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NWCG Standards for Helicopter Operations

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The *NWCG Standards for Helicopter Operations* (NSHO) establishes the standards by which helicopter operations are to be conducted under the exclusive direction and operational control of federal, state and local agencies in the accomplishment of interagency fire suppression and natural resource aviation management. These standards:

- Promote safe, cost-efficient and effective aviation services in support of agency and interagency goals and objectives.
- Define national, interagency helicopter management and operational procedures for helicopter users from participating agencies.
- Facilitate the ability of personnel from different agencies to work cooperatively on incidents or projects.
- Provide a framework within which areas, regions, states, and local units can provide supplemental, site-specific guidance.

The National Wildfire Coordinating Group (NWCG) provides national leadership to enable interoperable wildland fire operations among federal, state, tribal, territorial, and local partners. NWCG operations standards are interagency by design; they are developed with the intent of universal adoption by the member agencies. However, the decision to adopt and utilize them is made independently by the individual member agencies and communicated through their respective directives systems.

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Chapter 01 – Introduction

Scope

If an agency chooses to incorporate the NWCG Standards for Helicopter Operations (NSHO) as policy within the agency's directives system, it is essential that the user understands the use of language in the NSHO regarding mandatory or optional compliance. The use of the verb "must" conveys mandatory compliance; use of "should" conveys required compliance except for documented justifiable reasons; and use of "may" and "can" conveys optional compliance.

While it is recognized that field offices from most participating agencies have the authority to issue more restrictive guidance and directives than that contained in the NSHO, they are encouraged not to do so in the interests of the guide's objective to promote interagency standardization of helicopter operations. Exceptions to the NSHO may only be authorized through agency-specific procedures.

For aviation operations using Active Duty/Reserve military helicopters, and National Guard units officially "federalized" by the Department of Defense (DoD). See Chapter 70 of the *National Interagency Fire Center, Military Use Handbook* for specific policy and procedural information located at https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf.

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.

There may be discrepancies between direction found in this guide and applicable helicopter contract language. When discrepancies arise, the current helicopter procurement document should be followed. However, if discrepancies cannot be resolved to the satisfaction of the vendor and government representative, the Contracting Officer should be consulted.

Authority

The aviation directives of the participating agencies contain the authority to require implementation of this guide as policy.

Fire Operations

The target group for distribution includes users and managers of helicopters, helibase management and air operations personnel, and other personnel involved in helicopter operations such as aviation managers, dispatchers, and project managers.

Resource Operations

The USFS, BIA, BLM, and NPS have adopted the NSHO as policy for all helicopter resource operations.

Organization

The chapters of the NSHO are organized to assist the user in obtaining an understanding of standards and requirements for helicopter operations. The appendices provide standard operational and administrative forms, checklists, and other job aids.

Chapter 02 – Personnel

Introduction

This chapter establishes common duties and responsibilities of helicopter or helibase management positions. Roles and responsibilities cover both incident and resource operations.

Training, Qualification and Currency Requirements

An individual must be trained, experienced, current and certified prior to planning or participating in helicopter operations. Agencies may require additional training, experience and currency standards of their employees.

Training, qualification and currency requirements for helicopter and helibase management positions on incidents are established in the *NIMS: Wildland Fire Qualification System Guide*, PMS 310-1, https://www.nwcg.gov/publications/310-1.

Resource Helicopter and Helibase Management Positions

Training, qualification and currency requirements for DOI and USFS helicopter and helibase management positions for resource missions are found in the Interagency Aviation Training (IAT) Guide, https://www.iat.gov/.

Additional interagency guides and handbooks that contain information include:

- *DOI Law Enforcement Short-Haul Policy*, https://www.doi.gov/aviation/library/guides.
- *NWCG Standards for Aerial Ignition*, PMS 501, https://www.nwcg.gov/publications/501.
- *Interagency Helicopter Rappel Guide*, PMS 511, https://www.nwcg.gov/publications/511.
- DOI *Helicopter Short-Haul Handbook*, https://www.doi.gov/aviation/library/guides.
- DOI *Aerial Capture, Eradication, and Tagging of Animals (ACETA) Handbook*, https://www.doi.gov/aviation/library/guides.
- National Interagency Fire Center, *Military Use Handbook*, https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf.
- *Aviation Life Support Equipment (ALSE) Handbook*, https://www.doi.gov/aviation/library/guides.
- See the *NWCG Glossary of Wildland Fire*, PMS 205, https://www.nwcg.gov/glossary/a-z, for definitions of terms used within this publication.

Helicopter Staffing Requirements

Exhibit 2.1 – Minimum Staffing for Helicopter Operations.

Helicopter Type	FAA Standard/Transport Category	FAA Standard Category Temporarily Designated for Limited Use	FAA Standard Category Permanently Designated for Limited Use or FAA Restricted Category
Type 1	Helicopter Manager plus 4 Helicopter Crewmembers	Manager only	Manager only
Type 2	Helicopter Manager plus 3 Helicopter Crewmembers	Manager only	Manager only
Type 3	Helicopter Manager plus 2 Helicopter Crewmembers	Manager only	Manager only

- The minimum required staffing levels must be filled with fully qualified personnel. Trainees may be ordered in addition to the minimum staffing levels.
- Call-When-Needed (CWN) Helicopter and Module should marry up away from the assigned incident.

Helicopter Minimum Staffing Exceptions

The types of missions a helicopter may perform using the following exceptions are approved by the state/regional aviation manager by assessing the risks and benefits of the individual request.

An Air Operations Branch Director (AOBD) or Air Support Group Supervisor (ASGS) may request delegated authority to approve the following exceptions from the regional or state aviation manager.

Limited Use Exception

Helicopters designated as “Limited Use” may be staffed with fewer assigned Helicopter Crewmembers than listed in Exhibit 2.1. A Helicopter designated as limited use must be staffed by a fully qualified Helicopter Manager.

Requests for “Limited Use” will be documented using form HBM-14.

Typical missions performed by a limited use helicopter are those which do not require the support of multiple Helicopter Crewmembers.

2 for 1 Exception

State/Regional aviation managers may allow two (2) helicopters designated as “Limited Use” or FAA Restricted Category or both types to be managed by one qualified Helicopter Manager.

Requests for “2 for 1” will be documented using form HBM-14.

Required elements for approval are:

- An order for another Helicopter Manager for the second helicopter has been placed and is actively trying to be filled.
- Both helicopters are working out of the same helibase and are physically located side-by-side.

- A Helibase Manager is assigned.

Alaska Exception

A Helicopter Manager is assigned to all Exclusive-Use and CWN helicopters in Alaska. No additional Helicopter Crewmembers are required unless otherwise requested.

NWCG Incident Position Descriptions

For the following positions, position standards (including position descriptions and minimum position requirements for training, experience, physical fitness, and position currency) are located in the NWCG Position Catalog, https://www.nwcg.gov/positions:

Helicopter Manager (HMGB), https://www.nwcg.gov/positions/hmgb,
Helicopter Crew Member (HECM), https://www.nwcg.gov/positions/hecm,
Helibase Manager (HEBM), https://www.nwcg.gov/positions/hebm,
Deck Coordinator (DECK), https://www.nwcg.gov/positions/deck,
Aircraft Base Radio Operator (ABRO), https://www.nwcg.gov/positions/abro,
Mix Master Retardant (MXMS), https://www.nwcg.gov/positions/mxms, and
Helicopter Coordinator (HLCO), https://www.nwcg.gov/positions/hlco.

Non-NWCG Helicopter Management Personnel Roles and Responsibilities

Helicopter Flight Manager

Missions may be supervised by a Helicopter Flight Manager who has been trained and is qualified to conduct helicopter missions. These missions are limited to:

- Point-to-point transport of personnel from one developed heliport/helibase or airport to another developed heliport/helibase or airport.
- Reconnaissance missions both below 500’ above ground level (AGL) and above 500’ AGL.
- Landings at or takeoffs from improved or unimproved sites.

Helicopter Flight Manager Duties and Responsibilities

1. Coordinate with scheduling office, pilot, and users on flight planning.
2. Complete required administrative and operational forms specified in Appendix A and optional forms as required by local aviation management.
3. Ensure required personal protective equipment is available and used correctly.
4. Perform preflight briefing and ensure a preflight passenger briefing by the pilot is accomplished prior to the flight; verification that the aircraft and pilot are approved and authorized for the type operation to be conducted by checking Interagency Helicopter Pilot Qualification Card and Aircraft Data Card.
5. Ensure flight following and resource tracking is performed; perform a preflight radio check.
6. Ensure load calculation and manifests are completed correctly.
7. Ensure, except in an emergency, there is no deviation from established flight plan or type of intended use unless such deviation is relayed and/or approved through identified procedures and that any requirements of such a deviation are met.

8. Assist the pilot in aerial hazard identification; ensure a high-level reconnaissance is made prior to flight less than 500’ AGL.
9. Report any deviations from planned flight or normal operations immediately using agency incident/hazard report.
10. When requested, assist pilot in loading and unloading passengers and cargo.
11. Ensure flight payment documents are accurate and submitted according to direction found in procurement document.

Pilot

The pilot is an essential part of any aviation mission and must be made an integral part of a team effort whose objective is flight safety and efficiency. The pilot is in command of the aircraft and has ultimate responsibility, under both FAA and agency regulations, for the safety of the aircraft and its occupants.

The pilot’s decisions and judgment are final. No agency employee must explicitly or implicitly ask or require a Pilot to perform any mission or flight maneuver which compromises flight safety.

<u>Pilot Duties and Responsibilities</u>

1. Adheres to Federal Aviation Regulations (FARs), agency regulations (for agency pilots), and the requirements of the procurement document (vendor pilots).
2. As applicable, coordinates with dispatcher, helicopter manager, and/or Helibase Manager on project or incident planning and logistics; reviews manifests and intended loads to ensure aircraft is capable of performing the mission; is responsible for knowledge of hazards in area of operations.
3. Ensures that all aircraft and communications equipment is in good condition and operable; performs flight following as required by the agency.
4. Carries a current Interagency Helicopter Pilot Qualification Card; ensures the Aircraft Data Card is physically present in the aircraft; presents the card upon request.
5. Military, cooperator and other-government agency aircraft may have non-carded aircraft or pilots but a copy of the approving document must be available.
6. Performs aircraft preflight using an approved checklist and preflight safety briefing of passengers, or delegates the briefing responsibility to qualified personnel.
7. Completes Helicopter Load Calculation using applicable aircraft Flight Manual Performance Chart(s); ensures that payload does not exceed allowable payload.
8. Meets contract requirements for fueling using approved static bonding procedures.
9. Is responsible for the security of the aircraft.
10. Except in an emergency, does not deviate from flight plan without relaying change to appropriate dispatch office or other flight following facility; does not descend below 500 feet AGL unless such flight has been authorized in advance or an in- flight deviation is approved; makes no descent below 500 feet AGL without first performing a high-level reconnaissance of the operations area to identify hazards.
11. Wears personal protective equipment as required by agency directive (agency Pilots) or the procurement document (vendor Pilots).

12. Completes flight payment documents per agency or procurement document direction.
13. Speaks English fluently and communicates clearly.
14. Responsible for transporting hazardous materials in accordance with federal, state. and local requirements.
15. Follows FAA-approved company operational specifications.

Helibase/Helispot Management

See the *NWCG Glossary of Wildland Fire*, PMS 205, https://www.nwcg.gov/glossary/a-z for definitions of helibase, helispot, and unimproved landing sites.

Further information on specific requirements for helibase and helispot management can be found in Chapter 15 or other appropriate chapter(s) of this guide.

Unless otherwise specified, the following job descriptions apply to both incident and resource operations.

Helispot Manager

Helispot Managers are responsible for providing safe and efficient management of all helicopter activities at the assigned helispot. The Helibase Manager assigns the position of Helispot Manager to a person assigned to manage the aviation operations at a location physically separate from the helibase. A Helispot Manager performs under the supervision of the Helibase Manager.

Helispots are physically separate from the helibase, resulting in the inability of the Helibase Manager to oversee and monitor helispot operations, it is essential that the Helibase Manager assign the most capable person based on the complexity and nature of the assignment.

Minimum training, qualification and currency requirements of the Helispot Manager position on incidents are outlined in the *NIMS: Wildland Fire Qualification System Guide*, PMS 310-1, https://www.nwcg.gov/publications/310-1, within the position of Helicopter Crewmember.

Prior to the start of operations, the Helibase Manager should extensively review Helispot Manager duties and responsibilities, as well as the load capability planning forms in Appendices A and B.

Environmental considerations may affect the construction of a helispot. However, at no time will aircraft or personnel safety be compromised. Significant helispot improvements such as the cutting of numerous trees should be cleared by the Helibase Manager with a higher-level authority, for example, the AOBD or Project Aviation Manager in consultation with the Resource Advisor.

Helispot Manager Duties and Responsibilities

1. Obtain briefing from Helibase Manager and obtain the following forms: Incident Action or Project Aviation Safety Plan; Air Operations Summary, ICS-220; and Incident Radio Communications Plan, ICS 205, if available.
2. Ensure that qualified HECMs are assigned to assist in helispot management, providing on-the-job training as necessary; conduct regular briefings with helispot crew; ensure all assigned personnel understand their responsibilities and authority; manage resources/supplies dispatched to helispot.
3. Obtain necessary equipment and supplies for the operation of the helispot (tools, fire extinguishers, wind indicators, etc.)

4. On incidents, ensure that all helispot personnel are capable of and prepared to perform fire suppression duties in and around the helispot; ensure that helispot crew is equipped to remain overnight, even in adverse weather conditions.
5. Obtain allowable payload information for the helispot for each assigned helicopter, utilizing forms outlined in Appendices A and B.
6. Obtain transportation and report to the assigned helispot; establish radio communications with the helibase; provide the Helibase Manager with initial or additional information for the Helispot Information Summary.
7. Ensure that all helispot personnel and personnel to be transported wear required personal protective equipment.
8. Ensure the helispot and landing pad is constructed and prepared properly to ensure safe use of the highest gross weight helicopter and/or helicopter with the largest diameter rotor blades; construct the helispot according to safety standards; if required, obtain approval prior to making improvements.
9. Install wind indicators and sign the area perimeter as necessary; perform any necessary aerial and ground hazard reduction and safety improvements.
10. Anticipate dust abatement needs and provide or request as necessary.
11. Make crash rescue equipment such as fire extinguishers available.
12. Number and map the helispot in coordination with the Helibase Manager.
13. Ensure that flight routes and area hazards are made known to all Pilots; ensure communications and Parking Tender(s) are in place.
14. Complete manifests accurately for all flights originating from assigned helispot; perform manifesting, briefing, and loading of personnel and cargo.
15. Return external load equipment (nets, leadlines, and swivels) and excess firefighting equipment to the helibase promptly.
16. Inform Helibase Manager of helispot activities; coordinate activities and requests for air support with the Helibase Manager.
17. If applicable, supervise or perform water or retardant loading at helispot.
18. Maintain records and reports of helicopter activities for later inclusion in the Helicopter Daily Use and Cost Summary.
19. If returned to the helibase, attend the nightly debriefing and provide feedback on day’s operations; otherwise, provide by radio.

Parking Tender (PARK)

The Parking Tender is supervised by the DECK and is responsible for ground and air traffic in and around the assigned landing pad and for the landing and parking of helicopters at that pad.

Parking Tenders should be fully briefed regarding responsibility for the landing pad to which each is assigned, as well as the helicopter(s) assigned to the pad. Parking Tender should perform the bulk of their duties from outside the safety circle.

Minimum training, qualification and currency requirements of the Parking Tender position on incidents are outlined in the *NIMS Wildland Fire Qualification System Guide*, PMS 310-1, https://www.nwcg.gov/publications/310-1, within the position of Helicopter Crewmember.

Parking Tender Duties and Responsibilities

1. Obtain briefing from the DECK; obtain radio frequencies and other information necessary to perform the job.
2. Supervise activities at the assigned landing pad, including personnel, ground vehicle, and helicopter movement.
3. Know and understand crash rescue procedures; ensure that extinguishers are placed at the landing pad; be responsible for extinguisher operation in the event of fire either on landing, takeoff, or refueling.
4. Ensure touchdown pad is properly prepared, numbered, and maintained.
5. Ensure adequate communications between the pad, Pilot, DECK, and ABRO.
6. Know and understand helicopter hand signals; provide wind advisories and other landing, takeoff, and holding directions to the Pilot; assist the Pilot as needed when the helicopter is departing, approaching, or is on the landing pad. Communication with the Pilot may be done either through hand signals or by way of radio communication. Positive communication over the radio by the Parking Tender via a patch cord and flight helmet is the preferred method. Parking Tender should be positioned outside the safety circle.
7. Be alert for potential conflicts between inbound and/or outbound aircraft. Coordinate with Loadmasters on the loading and unloading of personnel and cargo; ensure that loading personnel check personnel seat belts, cargo restraints, and helicopter doors prior to departing the area.
8. Monitor the fueling of helicopters; report any problems to the Helibase Manager.
9. Wear high-visibility clothing to distinguish from other personnel.
10. Coordinate frequently with DECK; attend the nightly debriefing and provide feedback on problems encountered; recommend corrective action.

Loadmaster (Personnel or Cargo)

The Loadmaster is assigned and supervised by the DECK and is responsible for the safe loading and unloading of personnel and/or cargo.

It is essential that all Loadmasters be briefed concerning the characteristics of each make/model helicopter assigned, as well as standard Aircraft Safety Briefing procedures, personnel/cargo weighing.

Loadmaster Duties and Responsibilities

1. Obtain briefing from DECK; obtain radio frequencies and other information necessary to perform the job.
2. Ensure designation and signing of crew and cargo staging areas and of egress and ingress routes to the deck.
3. Obtain sufficient personnel resources to load personnel and cargo; supervise personnel assigned to loading positions, to include:

a. Ensure the safety and welfare of personnel (both agency and contract) assigned; ensuring all personnel understand their responsibility and authority; monitoring their actions to ensure duties and responsibilities are correctly performed

b. Conducting briefings of subordinates.

4. Ensuring personal protective equipment is worn by both personnel assigned to the deck and by personnel being transported.
5. Meeting timekeeping, eating, sleeping, and transportation needs.
6. Supervise the manifesting of personnel and cargo according to requirements:
7. Ensure that appropriate hazardous materials regulations are enforced as outlined in the *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513, https://www.nwcg.gov/publications/513.
8. Ensure the Pilot is aware of weight and nature of all loads being transported.
9. Supervise loading and unloading crews.
10. Ensure all passengers receive preflight briefings.
11. Ensure external load equipment is checked for proper operation before use.
12. Know and understand crash rescue procedures; inform personnel of helibase and helicopter crash rescue procedures.
13. Coordinate with ABRO and Parking Tenders.
14. Coordinate frequently with the DECK; attend the nightly debriefing and provide feedback on problems encountered; recommend corrective action.

Dipsite Manager

A Dipsite Manager is responsible for monitoring aviation activities at the assigned dipsite(s) mitigating hazards as required, maintaining communications with pilots and other ICS positions, and providing for crash rescue/emergency response in the case of a mishap. The Dipsite Manager is assigned as needed to a natural or man-made water/retardant source(s).

A Dipsite Manager typically performs under the supervision of the Helibase Manager in coordination with the assigned Division Supervisor or Task Force Leader when applicable. It is recommended that the assigned Dipsite Manager is a qualified helicopter crewmember.

Dipsite Manager Duties and Responsibilities

1. Obtain briefing from Helibase Manager, (or assigning official); obtain Incident Action Plan or Project Aviation Safety Plan, Air Operations Summary (ICS-220), Incident Radio Communications Plan (ICS-205), and local Mishap Response Plan/Crash Rescue Plan, commensurate with incident complexity.
2. Conduct briefings as necessary with dipsite personnel i.e. water tender, pump operator, law enforcement, etc. Ensure assigned personnel understand their duties and responsibilities.
3. Obtain necessary equipment and supplies for the operation of the dipsite, i.e. radios, tools, fire extinguishers, crash rescue kits, wind indicators, etc. Include a VHF-AM radio when available to monitor the assigned rotor wing air-to-air frequency.

4. Dipsite personnel should be prepared to perform fire suppression and/or crash rescue duties in and around the dipsite.
5. Report to the assigned dipsite; establish and maintain radio communications with the helibase, pilots and Division Supervisor when applicable. Provide the Helibase Manager with initial and/or additional dipsite specific information for dissemination to assigned pilots and Helicopter Managers.
6. When applicable, communicate with the public and/or coordinate with law enforcement/public safety official(s) to assure that the public are clear of dipsite operations and not exposed to hazards.
7. Perform any necessary hazard reduction and safety improvements
8. Install wind indicators and sign the area perimeter as needed.
9. Anticipate dust abatement needs and provide or request as needed.
10. Make crash rescue equipment such as fire extinguishers and crash rescue kits available, visible, and accessible.
11. Name and map the dipsite in coordination with the Helibase Manager and Aerial Supervisor.
12. Monitor aircraft separation; ensure that flight routes and area hazards are made known to all pilots.
13. Identify an emergency landing area near the dipsite. Identify a landing area where helicopter equipment troubleshooting can occur.
14. Identify escape routes for dipsite personnel in case of helicopter mishap at the dipsite.
15. Maintain records and reports of dipsite activities and as requested.
16. Report to Helibase Manager, Air Attack and Division Supervisor upon staffing/unstaffing of assigned dipsite as well as return to helibase, (or other assigned destination).
17. At the end of each operational period, provide feedback on the day's operations to the Helibase Manager.

Law Enforcement Helicopter Positions

Sensitive mission requirements and objectives may require security clearances of personnel participating in the mission. Any individual deemed not suitable for the mission by the law enforcement officer (LEO) must be removed from the operation and documentation of the action taken must be submitted to the Unit Aviation Manager.

All law enforcement aviation operations using helicopters must, depending on the mission profile, be conducted either by a qualified Resource or Incident Helicopter Manager or by a Helicopter Flight Manager.

It is recommended that a qualified LEOs fill the Helicopter Manager position.

The one exception to personnel being required to fulfill the above requirements is when the agency is using other-government agency or military aircraft, and the provider of the aircraft is also providing all helicopter and/or helibase management services, e.g., flight following, loading/unloading of personnel and/or cargo, external load operations., etc.

Any law enforcement personnel participating as a Helicopter Crewmember, and not solely as a passenger being transported, must meet the requirements for a Resource Helicopter Crewmember.

All law enforcement personnel filling helibase positions must meet the training, qualification and currency requirements of the position outlined in the *NIMS Wildland Fire Qualification System Guide*, PMS 310-1, https://www.nwcg.gov/publications/310-1.

Pilots from other law enforcement agencies, the National Guard, or DoD must be either approved through a Memorandum of Understanding or similar agreement, or must possess a current Interagency Helicopter Pilot Qualification Card.

Sensitive mission requirements may require security clearances of the Pilot and/or vendor to ensure mission integrity. Law Enforcement Helicopter Managers are responsible for informing the scheduling unit of any such requirements.

Search and Rescue Helicopter and Helibase Personnel

Helicopter Managers and Crewmembers performing search and rescue missions must meet resource requirements for helicopter or helibase management, as well as associated duties and responsibilities for each position filled.

Military Helicopter Personnel

See Chapter 70 of the *National Interagency Fire Center, Military Use Handbook*, located at https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf for operational procedures regarding personnel associated with the use of military aviation.

Aerial Capture, Eradication, and Tagging Of Animals (ACETA) Helicopter Positions

Vendors who provide gunners and muggers for ACETA operations are not required to adhere to the agency personnel requirements outlined below.

The Helicopter Manager of an ACETA operation must meet the requirements for a Resource Helicopter Manager.

