Check fuel source and fueling facilities for general condition, safety and appearance.

4. Annual Inspections. All of the daily, weekly, and monthly inspections, plus check electrical continuity with an ohmmeter.

I. Record Keeping.

See Appendix A, Form HCM-3, Aircraft Fuel Facility Inspection Log, for required record keeping. The individual responsible for fueling and/or the fuel source will keep a record containing the following information:

• Condition (clean, clear, bright, etc.) of the tank sump sample, filter sump sample and nozzle sample.

• Flow rate in gallons per minute to the nearest 1/10 gallon.

• Filter change, reason and date.
XI. Fuel Spills.

The information in this section is consistent with National Fire Protection Association (NFPA) Publication 407-90, “Standard for Aircraft Fuel Servicing,” and should be used for both vendor and government-operated fueling operations.

Fuel spills are often the result of improper or careless operation of fueling equipment and lack of preventive maintenance of the fueling equipment. Close attention on the part of every person responsible for fueling is required to prevent fuel spillage. Personnel shall follow the guidelines listed below. See Chapter 12 for crash rescue and firefighting procedures regarding fuel spills.

**CAUTION: All fuel spills, regardless of size, should be considered a fire hazard.**

Procedures for handling fuel spills are subject to the regulations and procedures established by the authority having jurisdiction.

**WARNING: Report all spills immediately; do not attempt to hide the fact that a spill occurred. There are severe civil and criminal penalties if a spill is not reported promptly.**

Each incident is somewhat unique, but certain general principles apply to all cases. Every fuel spill involves several variables:

- Size of the spill
- Terrain on which the spill occurred
- Equipment
- Weather conditions
- Type of fuel and its flammability
- Proximity to aircraft or personnel
- Aircraft accident involved
- Emergency equipment and personnel available

A. Prevention.

Following good spill prevention practices will significantly reduce the chances of one occurring.

- Devote full attention to the fueling operation.
- Never leave any fuel nozzle unattended.
- Never tie or wedge the nozzle trigger in an open position.
- Frequently check the amount of fuel in the tank to prevent overfilling.
• Pumps, hand- or power-operated, shall be used when aircraft are fueled from drums. Pouring or gravity flow shall not be permitted.

• Kinks and short loops in fueling hose should be avoided.

• At remote fueling locations using portable fueling equipment, sandbags should be used to elevate the fittings to facilitate pre-operational checks and detection of fuel leaks.

• At remote fueling locations using portable fueling equipment, construct a berm around the fuel bladder to contain fuel in case of rupture for both temporary and semi-permanent systems.

B. Mitigation Procedures in the Event of a Spill.

WARNING: During any fuel spill or leak, extreme caution must be exercised to avoid actions that could provide ignition sources to the fuel vapors. See Chapter 12 for procedures to follow to avoid ignition of a fuel spill resulting from a crashed aircraft.

Develop, keep current, and post a spill contingency plan. The procedures outlined below, with the addition of specific local material, should suffice. In addition to the plan, absorbent material should be available at the helibase or fueling location.

If a fuel leak develops or a fuel spill occurs during aircraft servicing, follow emergency procedures without delay. If the leak continues, or the spill is a large one, all non-essential personnel should leave the area immediately until the hazard is neutralized, repairs are made, and the area is safe. Follow these steps:

• Alert the airport fire crews or follow established emergency procedures applicable to a remote fueling operation, as outlined below.

• Stop the flow of fuel and the fueling operation immediately upon discovering leakage or spillage:

• If fuel is leaking or spilling from a fuel servicing hose or equipment, the emergency fuel shutoff valve must be actuated immediately.

• If the fuel is leaking or spilling from the helicopter at the filler opening, vent line, or tank seam, fuel delivery must be stopped immediately.

• If the spill occurs during open port (hot) refueling operations, the Pilot will make the decision on moving or keeping the helicopter in place. If the latter, then all electrical power must be shut down and the helicopter evacuated.

• Before the helicopter is put back into service, it must be thoroughly checked for damage and for flammable vapors that may have entered fuselage areas.

• Small spills involving an area of less than 18” normally pose little danger. However, personnel staffing fire extinguishers during start-up procedures should stand by until the helicopter departs the area of the spill because engine exhaust could ignite the
spill. These spills contain such a small amount of fuel that they may be absorbed and placed in an approved hazardous materials container to await disposal.

**NOTE:** New products to absorb fuel spills are available that reduce or eliminate the need for hazardous material containers. These new products should be considered for most fuel spills.

- A fire guard should be posted for other small or medium static spills - not over 10 feet on any side nor over 50 square feet in area. The fire guard should have one or more fire extinguishers with at least a 20 B rating. Local regulations and procedures must be followed, but in most cases absorbent materials or emulsion compounds should be used to absorb the spilled fuel, especially if aviation gasoline (AVGAS) or low flash point fuels are involved. The contaminated absorbent should be placed in an approved container to await disposal.

- Large spills - over 10 feet on any side or over 50 square feet in area - or smaller spills continuing to enlarge (non-static) should be handled by the fire department or, if in a remote location, by a ground engine. Anyone in the area of a large spill should move upwind of the spill at once.

**NOTE:** Aircraft fuels will damage some types of ramp surfaces. Spilled fuel should be picked up as quickly as possible if operating from a hard-surfaced ramp.

- All fuel spills resulting from an aircraft crash or ground collision should be blanketed with foam, if available, to prevent ignition and to prevent further damage to the equipment.

**CAUTION:** Wildland fire foams are not adequate suppressants for fuel spills. Foams must be approved for hydrocarbon fuels.

### C. Fuel Spillage on Personnel.

If the fuel handler’s clothing becomes soaked with fuel, the individual should:

- Avoid ignition sources.
- Leave the fueling area immediately.
- The act of removing clothing creates static electricity. Wet fuel-soaked clothes with water before removing. If water is not available, the person should be grounded to prevent sparks before removing clothes.
- Wash fuel off skin with soap and water as soon as possible.
- Seek medical attention.

**WARNING:** Entering a warm room wearing fuel-soaked clothing can be dangerous. Chances of a fire starting because of static electricity are increased.
CHAPTER 14: HELICOPTER MAINTENANCE.

I. Introduction.

Standards for vendor aircraft maintenance are found in the procurement document (USFS Rental Agreement, OAS Aircraft Rental Agreement, the National CWN contract, state or local agreements, etc.).

NOTE: It is highly recommended that if questions arise concerning helicopter maintenance that an agency maintenance inspector be immediately consulted.

II. Inspection.

Upon aircraft arrival, the Helicopter Manager/Flight Manager shall determine that the following has been accomplished. See Chapter 5.

A. All Procurements.

The aircraft has been inspected by maintenance specialists according to agency inspection criteria. There are interagency standards common to USFS, OAS, and some state and local agencies.

B. Military Aircraft.

Military aircraft used under a Letter of Agreement (LOA) or Memorandum of Understanding (MOU) are maintained in accordance with the terms of the agreement (usually military or National Guard standards).

III. Pilot Functioning as a Mechanic.

A Pilot may function as a mechanic when he or she holds a valid Airframe and Powerplant (A&P) mechanic certificate, meets experience requirements as specified in the procurement document, and the terms of the document do not prohibit this activity. When a Pilot functions as a mechanic, duty day and/or flight time limitations may be affected, per the procurement agreement or agency directive.