ACETA Helicopter Manager Duties and Responsibilities

1. Ensures that Pilot and aircraft are carded and certified for ACETA operations.
2. Ensures dual controls are removed prior to commencement of the ACETA operation.
3. Ensures crew and passengers wear PPE as specified in the ALSE Handbook, as well as in agency-specific manuals and handbooks
4. Ensures all cargo is restrained according to requirements.
5. The Gunner of an ACETA operation must:
    - Operate appropriate weapon(s); ensures the weapon is not loaded or cocked unless the muzzle is outside and pointed away from the aircraft.
    - Identify the animals(s) to target.
    - Ensure adequate covering for protection of control mechanism and under seat area to prevent ejected shells, etc., from interfering with controls.
6. The HECM participating on an ACETA operation as a mugger must meet the requirements for a Resource HECM.

7. All agency personnel filling helibase positions on an ACETA project must meet position requirements.
8. ACETA Pilots must be carded for the ACETA mission and specific animals targeted.
9. If single-skid, step-out, or toe-in landings are to be performed, Single-skid Toe-in Exit Procedures (STEP) training is required as well as an approved exemption granted by the appropriate agency aviation manager.

Chapter 03 – Operational Planning

Introduction

It is essential that aviation operations be planned with consideration given to safety and operational efficiency. Missions can be accomplished safely and efficiently, provided that a high degree of planning, risk analysis and management is applied. The success of a project or flight is affected by the ability to anticipate and influence events before they occur. Standard operating procedures (SOPs) have been developed to help streamline the planning process, incorporate the lessons learned from experience, and use the best practices that balance the demands for safety and efficiency.

The planning process includes several steps as a project or flight is considered. Initial planning tasks include determining objectives, risk assessment and contingency planning. Once these primary tasks are completed the process continues with aircraft selection and mission profile and planning that is more operational in nature.

Developing Objectives and Contingency Planning

Objectives

The objectives for a project or particular flight will affect the planning and decision making process. To be effective and support the overall goals of the organization, objectives must be clear, concise, achievable, and measurable.

- Achievable does not necessarily mean easy, but expectations should be reasonable.
- Measurable on some quantifiable scale so success can be determined.

Contingency Planning

Preparation is the key to flexibility. Considering multiple options in the planning stage rather than relying on one course of action will lead to success. Options based on “What If?” questions should be considered during the planning phase:

- What if the flight is delayed?
- What if the passengers are late?
- What if the meals for the spike crews aren’t delivered as scheduled?

It is easier to do contingency planning in advance rather than on short notice during active operations. Contingency planning should be detailed. Projects should be broken down into individual missions and missions should be broken down to their smallest elements. These elements should be ranked according to their importance, such as, “What’s going to stop progress?” or “What elements are essential?” After considering what can go wrong with each mission element, specific solutions can be developed.

Risk Management

This section is directed toward risk management as it applies to helicopter and helibase field operations. Risk management is an ongoing process.

Risk Management Principles

These basic decision making principles must be applied before any anticipated job, task, or mission is performed:

1. **Accept no unnecessary risk.** The most logical choices for accomplishing a mission are those that meet all the mission requirements while exposing personnel and resources to the lowest possible risk.
2. **Make risk decisions at the appropriate level.** Making risk decisions at the appropriate level establishes clear accountability. Those accountable for the success or failure of a mission must be included in the risk decision process. Supervisors at all levels must ensure subordinates know how much risk they can accept and when they must elevate the decision to a higher level.
3. **Accept risk when benefit outweighs cost.** Weighing risks against opportunities and benefits helps to maximize unit capability. Even high-risk endeavors may be undertaken when there is clear knowledge that the sum of the benefits exceeds the sum of the costs.
4. **Integrate risk management into planning and execution at all levels.** To effectively apply risk management, leaders at all levels must dedicate time and resources to incorporate risk management principles into the planning and execution phases of all operations. Integrating risk management into planning as early as possible provides the decision maker with the greatest opportunity to apply risk management principles.

Time Element in Risk Management

Performing risk management is limited by the amount of time available for planning and requires flexibility and judgment by both Pilots and air operations supervisors.

Risk management can be divided into three categories according to time element.

Time Critical

This type of risk management is an “on-the-run” mental or verbal review of the situation using the risk management process without necessarily recording the information. The process is often used to make decisions in a time limited situation. Many of the skills used in this context are applicable to normal mission where deliberate risk management has occurred and crews must manage risk in a dynamic situation.

Search and rescue missions also fall in this category. Encountering unexpected winds at a helispot is another common occurrence, where the pilot must rapidly assess the risk and determine whether to land, attempt to land at another spot farther from the objective, or abort the mission and return to base.

Deliberate

This type is used when planning time permits. It involves risk identification, evaluation, consideration of control options and risk decision making, implementation of controls, and supervision. Note that all of these may be applied to time critical risk management; however, the time frame in which the rapid examination is performed is compressed by the urgency of the situation. This is the type of risk assessment that should be performed by the AOBD while completing the form ICS 220; by the Helibase Manager while briefing personnel and discussing intended missions, and by project personnel when planning a flight mission days or weeks in advance.

For example, if a Wild Horse and Burro Specialist knows that a census in a certain area is required at a specific time of year, there is ample time to identify and evaluate hazards (wires, military training routes, deep canyons, etc.), develop and implement controls (for example, coordinate with the military to deconflict airspace) and supervise preparations for the mission.

Strategic/In-Depth

This type should be used in instances where new technology is being proposed, when risks appear high, and time and resources allow thorough assessment. Risk management at this level requires more sophisticated techniques and professional reviews.

An example would be the Safety Management System testing and implementation of a new aerial firing device, new external load method, or new method of personnel delivery. In these cases, handbooks and operating procedures must also be developed and/or revised.

Risk Management Process

During mission planning, risk decisions should be made at a level of command that corresponds to the degree of risk. For personnel at the field level a general field appraisal may often be sufficient and may be accomplished through the use of one of the risk management tools discussed in Appendix G.

Risk management tools are found in Appendix G.

Medium-risk decisions should be elevated to a somewhat higher level (for example, to the AOBD or Project Aviation Manager level). Low-risk decisions can usually be made at the Helibase Manager or Helicopter Manager level. See Appendix G for guidance.

During mission planning, risk decisions should be made at a level of command that corresponds to the degree of risk. The Pilot and/or Helicopter Manager always have the authority to decline the mission.

How to Properly Refuse Risk

Every individual (government and contract) has the obligation to report safety problems affecting his or her safety and has the responsibility to contribute ideas to correct the hazard. In return, supervisors are expected to give these concerns and ideas serious consideration. When an individual feels an assignment is unsafe, he or she also has the obligation to identify, to the degree possible, safe alternatives for completing that assignment. Turning down an assignment is one possible outcome of managing risk.

A "turn down" is a situation where an individual has determined he or she cannot undertake an assignment as given and is unable to negotiate an alternative solution. The turn down of an assignment must be based on assessment of risks and the ability of the individual or organization to control or mitigate those risks. Individuals may turn down an assignment when:

- There is a violation of regulated safe aviation practices.
- Environmental conditions make the work unsafe.
- They lack the necessary training, qualifications or experience.
- Defective or inappropriate equipment is being used.

Individuals will directly inform their supervisor that they are turning down the assignment as given. The most appropriate means of documented turn down criteria is using the Aviation Watch-Out Situations. See Exhibit 3-1.

The supervisor will notify the AOBD immediately upon being informed of a turn down. If there is no AOBD, notification must go to the appropriate Section Chief, the Incident Commander, or the local Aviation Manager. Proper handling of turn downs provides accountability for decisions and initiates communication of safety concerns within the incident organization.

If the assignment has been turned down previously and the supervisor asks another resource to perform the assignment, he or she is responsible to inform the new resource that the assignment has been turned down and the reasons why. Furthermore, the personnel need to realize that a turn down does not stop the completion of the assigned operation.

The turn-down protocol is an integral element that improves the effective management of risk, and it provides timely identification of hazards within the chain-of-command, and raises risk awareness for both supervisors and subordinates and promotes accountability.

If an unresolved safety hazard exists, the individual needs to communicate the issue/event/concern immediately to their supervisor and document as appropriate, including filing a SAFECOM.

Exhibit 3.1 Aviation Watch Out Situations

- Is this flight necessary?
- Who is in charge?
- Are all hazards identified and have you made them known?
- Should you stop the operation or flight due to change in conditions?
- Communications
- Confusion
- Conflicting Priorities
- Weather
- Turbulence
- Personnel
- Is there a better way to do it?
- Are you driven by an overwhelming sense of urgency?
- Can you justify your actions?
- Are there other aircraft in the area?
- Do you have an escape route?
- Are any rules being broken?
- Are communications getting tense?
- Are you deviating from the assigned operation or flight?

Flight Missions, Profiles and Categories

Informational needs, flight following methods, requirements for personal protective equipment, aircraft/pilot carding, and required management approvals differ between point-to-point and mission-type flights, and between general use and special use flight. In order to identify the type of flight, the following definitions have been established.

Point-to-Point Flight

Typically, the flight originates at one developed airport or permanent helibase, with flight route being direct to another developed airport or permanent helibase. The flight is conducted solely for the purpose of transportation of persons or cargo or for administrative travel purposes.

When planning to deviate from a direct route for aerial surveillance or other reasons, the deviation must be specified and documented in advance.

Except in an emergency or at the direction of an air traffic control facility, there must be no deviation from the submitted flight plan while en route unless the agency representative aboard the aircraft reports the amended flight plan to a designated point-of-contact.

All point-to-point flight is considered general use flight. For explanation, see the general and special use definitions below.

Mission Flight

These flights are defined by exclusion as all flights not meeting the definition of point-to-point flight. As such, mission flight requires work to be performed in the air, for example, retardant or water delivery, reconnaissance, or through a combination of ground and aerial work, for example, delivery of personnel and/or cargo from helibases to helispots or unimproved landing sites, rappelling or cargo letdown, horse herding.

> *Mission flight inherently requires greater planning due to the greater number of hazards and consequent higher degree of risk commonly involved in non-point-to-point flights.*

General Use or Special Use Flight

Flights are also categorized as either “general use” or “special use” activities. Special use flights require additional pilot qualifications, aircraft equipment, and passenger safety equipment. All helicopter flights, including those aboard cooperator, military, and other government agencies’ aircraft, must conform to the requirements as outlined in appropriate agency directives.

During a flight mission, the type of use must not change from a planned “general use” environment to an unplanned “special use” flight environment unless the following conditions have been met:

- Required personal protective equipment is being worn by both pilot and all passengers.
- Line manager approval is obtained prior to the change in type of flight activity. Pilot and aircraft are carded for the special-use activity, as verified by either the dispatcher or the Helicopter Manager.
- The dispatcher or other point-of-contact reviews the unit aerial hazard map and relevant information on area of operations is relayed to the pilot or Helicopter Manager.
- The Pilot performs a high-level reconnaissance above 500 feet AGL of the area to identify hazards prior to descent to low level.

These requirements are waived when a life-threatening situation exists on the ground, and intervention or surveillance by the occupants of the helicopter will avert the situation. Such situations must be documented by the Helicopter Manager or Flight Manager and a report submitted to the Unit Aviation Manager.

General Use Flights include point-to-point flights and mission flights conducted at greater than 500 feet AGL, with no descent at any time below 500 feet AGL.

Special use activities are described as operations involving helicopters which require special considerations due to their functional use. This may require deviation from normal operating practices when authorized. Special pilot qualifications and techniques, special aircraft equipment, and personal protective equipment are required to enhance the safe transportation of personnel and property.

Special use flight includes the following missions:

- Flights conducted below 500 feet AGL.
- Water or retardant application.
- Hover Fill operations. Prior agency authorization and training is required.
- HLCO and ATGS operations.
- Aerial ignition activities.
- Night Vision Goggle operations.
- Offshore vessel or platform landings.
- Single-skid, Toe in, hover Exit/entry Procedures (STEP). Prior authorization or exemption is required.
- Takeoff or landing requiring special techniques due to hazardous terrain, obstacles, pinnacles or surface conditions.

Specific Special Use Missions

- Law Enforcement. See Chapter 16 for more information of law enforcement specific missions and operational requirements.
- Search and Rescue. See Chapter 17 for more information of search and rescue specific missions and operational requirements.
- Aerial Ignition. All aerial ignition operations must be conducted in conformance with the *NWCG Standards for Aerial Ignition*, PMS 501, https://www.nwcg.gov/publications/501.
- Rappel. The use of rappel requires agency approval. Training, qualification, and certification must be in accordance with the current *Interagency Helicopter Rappel Guide*, PMS 511, https://www.nwcg.gov/publications/511. Tactical use of rappelling will be determined by the individual agency.
- Short-Haul. The use of helicopter short-haul requires agency approval. Training, qualification, and certification must be in accordance with agency policy. Tactical use of helicopter short-haul will be determined by the individual agency.

- Aerial Capture, Eradication, and Tagging of Animals (ACETA). ACETA operations are conducted primarily by DOI bureaus. For these operations, refer to the ACETA Handbook. Bureaus may have additional guidance.
- Media. Transportation of media personnel may be conducted in government helicopters provided media personnel meet the definition of "official passengers." Refer to agency specific direction concerning level of approval needed to conduct flights with media on board. Media personnel must adhere to all requirements (for example, personal protective equipment). See Chapter 10 for more information.
- External Load Operations. External load operations include water bucket operations, seeding, sling loads using either lead line/swivel/cargo hook or the swivel/remote electric hook/longline. When planning an operation which will involve external loads, the personnel requirements and operational procedures outlined in Chapter 11 must be followed.

Flight Planning and Scheduling Process

Flight planning involving all participants in the intended mission serves to reduce the risk inherent in any aviation mission to acceptable levels. Levels of aviation safety and efficiency can be significantly improved by comprehensive planning of both one-time and recurrent aviation projects. Individuals who have a need to initiate or participate on a flight mission should consult their agency's manual and handbooks for the specific process and procedures to be followed.

Elements of the Scheduling Process

There are common elements involved in any planning and aircraft scheduling process. This process should consist of:

1. An Aircraft Flight Request/Schedule submitted by the user requesting the mission.
2. A cost-analysis performed by the dispatcher or individual scheduling the flight.
3. OMB Circular A-126 requires a formal cost-analysis only for point-to-point (administrative travel) flights.
4. Performance of a cost-analysis of different makes and models of helicopters, as well as of various vendors or other aircraft sources available, for all flights is recommended.
5. Refer to agency-specific direction concerning requirements for a cost-analysis of mission-type flight. The Interagency Helicopter Approval Performance Index (IHAPI) for Type 1 and 2 CWN helicopters is recommended.
6. A Dispatch/Aviation Manager Checklist and Hazard Analysis performed by the requester (assigned Helicopter/Flight Manager), the scheduler (the Dispatcher and/ or Aviation Manager), and for complex missions, the Pilot.
7. Appropriate approvals. Higher-level approval may be required.
8. Agency-specific direction may require line manager approval for special use flights.
9. Administrative travel flights with senior federal officials on board require higher approvals and documentation. See OMB Circular A-126 for specific details.
10. Standard Aircraft Safety Briefing completed by the Helicopter Manager or Project Flight Manager and Pilot just prior to the flight.

11. A post-flight evaluation which identifies any problems encountered so that corrective action can be taken on future flights.

Frequency of Completion

One-Time Missions. The elements of the flight planning scheduling process described above should be addressed or completed for each flight mission.

Recurrent Special Use Projects and Operations. For recurrent flight missions of a similar nature in a special use environment, scheduling and approval requirements are identified in the Project Aviation Safety Plan.

Aircraft Flight Request/Schedule Preparation

Flight request formats will vary among agencies. See form HBM-9A for an example.

For cooperator (civil), other-government agency or National Guard aircraft, refer to agency specific direction and agreements for the approval process. For military aircraft, see the *National Interagency Fire Center, Military Use Handbook*, located at https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf for ordering and approval process. Gaining approval for use of these types of aircraft is the joint responsibility of the Dispatcher, Unit Aviation Manager, and the individual requesting the aircraft.

The flight request/schedule must be relayed to all personnel and offices involved in the flight including other dispatch offices, the Pilot, and the Helicopter/Flight Manager. This may be accomplished by automated flight planning and transmission by email, fax or telephone. The Helicopter/Flight Manager is responsible for relaying flight specifics to other passengers.

Aircraft Cost-Comparison Analysis

Requirements

OMB Circular A-126 requires that a cost analysis and comparison of different aircraft and vendors be performed for point-to-point administrative travel flights. States may have similar requirements.

If a helicopter flight falls within the point-to-point definition, then a cost-comparison that meets OMB Circular A-126 requirements must be performed.

The majority of helicopter flights involve non-point-to-point, mission-type flight for which this cost comparison may not be required.

It is recommended that a cost comparison be completed for helicopter mission flights. Often a helicopter that has a more expensive hourly rate will prove to be cheaper due to a variety of factors, including higher cruise speed during ferry, greater load-carrying capability, and other factors.

Documentation

The comparison and the reason for selecting any aircraft other than the lowest cost aircraft (for example, safety considerations, cannot meet ordered time frames, etc.) should be documented in writing.

Scheduling Aircraft with Vendors

The following guidance applies primarily to project flights.

- Documentation of Contacts. Once a preliminary flight plan has been prepared and a cost comparison performed, the scheduling dispatcher may contact a vendor to determine availability.

These contacts may be documented on a Resource Order form or other appropriate format.

- Vendor Review of Flight Request and Preliminary Flight Plan. During the scheduling contact, the preliminary flight plan must always be reviewed with the vendor and preferably the Pilot who will fly the mission. Scheduler should relay an accurate itinerary and manifest along with the desired sequence of events. Flight plans should be amended at this time, subject to aircraft limitations, refueling needs, or other concerns identified by the vendor. More complex projects may require in-person meetings with the vendor to plan the flight or project correctly.

Obtaining Approved Pilots and Aircraft

During the scheduling process, the individual scheduling the aircraft must ensure that the vendor provides approved pilots and aircraft.

Aircraft and Pilots must not be scheduled or dispatched unless it is verified that both are approved and current for the mission. Note that use of other-government agency, military, and civil aircraft requires approval, but not necessarily carding.

Initially it is the responsibility of the dispatcher to verify that the equipment and Pilots are carded. This may be done by reference to the agency's vendor source list. The dispatcher should then verify with the vendor that the Pilot(s) and aircraft are approved and that the Pilot is current for the intended mission.

Obtaining Necessary Equipment and Personnel

It is essential that the individual submitting the flight request give sufficient information to ensure any specialized mission equipment requirements are met, especially for equipment which is to be supplied by the vendor. Local operating plans should specify procedures for obtaining agency supplies such as handheld radios, external load equipment and personal protective equipment.

Analyzing Known Aerial Hazards

Known aerial hazards must be identified and analyzed during the flight planning process. Each flight request or Resource Order for mission-type flights, regardless of altitude, must have known hazards identified or a hazard map attached.

Aviation Project and Mission Planning

The following is a discussion of recommended procedures for project operations. Most sections are applicable to both resource and incident operations.

Identify Hazards and Manage Risks

The special use flight profile of low altitude flight places people and equipment in a higher risk area of potential wire strikes, mid-air collisions with other low flying aircraft, and impact with obstacles protruding beyond normal surface features.

To mitigate this risk, pilots, helicopter and flight managers, and passengers must be made aware of obstacles which they may encounter during low-level operations.

Managers must be made aware of the associated risk and make a risk management decision to accept those risks, provided they are properly mitigated. If not, managers will require the mission to be changed to avoid identified risks, or cancel the flight.

Known flight hazards must be identified on the unit's "Known Aerial Hazard Map." Each permanent helibase must obtain and post.

Known Aerial Hazard Map

Purpose

The purpose of aerial hazard mapping is to identify aerial hazards within and/or near local administrative boundaries so that flight safety awareness by the pilot, the helicopter manager and passengers is achieved.

Applicability

Each unit must maintain a current aerial hazard map in each location where flight planning, flight tracking and aircrew dispatching occur.

- The master map should be located in the office where flight planning and scheduling is accomplished (for example, in the dispatch office).
- For units without dispatch offices, the hazard map should be located where flights are normally planned and scheduled.
- Maps must also be maintained at permanent helibases.

Responsibility

Unit Aviation Managers are responsible for ensuring the development and update of Known Aerial Hazard Maps. All personnel are responsible for reporting aerial hazards to the designated point-of-contact for inclusion on the hazard map.

- Particular emphasis should be placed on identifying those obstructions not normally indicated on government published flight maps including old mining wires, stream flow gauges, areas of extreme turbulence, etc.
- Military Training Routes (MTR) and Special Use Airspace (SUA) must be included on the known aerial hazards map.
- Medical facilities (hospitals, clinics, etc.) with landing areas or heliports should be shown on the hazard map. Those with air transport ("life flight") capability should be so indicated.
- All airports, landing strips and heliports/helibases should be added.
- Each flight request or Resource Order for non-point-to-point, mission-type flights, regardless of altitude, must have known hazards identified or a hazard map attached.
- Instructions for completion. Potential hazards and emergency services as identified above must be marked. Method of marking is optional, but may be determined by agency-specific direction.
- The following NWCG site will display aviation data standards: https://www.nwcg.gov/data-standards/aviation-hazards-plp.
- The following FAA site will display standard symbols in the FAA Aeronautical Chart User's Guide: https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/aero_guide/.

Hazard Maps on Large Incidents

Hazards must be reviewed each morning during the briefing of pilots and helibase personnel.

In-Flight Hazard Identification. To reduce wire strike potential, it is essential that an on-site risk assessment be conducted prior to all low-level flights. All low-level flights require a thorough, high-level reconnaissance of the route to be flown. Transition to an unplanned low-level flight mode should only be conducted when determined to be critical to the safety of the operation. Extreme caution must be exercised.

Aviation Manager Responsibility. Prior to the start of the second full operational period, the dispatcher must furnish the incident air operations staff and all aircraft operating bases with a copy of the current local aerial hazard map for the area surrounding the incident, as well as the areas surrounding any aircraft operating bases.

Air Operations Branch Responsibility. Upon arrival at the incident, the AOBD or designee must make an aerial survey of incident operations airspace and post a detailed aerial hazard map at all aircraft operating bases. This map is usually the one received from dispatch, with any amendments or additional hazards observed added.

During the initial stages of a large incident, the AOBD position may be filled by the Operations Section Chief or by one of the sub-functions of the branch (for example, by a Helibase Manager). It must be the responsibility of that individual to perform the above survey. The local Unit Aviation Manager should ensure compliance.

Helicopter Capabilities and Limitations

To complete any helicopter mission safely and efficiently the aircraft must have passenger/cargo-carrying capacity and sufficient power capability for anticipated temperature(s) and elevation(s). This information can be found on a load calculation.

Aviation managers and dispatchers should be familiar with helicopter capabilities and limitations in order to schedule the proper aircraft.

During the scheduling process for project flights, the intended mission must be discussed in depth with the vendor and preferably with the Pilot assigned to the mission.

When selecting helicopters, several factors must be taken into consideration to determine an aircraft appropriate for the mission.

<u>Capabilities</u>

Each aviation management office should maintain a current copy of the specification of helicopters commonly used that summarizes performance capabilities of those aircraft. This data may be used for program planning, but must not be used to perform the actual helicopter load calculation prior to takeoff.

<u>Limitations</u>

Limitations to consider in operational planning may include, but are not limited to:

- Number of passenger seats.
- Aircraft performance given the density altitude at takeoff and landing sites.
- Skid or wheel footprint given the size of landing pad.
- Cargo-carrying equipment.

- Cargo hook or remote electric hook/longline equipment, cargo compartment, etc.

Anticipated Environmental Conditions

All environmental factors should be considered when selecting an appropriate helicopter. Temperatures, wind speed and direction, visibility, and local weather anomalies can impact aircraft capabilities, mission profile and fuel burn.

Location Coordinates

The standard format for Latitude and Longitude is Degrees and Decimal Minutes (DDD °MM.MMM') for interagency aviation missions. Helicopter procurement documents specify this format and most aircraft use it as a standard. Some applications may require Degrees-Minutes-Seconds (DMS). For most applications when using helicopters for a project or mission, it is appropriate to give the decimal minutes to the hundredths place (two digits to the right of the decimal point).

To convert from one to the other you either multiply or divide by 60.