IV. Pilot Performing Preventative Maintenance.

(Note that servicing an aircraft with fuel and oil is not considered to be maintenance.) Pilots who are not certificated mechanics may perform preventative maintenance if they have completed an approved training program and are authorized in writing by the vendor (certificate holder) to perform said maintenance. Each item a Pilot is authorized to perform
must be specified in writing. Examples of preventative maintenance which may be authorized include:

- Removal, inspection and reinstallation of magnetic chip detector plugs.
- Removal and installation of passenger seats.

V. Mechanic Approval.

Mechanics shall be approved prior to use. See Chapter 5.

VI. Maintenance Ferry Flight.

Ferry flights may be necessary to relocate an aircraft to a suitable maintenance location for scheduled or unscheduled maintenance purposes. Managers should remember that if maintenance time requirements have been (or will be) exceeded during flight, government passengers are not allowed on board the helicopter, nor may the vendor perform any government-ordered missions.

The sole purpose of the flight must be to ferry the helicopter to a maintenance facility or location where the work can be performed.

**EXAMPLE:** A 100-hour inspection is due in 0.5 hours, but it will take 0.8 hours to fly to the vendor’s maintenance facility. Although the manufacturer and/or the FAA may allow flight up to 10% over the scheduled maintenance timeframe (that is, may fly up to 110 hours since the last 100-hour inspection), flight may be performed only for the purpose of ferrying the helicopter to a maintenance facility.

If the maintenance time limit will not be exceeded during the ferry flight, the helicopter may be used to perform government work as part of the flight. Be aware, however, that it will be a revenue flight, and, as with any government-ordered flight, there should be a justifiable reason for payment.

VII. Scheduled Maintenance.

Helicopters shall be maintained in accordance with the Vendor’s Operation Specifications, applicable Federal Aviation Regulations, and the manufacturer’s recommendations. Under normal circumstances, scheduled inspections are not to be overflown. Scheduled maintenance should be performed before or after daily standby or as approved by the Contracting Officer or designated representative.

The following inspections are to be performed by authorized personnel and may require a logbook entry:
A. Duties Authorized to Be Performed by the Pilot.

1. Daily Preflight Check. The Pilot will perform a daily preflight check prior to the first flight of each day. The Pilot may make an entry in the helicopter’s logbook or record that such an inspection has been performed. The pre-flight inspection is included in the Pilot’s 14-hour duty day.

2. Turbine Engine Power Assurance Check. A Power Assurance Check shall be accomplished on the first day of operation and thereafter within each 10 hour interval of contracted flight operation unless prohibited by environmental factors (e.g. weather, smoke). The power assurance check shall be accomplished by the contractor in accordance with the Rotorcraft flight manual or approved (per OAS/USFS maintenance) company performance monitoring program. The results shall be recorded and either kept in the helicopter or at the assigned work location. A current record of the power check will be maintained with the aircraft under the contract and any renewal period.

Helicopters with power output below the minimum published performance charts shall be removed from service. The below minimum power condition shall be corrected before return to service and contract availability.

NOTE: Turbine Engine Power Assurance Checks for some aircraft cannot be trended. The reading may be correct or incorrect, or above or below specification, instead of having a numeric value.

See procurement document and Appendix A for more specific information on Power Checks.

3. Test Flight. Test flights do not have a specified minimum flight time requirement. Test flights will normally be of sufficient duration to determine that the item repaired, replaced or adjusted operates correctly. The Pilot is required to make an entry in the helicopter’s logbook or record. Passengers are not permitted to be aboard the aircraft during test flights.

B. Inspections or Maintenance Performed by the Mechanic.

1. 50/100-Hour Inspections. The vendor shall provide the necessary maintenance personnel and equipment to inspect and service the aircraft in the field. Under normal circumstances, 50/100-hour inspections should be performed before or after daily standby or as approved by the Contracting Officer or designated representative.

2. Annual Inspection. An annual inspection is required once every 12 calendar months. This inspection is identical to the 100-hour inspection in scope and detail, but must be performed by a licensed Airframe and Powerplant (A&P) mechanic with Inspection Authorization (IA). This inspection shall not be overflown.

3. Approved Aircraft Inspection Program (AAIP). In lieu of 100-hour/annual inspections, phase inspections may be authorized by the vendor’s maintenance program. Phase inspections can normally be accomplished in a very short period of time, since only a portion of the aircraft is inspected at each phase.
4. Time/Calendar Life Inspections. Various engine and airframe components require hourly or calendar inspections or replacement. These inspections will normally be performed in conjunction with other inspections. These inspections shall not be overflown unless the vendor has an FAA-approved extension from the manufacturer.

5. Airworthiness Directives and Service Bulletin Compliance. Special inspections may be required by the FAA or by the manufacturer. These inspections must be accomplished within the timeframes indicated in the directive or bulletin. The vendor is required to provide a compliance list at the designated base.

VIII. Unscheduled Maintenance.

Chart 14-1 lists those steps to be taken by USFS and DOI Helicopter Managers for proper documentation of unscheduled maintenance, and individual(s) to notify for each type of mechanical problem and return to contract availability approval. State and local agencies should consult agency directives.

IX. Mechanic Subsistence and Travel.

Although not specifically a maintenance issue, the question of whether to pay for mechanic subsistence and travel often arises. The Helicopter Manager should consult the procurement document for requirements.
<table>
<thead>
<tr>
<th>SITUATION</th>
<th>REQUIRED ACTION(S) DOI AND USFS</th>
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<tbody>
<tr>
<td>Failure of Minor Components (Gauges, Chip Detectors, etc.)</td>
<td>1. Document in Daily Diary</td>
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<td>2. Approval by vendor’s mechanic</td>
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<td></td>
<td>3. Notify agency maintenance inspector for return to contract approval</td>
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<td>4. Discuss with agency maintenance inspector if SAFECOM should be submitted.</td>
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<tr>
<td>Major Components (Transmission, Engine, Rotor Blades, Main Rotor Hub, etc.)</td>
<td>1. Immediately notify maintenance inspector and PI/COR</td>
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<td></td>
<td>2. Document in Daily Diary</td>
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<td></td>
<td>3. Approval by vendor’s mechanic</td>
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<td></td>
<td>4. Return to contract availability requires verbal approval or physical inspection by agency maintenance inspector (will make determination if physical inspection is necessary)</td>
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<td>5. SAFECOM should be submitted.</td>
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<tr>
<td></td>
<td>6. Notify contracting officer within 24 hours</td>
</tr>
</tbody>
</table>

Chart 14-1: Required Actions To Be Taken By Helicopter Manager For Maintenance Problems and Return To Contract Availability
CHAPTER 15: HELIBASE AND HELISPOT MANAGEMENT AND OPERATIONS.

I. Introduction.

Helibase management requires additional personnel, planning, completion of checklists and mandatory forms, and increased controls (vehicle traffic, airspace, communications, etc).

Prior to reading this chapter, it may be valuable to review the duties and responsibilities of both helicopter and helibase management positions found in Chapter 2.

Useful tools that the Helibase Manager and subordinate positions can use to plan and conduct operations include the:

- Daily Helicopter Operations Briefing/Debriefing Checklist (see Appendix F)
- Helibase Manager’s Reminders List (see Appendix H)
- Aviation Publication and Helicopter Operations Ordering List (see Appendix K)

It is also essential that the Helibase Manager review:

- Appendix A, Helicopter Management Forms and Checklists. Many of the forms are relevant to helibase operations and may supply information necessary to the completion of helibase management forms.
- Appendix B, Helibase Management Forms and Checklists. These are closely tied to the helibase planning, operational procedures and requirements discussed in this chapter.

II. Coordination with Project Aviation Manager or Air Support Group Supervisor and Air Operations Branch Director.

Coordination, communication and cooperation with these functions is essential to the success of helibase operations.

Correct and timely identification of problems encountered, along with corrective action already taken or to be taken, will do much to gain the support of supervisory air operations personnel. This process is a two-way street. If the Helibase Manager is not getting timely or correct information from supervisors, then this problem must be quickly identified. Chart 15-1 outlines essential areas of coordination among air operations staff and other incident or project personnel.

III. Helibase Briefing and Debriefing.

The importance of providing complete briefings for all vendor and government helibase/helispot personnel prior to the start of operations, as well as debriefings at the end of an operational period, cannot be overemphasized.
Two of the best tools available to the Helibase Manager in planning and monitoring all operations are the Helibase Manager’s Reminders List and the Daily Helicopter Operations Briefing/Debriefing Checklist. These are the primary management tools and job aids of the Helibase Manager. A complete review of all items will greatly promote the safety and efficiency of helibase/helispot operations. It should be remembered, however, that completion of forms and checklists does not replace good management and personal communications.


For incidents, the use of the Daily Helicopter Operations Briefing/Debriefing Checklist is mandatory at all multiple-helicopter bases by the start of the second operational period. It shall be completed on a daily basis thereafter.

For projects, use of the checklist is mandatory on the first day at all multiple-helicopter bases. It shall be completed on a daily basis thereafter.

The Daily Helicopter Operations Briefing/Debriefing Checklist is designed to enable the Helibase Manager to conduct comprehensive briefings and debriefings. Major areas covered are Organization and Personnel, Communications, Landing Areas, Safety, Operations, and Administration. One Checklist may be used for a seven day period, after which a new one must be initiated.

Anyone who cannot attend briefings or debriefings must be individually briefed or debriefed by the Helibase Manager or designee, using the Daily Helicopter Operations Briefing/Debriefing Checklist and other helibase forms (for example, Facilities, Hazard, And Flight Route Map, Helispot Information Summary, etc).

If any item on the Daily Helicopter Operations Briefing/Debriefing Checklist has not been accomplished, approval is required from the Incident Commander, Project Aviation Manager, or designee (for example, the Air Operations Branch Director). Detail the deviation on the Checklist, a General Message Form, or other format. A signature from the official approving the deviation is required. This documentation must be attached to the Checklist.

Pilots are required to sign the Daily Helicopter Operations Briefing/Debriefing Checklist on a daily basis.

NOTE: If the Helibase Manager arrives at an incident where operations are already proceeding, it is advisable, unless life or property is being threatened, to conduct a short briefing to review the Checklist. The Helibase Manager should make it clear to the air operations staff that there will be a slight operational delay while the initial briefing is accomplished. The time spent accomplishing this will result in a smooth transition from initial/extended attack to incident management helibase operations, and should increase safety awareness and efficiency significantly.
B. **Helibase Manager’s Reminders List.**

The use of the Helibase Manager’s Reminders List is optional. It is recommended that the Helibase Manager review it upon arrival, with additional review at convenient times throughout each day and after nightly debriefings. It is organized in a sequential and logical manner to lead the Helibase Manager and subordinate personnel through all phases of helibase operations:

- Helibase and Helispot Site Selection
- Personnel and Organization
- Communications
- General Planning Information and Organization Needs
- Operations
- Demobilization and Rehabilitation

C. **Briefing/Debriefing Schedule.**

Briefing and debriefing schedules vary according to incident or project requirements. Chart 15-1 is provided as a guideline.

- Note the necessity for the Helibase Manager and primary staff (DECK, TOLC) to provide for sufficient time to prepare for the morning briefing. Adequate preparation results in concise and comprehensive briefings.
- During complex, high-activity operations, briefings and debriefings should be scheduled to fall within the duty day of the majority of incident or project Pilots. Separate briefings or debriefings shall be held with Pilots who may miss the group briefing or debriefing due to a staggered duty day schedule.
- If long shifts are encountered, the Helibase Manager should consider shifting out on a rotating basis. For example, one day the Helibase Manager comes on duty late, and the DECK presents the morning briefing. The Helibase Manager conducts the nightly debriefing. This requires coordination and communication between the two individuals, but is effective in reducing fatigue. It should also be considered for other helibase personnel.
Chart 15-1: Briefing/Debriefing Schedule

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TIME FRAME</th>
<th>ADDITIONAL CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Briefing</td>
<td>Depending upon complexity of operations and Pilot duty day requirements, provide for adequate time prior to the “Commence” time shown on the Incident Air Operations Summary (ICS-220). Remember, part of this period must be provided for helicopter preflight prior to the “Commence” time. Adjust times as necessary, but be prepared to meet “Commence” times identified.</td>
<td>The Helibase Manager and primary staff should be preparing for the briefing at least 15-30 minutes prior to the briefing's scheduled start. All operational and safety problems identified during the previous nightly debriefing should be corrected. Remember to review the Helibase Manager’s Reminders List.</td>
</tr>
<tr>
<td>Debriefing</td>
<td>The debriefing should be accomplished as soon as possible after the completion of helibase operations. Remember for next-day planning purposes that vendor personnel are “On Duty” until the debriefing is completed. Notify the AOBD or Project Aviation Manager if completion time affects next day’s plan. At this time, the next day’s plan (if available) should be reviewed.</td>
<td>Ensure that feedback is obtained from everyone, including contractor personnel, concerning the day’s activities. Operational and safety problems should be either immediately corrected or brought to the attention of the ASGS/AOBD or Project Aviation Manager. Cost reports must be submitted to the Helibase Manager or Aircraft Timekeeper by all Helicopter Managers at the end of each operational period.</td>
</tr>
</tbody>
</table>

IV. Helibase Personnel and Organization.

Helibase organizations vary in size and configuration depending upon a variety of factors including incident or project complexity, number of assigned aircraft, range and type of missions, and experience level of personnel assigned.

The assignment of trained and qualified personnel to each helibase function is critical to the safety and effectiveness of operations. Refer to Section I of the Daily Helicopter Operations Briefing/Debriefing Checklist in Appendix F for personnel and organizational items that must be checked prior to the start of operations. Refer also to Appendix H, Helibase Manager’s Reminders List, Section III, for similar considerations.
The position of the Helibase Manager is common to all helibase organizations. This individual is responsible for the safety and efficiency of all helibase and helispot operations.

If an operation is not functioning smoothly, the Air Support Group Supervisor and/or Air Operations Branch Director should consider:

- Assigning a Deputy Helibase Manager (fully-qualified Helibase Manager).
- Splitting the operation into two or more helibases at different locations to reduce single-location complexity (there are negative aspects of this which may outweigh the advantages).
- Replacing the Helibase Manager. This option should only be considered if it is determined that the Helibase Manager is unable to manage the helibase appropriately. Supervisory personnel should also consider that failures at the helibase may be the result of failures in other parts of the Project or Incident Management Team.

V. Helibase Setup and Layout.

See Exhibit 15-2 for a typical helibase layout. Section I, Helibase Site Selection and Layout, in the Helibase Manager’s Reminders List (Appendix H) should be reviewed during initial site selection.

A. Time Frames.

A Helibase Manager who can manage and delegate responsibilities effectively should have accomplished all of the items discussed in this chapter, plus those specified on the Helibase Manager’s Reminders List, by mid-day of the second operational period on incidents. With more lead time available on a project, all items should be implemented or operational prior to commencement of the project.