- To get DDD °MM.MMM' from DMS, divide the seconds by 60.
- 45° 14' 30" (divide 30 by 60) to get 45° 14.500'.
- To get DMS from DDD °MM.MMM', multiply the decimal portion of the minutes by 60.
- 45° 14.500' (multiply .5 times 60) to get 45° 14' 30".

Communication Plan

Radio frequencies must be designated for Air-to-Air, Air-to-Ground and Ground-to-Ground operations. Identification of the means of flight following and the methods by which it will be accomplished is an essential part of the communication plan.

Airspace Coordination

Personnel involved in helicopter operations must follow all processes and procedures outlined in the Interagency Airspace Coordination Guide.

Positions such as the AOBD, ASGS, ATGS, HLCO, Helibase Manager and Project Aviation Manager are all responsible for evaluating the airspace surrounding the incident to include, but not limited to:

Identifying military training routes, special-use airspace, visual flight rules (VFR) airways, etc., which may impact air operations.

- Identifying these areas on the incident or project hazard map.
- Ensuring all Pilots are briefed on these hazards.
- Ensuring that a Temporary Flight Restriction (TFR) is in place when appropriate. NOTAMS are advisable for some project work, e.g., horse herding, construction longline, etc.
- Reporting any violations through the SAFECOM reporting system.
- Ensuring the TFR is cancelled when no longer necessary.

Obtaining Approved Pilots and Aircraft

During the scheduling process, the individual scheduling the aircraft must ensure that the vendor provides approved pilots and aircraft.

Aircraft and pilots must not be scheduled or dispatched unless it is verified that both are approved and current for the mission. Note that use of other-government agency, military, and civil aircraft requires approval, but not necessarily carding. Initially it is the responsibility of the dispatcher to verify that the equipment and pilots are carded. This may be done by reference to the agency's vendor source list. The dispatcher should then verify with the vendor that the pilot(s) and aircraft are approved and that the pilot is current for the intended mission.

Flight or Driving Time and Duty Day Limitations

For safety purposes, flight or driving time and duty day limitations must be taken into account when planning flights. Care should be taken that limitations not be exceeded. For contractor personnel, limitations are stated in the procurement document.

Personal Protective Equipment and Aviation Life Support Equipment

Requirements for personal protective equipment are determined by the type of flight and found in the ALSE Handbook. The type of ground operation being performed also will determine PPE required, e.g., hover hookup or working around operating helicopters.

Preflight/Passenger Safety Briefing

A briefing covering both the specifics of the intended mission and helicopter safety is required. A standard Aircraft Safety Briefing must be provided to all passengers by the Helicopter Manager or Project Flight Manager and pilot just prior to the flight.

Manifest

All personnel and cargo must be listed on the manifest with their weights. All hazardous materials must be identified on the manifest. All personnel on the manifest must meet the definition of "air crewmember", "authorized passenger", or "official passenger."

Post Flight Evaluation

Just as the pre-flight briefing is deemed essential to the success of a mission, the post flight evaluation of a flight is likewise important in order to correct problems encountered.

Project Aviation Safety Plans

Purpose

Ensure that recurrent flights in special use environments (primarily flight below 500 feet AGL) are adequately planned and that management is aware of and has approved flight in the special use environment.

Document the information required on the Aircraft Flight Request form and the Dispatch/Aviation Manager Checklist and Hazard Analysis for successive, similar missions. The Project Aviation Safety Plan (PASP) can relieve the user from completing repetitive information (hazards, communications, etc.) on the flight request each time a flight is made to the same area(s). For scheduling and manifesting purposes, the Aircraft Flight Request is completed for each use. However, only that information not contained in the Project Aviation Safety Plan is required, such as date/time of flight, manifest, etc.

Applicability

The PASP should be completed for all recurrent special-use flights for the same project to the same areas(s). Examples are wild horse counting or herding, bald eagle survey, communication site repair, etc.

Responsibilities and Requirements for Completion

The local Aviation Manager and Project Aviation Manager are jointly responsible for determining the need for a PASP.

Plans are generally completed in the following sequence:

1. Project Aviation Manager or assigned Helicopter/Flight Manager completes the majority of plan information.
2. Dispatcher completes flight following and emergency search and rescue information.
3. A risk assessment of both aerial and ground-based hazards is completed jointly by the Project Aviation Manager, the Helicopter Manager, the Dispatcher, and the Unit Aviation Manager.
4. Unit Aviation Manager reviews and recommends approval.
5. Line Manager or designee reviews and approves. Note that approval is not automatic. The Line Manager may choose to make a risk management decision to not conduct the operation as planned, or to not conduct the mission at all.

Routing and Filing

After approval by line management the plan is maintained in the dispatch office for reference during flight.

Annual Review and Update

The plan should be reviewed annually by the Unit Aviation Manager for currency of information, with at least annual re-approval by line management. Updates should be performed as necessary. A more frequent review and update may be necessary if the type of mission, location, etc., change.

Content

As a minimum, the PASP must consist of the following elements:

1. Project Name and Objectives – Provide a brief description of the project and its objectives.
2. Justification – Indicate why the project will require the use of aircraft in special-use flight conditions/environments and list the most practical alternative for completion of the project.
3. Person submitting the PASP – Identify a qualified Project Aviation Manager and/or Helicopter Manager
4. Project Dates – Dates the project will begin and end. These may be approximate, since exact dates of flights may not be known.
5. Location – Enter descriptive location and include a map clearly showing area where flights will be made. Aerial hazards must be clearly indicated.
6. Projected Cost of Aviation Resources – Enter cost coding, projected flight hours and cost, projected miscellaneous expenses (overnight charges, service truck mileage, etc.), and total cost of project.

7. Aircraft – If known, identify company that owns aircraft anticipated to be used, registration number, aircraft type, date of Aircraft Data Card expiration and missions for which aircraft is approved.

8. Participants – List individuals involved in flights, their qualifications (Helicopter Manager, Passenger, Helibase Manager, etc.), dates of last aviation training, and project responsibilities.

9. Communication Plan, Flight Following and Emergency Search and Rescue – Identify the procedures to be used.

10. Aerial Hazard Analysis – The Project Aviation Manager develops an aerial hazard analysis with attached map. Flights made in confined areas (e.g. deep, narrow canyons) require that a prior ground and/or aerial survey of hazards be made. A copy of the hazard map must be provided to the Pilot prior to any project flights. The necessary temporary flight restrictions and coordination with the Federal Aviation Administration and, if appropriate, military authorities, must be accomplished prior to project flights.

11. Protective Clothing and Equipment – Identify the protective equipment and clothing necessary for the particular operation. Survival equipment (extra water, flotation devices, sleeping bags, etc.) beyond the normal PPE complement may be required.

12. Load Calculations – The Pilot is responsible for the accurate completion of load calculations. Trained aviation personnel must ensure that aircraft scheduled are capable of performing the mission(s) safely and within the capabilities of the aircraft selected. The Helicopter Manager must ensure that manifests and load calculations are completed properly and are completed daily.

13. Signatures – Appropriate level of approval such as supervisor or Line Officer.

14. Pilot – If known, identify Pilot(s), type of aircraft qualified in, type of missions qualified for and Pilot card expiration date.

Chapter 04 – Communications, Flight Following, and Resource Tracking

Introduction

Pilots, dispatchers, and Helicopter Managers must be knowledgeable of these differences as they Pilots, dispatchers, and Helicopter Managers must be knowledgeable of the differences between flight following and resource tracking and of the different methods and options of flight following and resource tracking. Frequently, the two intermix. For example, a flight following check-in accomplishes resource tracking and vice versa.

Flight Following

Flight following is the knowledge of the aircraft location and condition with a reasonable degree of certainty such that, in the event of mishap, those on board may be rescued. Flight following, whether performed from a dispatch office or other facility, or at a remote location in the field, must be given a high priority by all personnel involved.

The purposes of flight following and resource tracking procedures are to:

- Ensure the safety and welfare of flight crew and passengers.
- Perform resource tracking to promote effective use of aircraft.
- Provide information for the administrative processing of aviation-related documents.

Some of the flight following procedures outlined here describe operations from a remote base, project or incident and supplement the procedures contained in the *National Interagency Mobilization Guide*, found at https://www.nifc.gov/nicc/mobguide/index.html.

Identification of Flight Following Requirements

At the time the flight is planned or during morning briefings at incident helibases, flight following requirements should be clearly identified by the dispatcher, Unit Aviation Manager, helicopter or project flight manager, Helibase Manager or other responsible party.

This individual should identify check-in procedures to include time and locations, dispatch office(s) or other flight following facilities involved, individuals responsible for flight following, frequencies to be used and any special circumstances requiring check-ins (for example, to military facilities within Special Use Airspace).

Methods of Flight Following

There are several methods to accomplish flight following. Some are appropriate for point-to-point flights, some for mission flights and some for special mission flights.

<u>Point-to-Point Flights</u>

- An Instrument Flight Rules (IFR) flight plan. This method is not usually used for helicopter point-to-point or mission flights.
- A VFR flight plan with radio/telephone check-in to an FAA facility or agency dispatch office at intervals specified. This method should be used for helicopter point-to- point missions, especially long-distance ferry flights to and from projects or incidents.

- An agency VFR flight plan with radio/telephone check-in at intervals specified in the flight plan that meets agency policy. Intervals vary for point-to-point and mission flights.

  Satellite based Automated Flight Following (AFF) system as described in Chapter 50 of the *National Interagency Mobilization Guide*, https://www.nifc.gov/nicc/mobguide/index.html or the procurement document.

Mission Flights

- An agency VFR flight plan with radio/telephone check-in at intervals specified in the flight plan that meets agency minimums. Minimums vary for point-to-point and mission flights.
- Satellite-based AFF system as described in Chapter 50 of the *National Interagency Mobilization Guide*, https://www.nifc.gov/nicc/mobguide/index.html or the procurement document.
- Aerial supervision using ATGS, HLCO or others. This is often the way to maintain communications with aircraft involved in low-level flight operations. The supervising aircraft must have communication procedures established with a ground-based dispatcher.

Law Enforcement Flights

- For specialized flight following procedures during law enforcement operations, see Chapter 16.

Documentation of Flight Following

The following requirements apply to agency flight following only and are not applicable to flight following performed through the FAA system. In the event of a mishap, the speed and effectiveness of search and rescue is dependent on the accurate transmission and recording of flight following information.

- Dispatch Flight-Following Log for Project Flights. Flight-following is accomplished using local forms and procedures for project missions.
- Helibase Flight Following Log, HBM-9, must be used for all flight following during project or fire helibase operations.

Check-in Facilities

FAA Flight Following. For FAA flight plans, check-ins are made with FAA facilities upon departure, while en route and upon arrival at destination.

Agency Flight Following. Check-ins may be made with either the dispatcher or with trained personnel or other aircraft at the incident/project site (e.g., helibase, Incident Commander, etc.). When field (on-site, local) flight following is approved, ground personnel performing the flight following must have contact with dispatch to allow timely reporting of any accidents, incidents, hazards or problems encountered.

Check-in Requirements

Check-in requirements differ between point-to-point and mission flights.

Point-to-Point Flight

- Check-ins must be made at 60 minute intervals (maximum) and at every fuel stop.

Mission Flight

Unless alternative flight following intervals have been identified in advance for areas of incomplete coverage or valid mission requirements, check-ins at intervals not to exceed fifteen (15) minutes are the standard.

- Prior to and immediately after landing. If it is anticipated that terrain will interfere with check-in at the landing site, call in while still at altitude, giving a reasonable estimate of on ground time. Helicopter Managers and pilots should be aware that the dispatcher will expect a check-in at the end of the on ground time identified.
- Prior to and immediately after takeoff. The takeoff check-in should be made as soon as communications can be established.

Exceptions must be made in Alaska due to long distances and incomplete FAA and agency communications facilities. Sixty minute interval check-ins for point-to-point flights and 15 minute interval check-ins for mission flights are not always feasible. It is therefore imperative that FAA and/or agency flight plans be filed for point-to-point flights and that the resource tracking check-in/check-out system is strictly implemented.

Law Enforcement Flights. For specialized flight following procedures during law enforcement operations, see Chapter 16.

Check-in Information

The check-in made by the helicopter manager or pilot for mission flights should consist of:

1. Current location.
2. Use latitude/longitude, if known. This should be in Degrees and Decimal Minutes, DDD° MM. MMM', to the hundredths. Example 47° 14.52' x 92° 23.25'.
3. Legal or geographic descriptions are acceptable.
4. Current direction of flight.
5. Next destination or area to be surveyed.
6. Estimated time on ground (if landing).

Failure to Meet Check-in Requirements

The dispatch or other flight following facility must immediately initiate emergency response procedures for overdue or missing aircraft.

Resource Tracking

In order to facilitate cost-effective use of aircraft and planning of resources, scheduling offices and ordering offices may request pilots or the government representative on board an aircraft to relay flight status information at designated intervals. These notifications are performed to coordinate changes in assignments or update time frames for mission completion. They may be performed via radio or phone calls to dispatch offices.

Methods of Resource Tracking

The need for and method of resource tracking should be planned and documented on the flight request/plan or Resource Order. The use of aircraft radios for resource tracking is at the discretion of the pilot and must not interfere with air traffic control or the safe operation of the aircraft.

<u>Point-to-Point Flights (including ferry flights)</u>

- Resource tracking may be performed by phone or VHF-FM radio (if the aircraft is equipped).
- It is required that the Helicopter Manager or Pilot make resource tracking check-ins, usually via telephone, prior to takeoff and at final destination.
- The Scheduling Dispatcher will specify check-in requirements for each stop enroute and may designate an alternate dispatch to contact with check-ins.

<u>Mission Flights</u>

Flight following and resource tracking become the same.

- An agency VFR flight plan with radio/telephone check-in at intervals specified in the flight plan that meets agency minimums.
- Satellite based AFF system.
- Aerial supervision using ATGS, HLCO or others with radio/telephone check-in at intervals specified in the flight plan that meets agency policy.

Communication Systems

It is important that a reliable communication system is established and maintained throughout the aviation and dispatch organizations. Effective communications at all levels should be encouraged to resolve issues before they become a problem.

Local units should ensure that the existing communications network is adequate to meet both fire and project flight needs. Unit Aviation Managers or dispatchers should report, through submission of a SAFECOM, any discrepancies in the flight following system. These discrepancies may involve human performance problems (for example, failure to adhere to check-in requirements) or failures or limitations in the system (for example, inoperative equipment, inadequate coverage areas, etc.). Corrective action must be given a high priority.

Personnel must be furnished and aircraft must be equipped with sufficient radio capabilities and maps or navigation systems ensure their location is known and can be relayed to the dispatcher.

The pilot is required to have paper or electronic access to sectional aeronautical charts of the area(s) of operations. On all non-point-to-point, mission flights, it is recommended that the Helicopter Manager also have paper or electronic access to topographic maps of the area(s) of operations.

Contract aircraft, and where possible, local vendor aircraft used on a recurring basis, should be equipped with agency compatible radios.

Special use missions require communications equipment that will allow radio check-ins to be made without removal of the approved flight helmet. Agencies should obtain avionics equipment that provides for this requirement.

If check-ins cannot be made due to equipment failure, the aircraft must return immediately to the departure point or proceed to the closest facility where a check-in can be made via telephone. The flight must not proceed until the problem is corrected and positive communications are established. Dispatchers are instructed to institute “Overdue Aircraft” procedures when check-in requirements are not met.

Aircraft Communication Systems

Aircraft VHF-AM Radio

All agency-owned, contract, and rental aircraft have a VHF-AM radio for communication with FAA facilities. Some VHF-AM radio frequencies are available for incident or project use on either a nationally or regionally assigned basis.

Along with the use of VHF-AM frequencies to perform flight following check-ins with FAA facilities, communication functions of the VHF-AM bandwidth include helicopter takeoff and landing coordination and air-to-air tactics.

With the exception of 122.925, these frequencies must be ordered from the local dispatch facility. The order must specify the function for which the frequency is intended, e.g., air-to-ground, air-to-air, etc.

VHF-AM frequency 122.925 is a frequency designated for use by all natural resource agencies. It may be used on both incidents and projects for air-to-air and air-to-ground communications. The hazard in utilizing this frequency for any extended period of time is that anyone can use it. An incident or project cannot restrict its use by others.

Aircraft VHF-FM Radio

Refer to the procurement document for required FM radio equipment.

Analog. VHF-FM analog frequencies are narrowband (12.5MHz) with only a few exceptions. Continuous Tone Coded Squelch System (CTCSS), Digital Private Line (DPL) or Digital Code Squelch (DCS) may be used on receivers and/or transmitters based on local conditions.

P-25 (Digital). P-25 uses Network Access Codes (NAC) and Talkgroups (TGID) in the same manner that analog uses CTCSS tones.

Discrete analog and P-25 digital communications are incompatible. Aircraft VHF-FM radios must be P-25 compatible to allow both analog and P-25 communications.

800MHz Radios - Many emergency response and law enforcement agencies use 800MHz radio systems. Aircraft may have 800MHz radio capabilities.

Satellite and Cell Phones

This equipment may supplement radio communications in some instances. Their use during flight by the Pilot should be limited to that necessary for the safety of the flight and its occupants.

Distractions and workload in the cockpit increase with the use of specialized equipment such as differential Global Position System (GPS) navigation systems, Dataloggers, programmable graphic displays and some radio equipment.

Helibase Communications

There are two major factors to consider regarding helibase communications:

1. The system itself, consisting of hardware, frequency assignments, and the location at which communications with aircraft are performed; and,
2. The individuals who are responsible for helibase communications.

A good helibase radio communication system, staffed by trained personnel, should result in effective, safe operations.

General Considerations

The following standards should be consistently followed:

- Operations must not be conducted if flight following requirements cannot be maintained.
- Communication between the helibase and helispots is required.
- Helicopters with avionics problems that don't allow positive communications must return to the helibase (or other directed location) and should be shut down until the problem is corrected.

A review of the Communications Plan must be conducted during the morning review of the Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00, ensuring that all helibase personnel and pilots are aware of frequencies to be used, flight following requirements, and, most importantly, any changes to the Communications Plan since the last shift. A critique of communications should be conducted at the debriefing.

Frequency changes during a project should be the exception rather than the rule. However, during large, complex incidents, or incidents that are in a transition stage from extended attack to team management, frequency changes may be the rule rather than the exception. Be flexible and ensure that changes are made known to all.

Ensure that problems are brought to the attention of the air operations staff or Project Aviation Manager. The communication unit leader and/or local radio technician are helpful resources in solving communications problems.

One of the difficulties air crews experience in contacting an incident is when frequencies have been changed on the incident, but not on the Aircraft Resource Order. It is incumbent that the AOBD or other staff ensures that dispatchers relay new or changed frequencies and air/ground contacts when ordering additional aircraft for an incident.

Organization

All personnel working at the helibase are affected by how information is exchanged. Communication flow and how it is structured within the helibase organization will differ with each situation, but must be established with and understood by each member of the helibase organization.

The key position under the Helibase Manager that directly manages the communication flow is the ABRO.

Helibase Communications and Flight Following Forms

The ABRO uses the following forms to accomplish the duties and responsibilities of the position:

- ICS-220, Air Operations Summary, identifies aviation communications frequencies.
- ICS-205, Incident Radio Communications Plan, identifies aviation and other communications frequencies and functions.
- HBM-6, Helibase Mission Request Log, identifies requested missions.
- HBM-5, Helibase Flight Following Log, enables the ABRO to track and identify current location and intended destination of assigned helicopters.
- HBM-15, Emergency Rescue Information, identifies primary and secondary medevac helicopters in the event of injuries to personnel or in the event of an aircraft mishap. This becomes part of the Medical Plan.
- HJA-1, Emergency Medevac/Medical Transport Request, allows the ABRO to obtain additional information necessary to respond safely and efficiently to a request for Helicopter Emergency Medical Services (EMS) services.

Incident Communications Plan and Frequencies

Refer to Exhibit 4.1 for a diagram of an Incident Communications Plan.

There is no standard communication plan that will work in all situations for all agencies during complex helicopter operations. For this reason, the following is a general discussion of helicopter communications in terms of communication functions, requirements, options, and radio discipline. These may be adapted to the specific situation encountered.

On an incident or project, the number of helicopter communication functions is dependent upon the complexity of the situation. One may use any number of these functions to meet the need. See Chapter 15 in the *Interagency Standards for Fire and Fire Aviation Operations* (Red Book) found at, https://www.nifc.gov/policies/pol_ref_redbook.html for more information.

Helibase Air Traffic Control

This function is commonly called the Takeoff and Landing Coordinator (TOLC) frequency. It is used to coordinate departing and arriving air traffic at the helibase with other aircraft.

Flight Following

This function is usually performed by the ABRO. The HLCO or the ATGS can be of assistance with this function, particularly when working the helicopters in remote areas of the incident or project out of VHF-AM, line-of-sight range.

- A “human repeater” is an effective method of flight following when radio repeaters are unavailable or not working. A Ground/ Aircraft Radio Link system which translates VHF-AM aircraft transmissions to UHF frequencies via a repeater may be established to provide direct communication to the helibase.

Deck Communication and Coordination

Use of a Logistics Net frequency for ground-to-ground deck communications on large helibases can facilitate communications between the Parking Tenders, Loadmasters, DECK, TOLC, and the ABRO.

Air-to-Air Tactics

This frequency is used by all aircraft, the HLCO, and the ATGS to coordinate aerial activities. On large incidents or projects, helicopters and airplanes may have separate frequencies.

Air-to-Ground Tactics

Several frequencies may be used to coordinate aerial activities with ground activities. Helicopters should have frequency compatibility for this function. If the helicopters do not, the HLCO or ATGS must have compatibility with ground units in order to pass on the information to helicopters via the air-to-air frequency.

Command

There is usually only one command frequency assigned, although there may be more than one frequency for this function on large incidents assigned as Air- to-Ground Command. This function is used to link the Incident Commander or Project Aviation Manager, air operations staff members, and the ATGS. Its use should be strictly limited to overhead communications and should not be used for other traffic except in an emergency.

Support/Logistics

This function is for supply and support requests, status keeping, and general non-tactical, non-command information. The ABRO can be the central point for relaying information that falls within this broad function.

Air Guard

Air Guard is a national frequency with specific designated uses: emergency contacts, initial contact at an incident by inbound aircraft, and long-range dispatch or rerouting. At no time should Air Guard be an assigned frequency, nor should it be used if other frequencies become overloaded.

Communication Requirements and Options

Frequency Compatibility

It is essential that all aircraft and ground personnel have compatible radios and frequencies in order to perform necessary communication functions.

Radio Traffic and Radio Discipline

Radio traffic must be disciplined and concise. If problems are encountered with overloaded radio frequencies, first examine whether radio discipline is being practiced. If not, take corrective action with Pilots, aircraft managers, and helibase personnel. If the frequencies remain overloaded, then an additional frequency or frequencies may be needed.

- The Air Guard frequency must not be used for any function other than its intended uses which include air-to-air emergency contact and coordination, ground-to-air emergency contact, and initial call, recall, and re-direction of aircraft when no other contact frequency is available.

Guidelines in Managing Radio Traffic

- Agency requirements for sterile cockpit procedures must be followed.

- Use clear text on all operations. Keep messages brief and to the point. If the message is long, stop the transmission periodically to allow for emergency or other short messages to be transmitted. Exhibit 4.2 displays an example of clear text.
- If a frequency has been designated for a specific function, do not allow radio traffic unrelated to this function on the frequency.
- On the takeoff and landing control frequency, encourage pilots to actively participate in aircraft coordination on inbound and outbound routes. If the ABRO tries to coordinate all air traffic, the pilots may be lulled into relying on the position excessively. The basic tenet of VFR flight is "see and avoid."
- If an individual (for example, the ABRO) will be off the frequency or out of the area temporarily, ensure that all Pilots who might try to communicate with that function are aware of the out-of-service condition. The flight-following function must always be staffed when aircraft for which it is responsible are airborne.
- Establish standard procedures for where and/or when helicopters contact the ABRO.
- When making a radio call, identify the resource you are calling first, followed by your identification, then the radio or frequency on which the message is being transmitted. Since pilots and ground personnel are monitoring more than one frequency, this will enable them to identify which radio or frequency to use to respond.

  "Victor" is an abbreviation for VHF-AM Radio, as opposed to VHF-FM, which may be identified as "Fox-Mike."

For example: "Blues Helibase, Helicopter 68X (or six eight x-ray) on Victor.

- Never use frequencies without prior authorization. Switching to an apparently unused frequency may have serious consequences for FAA air traffic control, other adjacent incidents, etc.

<u>Frequency Monitoring</u>

Pilots can usually monitor only two frequencies effectively.

Experience has proven that the fewer frequencies that need monitoring and the fewer people from whom the pilot is receiving direction, the better the pilot will function: Their understanding will increase and fatigue factors will be reduced.

It is essential that the HLCO, ATGS, and ABRO monitor all incoming radio traffic directed toward the airborne helicopter operation.

<u>Switching From One Frequency to Another</u>

The necessity to manually switch frequencies affects the pilot. Due to the normally short turnaround times of helicopter missions, frequency changes are a source of distraction and increase the already heavy workload. To relieve this, the pilot should be required to monitor only one primary frequency at a time, with a secondary as a backup.

New or Changed Frequencies

If a new frequency is necessary, or frequencies are changed, coordination between the aviation management positions is essential in getting new information to all ground and air personnel. Frequency additions, changes, and deletions must be coordinated through the Communication Unit Leader (COML) on incidents and with Dispatch on projects. A specific time for the changeover to occur should be established to avoid confusion.

If possible, avoid switching frequencies and their functions in the middle of a shift.

Separate or Combined Functions

On smaller incidents, communication functions can be combined. A common method is to combine helicopter air traffic control, air-to-air traffic control, air-to-air tactics, and flight following on one frequency. Command, air-to- ground tactics, and support are often combined on another frequency.

- The biggest drawback to combining functions is the resultant increase in radio traffic on each frequency, making this option usually usable only on smaller, less complex incidents or projects.
- Large helibases with numerous aircraft should have separate frequencies assigned for takeoff and landing control and air-to-air tactics for the entire incident or project. A checkpoint should be established at which the pilot should change frequencies from air-to- air tactics to takeoff and landing, and vice versa.

Issuing Air Traffic Information and Advisories

Safety is dependent upon adequate air traffic information and advisories being given, and that the information is received and acknowledged. Remember that interpretation can vary. Monitor radio traffic for compliance and ask the pilot to repeat if uncertain.

Only certified FAA Air Traffic Controllers can issue “clearances” and “control” the airspace. The function ABRO is to provide information, advisories, and coordination of inbound and outbound aircraft around the helibase.

Pilots need to know the following:

- Which helicopters are affected?
- Identification of unit issuing the advisory.
- What type of traffic (helicopter, fixed-wing, etc.) and what the traffic is doing?
- Location of traffic.
- Direction of travel.
- Type, direction, and altitude of pattern. Note that traffic pattern direction must change if wind changes.
- Recommendations.

Request Acknowledgment from Each Aircraft

This is critical for safety. Pilots may not receive the information due to being involved in radio traffic on other frequencies, their location, and helicopter noise.

Consider this example of a traffic coordination advisory from the ATGS on the Blues Incident.

“All Blues Incident helicopters, Blues Air Tactical, air tankers will be dropping on the ridge running north-south-west of Helispot 7. Drops will be from south to north, clockwise pattern. Stay below 4000 feet on the north and east sides of the incident until further notice. Acknowledge.”

Pass on new information. It is important that the ABRO and the aircraft on the incident or project relay new information to each other. This is critical on complex operations when there are separate frequencies for air-to-air and helicopter air traffic coordination.

- Once the message is acknowledged by all airborne helicopter pilots, the ATGS should contact the helibase(s) to ensure that no missions are launched to the area of air tanker operations.

“Blues Helibase, Blues Air Tactics, air tankers will be dropping on the ridge that runs north-south to the west of Helispot 7. Drops will be from south to north, clockwise pattern. Helicopters have been instructed to stay below 4000 feet on the north and east sides of the incident until further notice. Acknowledge.”

Special Operations

During special operations such as helitorch, plastic sphere dispenser, or rappel, discrete frequencies are often assigned to avoid interference from other operations. In all cases, consult the Communications Unit Leader or local agency communications specialist before using any frequency. Radio signals sometimes “pair up” to produce a signal on a third frequency which may interfere with other services.

Exhibit 4.1 – Incident Communications Diagram.

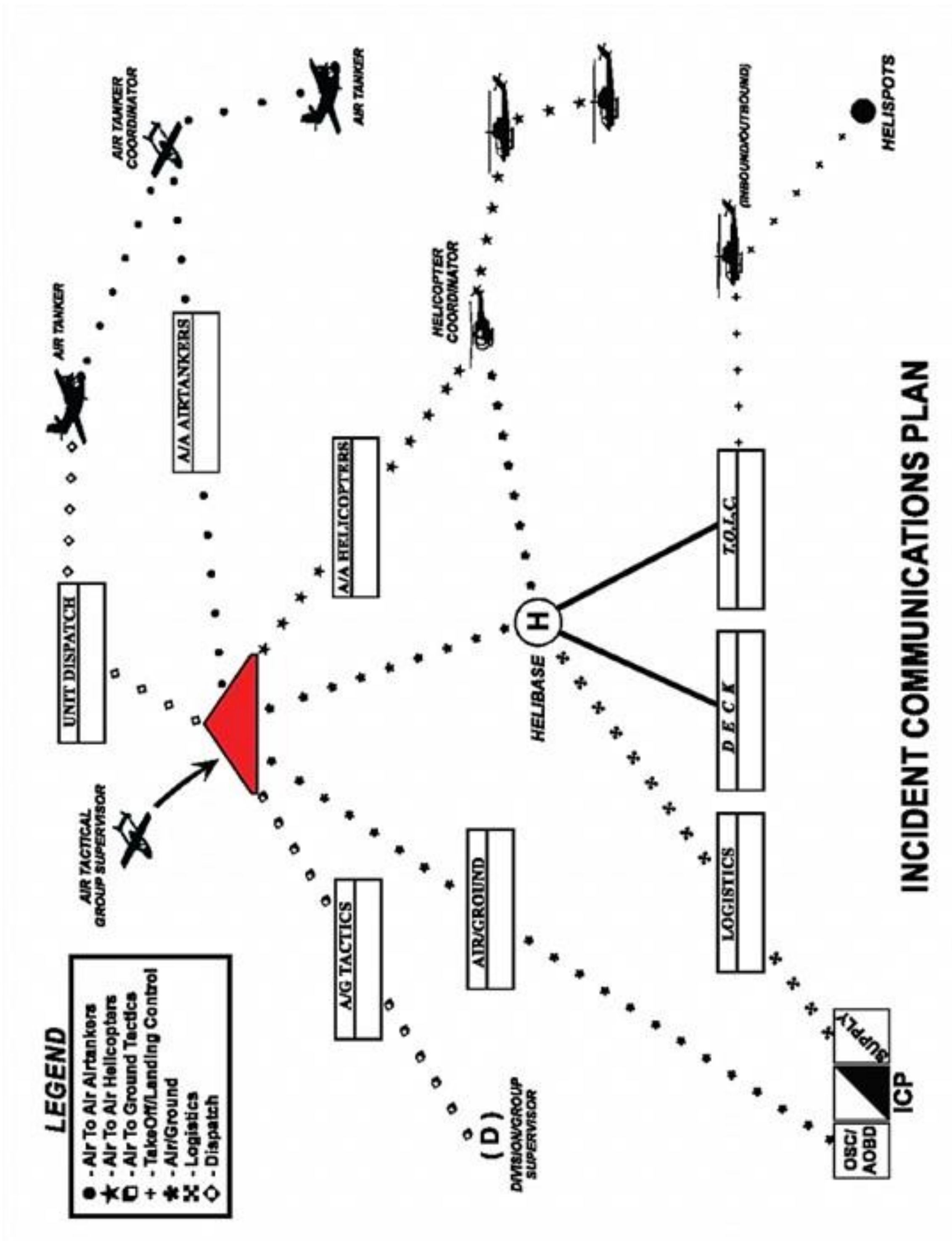


Exhibit 4.2 – ABRO Advisories to Pilots

WHEN HELICOPTER CONTACTS HELIBASE.

- Helicopter#_____, _____Helibase.
- Winds are ____ MPH from the ___________.
- Include the following information depending on the situation.
- There is no reported traffic, or
- (List Aircraft) is outbound from ______to______,and/or
- (List Aircraft) is inbound from _______to________.
- Be advised of _______ (list pertinent airspace activity).
- Land at Pad _____.

BEFORE A HELICOPTER DEPARTS HELIBASE.

- Helicopter#_____, _____Helibase, on_______.
- Winds are _____MPH from the________.
- Include the following information depending on the situation.
  - There is no reported traffic, or
  - (List Aircraft) is outbound from _____to_______ and/or,
  - (List Aircraft) is inbound from _____to________.
- Be advised of_______ (list pertinent airspace activity).
- Depart at your discretion.

EXAMPLE: Helicopter (5NR) Five November Romeo, Side Lake Helibase on Victor. Winds are 5 miles per hour from the west. Helicopter (0PA) Zero Papa Alpha, is outbound from the Helibase to H-1. Be advised of troop shuttle activity from the Helibase to H-1 and airtanker activity in Division Alpha.

Incident Airspace Communications

Temporary Flight Restriction (TFR)

A Temporary Flight Restriction (TFR) is a type of Notices to Airmen (NOTAM). A TFR defines an area restricted to air travel due to a hazardous condition, a special event, or a general warning for the entire FAA airspace. The text of the actual TFR contains the fine points of the restriction.

Fire Traffic Area (FTA)

The FTA is a communication protocol for firefighting agencies. It does not pertain to other aircraft that have legal access granted by the FAA within a specific TFR. The FTA should not be confused with a TFR, which is a legal restriction established by the Federal Aviation Administration to restrict aviation traffic while the FTA is a communication tool establishing protocol within firefighting agencies. Participating aircraft must adhere to TFR policies as established by the FAA.

For example, if the TFR boundary of a polygon exceeds the 12-mile initial contact ring, clearance will still be required in order to enter the TFR. In this case the TFR boundary becomes the No Communication (NOCOM) ring as described below.

If the TFR boundary is within the 12-mile ring, proceed with standard FTA communication procedures.

Temporary Flight Restriction (TFR) – All assigned/ordered aircraft must obtain clearance into or the incident TFR by the on scene aerial supervision or the official in charge of the on-scene emergency response activities.

Standard FTA Communication Procedures

Initial Communication (ICOM) Ring

A ring 12nm from the center point of the incident. At or prior to 12nm, inbound aircraft contact the ATGS or appropriate aerial resource for permission to proceed to the incident. Briefing information is provided to the inbound aircraft by the aerial supervision resource over the incident (ATGS, ATCO, ASM and HELCO).

No Communication (NOCOM) Ring

A ring 7nm from the center point of the incident that should not be crossed by inbound aircraft without first establishing communications with the appropriate aerial supervision resource.

Fire Traffic Area Entry Procedures

Helicopters enter the airspace in a right or left hand orbit at 500 feet AGL unless the situation dictates a different altitude (smoke/terrain). See Exhibit 4.3.

Aviation personnel must follow FTA entry procedures 12 NM from the center point of the incident as described in the 2017 *Interagency Aerial Supervision Guide*, PMS 505, https://www.nwcg.gov/publications/505, for further information.

Scenario 1: Aerial Supervision Is on Scene

- Notify the dispatch center of your position.
- Change to incident frequencies.

- Give 12-mile radio call to aerial supervision. Give your distance and cardinal direction from incident, and altitude.
- Obtain clearance into FTA by getting:
    1. Altimeter setting
    2. FTA Entry Altitude
    3. Altitude of aerial supervision
    4. Altitudes of other aircraft
    5. Airspace Hazards
- Notify the dispatch center you have positive communication with the incident aerial supervision, and are switching to local flight following.
- Enter the incident airspace as directed.
- Watch for other aircraft and call out a distance and clock reference when you spot the on scene aerial supervision.
- Contact IC/ground personnel and confirm objectives and priorities.

<u>Scenario 2: Aerial Supervision is Not on Scene, but Other Aircraft Are</u>

- Notify dispatch of your position.
- Change to incident frequencies.
- Give 12-mile blind radio call on the assigned air-to-air frequency. Give your call sign, distance and cardinal direction from incident, altitude, and intentions. An on scene aircraft should respond on the assigned primary air-to-air frequency.
- Obtain clearance into FTA by getting:
    1. Altimeter setting
    2. FTA clearance Altitude
    3. Altitudes and locations of other aircraft on scene
    4. Airspace Hazards
- Enter the incident airspace, as briefed with on scene aircraft.
- Watch for other aircraft and call out a distance and clock reference when you spot the on-scene aircraft.
- Get status of all on-scene aircraft (location, mission type, etc.)
- Call IC and get objectives and priorities.
- Notify dispatch you are on scene, in contact with on scene aircraft and the IC.
- Notify dispatch you are switching to local flight following when a ground contact has been established to perform flight following duties.

Scenario 3: There Are No Aircraft on Scene

- Give 12-mile call in the blind on the primary and secondary assigned air-to-air frequencies. Give your distance and cardinal direction from the incident, altitude, and intentions.
- Call the IC/ground personnel on the assigned FM air-to-ground frequency and verify no other aircraft are on scene.
- Proceed to the incident. Stay at or below 500’ AGL and watch for other aircraft.
- Call the IC/ground forces and establish objectives and priorities.
- Notify dispatch you are on scene, and in contact with the IC.
- Notify dispatch you are switching to local flight following when a ground contact has been established to perform flight following duties.

Standard Scripts (Adapted from Interagency Aerial Supervision Guide, PMS 505)

The following scripts are standardized procedures for Air Tactical Group Supervisors, Aerial Supervision Modules, Leadplane Pilots, Airtanker Coordinators, Air Tactical Pilots, Air Tactical Supervisors, Helicopter Coordinators, Helicopter Pilots, and Helicopter Managers.

Flight Following Departure Standard Script:

1. Tail Number or Designated Identifier
2. Identify Frequency
3. Departure location
4. Number onboard
5. Fuel on board
6. ETE
7. Destination
8. Confirm AFF

Example:

“Boise Dispatch, Helicopter six eight x-ray (68X) on National Flight Follow.”.

“Six eight x-ray, Boise Dispatch.”

“Helicopter six eight x-ray is off Boise, five on board, two-point five hours fuel, one hour and five minute ETE (Estimated Time En route) to the Blues Incident, confirm AFF.”

“Six eight x-ray, Boise dispatch copies and you’re positive AFF.”

“Six eight x-ray copies.”

Key points

- Identify yourself as Helicopter.
- State the frequency you are transmitting on.

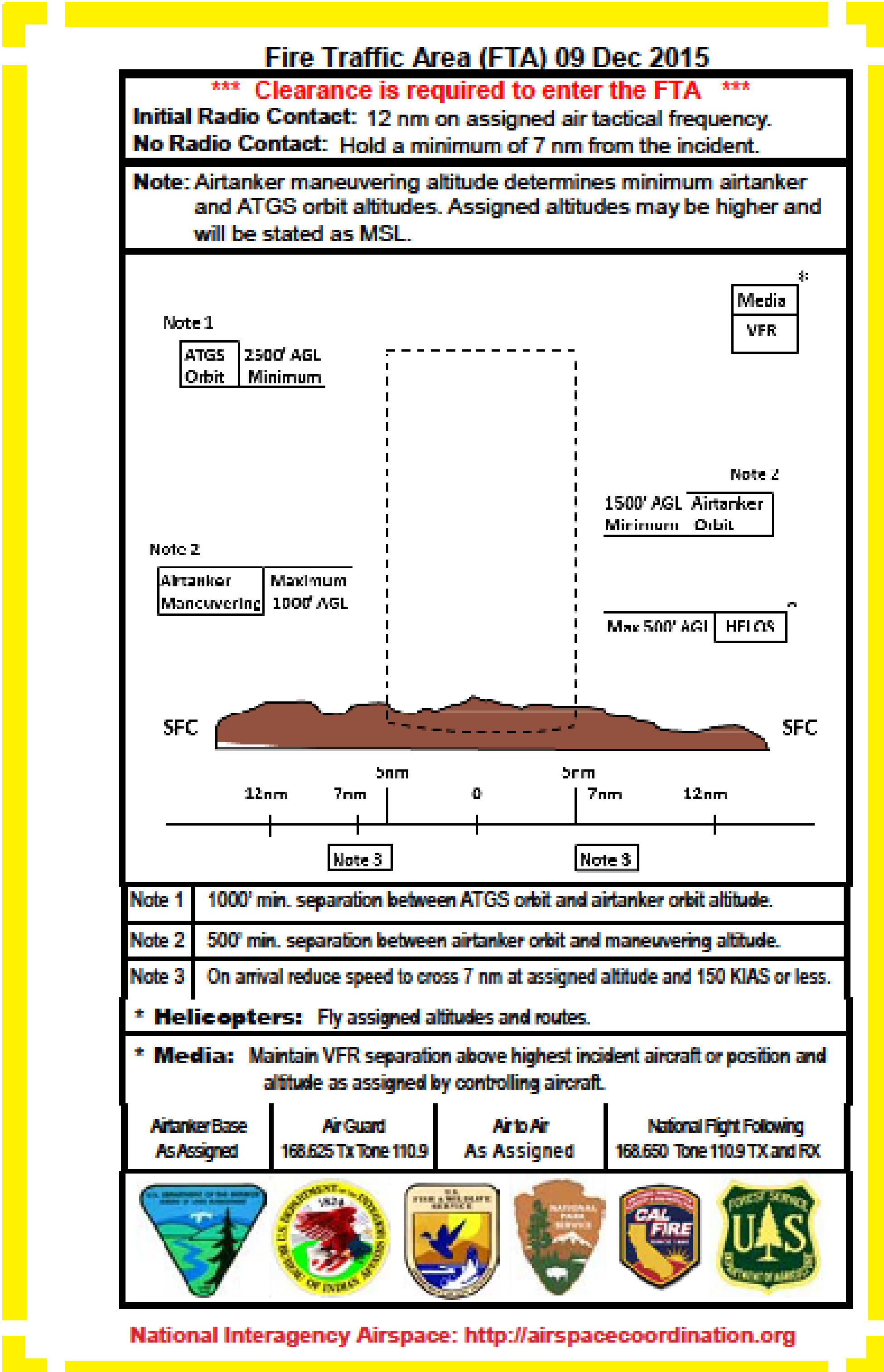
- It may be useful to state the full tail number when operating in areas with high fire activity or when operating outside of your typical dispatch zone.
- A heading or flight route may be useful to include should AFF not be in use, or when the flight path is not direct due to terrain, weather, en route recon, etc.

<u>FTA Calls in the Blind Standard Script:</u>

1. Receiving unit
2. Tail number or Designated Identifier
3. Distance and cardinal direction from incident.
4. Altitude
5. Intent
6. "Any traffic please advise."
7. Frequency

> Example:
>
> "Blues fire traffic, Helicopter six eight x-ray is twelve miles to the south-west, at five thousand five hundred feet (5500' MSL), inbound, any traffic please advise on one-two-two-point nine-two-five (122.925.)"

Exhibit 4.3 – Fire Traffic Area (https://www.nwcg.gov/sites/default/files/publications/pms505d_FTA-card-2015.pdf)



Chapter 05 – Vendor Personnel and Equipment Approval and Carding

Introduction

The DOI and the USFS inspect and approve vendor personnel and equipment for interagency use.

With the exception of life-threatening situations or undercover law enforcement missions, personnel must not fly with pilots or in aircraft that have not been approved.

Approval and Documentation Process

DOI and USFS accept and use each other's carded aircraft and pilots.

Each agency must have a contract or memorandum of understanding with the operator of the aircraft or an interagency agreement with the providing government agency before using an aircraft.

Interagency Carding

- Interagency Helicopter Pilot Qualification Card, OAS 30B/FS 5700-3A.
- Helicopter Data Card, OAS-36B/FS 5700-21a.
- Interagency Mechanic Qualification Card*
  *There are differences in the way agencies issue approval for mechanics.
- Helicopter Service Truck Data card.

DOI- and USFS approved inspectors complete annual inspections of the aircraft, pilots, mechanics, fuel service vehicles and associated equipment. The cards are valid for up to 12 months from the date of inspection. Extensions may be granted on a case-by-case basis.

Contingency Planning

Cooperating aircraft (other-government, military, and cooperator (civil) aircraft) and pilots will be inspected and approved for transporting Federal employees and/or working on interagency projects or fires. Upon approval, these aircraft, pilot, mechanics, and fuel service vehicles will not necessarily be carded, but must have documentation of approval for use. Letters of Approval are issued to cooperators and are approved annually by the appropriate USFS, Regional Aviation Officer or the DOI OAS Regional Director.

Most state and local agencies have a carding and approval process. They may also accept USFS or DOI carding. In certain cases, USFS and DOI accept state agency cards. Documentation and review of these approvals is mandatory prior to use.

Interagency and Procurement Document Standards

Minimum equipment and pilot standards for interagency helicopter operations are incorporated into procurement documents. Some procurement documents require additional equipment and/or pilot standards.

Aircraft, pilots, fuel service vehicles and mechanics may be approved for interagency use if they:

- Meet the current, approved MOU Interagency Fire Helicopter Standards. The MOU may be found at the following site http://www.doi.gov/aviation/library/index.cfm.

- Meet standards set forth in procurement document.
- Possess a current Interagency Helicopter Pilot Qualification Card or Letter of Approval.

Responsibility for Checking Carding or Approval Prior to Use

Prior to use, the approval documents for the pilot, helicopter, mechanic, and fuel servicing vehicle must be verified.

If any discrepancy is found during this process the flight must not proceed and the helicopter manager must call the scheduling office immediately.

Interagency Helicopter Pilot Qualification Card

Pilots are carded separately for airplane and helicopter operations. To be carded for special use missions, the pilot may be required to meet additional qualification requirements (for example, a specified number of hours in the low-level flight environment). See Exhibit 5.1.

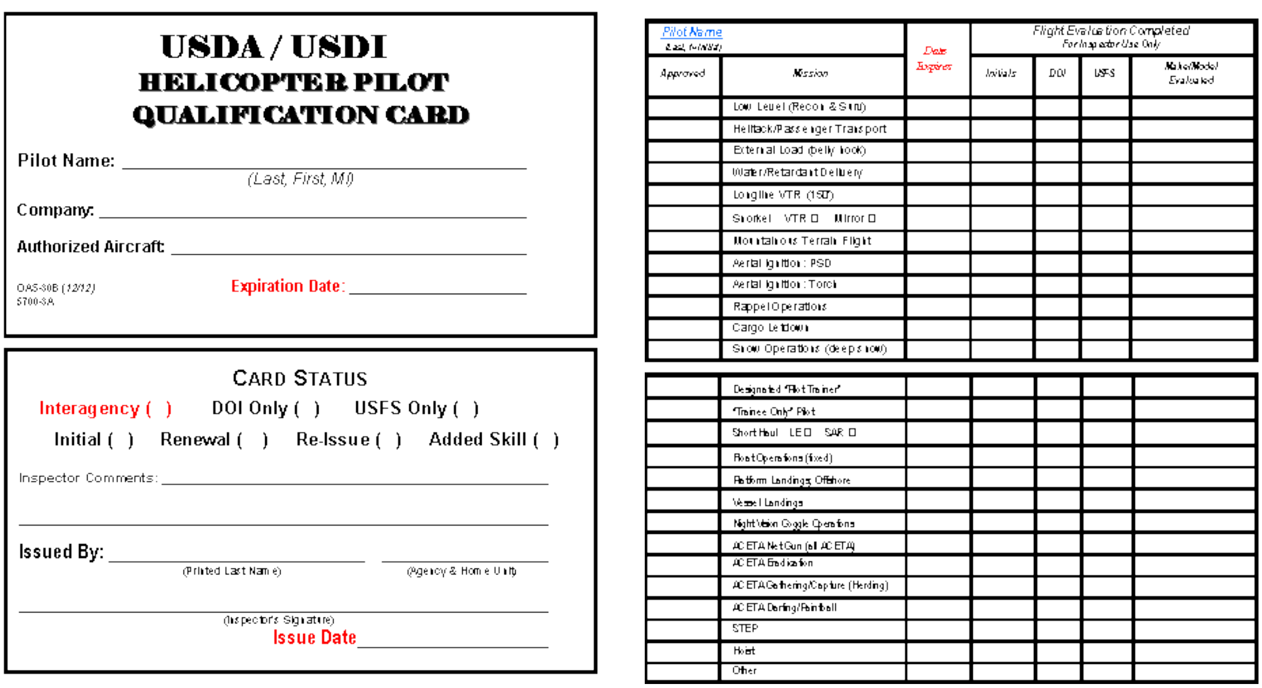
The pilot must have a current interagency card showing qualifications for the mission to be performed.