On incidents, accomplishing all of these tasks may require additional work after the end of the shift on the first day. The Helibase Manager should not attempt to accomplish everything alone. Share the workload among helibase staff. Spending this additional time is well worth the effort in terms of achieving a smooth, safe operation the next day.

B. Obtaining Necessary Equipment.

Consult Appendix K for ordering information. The Helibase Manager should consult this list both at the beginning of the incident or project and frequently thereafter. Appendix K contains information on how to use the ordering list in conjunction with the supply unit.

Commonly needed items include, but are not limited to:

- Radios and radio kits
- Ground vehicles
- Crash rescue and evacuation kits
- Helicopter support kits, plus additional fire extinguishers, wind socks, pad markers, signs, lead lines, swivels and cargo nets
- Personal protective equipment
- Portable tanks and water bags
- Tents
- Aerial ignition equipment
- Miscellaneous administrative and office supplies

**HINT:** At larger helibases with significant cargo transport, assign an Ordering/Distribution Manager to the helibase. This individual’s function is to coordinate the ordering, delivery and distribution of supplies and equipment to the helibase from the supply unit.

C. **Facilities and Layout Considerations.**

Refer to Exhibit 15-2. (Once the helibase is established, complete the Helibase Facilities, Hazard, and Flight Route Map.)

1. **Operations and Communications Area.** One of the first priorities is the establishment of a helibase operations and communications area. See Chapter 4 for additional discussion of this area and its needs.

   a. **Location.** This area should command a full view of the helibase operational area.

   b. **Set up.** Set up communications equipment in an area in which the TOLC and Helibase Radio Operator can function effectively and communicate readily with the Helibase Manager and DECK. The following set-ups are usually acceptable:

      - Outside a helicopter crew chase truck equipped with side compartments to handle communications needs
      - Inside a tent, with a full view of the helibase
      - In a communications trailer designed for air operations use
c. Communications Equipment. The use of radio headsets to counter helibase noise is strongly encouraged. Various radio kit configurations are listed in Appendix K. Refer to Chapter 4 for a discussion of various communications functions.

**IMPORTANT NOTE:** The Helibase Manager should ensure that assigned radio equipment and frequencies meet the needs for ground-to-ground, air-to-ground, and air-to-air functions.

2. Wind Indicators.
   - Set up wind indicator(s) in location(s) visible to all helicopters. Indicators should be placed on both the approach and departure paths.
   - Indicators should be located at sufficient height to give a true indication of wind direction that is not affected by adjacent vegetation or terrain.
   - They should be placed in location(s) that are unaffected by rotor wash.

3. Approach and Departure Paths.
   - Establish approach and departure paths with Pilot input and in conformance with requirements in Chapter 8.
   - Establish hover lanes for access to various areas on the helibase.
   - Enter information on the Helibase Facilities, Hazard, and Flight Route Map.
Exhibit 15-2: Typical Helibase Layout
4. **Touchdown Pads and Safety Circles.**
   - Establish touchdown pads and safety circles in conformance with requirements in Chapter 8.
   - Group pads by helicopter types. Also separate pads, or groups of pads, by type of flight mission (for example, external cargo transport pads separate from personnel transport pads).

   **CAUTION:** Establish external load pad(s) to avoid overflights of other pads, helibase, or camp.

   - Establish special pads as necessary for fueling, maintenance, retardant mixing, or aerial ignition (refer to Chapter 13 for fueling separation requirements).
   - Enter information on the Helibase Facilities, Hazard, and Flight Route Map.

5. **Vehicle Parking and Movement.**
   - Establish vehicle parking area for crash rescue vehicle (if assigned), fuel, cargo, personnel transports, visitors, etc.
   - Establish procedures for vehicle movement (access to helibase, refueling, delivery of cargo, etc.).
   - Enter information on the Helibase Facilities, Hazard, and Flight Route Map.

6. **Security.** For special security requirements during law enforcement operations, see Chapter 16.
   - Cordon off the helibase to control vehicle and foot traffic.
   - Request security as needed.

7. **Personnel and Cargo Staging Areas.**
   - Establish staging areas for personnel and cargo.
   - Use pennant flagging for crew “holding areas,” as well as for entry-egress routes to pads.
   - Establish the cargo loading and external load area(s) so that other helicopters are not overflown, and so that upon either approach or departure with a load, the helicopter does not fly over inhabited areas. See Chapter 8.
   - If moderately or heavily traveled roads will be overflown on approach or departure, a road guard may need to be posted. Consult with local law enforcement officials on the posting of road guards. If county, state, or federal highways are involved, the appropriate law enforcement agency is responsible for traffic control.
   - Enter information on the Helibase Facilities, Hazard, and Flight Route Map.
8. Weighing. Set up scales for weighing personnel and cargo.

HINT: Scales may be set up in both the Food and Supply Units to weigh cargo that will be sent to the helibase for transport to the line. Assigning a Loadmaster from the helibase to ensure cargo arrives properly packaged, weighed, and labeled with destination is highly effective. This system also works well on large projects.

9. Signing. Post warning signs as required, including helibase, speed limit, cargo area, personnel staging, parking, no smoking, etc.

10. Sanitation.

- Provide an adequate number of portable toilet facilities to meet the needs of helibase personnel and crews in transit through the helibase.
- Order enough trash barrels or dumpsters to handle both the helibase waste needs and the backhaul from helispots.
- Establish a separate disposal area for used batteries and other hazardous materials such as saw gas, oil and grease from helicopter maintenance, etc.
- Enter information on the Helibase Facilities, Hazard, and Flight Route Map.

11. Display Board. Refer to Exhibit 15-3. A Display Board is an essential part of any helibase operation to facilitate information posting, exchange, and briefing requirements.

- The display board should be located near the helibase operations and communications area for ease of posting and referring to information, conducting briefings and debriefings, etc.
- 4’ by 8’ sheet(s) of plywood work well. Ensure that the board has adequate support to withstand high winds and rotor wash.
- Cover with plastic to protect information from adverse weather.
- For incidents, required information should be completed and posted on the display board no later than mid-day of the second operational period. For projects, it should be posted prior to the commencement of operations. Unless noted as optional, the following should be posted on the display board.
  - Incident Action Plan (ICS Forms 202, 203, 204, and 205 minimum) or Project Aviation Plan.
  - Incident or Project Map.
  - Air Operations Summary (ICS-220).
  - Helibase Facilities, Hazard, and Flight Route Map.
  - Helibase Organization Chart (HBM-1).
  - Aviation Locations Summary (HBM-2).
- Helibase Aircraft Information Summary (HBM-3) (optional).
- Helibase Flight Time Tracking Record (HBM-5A) (optional).
- Daily Helicopter Operations Briefing Checklist (HJA-1).
- Load Calculations for representative elevations and temperatures for all helicopters assigned, or Helicopter Load Capability Summary - Multiple Helispots and Fuel Loads (Form HCM-10).
- Allowable Payload Chart (HBM-4).
- Emergency Rescue Information (Form HJA-4A).
- Standard Aircraft Safety Briefing.

**Exhibit 15-3: Example of a Helibase Display Board (4’x8’ Plywood)**
12. Helibase Eating Area and Arrangements. An area for eating meals should be established and posted on the Helibase Facilities, Hazard, and Flight Route Map.

The Helibase Manager should coordinate immediately with the Project Aviation Manager or the Air Support Group Supervisor regarding meal arrangements.

While every situation is different, it is generally the case that helibase shifts do not coincide with the main camp's meal schedule. In order to minimize the disruption to the caterer, it is recommended that arrangements be made so that both helibase government and vendor personnel eat at the helibase.

At a minimum, cold breakfast items such as cereal, fruit, rolls, milk and juice will provide an adequate breakfast prior to the morning briefing.

If the caterer's schedule is such that the kitchen shuts down prior to the completion of the nightly debriefing, dinner in hot food containers should be provided.

NOTE: In Alaska, personnel are supplied with Meals-Ready-To-Eat (MRE's) for the first three days. Thereafter, fresh food boxes may be provided. Government and vendor personnel are expected to prepare their own meals.

13. Helibase and Vendor Personnel Sleeping Area. One or two general sleeping areas for personnel should be immediately designated and posted on the Helibase Facilities, Hazard, and Flight Route Map. Sleeping areas should be well away from the helibase operational area, hover lanes, and flight paths to avoid the effects of rotor wash.

NOTE: The Helibase Manager should make his/her sleeping area known to the Air Support Group Supervisor or Project Aviation Manager in case an emergency arises during the night.

If vendor personnel are required to stay at the incident, then the Helibase Manager is required to ensure that the contractual requirements for adequate rest are met. At a minimum, cots and tents should be ordered.

To meet aviation safety objectives, the effects of Pilot fatigue and inadequate rest facilities must be recognized. It is recommended that Pilot fatigue factors be reduced by:

- Allowing Pilots to sleep in motels or other available facilities, provided that such a policy does not significantly interfere with Pilot duty day/flight time limitations.
- Modifying the above by allowing Pilots to sleep in motels or other available facilities on a rotating basis every third night.

HINT: If motels are not ground accessible within a reasonable time, reduce the effect on duty days by flying all Pilots to the rest location in one or two aircraft, instead of allowing each Pilot to fly in.
• In Alaska, helicopter vendors are advised in the procurement document to provide tents for their personnel. Sleeping bags, plastic sheeting and bug nets are provided at remote helibases. Housing may be available in villages.

• All sleeping areas shall be policed prior to the morning briefing and all equipment and supplies secured.

VI. Helispot Considerations.

A. Personnel and Organization.

Proper helispot management is essential for safe and efficient operations. The Helibase Manager is responsible for ensuring adequate numbers of personnel are assigned.

As a general rule, helispots should have a minimum of two people assigned, although more than two may be necessary (for example, at a camp with significant transport of personnel or cargo). Consider assignment of a Type II or I Helibase Manager to helispots at large camps.

HECMs that manage helispots need to ensure that their staff understands the responsibilities and authorities of helispot management.

Assignments will normally be made at the helibase briefing prior to the start of the operational period. For helispot personnel who stay at camps or helispots overnight, a briefing on the intended operations for the day should be relayed by radio, and input solicited for the nightly debriefing.

Personnel managing helispots should work and communicate closely with the helibase and incident supervisor for the area on both logistical and tactical needs at the helispot.

At the end of each shift, all those who used the helispot should offer a constructive critique of the operations there.

B. Establishing Helispots.

On incidents, the Air Operations Branch Director is responsible for the establishment of all helispots, though this responsibility may be delegated to the Air Support Group Supervisor or Helibase Manager. On projects without a full aviation staff, the Helibase Manager is responsible. In either case, close coordination with, and in many cases, authorization by the local Resource Advisor to construct helispots is required. Refer to Chapter 8 for additional information.

Form HBM-2, Aviation Locations Summary, should be initiated and updated as new helispots are established. Its primary use is for Pilot safety briefings.
All helispots must be approved regarding hazards and capability (HIGE or HOGE) by a trained and authorized individual. Pilots are a good source for this information.

C. Necessary Equipment.

It is essential that all tools and equipment to perform the job, including initial attack firefighting gear, be obtained by personnel managing the helispot. This equipment includes:

- One (1) 20-pound, dry chemical, 40 B:C rated fire extinguisher
- Pad marker with nails (initial establishment of spot)
- Radio with extra batteries
- Wind Indicator(s)
- Scales (recommended, but not required)
- Fiber Tape
- Manifest Book(s)
- Pocket Calculator
- Passenger Aircraft Safety Briefing Cards
- A list of allowable payloads for each helicopter assigned to the helibase (HIGE and HOGE) for all helispots, since they may be assigned to another spot during the course of the day; copies of Form HCM-11, Single Helicopter Load Capability Planning Summary - Multiple Helispots and Fuel Loads, for each helicopter works well for this purpose
- Food and water
- Initial attack gear
- Overnight gear (even if the plan is to return the crew to the helibase)

IMPORTANT NOTE: These items are not required for unimproved landing sites which are used only infrequently. However, if the site is used on a recurrent basis as a personnel or cargo destination, then it becomes a helispot and applicable requirements should be met.

D. Facilities and Layout Considerations.

Helispot personnel are usually the first personnel to be flown to a helispot, both for initial construction and improvement and on a daily basis thereafter in preparation for personnel and cargo transport. The helispot shall not be declared operational (that is, ready to receive personnel or cargo) until the helicopter crewmembers assigned to that helispot have informed the helibase that the spot is ready.
Some of the considerations regarding facilities and layout of helibases also apply to helispots. Refer to Section II, Helispot Site Selection and Layout, in the Helibase Manager’s Reminders List (Appendix H) for items which should be checked during the establishment of any helispot. Also refer to Chapter 8, Helicopter Landing Areas, for requirements. Items to consider include, but are not limited to:

- Wind Indicators. Considerations are the same as with helibases.
- Approach and Departure Paths. Establish approach and departure paths with Pilot input in conformance with requirements in Chapter 8.
- Touchdown Pads and Safety Circles. Establish touchdown pads and safety circles in conformance with requirements in Chapter 8.
- Vehicle Parking and Movement. Though road access to a helispot is the exception rather than the rule, the helispot may have road access. If so, consult guidelines for helibases.
- Security. The helispot may have need for security. If so, consult guidelines for helibases. For special security requirements during law enforcement operations, see Chapter 16.
- Personnel and Cargo Staging Areas. Although helispot staging areas do not need to be as elaborate as those for the helibase, establish areas for personnel and cargo well away from the landing pad. If necessary, use pennant flagging for crew “holding areas,” as well as for entry-egress routes to the helispot landing pad.
- Weighing. If scales are available, use them for the accurate weighing of personnel and cargo.
- Signing. Post warning and informational signs (helispot, no smoking, etc.) as appropriate.

VII. Communications.

Communications is one of the most important aspects of helibase operations. A good communications plan and network will greatly increase chances of success. Conversely, a poor plan with inadequate equipment is a guarantee of failure.

Communications problems must be solved immediately. Close coordination with the Air Operations Branch Director or Project Aviation Manager is essential. Refer to Chapter 4 for a discussion of communications concerns. Brief all involved using the Aviation Communications Plan included in Chapter 4.

- Section II, Communications, in the Daily Helicopter Operations Briefing/Debriefing Checklist must be completed on a daily basis prior to the start of operations.
- Section IV, Communications, in the Helibase Manager’s Reminders List should be reviewed as needed by the Helibase Manager.
VIII. Safety.

Safety items as specified in Section IV in the Daily Helicopter Operations Briefing/Debriefing Checklist must be reviewed on a daily basis prior to the start of operations. The Helibase Manager should maintain constant awareness of other safety items not on the Checklist that need review.