Field personnel, including the Contracting Officer’s administrative representative (COAR)/Contracting Officer’s Representative (COR) or Project Inspector (PI), do not have the authority to suspend or revoke a pilot’s card. Only the agency Contracting Officer or other agency-designated official may suspend or revoke the card.

Each qualification card has an expiration date which is the primary criteria for use of that pilot. However, this is not the only check necessary.

If the pilot is to be used for a special use mission, then that use must be noted with the inspector’s initial on the reverse of the card.

Exhibit 5.1 – USDA/USDI Helicopter Pilot Qualification Card.



USDA / USDI
HELICOPTER PILOT
QUALIFICATION CARD

Pilot Name: ____________________
(Last, First, MI)

Company: ____________________

Authorized Aircraft: ____________________

OAS-30B (12/12)
5700-3A

Expiration Date: ____________

CARD STATUS

Interagency ( ) DOI Only ( ) USFS Only ( )

Initial ( ) Renewal ( ) Re-Issue ( ) Added Skill ( )

Inspector Comments: ____________________

Issued By: ____________ ____________
(Printed Last Name) (Agency & Home Unit)

____
(Inspector's Signature)

Issue Date ____________

Pilot Name (Last, First, MI)		Date Expires	Flight Evaluation Completed For Inspector Use Only			
Approved	Mission		Initials	DOI	USFS	Make/Model Evaluated
	Low Level (Recon & Surv)					
	Helitack/Passenger Transport					
	External Load (belly hook)					
	Water/Retardant Delivery					
	Longline VTR (150')					
	Snorkel VTR ☐ Mirror ☐					
	Mountainous Terrain Flight					
	Aerial Ignition: PSD					
	Aerial Ignition: Torch					
	Rappel Operations					
	Cargo Letdown					
	Snow Operations (deep snow)					
	Designated “Pilot Trainer”					
	“Trainee Only” Pilot					
	Short Haul LE ☐ SAR ☐					
	Float Operations (fixed)					
	Platform Landings Offshore					
	Vessel Landings					
	Night Vision Goggle Operations					
	ACETA Net Gun (all ACETA)					
	ACETA Eradication					
	ACETA Gathering/Capture (Herding)					
	ACETA Darting/Paintball					
	STEP					
	Hoist					
	Other					

Helicopter Data Card

The aircraft must have a current interagency card showing that the aircraft has been inspected and approved for the mission(s) to be performed. Remember that use of other government, military, and cooperator (civil) aircraft requires agency approval, but the aircraft may not necessarily be carded.

Exhibit 5.2 – Helicopter Data Record.

FS-5700-21a, Part 2 (12/2011)
OMB 0596-0015

USDA - Forest Service **INTERAGENCY FIRE** **HELICOPTER DATA RECORD** ***(Reference FSH 5709.16)***	1. Contract/Rental Agreement No.	
	2. Item No.	
	3. Designated Base	
	4. Region/Area	

SAMPLE

SECTION I - Operator & Aircraft Information (Fill in Blanks)

1. Operator	2. Address (Street, City, State & ZIP Code)			
3. Phone No.	4. Make and Model	5. FAA Registration No.	6. Manufacturer's Serial No.	7. Hobbs Reading
8. Max Gross Weight *(Internal)*	9. Max Gross Weight *(Ext.)*	10. No. of Passengers	11. Type Fuel Jet A	12. Fuel Flow (Cruise) G.P.H

FOR CURRENT EQUIPPED WEIGHT CHECK WEIGHT & BALANCE DATA IN AIRCRAFT FLIGHT MANUAL

13. Authorized Uses (Initial appropriate boxes)
(Line Through Unapproved Uses)

Expires (Fill in the Blank)
(Month/Year)

2015

a.	Passenger & Cargo	h.	*Fire Suppression - Interagency*	o.	Approved for Left Seat Ops
b.	Low Level Reconnaissance	i.	*Fire Suppression - Local*	p.	Approved MEL MMEL *Rev No* (D95)
c.	Cargo Only *(Restricted Category)*	j.	*Water/Retardant Bucket*	q.	Other
d.	External Load *(Sling)*	k.	*Fixed Tank Tank No.(*)	r	Other
e.	Rappelling	l.	*Longline/Remote Hook*	s.	Other
f.	Aerial Ignition	m.	*Rapid Refuel* *CCR* Splash	t.	Other
g.	~~Manager May Ride (Type 1 ONLY)~~	n.	Air Attack Type( )	u.	Other

14. Approved By *(Signature)*	15. Title Aircraft Inspector	16. Region	17. Date

electronically signed: ← *Card with electronic signature* ***invalid*** *without date stamp* 4.0

Mechanic Qualification Card

The mechanic must have a current FAA mechanic certificate with airframe and power plant ratings. DOI and USFS policies differ regarding carding of mechanics.

USFS Procedure.

Mechanics on USFS Exclusive-Use and CWN procurement agreements must have an Interagency Mechanic Qualification card.

DOI Procedure.

Mechanics on DOI exclusive-use procurement agreements are approved by name on an Inspection Report, OAS-68 (https://www.doi.gov/sites/doi.gov/files/uploads/oas-68.pdf). Depending upon whether or not they have also been approved on a USFS contract, they may or may not possess a Mechanic Card. The lack of a card does not preclude the mechanic from functioning as such on a USFS incident, provided the aircraft is operating under a DOI procurement agreement.

Exhibit 5.3 – Interagency Mechanic Qualification Card

USDA – INTERAGENCY – USDI
MECHANIC QUALIFICATION

NAME ______________________________
COMPANY ______________________________
CONTRACT NO. ______________________________
CARD EXPIRATION DATE ______________________________
ISSUED BY ____________________ UNIT __________
DATE ______________________________

QUALIFICATIONS

AIRCRAFT	INSPECTOR INITIALS

ENGINE	

Service Truck Data Card

For interagency fire helicopters, helicopter service trucks operating under procurement agreement are inspected and carded by DOI and USFS. The inspection sticker should be located on or in the vehicle in a conspicuous location. It is the Helicopter Manager's or Flight Manager's responsibility to ensure that the service truck has a valid, current inspection sticker. Per the procurement document, the fuel truck driver should perform daily and weekly checks on fuel quality, using vendor formats.

See Chapter 13 for further information.

Exhibit 5.4—Interagency Data Card Service Truck.

INTERAGENCY DATA CARD
FUEL SERVICE VEHICLE

SAMPLE

CONTRACTOR			
ADDRESS			
TYPE VEHICLE			
LICENSE NO.		UNIT #	
CAPACITY GAL.		FUEL TYPE	Jet A
ARA #		EXP.DATE	
CONTRACT #		EXP.DATE	
CONTRACT #	Any USFS	EXP.DATE	
APPROVED BY			
DATE:		REGION/AREA	

Aircraft Fuel Facility Inspection and Carding

Helicopter fuel facilities, operated by the government or for which a vendor is responsible but are located on government lands, must be inspected regularly by DOI or USFS personnel. Document the inspection via Aircraft Fuel Facility Inspection Log, Helicopter Management (HCM)-3. See Appendix A and Chapter 13 for additional information.

Depending on agency policy, an inspection sticker for the facility may be issued. The sticker should be located in an area secure from the elements. A copy of the inspection must also be maintained by the local unit responsible for the facility.

Chapter 06 – Helicopter Capabilities and Limitations

Introduction

It is essential that non-pilot users of helicopters have a basic knowledge of helicopter capabilities and limitations. Users are encouraged to extend this knowledge further by engaging in conversations with Pilots or other subject matter experts.

On any flight, the Pilot is responsible for the safety of the aircraft and its occupants.

The user should be familiar with terms used in this chapter including:

- Allowable payload.
- Center of gravity.
- Cruise speed.
- Density altitude.
- Equipped weight.
- Fixed weight reduction.
- Fuel consumption/capacity.
- Hover ceiling.
- Hover ceiling-in-ground effect (HIGE).
- Hover ceiling-out-of-ground effect (HOGE).
- Maximum certificated gross weight.
- Maximum computed gross weight.
- Operating weight.
- Pressure altitude.
- Takeoff and landing limitations.
- Weight and balance.

For a basic explanation of the principles of helicopter flight, capabilities, and limitations, the user may want to refer to the Basic Aviation Safety, a DOI OAS publication, https://www.iat.gov/docs/2013_Basic_Aviation_Safety.pdf.

Helicopter Performance and Selection

In order to safely and successfully complete a mission, the helicopter must be capable of meeting the performance required. Allowable payload, hover ceiling, airspeed, and fuel requirements need to be considered in selecting the proper aircraft.

Chapter 7 and Appendix A address the specifics of the helicopter load calculation form, which is the primary planning tool for determining if the helicopter is capable of lifting a load at a given temperature and elevation.

Exhibit 6.1 summarizes the minimum specifications for the typing of helicopters by allowable payload, number of passenger seats, and water or retardant carrying capability. When a helicopter is referred to by type, for example, a Type 2 helicopter, it must have met the minimum specifications outlined in the exhibit for a Type 2 helicopter.

Exhibit 6.1 – ICS Type Specifications for Helicopters.

Attributes	Type 1	Type 2	Type 3
Useful load at 59°F at sea level	5,000 pounds	2,500 pounds	1,200 pounds
Passenger seats	15 or more	9-14	4-8
Retardant or water carrying capability	700 gallons	300 gallons	100 gallons
Maximum gross takeoff/landing weight	$12{,}501^{+}$ pounds	6,000-12,500 pounds	Up to 6,000 pounds

Weight and Balance

Weight and balance information is kept in each aircraft flight manual or weight and balance book. This information includes:

- Equipped weight of aircraft, as configured.
- Passenger configurations.
- Cargo weight and distribution limits.
- Center of gravity (CG) limits, as configured.
- Maximum takeoff and landing limits.
- Charts for computing weights and CG location.

High Density Altitude

At high density altitude, helicopter performance is decreased. The combination of temperature, humidity and pressure altitude formulate the makings of density altitude. The two factors that create concerns for high density altitude performance are high elevations and high temperatures. High density altitude operations include, but are not exclusive of, locations of high elevation.

Performance of the aircraft due to high density altitude will be less than aircraft performance at lower elevations and temperatures. Aircraft capabilities/limitations must be considered when ordering resources for anticipated high density altitude missions. Changes in performance include:

- The allowable payload will be reduced.
- Increased turnaround time for delivery of water/retardant drops.
- With bucket/tank operations, the reduction in water volume may not allow penetration of any significant canopy and reduce drop effectiveness due to wind drift.
- The aircraft’s responsiveness will be affected and the Pilot must anticipate (stay ahead of) the aircraft flight control inputs.

- The high density altitude and variable wind are going to greatly reduce the helicopter's ability to safely slow down to below Effective Translational Lift (ETL) airspeed.
- Hovering spot drops should be avoided.in areas with high density altitude.

Day/Night Flight Limitations

Day Visual Flight Rules (VFR) Only.

Except as noted below, or for reasons of life-or-death emergency, single-engine helicopters must be limited to flight during daylight hours and only under VFR conditions (minimum ½ mile visibility). Daylight hours are defined as 30 minutes before official sunrise until 30 minutes after official sunset or, in Alaska, during extended twilight hours when the terrain features are readily distinguishable for a distance of at least one mile.

In mountainous or hilly terrain, compounded by the aspect of the terrain in relationship to the sun's position, one may experience late dawn or early dusk conditions. Flight periods should be adjusted accordingly. Daylight hours may be further limited at the discretion of the pilot or Helicopter Manager by conditions of visibility caused by smoke, shadows, etc.

Authorization for Night Flying Operations

Night operations are unique and require agency authorizations.

Basic VFR Weather Minimums - FAR 91.155 establishes minimum operating conditions. The following operational weather minimums are required for normal night operations and recommended for helicopters performing emergency night operations.

Night in Class G airspace 1,200 feet or less above the surface:

- A helicopter may be operated clear of clouds if operated at a speed that allows the Pilot adequate opportunity to see any air traffic or obstruction in time to avoid a collision.
- FAR Part 135.205 states the visibility must be a minimum of one mile.
- Night in Class G airspace more than 1,200 feet above the surface but less than 10,000 feet MSL:
- Three (3) statute miles flight visibility.
- Distance from clouds: 500 feet below, 1,000 feet above, 2,000 feet horizontal.

Tactical Night Operations

Helicopters may fly during nighttime hours provided they are equipped with approved Night Vision Goggle (NVG) capability and the Pilots are approved for NVG operations. NVG helicopter operations must be conducted within agency NVG operational guidelines.

Logistical Operations

Pilots may operate at night under the following conditions:

- Agency and contract Pilots may, with agency-specific approval, solo-pilot single-engine helicopters at night for ferry and maintenance purposes.
- Transportation of passengers at night in a single-engine helicopter is prohibited.

- Agency and contract Pilots may, with agency-specific approval, fly twin-engine helicopters at night for ferry, transportation of passengers, and maintenance purposes.
- Conduct all night helicopter operations, other than NVG operations, in one of the following ways:
- To and from airports and heliports having FAA-approved lighting.
- To and from airports and helibases approved by the regional or state aviation manager.

Emergency Operations

The principles and procedures of risk management and analysis outlined in Appendix G must be applied to any decision regarding conducting a nighttime emergency operation, particularly those conducted in adverse conditions of fog, mountainous terrain, etc.

Pilot-in-Command Authority. For single and twin-engine night operations under emergency life-or-death criteria, final authority for the safety of the flight resides with the Pilot.

Instrument Flight Rules (IFR) Flight Limitations

IFR operations are authorized in multi-engine helicopters that are certificated for IFR operations when the aircraft and Pilot are approved and carded.

Flights into IFR conditions must be conducted only when weather minimums meet or exceed those prescribed in 14 CFR 135 for helicopter IFR operations.

Wind Restrictions

The capability to fly a helicopter in excessive wind conditions varies considerably with the weight class of the helicopter and the degree of turbulence associated with the wind. If the helicopter flight manual or the helicopter operator's policy does not set lower limits, the limits listed in Exhibit 6.2 must be used. These limits may be further restricted at the discretion of the Pilot or other air operations personnel.

Exhibit 6.2 – Flight Permitted in Winds Less Than/Maximum Gust Spread in Knots, by Helicopter Type.

Distance Above Ground Level (AGL)	Type 1 (Heavy) Helicopter	Type 2 (Medium) Helicopter	Type 3 (Light) Helicopter
More than 500' AGL	50/NA	50/NA	50/NA
Less than 500' AGL	40/15	40/15	30/15

Helicopter Operating in Snow-Covered Areas.

Helicopters may have manufacturer limitations for operating in falling or blowing snow and could require additional equipment to be installed such as engine snow baffles, auto-re-ignition, engine filtration, etc. "Bear paws" or "full length skis" are needed in deep snow. The aircraft flight manual must be reviewed to determine specific requirements and/or limitations. Regardless of snow depth, extra caution is required when operating in areas of freshly fallen snow due to possible whiteout conditions, created by the rotor wash, which could result in the loss of positional awareness.

Special pilot techniques are required for safe operations when landing in 36 inches or more of undisturbed or crusted snow (not hard packed) in most light and medium helicopters that are equipped with high skid gear. Snow depths that are substantially less than 36 inches may require special pilot techniques when operations are conducted in models equipped with standard (low) height skid gear. Failure to use special operating techniques can be catastrophic if the tail rotor contacts the snow surface. Dynamic rollover is also possible. In addition, special passenger entry and exit procedures are required when operating in these conditions.

Pilots are required to have a "deep snow" endorsement on their Interagency Helicopter Pilot Qualification Card when operating over snow-covered areas where the depth and condition of the snow could pose a threat to safe operation during the takeoff and landing phases of flight. If the snow depth is unknown, but suspected to be in excess of 18 inches deep, the Pilot should be approved for deep snow operations.

It is difficult to specify a specific snow depth that defines the need for a deep snow endorsement on an Interagency Helicopter Pilot Qualification Card. If defined as the snow depth at which the entire weight of the helicopter is supported by snow only and no portion of the skids or wheels contacts the ground, the depth of the snow that may create that landing hazard to a Robinson R-44 may be different for a Sikorsky S-64. In addition, snow consistency may impact the need of a deep snow endorsement. For example, although a Pilot may land on 5,000 feet of undisturbed snow on Antarctica's polar cap, he or she would have difficulty having skids penetrate the surface more than a few inches due to hard packed snow, thus not requiring a deep snow endorsement.

To ensure safety, please contact an agency helicopter inspector pilot if there are questions or concerns.

Helicopter Flight Over Congested and Densely Populated Areas

Whether a helicopter may operate over congested and/or densely populated areas pursuant to the FARs depends on the type of operation being performed.

With respect to external load operations, the FAA has determined that such operations are in the public interest and do not pose an undue risk to the public, as long as risk management principles are implemented.

Specifically, the FARs permit an operator to conduct external load operations over congested and densely populated areas provided the following conditions are met. Each flight must be conducted at an altitude, and on a route, that will allow a jettisonable external load to be released, and the rotorcraft landed, in an emergency without hazard to persons or property on the surface. However, in the event of an emergency involving the safety of persons or property, a Pilot may deviate from the rules to the extent required to meet that emergency.

Densely populated areas are those areas of a city, town or settlement that contain a large number of structures or a large gathering of persons, such as on a beach, air show, sporting event or roadway. Helicopters may conduct external load operations over roadways as long as the Pilot is able to remain clear of nonparticipating personnel. Mitigations may include:

- See and avoid.
- Traffic control using road guards (coordinate with appropriate authorities).
- Closure of road.

Ensure that areas for load jettisoning, emergency landings, ingress and egress routes and a means to reduce the threat to the nonparticipating public are communicated. The last item is most important since the presence of a helicopter conducting an external load operation is likely to draw spectators and other unnecessary personnel to the scene.

Supplemental Oxygen Requirements

Supplemental oxygen may be required when operating above 10,000 feet for more than 30 minutes. Consult the procurement document and technical specialists for specific requirements. Reference FAR Part 91.211 or Part 135.89 for, located at http://www.ecfr.gov/cgi-bin/text-idx?node=14:2.0.1.3.10.

Lockdown of Controls

Specific direction may be provided by the procurement document regarding the lockdown of controls.

In general, when trained ground or aircrew personnel are available to assist in loading and unloading, the Pilot should remain at the controls when the rotors are turning.

When these personnel are not available to assist, whenever practical, the aircraft should be shut down and rotors stopped prior to departure of passengers and Pilot.

It is recognized that there are certain situations when personnel are not available and which may require the Pilot to lock down the controls (flight idle with controls locked). An example is the Pilot needing to check that the doors are secure. In these cases, if allowed in the approved flight manual, the Pilot may lock down the controls but should not leave the area of the rotor arc.

Military Helicopter Limitations

- The use of military aircraft must comply with the requirements established in the *National Interagency Fire Center, Military Use Handbook* located at https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf. Military helicopters and flight crews, including National Guard and Coast Guard, must be agency-approved by letter or card. A copy of this letter must be available.
- Military performance planning cards (PPC) may be used, at the discretion of military pilots, in lieu of the load calculation form.
- Helicopter management personnel should be aware that military radios may not be compatible with operation radios and should be checked prior to use.
- Military helicopters might not be configured to carry cargo. If they are, use military external load equipment, provided it meets military safety standards.

For further information, refer to the *National Interagency Fire Center, Military Use Handbook* or local agreements with military authorities such as the National Guard.

Chapter 07 – Helicopter Load Calculations and Manifests

Introduction

Interagency Helicopter Load Calculation form (OAS-67/FS 5700-17) must be completed for all flights to ensure that the helicopter will perform within the limitations established by the helicopter manufacturer, without exceeding the gross weight for the environmental conditions where the helicopter is to be operated. Additionally all loads must be manifested either on the load calculation form or on a manifest form. See Appendix A for examples.

The user needs to become familiar with a number of terms in this section, including:

- Allowable payload.
- Center of gravity.
- Cruise speed.
- Density altitude.
- Equipped weight.
- Fuel consumption/capacity.
- Gross weight limitations.
- Hover ceiling.
- Hover ceiling in-ground effect (HIGE).
- Hover ceiling out-of-ground effect (HOGE).
- Maximum certificated gross weight.
- Maximum computed gross weight.
- Operating weight.
- Pressure altitude.
- Takeoff and landing limitations.
- Useful load.
- Weight and balance.
- Weight reduction.

For a basic explanation of the principles of helicopter flight, capabilities, and limitations, the user may refer to FAA-H-8083-21 *Rotorcraft Flying Handbook* located at https://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/media/faa-h-8083-21.pdf .

Important points to remember include:

- Environmental conditions aside from those of temperature and altitude may affect allowable payload. One example is the effect of wind on certain Bell models. Some performance charts are designed for no-wind conditions.
- Performance charts are predicated on the helicopter engine(s) meeting the engine manufacturer's specific torque values as determined by helicopter turbine engine power checks.

- Errors, high or low, may result when plotting the maximum computed gross weight on the helicopter performance chart. Use of enlarged copies of charts is recommended to reduce errors.
- Structural limitations such as maximum skid weight, as opposed to performance limitations, may cause confusion. Ensure that personnel understand the difference between these limitations.

Agencies Not Using the Interagency Helicopter Load Calculation Form

When aircraft from agencies which do not use the form are operating on an incident or project managed by an agency for which the form is required, then the load calculation must be used for all non-DoD helicopters operating on the incident or project.

Conversely, when helicopters from an agency requiring its use are operating on incidents managed by an agency which does not require the load calculation, the load calculation form must be used for all helicopters operated by or under the control of agencies requiring its use.

Furthermore, agency personnel for whom use of the load calculation is required may not ride aboard helicopters managed or controlled by agencies not using the load calculation unless specifically authorized.

Cooperator (Civil) and Other Government Agency Helicopters

When employees from agencies that mandate use of the load calculation form are riding on civil, corporate or other-government agency aircraft in non-revenue status, the form must be used.

Military Helicopters

When using military helicopters, a similar load calculation system such as the PPC method is authorized.

For aviation operations using Active Duty/Reserve Military helicopters, and National Guard units officially federalized by the DoD, refer to Chapter 70 of the *National Interagency Fire Center, Military Use Handbook*, https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf, 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.

Restricted Category or Limited Use Helicopters

Load calculations must be completed for all flights. The same rules apply as those for standard category helicopters regarding omitting the weight reduction for external, jettisonable loads, provided the Pilot concurs.

Responsibility for Completion of Load Calculations

Pilot

It is the Pilot's responsibility to complete the load calculation, including computing the allowable payload.

The Pilot must utilize the applicable charts in the aircraft flight manual, referencing them each time a load calculation is initiated. The Helicopter Manager is responsible for ensuring that the Pilot does this.

The Pilot must check or be informed of any subsequent passenger/cargo manifested weights completed under the initial load calculation to ensure allowable payloads are not exceeded.

Government Representative

The government representative is responsible for providing an accurate passenger/cargo manifest weight that does not exceed the allowable payload based on current conditions. The government representative is responsible for checking the load calculation to ensure accuracy and completeness.

The government representative should participate in the completion of load calculations. However, the Pilot is ultimately responsible for content accuracy.