IX. General Planning, Information and Organization Needs.

- Appendix B contains guidance and direction concerning both required and optional planning tools available to the Helibase Manager.
- The Helibase Manager should review Section V, General Planning, Information and Organization Needs, in the Helibase Manager’s Reminders List.

X. Operations.

- Section V, Operations, in the Daily Helicopter Operations Briefing/Debriefing Checklist must be completed on a daily basis prior to the start of operations.
- The Helibase Manager should review Section VI, Operations, in the Helibase Manager’s Reminders List.

XI. Demobilization of Aircraft and Personnel.

The Helibase Manager should review Section VII, Demobilization, in the Helibase Manager’s Reminders List when it is anticipated a helicopter will be demobilized. Although use of Form HBM-11, Helicopter Demobilization Information Sheet, is optional, it facilitates the orderly demobilization of air and associated ground resources.

XII. Rehabilitation.

The Helibase Manager should review Section VIII, Rehabilitation, in the Helibase Manager’s Reminders List whenever a helispot or helibase will be placed in inactive status or will be permanently demobilized. Consult the local Resource Advisor for specific rehabilitation standards.
XIII. Demobilization and Deactivation of the Helibase.

Aside from the physical cleanup considerations of demobilization addressed in Section VIII, Rehabilitation, in the Helibase Manager’s Reminders List, the Helibase Manager is responsible for ensuring that a complete Helibase File is left with the Documentation Unit Leader on incidents or the Project Manager on projects. This file should consist of the items specified in Section V of the Helibase Manager’s Reminders List.

XIV. Miscellaneous Considerations.

A. Operations Involving Military Helicopters.

Operations involving use of military helicopters can increase the complexity of a helibase operation. For aviation operations using Active Duty/Reserve Military helicopters or National Guard units officially “federalized” by Department of Defense, refer to Chapter 70 of the Military Use Handbook for specific policy and procedural information.

The use of National Guard units for federal firefighting purposes within their state must be outlined in national, regional, state or local agreements and MOUs between federal agencies and the specific National Guard units.

B. Pilot Informational Needs.

Most Pilot informational needs are provided through use of the Daily Helicopter Operations Briefing/Debriefing Checklist at the start of the operational period and by consulting information posted on the helibase display board.

All Pilots must be briefed on a daily basis. Individual briefings must be provided for Pilots not in attendance at the group briefing (such as those who may have a later start time due to staggered duty days). In addition, all Pilots shall be provided with a copy of the following:

- A current Incident or Project Map marked with hazards, helispots, drop points, dip sites, etc.
- A copy of the Air Operations Summary (ICS-220)
- A copy of the Radio Communications Plan (ICS-205)

It is the Helibase Manager’s responsibility to communicate hard-copy needs of the above to the Air Support Group Supervisor, Air Operations Branch Director or Project Aviation Manager.
C. **Helibase Manager Kit.**

Helibase Managers should bring the items identified in Appendix B to all incidents or projects.

D. **Aviation Safety Assistance Teams/Safety and Technical Aviation Team (ASAT/STAT).**

A geographic area (State, Area, or Region) may request that the Incident Commander accommodate the visit of an Aviation Safety Assistance Team, or the Incident Commander or Project Aviation Manager may request one.

Teams are usually made up of Helicopter Operations Specialists and Pilot, Maintenance, and Avionics Inspectors.

Teams have been instructed not to interfere with operations unless an immediate safety hazard is observed. The ASAT/STAT should close out with both the Helibase Manager, supervisory air operations staff (ASGS/AOBD), and the Incident Commander or Operations Section Chief, or Project Aviation Manager.

It is advisable that the Helibase Manager consult the Incident/Project Helicopter Operations and Safety Evaluation prior to the Team's arrival. Close adherence and attention to the items in the Daily Checklist and Helibase Manager’s Reminders List will usually ensure a positive evaluation. The evaluation team completes the following:

- Reviews the Daily Checklist items, checking for compliance.
- Reviews the Helibase Manager Reminder’s List items, checking for compliance.
- Evaluates management relationships to determine if coordination and communication are occurring.
- Determines if training opportunities are being offered.
- Reviews Pilot, maintenance, and avionics inspectors’ findings.
CHAPTER 16: LAW ENFORCEMENT OPERATIONS.

I. Introduction.

All direction in this chapter is provided for the purpose of ensuring safety and efficiency in law enforcement aviation operations. It is essential that law enforcement personnel who use helicopters in the conduct of their missions possess thorough knowledge of all aspects of helicopter operations.

Law enforcement aviation operations often have special needs. Some missions are conducted in a higher-than-normal risk environment where the hazards on the ground from potential gunfire and apprehending suspects may be greater than, or compound, the hazards associated with the aviation mission.

IMPORTANT NOTE: Provisions in the procurement document may prohibit use of vendor helicopters for high-risk law enforcement missions. Vendors and Pilots must be informed of any potential hazard to the aircraft or its occupants.

Though this chapter and agency-specific policy may exempt law enforcement from some standard helicopter operating procedures, it must be emphasized that an exemption in one area does not automatically exempt law enforcement users from following other standard operating practices and procedures. All activities not covered in this chapter and specifically exempted here or in agency-specific policy shall follow the procedures outlined in previous chapters. This chapter is organized according to the structure and chapter sequence of the guide itself for ease of reference.

The leader of each law enforcement mission shall implement the rapid risk assessment and management techniques discussed in Chapter 3.

II. Personnel Duties and Responsibilities, Qualifications, Certification and Training.

All law enforcement aviation operations should be conducted by qualified helicopter managers and crew members in accordance with agency requirements for Resource/Project Helicopter Manager and Resource/Project Crew Member.

III. Operational Planning.

Law enforcement aviation missions may be accomplished using agency-owned, contracted, rented, other-government agency or military helicopters. There are numerous agreements between agencies and the military for using the latter’s aircraft and Pilots.
A. Types of Missions.

Specialized law enforcement aviation operations are often conducted in coordination with other-agency law enforcement personnel and aircraft. They may include:

- Counter-narcotics operations
- Surveillance of suspects or locations
- Warrant service
- Reconnaissance
- Fire Investigation
- Seizure and removal of evidence, contraband, and other property

Operations must emphasize safety requirements and considerations. All law enforcement personnel shall adhere to all agency policy except those personnel involved in operations defined as covert. Special exemptions granted by the agency shall then apply, but only in specific areas defined in the exemption.

When planning law enforcement aviation missions, an Aviation Manager shall be consulted to ensure compliance with guidelines and procedures and to assist in planning safe, effective operations.

B. Rappel and Short-haul Operations.

All rappel and short-haul missions conducted by agency law enforcement personnel shall conform to the procedures outlined in the Interagency Helicopter Rappel Guide or the Helicopter Short-haul Handbook, whichever is applicable. Rappellers and short-haulers from other agencies and the military must adhere to their agency requirements.

C. Use of the Incident Command System Aviation Structure.

During complex operations, it is advisable to use the Incident Command System aviation structure.

D. Aerial Supervision/Airspace Coordination.

For multiple aircraft operations, it is recommended that an aerial supervisor be assigned (ATGS, HLCO) to perform aerial supervision and airspace coordination duties. This individual can operate from either a fixed-wing aircraft or helicopter. The requirements of Federal Aviation Regulation FAR 91.119 regarding maintaining minimum safe altitudes from persons or property on the ground apply (see Interagency Airspace Coordination Guide).
IV. Flight Following, Resource Tracking and Communications.

All procedures in Chapter 4 shall be followed, except for covert operations where the need for secure communications is essential. In those cases, one of the following procedure(s) shall be used:

A. Grid Map Reference.

The flight plan is placed in a sealed envelope to be opened by the flight following Dispatcher only in the event of an aircraft emergency or failure to check in within specified time frames. Flight check-ins are performed using coded grid references rather than geographical location descriptors.

B. Flight Following Through Another Agency.

Flight following may be performed by another agency (for example, Department of Defense, National Guard or sheriff’s office). Check-in frequency shall meet the requirements outlined in Chapter 4.

C. Satellite Flight Following.

Flight following via an automated reporting satellite system is highly recommended, since no voice communication is necessary.

V. Personnel and Equipment Approval and Carding.

Aircraft of other federal, state, and local agencies, military components, and private industry cooperators used by law enforcement shall meet aircraft equipment requirements, conditions, and standards comparable to those required of contractors or in-house aircraft, as established by Letter of Agreement (LOA) or MOU.

A. Non-Emergency Operations.

All rented, chartered, contracted or agency-owned aircraft shall be flown by Pilots who meet agency standards and possess a current Interagency Pilot Qualification Card.

Use of other law enforcement agency, Department of Defense, National Guard, or Coast Guard aircraft flown by that agency’s Pilot(s) requires acceptance of that agency’s Pilot qualifications requirements in an MOU or LOA. In these instances, it is acceptable for agency law enforcement personnel to fly with uncarded Pilots who have been approved under the MOU or LOA.
B. Emergency Operations.

In certain life threatening emergencies and/or covert operations, it may be necessary for law enforcement personnel to deviate from policy. This may include PPE deviations, seating configurations, and riding in unapproved aircraft and/or with unapproved Pilots. These situations usually involve search and rescue or medevac operations being conducted by local authorities using public agency, military, commercial or private aircraft.

It is also recognized that covert law enforcement situations exist where an agency employee can become engaged in an activity, while operating within the normal scope of employment, which precludes using carded and approved aircraft and Pilots. An example would be a law enforcement officer put in a situation, while operating undercover, where they are required to fly in a suspect's aircraft.

Law enforcement employees are authorized to use unapproved aircraft and Pilots during the covert phase of an operation providing such use is, in their judgment, necessary. The following policies shall govern emergency situations:

- Authorization shall be given on a case-by-case basis by the law enforcement officer in charge or Incident Commander (it is recognized that this cannot always be accomplished before the fact).

- A written justification statement shall be prepared by the law enforcement officer in charge and submitted to the appropriate Aviation Manager within 24 hours of the completion of the mission. Submit a SAFECOM report as soon as possible to the unit with operational control.

VI. Helicopter Capabilities and Limitations.

Refer to Chapter 6, especially for guidance regarding flying at night during emergency operations.

VII. Helicopter Load Calculations and Manifests.

See Chapter 7 and Appendix A for requirements and procedures.

- When using aircraft other than military, load calculations and manifests are required, except, subject to the exemption above, when flying undercover in a suspect's helicopter.

- When using military aircraft, use of the PPC is acceptable.

VIII. Helicopter Landing Areas.

Standards outlined in Chapter 8 shall be followed. It is recognized that landing areas may not always be optimal. Nevertheless, particular care should be exercised in selecting landing sites for law enforcement operations.
IX. Equipment Requirements and Maintenance.

Refer to Chapter 9 for standard requirements and procedures.

- Exemptions from agency aviation PPE requirements are agency-specific and shall be used only in emergency situations when the hazards on the ground (for example, from gunfire) are greater than those requiring the use of aviation PPE.
- It is recognized that law enforcement operations may require the use of specialized equipment. In these situations, consult with the local unit Aviation Manager.
- It is essential that a thorough preflight check of the aircraft be made to detect sabotage. Security is addressed later in this chapter in Section XV.

X. Personnel Transport.

See Chapter 10 for standard requirements and procedures. The following specifically applies to law enforcement and should be conducted by law enforcement personnel only.

A. Transport of Injured Officers.

Prior to transporting an officer with serious injuries, all weapons being carried by the injured officer shall be secured by another law enforcement officer.

B. Transport of Canines.

All canines should be either muzzled and restrained or contained in a secured portable carrier with Pilot’s concurrence. Canines shall be transported in the rear of the helicopter and accompanied by a handler.

C. Transport of Prisoners.

When prisoners are transported by aircraft, the following guidelines shall be used (not applicable to inmate fire crews).

- Brief the Pilot on the prisoner, the nature of the crimes and the extent of safety precautions used while transporting a prisoner. Brief the prisoner on aircraft safety using the standard briefing format for all passengers.
- Search the prisoner for weapons even if the prisoner has been previously searched.
- Handcuff the prisoner using standard law enforcement policy and procedures. If the prisoner is to be handcuffed in front, ensure that a belly chain or other suitable device is used.
- Seat and restrain prisoners in the rear of the aircraft opposite the Pilot with the law enforcement officer sitting next to the prisoner. It is not advisable to seat a prisoner where the prisoner has access to the Pilot or controls.

- Law enforcement officers at the receiving landing area should be briefed and available for pickup and transportation of the prisoner.

XI. Cargo Transport.

Refer to Chapter 11 for standard requirements and procedures. The following specifically applies to law enforcement operations.

**A. Transport of Evidence.**

Transportation of evidence should follow agency guidelines and requirements, but must not compromise aviation safety.

**B. Hazardous Materials.**

With the exception of defensive equipment, all transportation of hazardous materials during law enforcement operations shall follow the procedures of the *Interagency Aviation Transport of Hazardous Materials Handbook/Guide*. Weapon control, readiness for use, and method of transport is the responsibility of the LEO.

1. **Transport of weapons.** Transportation Security Administration, (TSA) 49 CFR 1544.219 governs LEOs in the transportation of ammunition and compressed gas cylinders contained in weapons, magazines and belt holders. When LEOs transport weapons in the aircraft the following safety precautions shall be taken.
   - Brief Pilot(s) on weapons type(s) and safety policy.
   - Long guns (shotguns, rifles, etc.) shall not have a round in the chamber unless the tactical situation as determined by the LEO dictates, the Pilot in command has been briefed, and all agency guidelines and requirements are followed.
   - Hand guns may be loaded and shall be holstered.
   - Fully automatic weapons shall have an empty chamber and the bolt locked in safe position.
   - Keep all weapons pointed in a safe direction as determined by the Pilot during the preflight briefing.


3. Transport of Hazardous Chemicals. When law enforcement personnel carry hazardous chemicals in the aircraft, the following safety precautions shall be taken:

- Brief Pilot(s) on material and safety policy.
- All clandestine laboratory paraphernalia shall be transported under the direction of a designated hazardous materials response team.

XII. Fire Protection and Crash rescue.

See Chapter 12 for standard requirements and procedures.

XIII. Fueling Operations.

See Chapter 13 and Appendix I for standard requirements and procedures.

XIV. Helicopter Maintenance.

See Chapter 14 for standard requirements and procedures.

- Maintenance requirements for use of cooperator or military aircraft should be established by LOA or MOU.
- It is essential that a thorough preflight check of the aircraft be made to detect sabotage.

XV. Helibase and Helispot Management and Operations.

See Chapter 15 and Appendix F for standard requirements and procedures.