Mutual Responsibility

After completion of the Interagency Helicopter Load Calculation form, the Pilot and Government Representative must sign the form.

Determining Load Capability Using Appropriate HIGE/HOGE Aircraft Performance Charts

General Requirements

With the exception noted for military helicopters, all helicopter flights require a load calculation/performance determination prior to takeoff.

Automated Helicopter Performance Planning may be used with agency approval. If an electronic format is used, the form must be printed, signed by the Pilot and government representative and retained.

Appendix A provides instructions for completion of form HCM-10, Helicopter Load Capability Planning Summary – Multiple Helispots and Fuel Loads. Use of this format is for planning purposes only.

Specific Requirements

Frequency of Completion

A load calculation will be completed daily. One load calculation is valid between points of similar elevation, temperature, and fuel load.

- Completion of a new load calculation is required when there is a change of:
    - +/- 5 degrees Celsius in temperature, or
    - +/- 1,000 feet change of altitude, or
    - Helicopter Equipped Weight
    - Flight Crew Weight.

Other qualified use of load calculations or manifests

A change in the fuel load at the same temperature and elevation changes aircraft performance. In order to use changes in allowable payload resulting from fuel burn, the current fuel load must be communicated from the pilot. This change in fuel load must be documented on either a load calculation or manifest form.

The manifest includes a second set of LBS, Fuel, Pressure Altitude (PA), outside air temperature (OAT) and HIGE/HOGE/HOGE-J as a means to use the fuel burn to adjust allowable payload.

Helicopter Managers must ensure the actual load does not exceed allowable payload from the load calculation for the HIGE/HOGE/HOGE-J conditions anticipated.

Routing and Filing

Incident. The Helicopter Manager is responsible for submitting copies of all load calculations and manifests to the Helibase Manager or Incident Commander. These copies become part of the incident file.

Project. The Helicopter Manager is responsible for submitting all load calculations and manifests to the Unit Aviation Manager or designee.

Determining Pressure Altitude

Pressure altitude can be determined by using the aircraft altimeter's Kollsman Window. Adjust it to read 29.92 inches of mercury (HG) and read the pressure altitude directly off the altimeter.

For locations where the helicopter or an altimeter setting is not available, altitude can be estimated by using a GPS, map, bench mark, signs, etc.

> If elevation is used to estimate pressure altitude, actual pressure altitude should be obtained as soon as possible.

Determining Temperature

Temperature can be determined by:

- On-site thermometer.
- Weather stations.
- Fixed-Base Operator (FBO) or Flight Service Station (FSS).
- Aircraft outside air temperature (OAT) gauge. The OAT gauge may show a higher than actual temperature due to direct sunlight and radiant heat.
- Using the standard adiabatic lapse rate of 2° C (or 3½° F) per 1,000 feet from a known temperature and elevation. This is only accurate if it is a standard day. When an atmospheric inversion exists, temperatures may actually increase at higher elevations.

Determining Helicopter Equipped Weight

The helicopter equipped weight is obtained from the Pilot and by checking the aircraft weight and balance form in the approved flight manual.

Determining Flight Crew Weight

This is the weight of Pilot(s), plus personal gear and flight gear.

Determining Fuel Weight

The actual weight of a gallon of aircraft fuel may vary slightly. For computation purposes, the following weights should be used.

- AvGas = 6.0 pounds/gallon
- JetFuel = 7.0 pounds/gallon

Operating Weight

This is the sum of the helicopter's equipped weight, flight crew weight, and fuel weight.

Maximum Computed Gross Weight

In order to safely operate a helicopter at varying altitudes and temperatures, the helicopter's performance capability must be determined. This is done by referring to the performance charts provided with helicopter flight manuals. The Maximum Computed Gross Weight is obtained from the appropriate performance charts.

A list of the appropriate charts can be obtained from agency aircraft inspectors for all helicopters used by the agency. Helicopter flight manuals often contain many different performance charts. These charts provide HIGE and HOGE information. Care should be taken to ensure Pilot use of the proper chart(s). Charts differ for:

- The specific equipment configuration of the helicopter, such as skid height, particle separators on/off, with/without cargo hook or floats, and other equipment configurations.
- Conditions such as anti-ice on/off, critical wind azimuth, etc.
- Environmental temperature ranges.

Current aircraft configuration and temperature range must match with the correct performance chart.

Performance enhancing data (helicopter turbine engine power checks, fleet average or charts that take advantage of prevailing winds, etc.) shall not be used. Only Charts based on manufacturer's minimum specification engine performance shall be used.

With agency approval the operator may use computer programs for performance planning in lieu of flight manual performance charts if the FAA has approved them in the company's operating specifications. Reference the procurement document for specific details.

For helicopters with Weight Altitude Temperature (WAT) charts or other weight reducing limitations listed in the Limitations Section of the applicable flight manual or supplement: Line 10 of the Interagency Helicopter Load Calculation Gross weight Limitation must reflect the applicable limitations as specified in the flight manual or supplement.

For helicopters without applicable flight manual weight limitations: the applicable performance and associated control margin charts are to be considered limitations for the purpose of Line 10 of the Interagency Load Calculation.

Performance Enhancement Charts (Also Called "Wind Charts") That Attempt To Take Advantage Of Prevailing Winds Are Not Authorized.

For the majority of operations, the manufacturer's performance charts provide the needed information. However, in some unusual circumstances such as hot and high conditions, this may not be the case. It is important to understand that an altitude line may not be extended (that is, extrapolated out) to intersect a temperature line in order to complete a load calculation. Such a practice would allow the helicopter to be operated in an area for which the manufacturer has not provided performance information.

If Performance Capability Cannot Be Determined Using Manufacturer Data, Then The Mission Must Not Be Flown.

HOGE charts should be used to calculate allowable weight for internal loads when the destination is unknown or is known to be a HOGE site. Ground effect will dissipate over rough, sloped, or vegetated ground. Since there is nothing precise about ground effect, power requirements (load capability estimates) should always be conservative. If the helicopter is inadvertently loaded for HIGE and the landing site requires HOGE capability, the aircraft may settle and possibly crash if the Pilot attempts the landing.

Caution should be used when identifying HIGE helispots/helibases. At a minimum the following considerations must be met prior to committing to landing or taking off HIGE. Pilots and flight crew must review load calculations and ensure the environmental parameters are correct. Additionally the crew must be familiar with the criteria in the applicable performance charts for HIGE payload. Typical charts are based on a five foot or less hover over smooth, level, flat surfaces and may require low level flight outside the normal safety circle. Lastly, if there is any doubt as to the suitability for HIGE operations, use HOGE.

Fixed Weight Reduction

The Fixed Weight Reduction is required for all non-jettisonable loads. The Fixed Weight Reduction is optional (mutual agreement between Pilot and Helicopter Manager) when carrying jettisonable loads (HOGE-J) where the Pilot has total jettisonable control. The appropriate weight reduction value for make and model can be found in the current helicopter procurement document.

All internal loads will be downloaded in accordance with the weight reduction chart. For external, jettisonable loads, the government representative may suggest the omission of the fixed-weight reduction. However, the final decision will be made by the Pilot if he or she decides it would be prudent to do so.

If the weight reduction is omitted for external, jettisonable loads, a load calculation reflecting this must be completed.

Gross Weight Limitations

Enter applicable gross weight limit from Limitations Section of the basic Flight Manual or the appropriate Flight Manual Supplement. This may be Maximum Gross Weight Limit for Takeoff and Landing, a Weight/Altitude/Temperature (WAT) limitation or a Maximum Gross Weight Limit for External Load (jettisonable). Limitations may vary for HIGE, HOGE and HOGE-J.

Do not use a limitation (for example, maximum skid weight) when determining the computed gross weight.

Alternatives When Conditions at Destination Landing Site Are Unknown or Found to Be Different

Although HOGE should be used to calculate allowable weight the first time flying into an unknown landing site, in certain instances, particularly for initial attack where fuel and allowable load are pre-calculated each day, environmental conditions at the landing site may be more severe than were estimated on the load calculation.

Examples include a higher altitude or temperature than was anticipated, or a HOGE instead of a HIGE landing site. Another example is where an inversion exists, and the temperature actually increases instead of decreases at higher elevations. This often results in an over-gross-weight condition for the intended landing site. Wind speed and direction may also have a detrimental effect on aircraft controllability.

Takeoffs and landings, as well as external load operations, must never be attempted when the aircraft is not operating within its performance capabilities.

If an over-gross condition is anticipated prior to takeoff or at an intermediate stop, personnel and/or cargo must be off loaded to bring the aircraft to within its performance capabilities.

There are occasions (for example, fire initial attack dispatches) when a possible over-gross condition cannot be determined due to unknown winds and/or site conditions. After it is determined that conditions are such that performance limitations are exceeded, then a more suitable landing site, usually at a lower elevation, must be selected. A portion of the personnel and/or cargo are offloaded at the lower site, with the remaining load then taken to the original destination.

If a HOGE site is encountered at the destination, and if the aircraft would be in an over gross condition if a landing were attempted at the HOGE site, then either the alternative outlined in the paragraphs above must be chosen, or a HIGE landing site must be found.

Managing Helicopter Bucket Payloads

Helicopter bucket operations require attention to ensure that allowable payloads are not exceeded. Allowable bucket payloads must be calculated for current fuel loads and local environmental conditions. Bucket payloads can only be accurately determined if the bucket is filled to adjusted capacity or an onboard load meter is used.

The following procedures must be used for all bucket operations:

- Determine allowable payload using the load calculation method, appropriate HOGE helicopter performance charts and current local temperature and pressure altitude. Since buckets are external jettisonable loads, the weight reduction may be omitted from the load calculation process with pilot approval.

The following procedures must be used for all bucket operations except those using helicopters equipped with electronic helicopter hook load measuring systems (load cells) that provide cockpit readout of the external load weight and a bucket that is equipped with a gating system that allows partial loading of the bucket.

- At the beginning of the fuel cycle, adjust the bucket capacity so that the actual payload, when the bucket is filled to the adjusted capacity, does not exceed the allowable payload. Use 8.3 pounds per gallon of water. If mixed fire retardants are being delivered by bucket use the appropriate weight per gallon for that mixture. The weight of the empty bucket and any associated suspension hardware (lines, cables, connectors, etc.) must also be included in calculating the actual payload. The calculation of the actual bucket payload must be documented on the load calculation form or separate load manifest.

If the helicopter bucket provided by the contractor cannot be adjusted to the allowable payload for current, local environmental conditions, bucket operations must not be conducted. If this situation occurs, consult with the appropriate Contracting Officer to determine contractual ramifications and necessary actions.

- After the bucket has been adjusted so that the actual payload will be within the allowable payload, bucket operations may begin. The pilot will fill the bucket to the adjusted capacity each time (no partial dips for performance planning purposes).

There are many different manufacturers and designs of helicopter buckets. Capacity adjustments are made in various ways including electronic control from the cockpit, removing plugs, opening zippers or cinching collapsible/foldable buckets. Capacity at each position or adjustment level should be marked on the bucket. Collapsible buckets with cinch straps should only be adjusted to the marked graduations (such as 90 percent or 80 percent). Attempts to establish intermediate graduations or capacities below the manufacturer’s minimum graduation (such as tying knots) are prohibited as it results in estimated capacities and may interfere with the release mechanism.

Exhibit 7.1 – **Interagency Helicopter Load Calculation, OAS-67/FS 5700-17**

INTERAGENCY HELICOPTER LOAD CALCULATION AMD-67/FS 5700-17 (10/06)			MODEL	
			N#	
PILOT(S)			DATE	
MISSION			TIME	
1 DEPARTURE		PA	OAT	
2 DESTINATION		PA	OAT	
3 HELICOPTER EQUIPPED WEIGHT				
4 FLIGHT CREW WEIGHT				
5 FUEL WT (_____ gallons X _____ lbs per gal)				
6 OPERATING WEIGHT (3 + 4 + 5)				

	Non-Jettisonable		Jettisonable
	HIGE	HOGE	HOGE-J
7a PERFORMANCE REF (List page/chart from FM)			
7b COMP GROSS WT (FM Performance Section)			
8 WT REDUCTION (Req for all Non-Jettisonable)			
9 ADJUSTED WEIGHT (7b minus 8)			
10 GROSS WT LIMIT (FM Limitations Section)			
11 SELECTED WEIGHT (Lowest of 9 or 10)			
12 OPERATING WEIGHT (From Line 6)			
13 ALLOWABLE PAYLOAD (11 minus 12)			

14 PASSENGERS/CARGO MANIFEST	
15 ACTUAL PAYLOAD (Total of all weights listed in item 14) Line 15 must not exceed Line 13 for the intended mission.	
PILOT SIGNATURE	HazMat
MGR SIGNATURE	Yes ___ No ___

INSTRUCTIONS

A load calculation must be completed for all flights. A new calculation is required when operating conditions change (± 1000' in elevation or ± 5o C in temperature) or when the Helicopter Operating Weight changes (such as changes to the Equipped Weight, changes in flight crew weight or a change in fuel load).

All blocks must be completed. Pilot must complete all header information and Items 1-13. Helicopter Manager completes Items 14 and 15.

1. **DEPARTURE** – Name of departure location and current Pressure Altitude (PA, read altimeter when set to 29.92) and Outside Air Temperature (OAT, in Celsius) at departure location.
2. **DESTINATION** – Name of destination location and PA & OAT at destination. If destination conditions are unknown, use MSL elevation from a map and Standard Lapse Rate of 2o C/1000' to estimate OAT. Check the box in Line 1 (Departure) or Line 2 (Destination) to indicate the most restrictive values used to obtain Computed Gross Weight in Line 7b.
3. **HELICOPTER EQUIPPED WEIGHT** – Equipped Weight equals the Empty Weight (as listed in the Weight and Balance Data) plus the weight of lubricants and onboard equipment required by contract (i.e. survival kit, rappel bracket).
4. **FLIGHT CREW WEIGHT** – Weight of the Pilot and any other assigned flight crewmembers on board (i.e. Co-pilot, flight engineer, navigator) plus the weight of their personal gear.
5. **FUEL WEIGHT** – Number of gallons onboard X the weight per gallon (Jet Fuel = 7.0 lbs/gal; AvGas = 6.0 lbs/gal).
6. **OPERATING WEIGHT** – Add items 3, 4 and 5.

7a. **PERFORMANCE REFERENCES** – List the specific Flight Manual Supplement and hover performance charts used to derive Computed Gross Weight for Line 7b. Separate charts may be required to derive HIGE, HOGE and HOGE-J. HIGE: use Hover-In-Ground-Effect, External/Cargo Hook Chart (if available). HOGE & HOGE-J: use Hover-Out-Ground-Effect charts for all HOGE operations.

7b. **COMPUTED GROSS WEIGHT** - Compute gross weights for HIGE, HOGE and HOGE-J from appropriate Flight Manual hover performance charts using the Pressure Altitude (PA) and temperature (OAT) from the most restrictive location, either Departure or Destination. Check the box in Line 1 (Departure) or Line 2 (Destination) to indicate which values were used to obtain Computed Gross Weight.

8. **WEIGHT REDUCTION** – The Government Weight Reduction is required for all "non-jettisonable" loads. The Weight Reduction is optional (mutual agreement between Pilot and Helicopter Manager) when carrying jettisonable loads (HOGE-J) where the pilot has total jettison control. The appropriate Weight Reduction value, for make & model, can be found in the current helicopter procurement document (contract).
9. **ADJUSTED WEIGHT** – Line 7b minus Line 8.

10. **GROSS WEIGHT LIMITATION** – Enter applicable gross weight limit from Limitations Section of the basic Flight Manual or the appropriate Flight Manual Supplement. This may be Maximum Gross Weight Limit for Takeoff and Landing, a Weight/Altitude/Temperature (WAT) limitation or a Maximum Gross Weight Limit for External Load (jettisonable). Limitations may vary for HIGE, HOGE and HOGE-J.
11. **SELECTED WEIGHT** – The lowest weight, either line 9 or 10, will be entered for all loads. Applicable limitations in the Flight Manual must not be exceeded.
12. **OPERATING WEIGHT** – Use the value entered in Line 6.
13. **ALLOWABLE PAYLOAD** – Line 11 minus Line 12. The maximum allowable weight (passengers and/or cargo) that can be carried for the mission. Allowable Payload may differ for HIGE, HOGE and HOGE-J.
14. **PASSENGERS AND/OR CARGO** – Enter passenger names and weights and/or type and weights of cargo to be transported. Include mission accessories, tools, gear, baggage, etc. A separate manifest may be used.
15. **ACTUAL PAYLOAD** – Total of all weights listed in Item 14. Actual payload must not exceed Allowable Payload for the intended mission profile, i.e., HIGE, HOGE or HOGE-J. Both Pilot and Helicopter Manager must review and sign the form. Check if HazMat is being transported. Manager must inform the pilot of type, quantity and location of HazMat onboard.

Manifests

A listing of all passengers and cargo being transported is required for each flight. This may be accomplished on the Interagency Helicopter Passenger/Cargo Manifest, HCM-9 (https://www.nifc.gov/PUBLICATIONS/ihog/HCM_Forms/HCM-9.xls). Each manifested trip's actual payload must not exceed the allowable payload from the load calculation, unless changes in the fuel load have been communicated by the pilot and documented on the manifest.

Crews may provide a manifest using their own format and this practice is acceptable as long as the information on the form is accurate and verified.

The manifest must include:

- Helicopter #.
- Pilot Name.
- Time and Date.
- Departure and Destination.
- Pressure Altitude.
- Outside Air Temperature.
- Allowable Payload for HIGE/HOGE/HOGE-J.
- Hazardous Materials weight and location.
- Actual payload.
    - Full name of each passenger.
    - Weight of each passenger and personal gear.
    - Weight of additional cargo.

- Current fuel in pounds.

A copy of the manifest must remain at the departure base. If there are no personnel to receive manifests at the departure base and no verbal relay exists, a copy of the manifest must be left in a visible, easily accessible place.

Responsibility for Completion

It is the responsibility of the Helicopter Manager or other authorized individual to complete a manifest prior to each flight leg flown. It is the responsibility of the Pilot to ensure the actual payload on a manifest does not exceed the allowable payload.

Crews may provide a crew manifest using their own format. This practice is acceptable as long as the information on the form is accurate and verified.

Routing and Filing

Incident The Helicopter Manager is responsible for submitting copies of all load calculations and manifests to the Helibase Manager or Incident Commander. These copies become part of the incident file.

Project The Helicopter Manager is responsible for submitting all load calculations and manifests.

Chapter 08 – Helicopter Landing Areas

Introduction

The proper selection and construction of landing areas is essential to both the safety and efficiency of helicopter operations. Landing areas that are poorly located or constructed may contribute to or be the cause of an accident. At a minimum, inadequate areas heighten risk, increase Pilot workload, and result in inefficient operations.

This chapter establishes the requirements and specifications for helibases (permanent or temporary), helispots, and unimproved landing sites. Consult the *NWCG Glossary of Wildland Fire*, PMS 205, https://www.nwcg.gov/glossary/a-z, for definitions.

As clarification for when a helispot should be staffed, managed, and operated as a helibase, the general rule, as applied in this guide, is that when a site is used for more than one day as an operational base for two or more helicopters, it should be classified and operated as a helibase.

An unimproved landing site becomes a helispot when it is used on a recurring basis for the purpose of transporting personnel, cargo and/or medivac to or from the site. It should then be managed, improved to the extent necessary, and supplied with the appropriate equipment.

Helibases and helispots are used for both incident and resource missions. There is little or no difference between a helispot serving as a landing area for wildlife biologists and one being used to transport crews and supplies and or medivacs. Similarly, the helibase that serves as the aerial transportation focal point for a 50,000 acre fire could also have functioned as the helibase for a 200,000 acre aerial seeding project the year previous. Requirements for good planning and emphasis on safety and efficiency in operations remain the same.

Regardless of the size or complexity of an operation, there are sequential and logical steps which must be taken to achieve a safe, efficient operation and accomplish incident or project objectives. Items such as site selection, set-up and layout, operational phases, and demobilization must be considered for any helibase operation to be successful. The versatility of helicopters employed in natural resource operations, coupled with the wide variety of missions, adds to the complexity of helibase and helispot management.

The need to be flexible, as well as to anticipate and plan for most reasonable occurrences and contingencies, cannot be overemphasized.

Planning

Good planning prior to the start of a project or during the initial stages of an incident will contribute to safe, efficient operations. Conversely, poor site selection will hinder the management and adversely affect the safety of the operation.

Helibases can be relocated, but usually at great inconvenience and temporary disruption of operations. Good planning will prevent this from becoming necessary. However, do not hesitate to relocate if safety and/or efficiency can be improved.

The Helibase Manager's Reminders List, HJA-2, contains specific criteria to consider when selecting a helibase or helispot site.

- HJA-2 Section I should be reviewed during initial helibase site selection.

- HJA-2 Section II should be reviewed whenever a helispot is established.
- The selection of an area or areas on which to land the helicopter(s) is an important planning activity. When possible, the Pilot(s) should have input. The following general requirements should always be considered.
- The types of activity and volume of traffic will affect selection, as well as initial and later development of the landing area(s).
- The site should lend itself to economic and environmentally sensitive development to the size which will accommodate the type of helicopters and volume of traffic expected in both the short- and long-term. Anticipate future needs.
- Weather (potential for smoke or fog inversions, winds) plays a significant role in the location of facilities, both short- and long-term.

Site planning and construction of all sites, both permanent and temporary, must be in accordance with local agency land management policy.

Permanent Helibase

A careful study should be made of local, state, and federal laws, rules and regulations relating to construction of a permanent helibase. Site selection should provide for adequate approach and departure paths which avoid housing areas, schools, churches, and any other facilities that might be disturbed by low-flying helicopters.

Accommodation for Different Helicopter Types (Sizes)

All permanent facilities should, at a minimum, be built to accommodate one Type 2 (medium) helicopter.

Planning and Construction Specifications

The planning and construction of permanent helibases must be according to agency-specific and/or FAA policy and specifications, as well as applicable local, state, and federal regulations.

Temporary Helibases and Helispots

Helibase or helispot construction, especially in wilderness or similarly sensitive areas, can cause a double impact -- the impact of an abrupt or unnatural opening in the landscape, and the impact resulting from cut-faces of stumps and boles of trees or shrubs.

The area should not be considered as a landing site if it cannot be built to safe standards or negative environmental impacts cannot be mitigated. Minimum Impact Suppression Tactics (MIST) should be reviewed prior to construction in wilderness or sensitive areas. See Interagency Response Pocket Guide (IRPG), PMS 461.

Initial Planning

Project helibases and helispots can be adequately planned in advance of the project start.

Incident helibases and helispots are established and become operational in a very short time frame. The rapidity of incident response does not relieve the Helibase Manager or Helispot Manager from performing basic planning actions.

Upon arrival, the Helibase Manager should gather intelligence by obtaining maps from the dispatch office, talking to local inhabitants, flying a reconnaissance, reading the local aviation plan, etc.

Check with the local Resource Advisor to ensure that the sites for the helibase(s) and helispots are acceptable from an environmental standpoint. Factors to consider include, but are not limited to:

- Impact of construction and aerial activity on threatened and endangered species or on wilderness or similar values.
- Hazardous materials (fuel) handling.

The Helibase Manager should reference the HJA-2 for factors to consider. These include items for both the Helibase Manager and Helicopter Manager to review when initially selecting sites. Even though they should be initially considered, a review at timely intervals (for example, every 5-7 days) is also appropriate.

Good planning for project operations should preclude poor site selection. The rapidity with which incidents occur sometimes results in a poor site being used initially. If a poor site for either the helibase or a helispot has been selected, do not hesitate to relocate if a better site can be established. Do this immediately during the initial stages of the transition from initial or extended attack, or prior to the start of the project. Otherwise, unacceptable delays in operational and logistical support, as well as safety hazards, may result.

Perform an aerial reconnaissance to locate desired helispots. Individuals on this reconnaissance should include the local Resource Advisor, Operation Section Chief (or designee) or Project Aviation Manager, AOBD (or a designee such as the ASGS or Helibase Manager), and, if possible, the Helispot Manager who will be responsible for constructing the spot. Consider the following:

- Where possible, identify natural openings which could be used as a helibase or helispot with little or no improvements.
- What will be the primary function of a helispot (crew shuttle, cargo transport, or both)? If used for cargo transport only, consider designating the spot for longline/ remote hook operations only (referred to as a sling site) in lieu of constructing a helispot.
- If a helispot cannot be constructed due to environmental or other issues, consider designating the spot a sling site.
- Avoid high visitor use areas, especially if construction is necessary.
- Avoid use of schoolyards, parking lots, local parks, etc., unless absolutely necessary and then only if strict security by local authorities can be provided.
- Discuss construction standards relative to the type of helicopters which will be using the helispot. Provide specific instructions (if possible, in writing) for the Helispot Manager assigned. Remember that construction standards must not be compromised.
- If a high environmental impact is anticipated, examine other potential sites some distance away from the ideal location which would result in lower impact and still accomplish intended incident or project objectives.
- Discuss measures to restore the helispot to as natural a condition as possible. Consult the local Resource Advisor for standards.

Crews should not be allowed to construct helispots unless prior approval and specifications have been provided as outlined in the above procedures.

Site Ownership and Approval

It cannot be assumed that any suitable piece of property can be used for a helibase over an extended period of time without first determining ownership. This is often overlooked in the rush to establish a helibase on incidents. It should not happen with the advance planning time available for projects. During the site selection and planning process, site approval issues must be addressed.

Check that the land being considered, whether it be a meadow, field, airport, or airstrip, is owned by an individual or entity that supports the operation being conducted. Do not assume that the land immediately adjacent to an incident or project area is managed by a government agency.

Private Ownership

If the land is owned by an individual or corporation, contact must be established as soon as possible to request permission to continue to use the land. This assumes that initial attack crews have chosen the site as optimal from an operational standpoint and have already established initial helibase operations. Consideration must be given to the following:

There may be restrictions that the landowner desires. These might include not using certain areas, such as those the landowner planned to irrigate or plow.

There may be rental costs involved. Notify local administrators of the need for a land use agreement. A Helicopter Manager, Helibase Manager, or other air operations staff member usually does not have the authority to negotiate rental costs.

Rehabilitation of the land is often an issue.

Public Ownership

If the land is managed by a federal, state, or local agency, the Helicopter Manager must coordinate with the agency's Resource Advisor to determine if use of the site is appropriate and any mitigation measures that must be taken.

If the site is owned by a local municipality, contact the local manager or public official.

Role of the Finance Section Chief or Local Agency Administrative Officer

The Helibase Manager should immediately coordinate with the Finance Section Chief on incidents or the local administrative officer responsible for the project. The Finance Section Chief or local agency administrative officer should establish an agreement with the landowner that includes the following, at a minimum:

- Cost (if any) for use of the land.
- Any restrictions on use of the land such as keeping fuel trucks away from certain areas, use of soil stabilizers, etc.
- Rehabilitation requirements after the incident has ended or the project is completed.

Use of Airports and Airstrips

Use of airports or airstrips requires the permission of the Airport Manager or a responsible agency such as the state aeronautics division. In some cases, closure of the airport or airstrip may be necessary. If so, prior and continued coordination and communication with the applicable authority is essential.

Helibases established at airports or airstrips should be located such that both landing areas and approach/departure paths are segregated from airplane operations. It is recommended that a Fixed Wing Base Manager be ordered to perform this coordination.

Helispots

The same considerations addressed above may apply to the use of helispots, especially those that require improvements.

Water Sources

The same considerations addressed above apply to the location and use of water sources for dipping or bucket/tank fill operations. Do not assume that each pond or lake is managed by the government. Provisions for replenishment of water sources can be made if use of water is an issue. The use of water additives (foam or retardant), as well as invasive aquatic species, are additional issues to discuss with agency Resource Advisors and private landowners. See *Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations*, PMS 444, https://www.nwcg.gov/publications/444.

Selection of and Specifications for Temporary Helibases, Helispots, and Unimproved Landing Sites

Landing at Unimproved Landing Sites

The Pilot is responsible for making the decision to use unimproved landing sites. The government representative on board may make a recommendation, but must defer to the Pilot's judgment, even if the Pilot's preferred site is at a distance from the desired.

Conversely, the government representative or Pilot has the option to advise that he or she does not feel comfortable landing at a site selected, and may decline to land at the site.

Prior to landing at an unimproved site, the Pilot must make a high-level reconnaissance of the area to determine the location of any aerial hazards in the approach or departure path and to determine wind conditions, slope, ground stability, rotor clearances, ground hazards, and size of touchdown area. The Pilot is responsible to ensure sufficient power is available. Refer to: IATB 17-01for additional information and can be found at https://www.doi.gov/sites/doi.gov/files/uploads/iatb_2017-01.pdf.

Use of unimproved landing sites on a recurring basis is discouraged. When logistical and environmental concerns allow, the site should be improved to meet helispot standards. The following is recommended:

The appropriate authority (agency determined) should identify the level of improvement and approve the extended use of unimproved landing areas.

- For large fire operations, extended use will be approved by the AOBD or designee.
- For initial attack operations, the Helicopter Manager must make this determination.

Construction and Improvement

Construction of approach/departure paths for helibases and helispots will conform as closely as possible to the specifications in Exhibit 8.1 and as discussed later in this chapter. A one-way helispot as depicted in Exhibit 8.2 is sometimes unavoidable.

Exhibit 8.1 – Diagram of Two-Way Helispot.

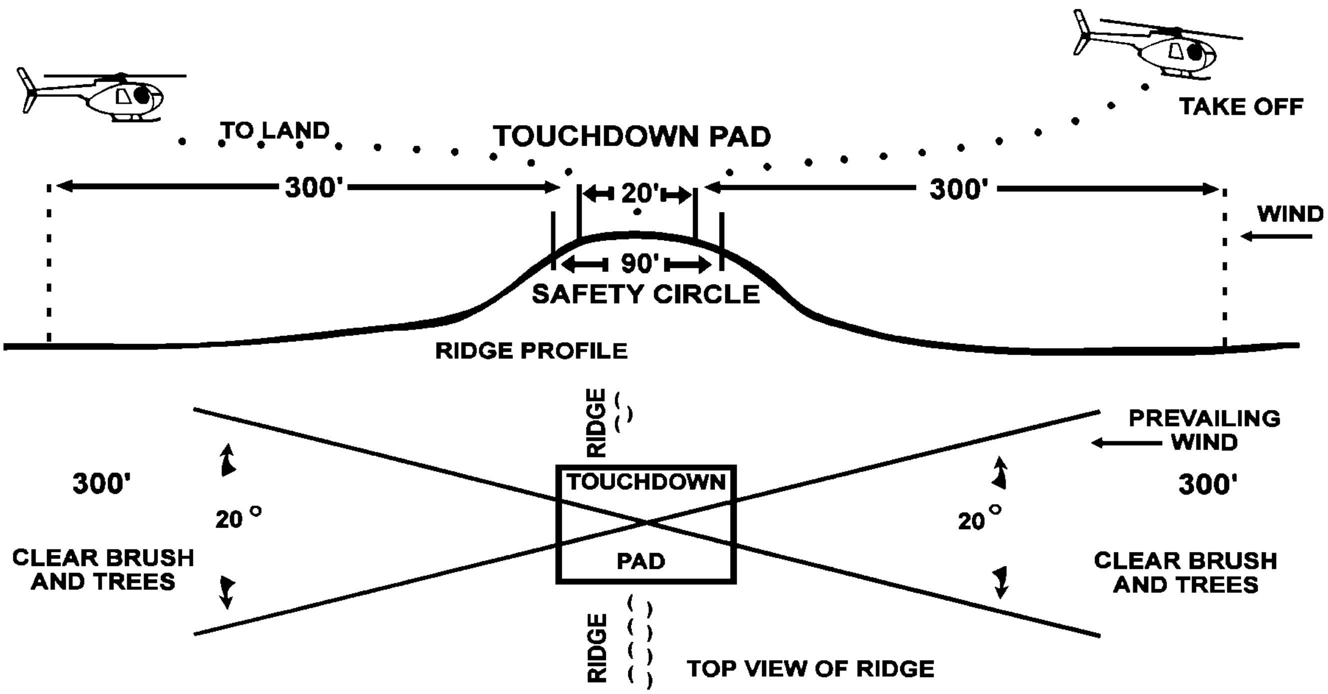
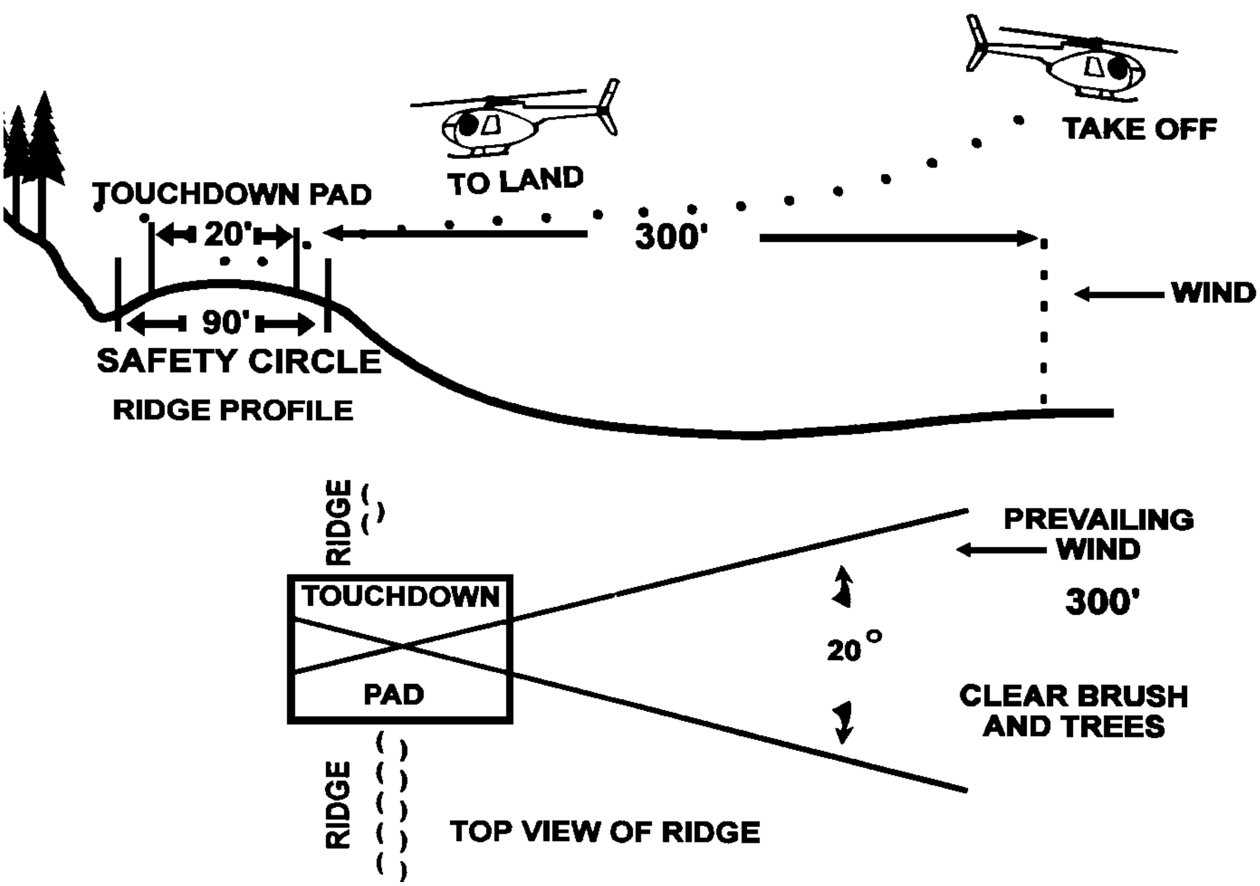


Exhibit 8.2 – Diagram of One-Way Helispot.



Hand Construction

Hand construction methods are best since there is less ground disturbance than that created by mechanized construction. There are measures which can be implemented during construction of a helibase or helispot that will lessen the workload during rehabilitation and help ensure that the objective of restoration to as close to a natural state as possible is achieved. These include:

Cut trees or snags close to the ground, leaving stump heights of 0-3 inches. It is recognized that this may not always be possible during initial construction. Follow-up flush cutting may be necessary.

If possible, and only if it can be performed safely, fell trees or other vegetation so that some cut trees and snags will be in a crisscrossed or natural appearing arrangement.

Buck up only what is necessary to achieve a safe operation in and around the touchdown pad and in the approach/departure path(s). Bucked pieces are unnatural and also increase the workload of camouflaging cuts during helispot rehabilitation.

Limb only what is necessary to achieve a safe operation in and around the touchdown pad and in the approach/departure path(s). If possible, breaking of limbs is preferred to sawing. Excessive limbing results in additional, smooth-cut spots along the boles. It also creates an increased amount of limbs to either dispose of in the timbered area or to arrange in a fashion that resembles a natural ecosystem floor.

Mechanized Construction

Basic requirements are the same as those for hand construction. If large rocks are dislodged, they should be removed and placed in an area where they appear to be natural. Hand work is frequently necessary to cut the fringe of brush left by bulldozers. Dozer constructed landing areas generally have soil that is disturbed, requiring dust abatement procedures. Unless necessary, mechanized construction or improvement is to be avoided.

Landing Area Specification

The touchdown pad is a designated area, that may have a prepared or improved surface, at a helispot or helibase that is used for takeoff, landing or parking of helicopters.

The safety circle is a zone that provides an obstruction-free area on all sides of the touchdown pad. For helispots and helibases, the only items that should be within the safety circle are a fire extinguisher, a pad marker, and if applicable, external loads awaiting transport. The Parking Tender may also be within the safety circle.

When there are multiple helicopters at a helibase, safety circle dimensions may or may not provide adequate clearance and separation between helicopters when rotors are turning.

As a general rule, safety circles should be at a minimum 1.5 times the rotor diameter. In addition, separation between safety circles should be at a minimum one rotor blade(s) diameter. The following charts depict minimum pad, safety circle and separation requirements (See Advisory Circular AC 150/5390-2C Heliport Design-4/24/2012).

Example: BV 234/CH 47 with two rotor discs, the combined diameter of the rotors is approximately 100 feet, thus the safety circle should be 150 feet, with a distance of 100 feet between safety circles.

Exhibit 8.3 – Minimum Touchdown Pad and Safety Circle Dimensions

Minimum Dimensions	Helicopter Type 1	Helicopter Type 2	Helicopter Type 3
Touchdown Pad	30’ x 30’	20’ x 20’	15’ x 15’
Safety Circle Diameter	110’	90’	75’

Exhibit 8.4 – Minimum Separation of Helicopters at Helibases

Minimum Separation	Helicopter Type 1	Helicopter Type 2	Helicopter Type 3
Pad Center to Pad Center	185’	140’	110’
Safety Circle to Safety Circle	75’	50’	35’

Use the separation distances listed in Exhibit 8.4 as a guide when laying out a helibase. These recommended distances are not mandatory, but they can be used to provide appropriate separation between helicopters.

When helicopter makes/models are known, the rotor-to-rotor separation dimensions may be used as a guide to provide adequate separation between helicopters.

When helicopter makes/models are unknown, it is recommended that the pad-to-pad separation dimensions be used as a guide to provide adequate separation between helicopters.

General Locations for Helispots and Unimproved Landing Sites

Ridge Tops. An exposed knob on a ridge offers the best location, especially if approach/departure is available from all or several directions. Consider the following.

- Minimum approach/departure path should be no less than the required safety circle.
- Avoid cutting timber keyhole helispots visible from scenic roads, towns, rivers etc.
- Clear brush and trees below the level of the landing area. Jumbled brush and limbs tend to dissipate the ground-effect, resulting in an abrupt transition to out-of-ground-effect flight.

Lakes or Rivers

Bodies of water, with their less-than-solid surfaces, may reduce the benefits of ground effect. A helibase or helispot should offer a takeoff and landing profile that will not place an aircraft loaded for in-ground-effect over water before sufficient airspeed and lift is achieved. Depth perception can also be a problem for overwater portions of approach/departure paths.

Canyon Bottoms

If the canyon is deep, the helicopter will need a long forward run to climb out of the canyon, or a wide spot in the canyon where it can circle to gain altitude.

Meadows

Caution should be exercised prior to using meadows with high grass. Grass tends to dissipate the ground-effect cushion. High grass may also hide rocks, logs, and swampy areas which are a hazard to personnel and the helicopter’s skids, wheels, or fuselage. Grassy areas are also a potential fire hazard.

Snow Areas

Depth perception on snow and glacial ice is often poor. It is important to clearly mark the landing site with objects of contrasting color. To reduce blowing snow, tramp the area thoroughly inside the safety circle. Reference Helicopter Operating in Snow-Covered Areas in Chapter 6 for additional information.

If surfaces are icy, avoid locations that are over 6° (9:1) slope. Choose a site large enough and flat enough to keep main and tail rotors from striking ice pinnacles or pressure ridges. Test the surface and load-bearing capability of the touchdown pad area to avoid snow bridges, thinly covered crevasses, crusts, and cornices.

Helicopters that operate in snow areas are usually equipped with snow pads which function similarly to snowshoes by spreading the weight of the helicopter over a larger load-bearing area. It is the Pilot’s responsibility to determine if a landing can be safely made in snow conditions, with or without snow pads.

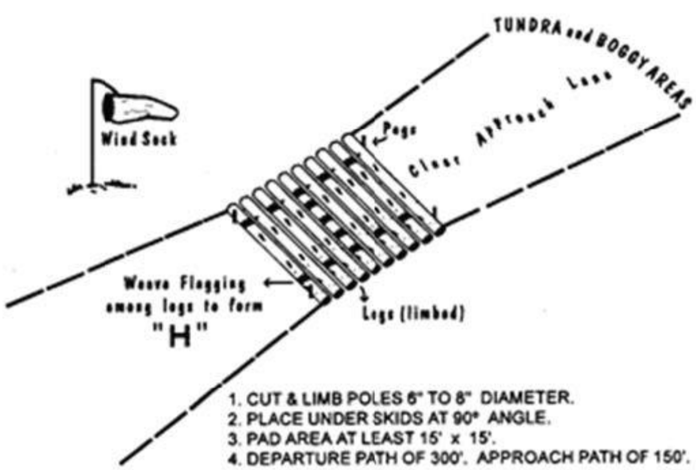
Tundra and Boggy Areas

Tundra and boggy areas are unstable surfaces. Helicopters that operate in tundra areas are usually equipped with tundra pads that function similarly to snow pads.

A log-deck pad may also be used. Cut and limb at least 10 poles, 20 feet long and approximately 6” to 8” in diameter. Use these to build a square touchdown pad. Place at right angles to the helicopter skids. The poles must be able to support the largest helicopter to be used. Secure the outer logs to prevent rolling or separation.

Even when equipped with tundra pads, helicopters may sink into boggy tundra. To ensure adequate clearance for the tail rotor, there must be enough pad area and log strength to support the weight of the rear end of the skids. Exercise care when landing on and taking off from log-deck landing pads.

Exhibit 8.5 – Log-Deck Landing Pad for Use in Tundra and Boggy Areas.



Surface Features and Requirements

Level locations are best. The ideal approach/departure path is 300’ long, sloping down and away from the landing site.

Slope

- Avoid sloped pads that have over 9:1 slope ratio (6° or 11%) or 1.3”/foot slope.
- Pads must be as level as possible at temporary helibases and helispots.

Exhibit 8.6 – Slope Conversion Chart.

Slope Ratio	Degree Slope	Percent Slope	Inches/Foot
1:1	45.0	100	12
2:1	26.6	50	6
3:1	18.4	33	4
4:1	14.0	25	3
5:1	11.3	20	2.4
6:1	9.5	16.7	2.0
7:1	8.1	14.3	1.7
8:1	7.1	12.5	1.5
9:1	6.3	11.1	1.3
10:1	5.7	10	1.2

Safety Circle

- Safety circles should be as level as possible with trees and large brush removed.
- Avoid damaging small bushes and grasses that help to reduce the dust problem. Limit dozer or other mechanical work as much as possible.

Touchdown Pad

The pad should be free of brush or other obstructions and large enough to accommodate all wheels or both skids. There must be adequate clearance under the fuselage to clear antennas, cargo hooks, or externally supported accessories.

Pads must be firm enough to support the type of helicopter being used at temporary helibases and helispots.

Where possible, avoid selection or construction of landing pads on a slope. The pad should be as level or as close to the terrain surface as possible without disturbing the small brush and grass cover.

Approach/Departure Path

Site selection should provide for approaches and departures in several directions. If the site is not located on a ridge top, an approach/ departure path aligned with the prevailing wind should be constructed. If possible, avoid one-way helispots, although these landing sites are not inherently unsafe provided correct piloting techniques are followed.

Winds

When possible, locate landing areas so that takeoffs and landings may be made into the prevailing winds.

Full Performance Takeoff and Landing

Almost-vertical approaches and departures are not inherently unsafe, but should be avoided if possible, especially on an extended-use basis.

Minimum Width

The minimum width for an approach/departure path is the diameter of the safety circle. Construction starts at the edge of the safety circle and extends in the takeoff direction far enough to permit normal no-wind takeoffs for the expected density altitudes. Safety is increased if the paths can be widened to a 20º angle from the center of the landing pad. To determine if additional clearing of obstructions is prudent or necessary:

- Take a compass reading down the center of the approach/departure path.
- Take a new reading 10º on each side of the centerline to determine the optimal, or 20º- wide path.
- Obstacles that occur between the point where these lines intersect with the minimum width of the approach/departure path (safety circle diameter) may be removed to increase safety.

Exhibit 8.7 – Distance from Obstacles.

Distance From Edge of Safety Circle	Height of Obstacle
80’	10’
160’	20’
240’	30’
320’	40’

Approach

The path should be free of obstructions which would prevent a normal approach. If environmental considerations restrict this from being accomplished, the helispot should not be built.

Departure

There should be enough level running space to permit normal acceleration from hover to translational lift and initial climb. If environmental considerations restrict this from being accomplished, the helispot should not be built.

Downdraft Areas

Avoid downdraft areas on lee sides of ridges.

Required Equipment and Facilities

Exhibit 8.8 lists equipment and facility requirements and standards for permanent helibases, temporary helibases, and helispots. Construction should take into account these needs and requirements.

Refer to Chapter 9 for specific details regarding fire extinguisher requirements.

Exhibit 8.8 – Required and Recommended Facilities for Permanent Helibases, Temporary Helibases, and Helispots.

Requirement	Permanent Helibase	Temporary Helibase	Helispot
Operations office or area for communications + administration.	Required	Required	N/A
Communications equipment, to include as appropriate, telephone, station-to-station and air-to-ground radios. Where no telephone service is available, a mobile or cellular phone should be installed at site.	Required	Required	Required (handheld radio only)
Ready room/rest area for vendor personnel, including cots, toilet, desks, and if possible, stove and refrigerator.	Required	Rest and sanitation facilities only	N/A
Cache for agency-owned equipment	Required	N/A	N/A
Storage area for helicopter equipment and servicing supplies	Required	Recommended	N/A
Parking and staging areas for vehicles for ground accessible sites	Required	Required	N/A
Water supply for drinking, utilities, and aircraft maintenance	Required	Recommended	N/A
Maintenance lights, including electrical outlets at each touchdown pad	Required	N/A	N/A
Security fence at least 150’ from center of the touchdown pad on the approach/departure path	Required	N/A	N/A
Safety and warning signs, including “No Smoking”	Required	Required	Recommended
Evacuation and crash rescue kits	Required	Required	Recommended

Requirement	Permanent Helibase	Temporary Helibase	Helispot
Fire extinguisher at each pad	Required	Required	Required
Scale for weighing passengers & cargo	Required	Required	Recommended
Wind indicators	Required	Required	Required
Dust abatement, if necessary	Required	Required	Required
Fueling capabilities	Required	Required	N/A
Identifiable, marked touchdown pads	Required	Required	Required
Hazard map	Required	Required	N/A
First aid kit	Required	Required	Recommended

Markings for Aerial Identification

Helibases

Permanent helibases may use the triangle and "H" marking. The triangle-H design should be placed in the center of the touchdown pad with the solid apex of the triangle pointing to magnetic north. The base name, elevation, and latitude and longitude should also be painted on the pad. Permanent markings for temporary helibases are not required.