A. Law Enforcement Helibase.

Law enforcement shall be at the helibase at all times. If a Helicopter Manager or Helibase Manager is a qualified LEO, he or she can act in this capacity.

B. Law Enforcement Helispots.

Law enforcement must be with the aircraft at all times while it is on site. At no time shall the helicopter shut down without an LEO present.

C. Overnight Security.

Unless set forth in the contract, agency law enforcement is not legally responsible for overnight security of the aircraft at an airport or other secured area. At other sites, however, it may be highly prudent for the agency to provide security.
D. Fuel Truck.

Fuel trucks shall be escorted through high risk areas by an LEO. Overnight security shall be under the same guidelines as the aircraft.

XVI. Administration.

- Appendix D provides guidance on helicopter administration, including Contracting Officer, Contracting Officer’s Representative, and Project Inspector duties and responsibilities; completion of flight payment documents; etc.
- Agencies may have specific guidelines for reporting non-revenue use of cooperator and military helicopters.
CHAPTER 17: SEARCH AND RESCUE OPERATIONS.

I.  Introduction.

The use of aviation assets for search and rescue operations can be highly effective. All
direction in this chapter is intended for the purpose of promoting the safety and efficiency in
search and rescue aviation operations.

All activities not covered in this chapter shall follow the procedures outlined in other parts of
this guide, as well as other appropriate agency manuals and handbooks. Due to the high-risk
nature of search and rescue missions, it is critical that search and rescue personnel possess
thorough knowledge of all aspects of helicopter operations.

The leader of each helicopter search and rescue mission shall implement the rapid risk
assessment and management techniques discussed in Chapter 3.

CAUTION: It is very easy to become caught up in the urgency of a search and rescue
mission, especially those involving life threatening situations. Regardless of the emergency,
ever forget to follow basic helicopter procedures.

II.  Personnel Duties and Responsibilities, Qualifications, Certification and Training.

All search and rescue aviation operations should be conducted by qualified helicopter
managers and crew members in accordance with agency requirements for Resource/Project
Helicopter Manager and Resource/Project Crew Member.

III. Operational Planning.

A.  Types of Missions.

Types of specialized search and rescue flight environments and missions may include:

- Reconnaissance
- Low-level flight
- Hovering Out of Ground Effect
- Short-Haul
- Rappel
- Cargo Letdown
- Support to other agencies
These types of operations must emphasize safety requirements and considerations. When planning aviation missions, an Aviation Manager must be consulted to ensure compliance with guidelines and procedures and to assist in safe, effective operations.

B. Rappel and Short-haul Operations.

The use of rappel or short-haul requires agency approval, training and qualifications in accordance with the current edition of the *Interagency Helicopter Rappel Guide* or the *Helicopter Short-haul Handbook*.

C. Use of the Incident Command System Aviation Structure.

During complex operations, it is advisable to use the Incident Command System aviation structure.

D. Aerial Supervision and Airspace Coordination.

For operations using multiple aircraft, it is recommended that an aerial supervisor be assigned (ATGS, HLCO) to perform aerial supervision and airspace coordination duties. This individual can operate from either a fixed-wing aircraft or helicopter. The requirements of Federal Aviation Regulation FAR 91.119 regarding maintaining minimum safe altitudes from persons or property on the ground apply (see *Interagency Airspace Coordination Guide*).

IV. Communications and Flight Following.

All procedures in Chapter 4 shall be followed.

V. Personnel and Equipment Approval and Carding.

Aircraft of other federal, state and local agencies, military components, and private industry cooperators used by search and rescue entities that are not currently under contract or agreement should only be used until approved aircraft and Pilots can be obtained.

NOTE: The agency involved in the search and rescue operation may have a LOA or MOU that allows use of other-agency or military aircraft that contains standards for Pilot and equipment approval.

A. Emergency Operations.

In certain life threatening emergencies it may be necessary for personnel to deviate from policy. This may include PPE deviations, seating configurations and riding in unapproved aircraft and/or with unapproved Pilots. These situations usually involve search and rescue or medevac operations being conducted by local authorities using public agency, military, commercial or private aircraft.
CAUTION: Don’t become part of the emergency! Choose an aircraft capable of meeting performance requirements for the mission.

The following policies shall govern emergency situations:

- Authorization will be given on a case-by-case basis by the responsible employee in charge or Incident Commander (it is recognized that this cannot always be accomplished before the fact).
- A written justification shall be prepared by the employee and attached to a SAFECOM report, and submitted to the appropriate Aviation Manager within 24 hours of the completion of the mission.

B. Non-Emergency Operations.

All rental, charter, contracted or agency owned aircraft shall be flown by Pilots who meet agency standards and possess a current Interagency Pilot Qualifications Card.

VI. Helicopter Capabilities and Limitations.

Refer to Chapter 6, especially for guidance regarding flying at night during emergency operations.

VII. Helicopter Load Calculations and Manifests.

See Chapter 7 and Appendix A for requirements and procedures.

- When using aircraft other than military, load calculations and manifests are required.
- When using military aircraft, use of the PPC is acceptable.

VIII. Helicopter Landing Areas.

Standards outlined in Chapter 8 shall be followed. It is recognized that in emergency situations landing areas may not always be optimal. Nevertheless, particular care should be exercised in selecting landing sites for search and rescue operations.

IX. Equipment Requirements and Maintenance.

Refer to Chapter 9 for standard requirements and procedures.

- Exemptions from aviation PPE requirements are agency-specific and shall be used only in emergency situations. These generally apply to the use of alternative PPE for extreme environmental conditions.
• It is recognized that search and rescue operations may require the use of specialized equipment. In these situations, consult with the local unit Aviation Manager.
• High-visibility flight suits for dedicated search and rescue personnel are highly recommended (Pilots can readily locate personnel on the ground).

X. Personnel Transport.

See Chapter 10 for general requirements and procedures. It is recognized that during emergency search and rescue operations all requirements may not be met. Nevertheless, care must be exercised to prevent additional injury and/or loss of life. If possible, the Helicopter Manager should be on board the helicopter to assist with aircraft management.

Depending on the situation, the following procedures should be used.

A. Medical Transport of Patients.

• Secure oxygen tanks.
• Carry medical gloves for protection from patient body fluids and blood-borne pathogens. Proper body substance precautions should be used in transport of the deceased.
• Secure the patient to the litter and then secure the litter to the helicopter.
• If injuries would be aggravated by use of personal protective equipment then PPE requirements are exempt.

B. Transport of Canines.

All canines should be either muzzled and restrained or contained in a secured portable carrier with Pilot’s concurrence. Canines shall be transported in the rear of the helicopter and accompanied by a handler.

XI. Cargo Transport.

Refer to Chapter 11 for standard requirements and procedures.

XII. Fire Protection and Crash rescue.

See Chapter 12 for standard requirements and procedures.
XIII. Fueling Operations.

See Chapter 13 and Appendix I for standard requirements and procedures.

XIV. Helicopter Maintenance.

See Chapter 14 for standard requirements and procedures. Maintenance requirements for use of cooperator or military aircraft should be established by LOA or MOU.

XV. Helibase and Helispot Management and Operations.

See Chapter 15 and Appendix F for standard requirements and procedures.

XVI. Administration.

- Appendix D provides guidance on helicopter administration, including contracting officer, contracting officer’s representative and project inspector duties and responsibilities; completion of flight payment documents; etc.
- Agencies may have specific guidelines for reporting non-revenue use of cooperator and military helicopters.