Helispots

Incident or project helispots used on a recurrent basis by more than one helicopter should be numbered or identifiable from the air.

<u>Log-deck Touchdown Pad</u>

Weave flagging or other colored cloth strips around the logs to form a letter "H". Ensure cloth strip is secure and cannot unravel. See Exhibit 8.5 for diagram.

<u>Snow Areas</u>

Depth perception on snow and glaciers is often poor, so it is important to clearly mark helispots with objects of contrasting color. Wands about 3 feet high with streamers attached, packs, tramping a trench to create shadows, spray painting, colored chalk, and smoke grenades are several methods of marking snow areas.

<u>Miscellaneous Markings</u>

- Painted rocks or well-secured and weighted signal panels may be used to outline a touchdown pad or landing area.
- Color markings should provide sufficient contrast with the background area. Reflective material may be used. If paint is to be used, it must be environmentally acceptable (for example, a water-based paint).

- Known hazards outside the safety circle such as poles, pipes, and high vegetation should be marked with colored ribbon or other means. Known hazards must also be marked on the Known Aerial Hazard Map at helibases and should be noted on form HBM-2, Aviation Locations Summary, which identifies helispot hazards.

Do not use ground panels in loose or rocky soil. Rotor wash will easily pull them out of the ground. If ground panels are used, check the spikes holding down the panels occasionally as they can work loose.

Dust Abatement

The potential for dusty conditions usually exists when not operating from turf or pavement. Dust abatement must be accomplished at all helibases and helispots. This may be as simple as the application of water by ground equipment or from helicopter buckets or fixed tanks. A more complicated approach involves the application of chemical products. Their use may be of concern from an environmental standpoint and local authorities must be consulted prior to application. Chemical products are usually more expensive than water, but provide a longer-lasting application.

Safety Data Sheets (SDS) information for the chemical product or hazardous material should be obtained prior to use. The SDS information is available from the manufacturer or online. They should be available for the local Resource Advisor to review in determining environmental or ecological impacts.

Water

- Most commonly used.
- Is usually the most economical.
- Can be applied via ground or aerial delivery.

Lignin Sulfonate

The most commonly used chemical for is lignin sulfonate. It is a by-product of the lumber industry, derived from wood pulp in the lumber milling process. The resulting lignin is mixed with ammonia and calcium bases to enhance its fertilizing characteristics. It has been used successfully on roads for soil stabilization and dust control. The cost, compared to other materials, is reasonable.

Application considerations for lignin sulfonate include:

- Approved on an agency-specific basis. Local Resource Advisor must be consulted prior to use.
- Not approved for fixed-tank application.
- No ground preparation is necessary.
- Availability of commercial sources to travel to the site and apply the chemicals.
- Lignin sulfonate can be applied by many methods except for helicopter fixed-tank. Methods include using back-pack pumps, pillow tanks, rigid tank/ pump operations, helicopter buckets, and engines.
- Do not use potable water containers.

Lignin sulfonate is mixed with water in ratios of 1:1 to 1:3, depending on temperatures and soil condition. Lignin sulfonate is ready for use 15 to 30 minutes after mixing, depending on the ambient temperature. It can then be applied using any approved method. When the site is ready, apply the lignin sulfonate/water mixture evenly and ensure proper coverage. If the area becomes churned up during operations, apply a small amount of water or more lignin sulfonate/water mixture to make effective again.

All equipment must be cleaned with water. If the lignin sulfonate dries, it breaks down with application of water and will wash out of clothing easily.

Procedures for Landings

The Pilot and Helicopter Manager are responsible for choosing safe landing sites. The Helicopter Manager or passengers may indicate landing sites that are convenient to their ground work site or drop-off point. However, in no case will safety be compromised for convenience, nor will any passenger implicitly or explicitly attempt to pressure the Pilot into performing a landing, takeoff, or flight maneuver that is unsafe.

Load Calculations

Prior to repetitive flights to and from the same helispot, the Helicopter Manager will consult with the Pilot and designate sites as either HIGE or HOGE. In planning and computing loads for those sites, applicable performance charts will be used.

High-Level Reconnaissance

The Pilot must fly a high-level reconnaissance before descending on the approach path to an unimproved landing site that has not been used before.

HOGE Power Available Check

The Pilot is responsible to ensure sufficient power is available by performing a hover-out-of-ground (HOGE) power check prior to any landing site approach/departure. Refer to IATB 17-01 https://www.doi.gov/sites/doi.gov/files/uploads/iatb_2017-01.pdf.

Areas to Avoid

Avoid dusty landing areas. A low, slow flyby may be necessary to determine dust conditions. Avoid marshy areas and areas with high grass or shrubs where ground hazards and soil stability cannot be determined.

Wind Direction

Ground personnel, if available, should furnish the Pilot with wind direction indication. This can be accomplished by throwing dirt, attaching flagging to vegetation, radio communication, or hand signal.

Reduction of Power

Care must be taken to ensure that skids or wheels are down on solid ground before reducing power.

Pre-Exit Briefing

The Pilot must ensure that passengers are briefed on proper exit direction, especially when sloping terrain may pose a hazard to personnel exiting the helicopter.

Single Skid, Toe-In, Hover Exit/Entry

Except in a life-threatening emergency, these types of landings are prohibited unless specifically authorized.

Tundra or Boggy Areas

Inform the Pilot if landing gear or skids begin to sink into tundra or boggy area.

Snow Landings

Snow landings may require agency approval. If the snow is suspected to be deeper than 18 inches, check the Interagency Helicopter Pilot Qualification Card for deep snow operations and ensure that the helicopter is equipped appropriately. See Chapter 6, “Helicopter Operating in Snow-Covered Areas” for additional guidance.

Chapter 09 – Equipment Requirements and Maintenance

Introduction

The proper use and maintenance of equipment used in helicopter operations by ground, flight, and air crew personnel is essential to safety. Since much of this equipment is of high cost, proper maintenance is also cost effective.

Interagency Fire Helicopter Equipment Requirements

The required items for interagency carded fire helicopters change frequently.

For CWN fire helicopters, use and completion of form HCM-2, Helicopter and Service Truck Pre-Use Checklist, with reference to the procurement document, should ensure that requirements are met. See Appendix A for instructions on completing this form.

Personal Protective Equipment (PPE) Requirements for Personnel

Refer to the *Aviation Life Support Equipment (ALSE) Handbook*, https://www.doi.gov/aviation/library/guides, for additional information.

PPE requirements for helicopter occupants

PPE is required to be worn on all helicopter flights by all occupants and consists of:

- Fire resistant clothing, e.g., long-sleeved shirt and pants or flight suit.
- Fire resistant or leather gloves.
- Hardhat with chinstrap or approved aviator flight helmet.
- All-leather, over the ankle boot.
- Fire shelters for every occupant are required on board the aircraft for missions that take place over active fires.

If any flight crewmember, air crewmember, or passenger refuses to adhere to PPE requirements, the Helicopter Manager must terminate the flight and report the non-compliance to the Unit Aviation Manager and complete a SAFECOM.

Exceptions or additional PPE requirements for all occupants are determined by flight mission and physical location and include:

- Reconnaissance over water when beyond gliding distance from shore: personal flotation device (PFD) is required. Fire resistant clothing and leather boots not required.
- Reconnaissance over water-extended: PFD, anti-exposure garment, raft & kit required. Refer to ALSE Handbook for exceptions. Fire resistant clothing and leather boots not required.
- Individual not restrained by installed aircraft restraint system, e.g., spotter, cargo letdown, cargo freefall, ACETA, Plastic Sphere Dispenser (PSD): approved auxiliary restraint harness/tether required.
- Extreme environmental conditions, e.g., wet, boggy, extreme cold: specific agency waiver to policy is required and may allow the use of rubber or synthetic footwear and climate-appropriate clothing.

- Rappel, short-haul, cargo letdown, aerial ignition: refer to agency policy and applicable guide/handbook for specific PPE requirements.
- Firefighter: may wear a hardhat with chinstrap in lieu of an aviator flight helmet ONLY when being transported as a passenger during fire operations from an established, managed helispot or helibase to another established, managed helispot or helibase.
- A managed helibase/helispot is established when there is a helicopter crewmember or a Helibase Manager on the ground at the helibase/helispot before passengers are transported to these locations.

PPE requirements for helicopter ground operations

PPE is required to be worn by all government personnel while working around operating helicopters or when "on the deck" when helicopters are operating. This PPE consists of fire resistant clothing, e.g., long-sleeved shirt and pants; hardhat with chinstrap or approved aviator flight helmet; fire resistant or leather gloves; all-leather boots; and hearing and eye protection.

It is at the discretion of the Helibase Manager, deck coordinator or helicopter manager to establish the appropriate level of PPE to be worn by ground personnel when no helicopter operations are being conducted or for positions not assigned to the deck.

Consult the specific helicopter procurement document for vendor personnel PPE requirements.

Exceptions or additional PPE requirements for ground personnel working around operating helicopters are determined by duty and include:

- Longline hookup personnel and Parking Tenders: aviator helmet with handheld radio adaptor is recommended. Radio contact with pilot is required.
- Helitorch mixmaster and crewmembers: refer to the Interagency Aerial Ignition Guide for PPE requirements.
- Government fuelers: non-static clothing is required; may use rubber gloves in lieu of leather gloves; eye and hearing protection required only when in the vicinity of operating helicopters.

PPE Components

PPE consists of clothing and equipment that provide protection to an individual in a hazardous environment. Equipment requirements are found in Chapter 02 of the ALSE Handbook/Guide at https://www.doi.gov/aviation/library/guides

- Aviator Flight Helmets
- Hardhats
- Hearing Protection
- Eye Protection
- Fire Resistant Clothing

Survival Equipment

It is the responsibility of the helicopter manager or project flight manager to ensure that proper and adequate survival equipment for the planned mission is aboard and available for all crewmembers and passengers. Requirements for survival equipment for overwater missions, survival kits for special use overland missions, and first aid kits for all missions are found Chapter 03 at https://www.doi.gov/aviation/library/guides

- Overwater Flotation and Survival Equipment
- Overland Survival Equipment
- Aircraft Survival Kits

Aircraft Equipment

Personnel Restraints, Seat Belts, and Harnesses

General Seat Belt Requirements. The following are required for all helicopter flight activities, including those where doors are open or removed.

- FAA-approved 4-point restraint system that includes a double-strap shoulder restraint with automatic, locking inertia reels for each front seat occupant.
- Approved 3 or 4 point restraint system for all aft seat passengers. Shoulder restraints must be worn.
- Shoulder and lap restraints must fasten with one single-point, metal-to-metal, quick release mechanism. Heavy-duty (military style) restraints such as those installed in Bell medium helicopters are acceptable even though they have fabric loops connecting the shoulder restraints to the male portion of the buckle.

> Personal equipment may interfere with the operation of the seat belt or cause the seat belt to be accidentally released. An example is a radio chest harness catching on the seat belt release mechanism. DO NOT apply tape to the seat belt release mechanism to prevent it from opening.

Special use activities which may require restraint systems other than approved seat belts include, but are not limited to, helicopter rappelling, aerial ignition, ACETA missions, short-haul, cargo letdown, photography, and infrared sensing.

Personnel performing activities while doors are open or removed and who need to be in a location other than seated with an aircraft seatbelt, must wear an approved secondary restraint. The harness must be attached to an approved tether and helicopter hard point. See Exhibit 9-1.

> Some missions where doors are open or removed may benefit from the use of a secondary restraint. If aircrew members will be leaning into the shoulder restraint then a secondary restraint provides additional protection in the event that the seat belt release mechanism is accidentally opened.

For additional information on restraint harnesses, refer to the appropriate special use mission guide or the ALSE Handbook.

Exhibit 9.1 – Example of Restraint Harness Configuration.

Emergency Locator Transmitter (ELT)

An ELT must be installed in the helicopter.

Emergency Position Indicator Radio Beacon (EPIRB)

The EPIRB is battery operated, water-resistant, and will float with the attached antenna vertical. An EPIRB will be included in the survival equipment for extended overwater operations.

Personal Locator Beacon (PLB) or Personal Trackers

The PLB is available from several manufactures. Typical designations include “Portable Rescue Beacon,” “Personal Downed-Pilot Locator,” or “Human Emergency Locator.” PLBs communicate as a beacon on 406MHz, similar to an ELT.

Some personal trackers provide a two-way texting feature and some are wireless capable to link with smart phones. These units are not required, but are highly recommended to be included in personal survival vests or float vests.

Fire Extinguisher

A fire extinguisher meeting the requirements of the procurement document must be installed in the helicopter.

Crash Rescue Equipment for Helicopter Landing Sites

See Chapter 12 for additional crash rescue information.

Requirements for Fire Extinguishers, Evacuation Kits, and Crash Rescue Kits at Helicopter Landing Sites

Personnel must be trained and briefed in the use of crash rescue equipment.

Helibases should have the amount of equipment indicated for the largest operation that could be accommodated at the helibase.

Fire Suppression Systems with aqueous film forming foam (AFFF) or potassium bicarbonate (Purple K extinguishers) are supplemental and not a substitute to the minimum requirements listed in Exhibit 9.2

See Chapter 8 for helispot requirements. There is no extinguisher requirement for an unimproved landing site unless the site is used on a recurring basis.

Exhibit 9.2 – Required Quantity of Fire Extinguishers, Evacuation Kits, and Crash Rescue Kits at Helibases.

1—4 Helicopters	5—10 Helicopters	11+ Helicopters
1 fire extinguisher 20A-120B:C per landing pad	1 fire extinguisher 20A-120B:C per landing pad	1 fire extinguisher 20A-120B:C per landing pad
1 crash rescue kit	2 crash rescue kits	1 crash rescue kit per 5 helicopters
1 evacuation kit	2 evacuation kits	1 evacuation kit per 5 helicopters

Crash Rescue Kit, NFES 001040

- 1 bolt cutter, 24”
- 1 crash axe, serrated edge
- 1 hacksaw frame w/blade
- 5 hacksaw blades
- 1 pliers, 12”, adjustable joint, angle nose, multi-tongue
    - 1 carrying case and sleeve
- 1 crash axe, smooth edge
- 1 rescue knife, seatbelt type
- 1 door opener w/claw tool
- 1 canvas case, rescue kit

Evacuation Kit, NFES 000650

- 24 AA batteries
- 2 boxes chemical light sticks, 12-hour, yellow
- 4 cold compress
- 1 first aid kit, type III, 24-person
- 1 litter, S.K.E.D.
- 1 pliers, 6", slip joint
- 1 screwdriver, 6", flat-tip
- 1 splint, spine
- 3 blankets, disposable, paper, 60" X 90"
- 1 carton, fiberboard, 42" X 13 1/2" X 14"
- 1 cord, cotton braided, 1/8" X 100'
- 2 headlamps, single cell, cordless (added)
- 3 markers, ground, 9" X 10'
- 2 rope, nylon, 1/4" X 100' each
- 1 splint, inflatable, all limbs, 6 pieces

Standard Equipment for External Loads

This section addresses external load helicopter accessories for transporting equipment and supplies. This includes swivels, leadlines, buckets, hooks, nets, etc., that are attached to the cargo hook of the helicopter. Equipment must be rated for vertical lifting and must have a working capacity equal to or greater than the load to be carried.

Users should check the Aircraft Data Card and Helicopter Pilot Qualification Card to ensure that the aircraft and pilot are current and authorized to perform the external load mission.

Cargo Basket and Rack

Loads contained in cargo baskets or racks are considered external, non-jettisonable loads. All cargo carried in baskets or racks must be restrained by means of bungee cords or other fastening devices. Chapter 11 outlines correct methods of loading and carrying cargo in external racks.

Bungee cords or other cargo restraint devices must be fastened securely to the rack. Check for tears, rips, or cracks. Do not use if damaged.

Cargo Hook

The cargo hook is attached to the belly of the helicopter. It must be FAA-approved, self- cocking and automatic locking. It may be loaded and locked in a single motion with one hand. The release must be both manually and electrically operated by the Pilot from the cockpit. See Exhibit 9-2.

The cargo hook also has a manual release on the hook itself that can be operated by the individual performing the hookup. This release allows the Pilot or hookup person to check that the hook is functioning properly.

Prior to using the hook, it is important to first test the manual release, then the electrical release to ensure that both function properly. This sequence is important because the manual release may be susceptible to snagging.

Move the cargo hook to its extreme travel limits to ensure that the manual release will not operate inadvertently. There should be at least ½” slack in the operating cable with the hook in all possible positions.

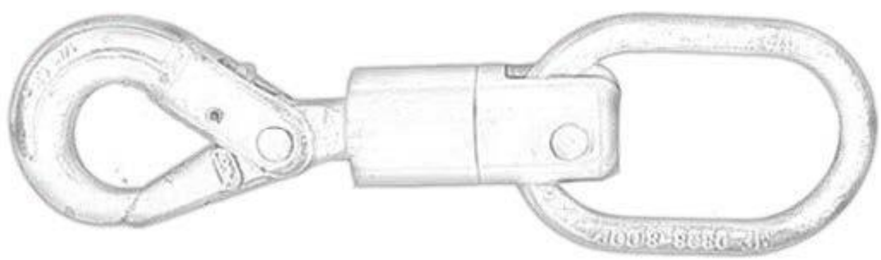
Exhibit 9.3 – Typical Cargo Hook.

Swivel

A cargo swivel consists of a ring or link on the upper end, a hook on the lower end, and a swivel section in between. The ring or link and hook may be integral with, or detachable from, the swivel body. If detachable, components should be replaceable and attached by bolts secured with self-locking nuts, or some other system that provides equivalent safety.

A swivel allows the load to rotate while in flight. This prevents the load from twisting and binding on the cargo hook, remote hook, or leadline or causing cable damage or an inadvertent release.

Exhibit 9.4 – Typical Swivel.



Capacity of Swivels

Standard swivels are rated at 3000 and 6000 pounds. Swivels must be rated for vertical lifting and must have a working capacity equal to or greater than the load to be carried. Approved swivels may be obtained through the National Fire Cache System.

Swivels without a capacity stamp must not be used.

Inspection and Maintenance of Swivels

When inspecting swivels, check:

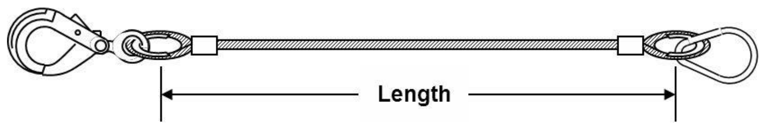
- Spinning action of the swivel.
- Condition of the integrated latch system.
- Bolts on the detachable type of swivel.
- All serviceable parts.

Leadline

A leadline is an accessory used to connect loads to the helicopter. A leadline is constructed of flexible steel cable with a ring or link on one end and a hook on the other. End loops are formed around heavy metal thimbles and spliced or swaged.

Leadlines are not designed to be used as chokers.

Exhibit 9.5 – Typical Leadline (12ft.)



The use of synthetic leadlines made of nylon/polypropylene rope or nylon or natural fiber straps is not normally approved due to the potential of these materials to become frayed and fail, or for snapback or streaming back into the tail rotor system. There are missions such as the transport of live animals where the use of non-twisting synthetic or natural fiber ropes or straps is preferred, and is in fact critical to the well-being of the animals. If used, the equipment must be closely inspected.

Capacity and Length of Leadlines

Leadlines are rated at 3000 and 6000 pounds. The standard length is 12’. The leadline must have a working capacity equal to or greater than the load to be carried.

Inspection and Maintenance of Leadlines

For guidance on the inspection of leadlines please refer to the Interagency Aviation Safety Alert (IASA 12-01). When inspecting leadlines, check:

- The condition of the keeper gate on the hook at the end of the cable if it is not a latch hook. Keeper gates are the part that generally becomes broken or damaged. If there is significant play in the gate, do not use. If the gate can be moved outside the hook itself, do not use. Be sure to tag damaged leadlines with an explanation of what is wrong with it.
- Swages are metal sleeves where the end of the cable forms a loop. Ensure they are secured on the cable. Swages are painted for slippage check and should not be covered. Copper swages should have a compression groove from being pressed together. If in doubt, or the cable is kinked, tag the damaged line and do not use.

Leadlines with aluminum swages must not be used.

Longline with Remote Electric Hook

The longline/remote hook system consists of cable or synthetic line sections, a remote cargo hook, a remote hook guard and handgrip, electric cord, appropriate attachment hardware, and electrical pigtail. The Pilot is able to electrically release loads attached to the remote hook when it is operating correctly.

Remote Hook

At the end of the line is a remote electric hook similar to the cargo hook on the helicopter. An electrical line runs the length of the line and is plugged into the electrical system of the helicopter. The other end is plugged into the remote hook. The remote hook is self-cocking and automatic locking.

Remote Hook Guard

The remote hook guard provides:

- A way to attach the remote hook to the longline.

- Protection of the remote hook when the hook is placed on the ground.
- A handle for ground personnel to use when moving the hook.
- Adequate weight to ensure good flying qualities of the remote hook and longline.

Cable or Synthetic Line Section

General requirements for the longline are stipulated in the procurement document and include:

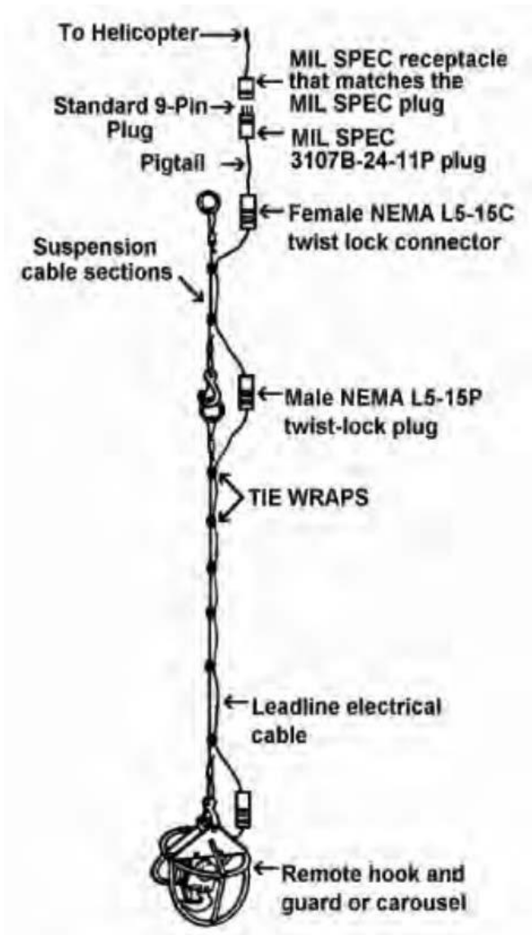
- Sections are in lengths of 50’ feet and greater.
- Longline may be constructed of anti-twist, counter-wound cable or synthetic rope.
- Longline attaches to the helicopter cargo hook on one end by means of a steel ring. On the other end, it attaches to the remote hook by means of a clevis or hook.

Inspection and Maintenance of Longline with Remote Electric Hook

When inspecting longlines with remote hooks and preparing them for use, lay the cables out and check:

- For kinks or abrasions in the cable or electrical cord.
- For excessive fraying of synthetic lines.
- For cracked or broken electrical plugs at each section.
- For broken or bent keepers on hook connections.
- The condition of swages at the end of each cable section.
- That the electrical cord is attached to the line with plastic tie-wraps or duct/ electrical tape placed at 12-inch intervals for the entire length. Some vendors have a sheath for the synthetic line and electrical cord that protects them from damage. The inspection of either cable or synthetic is to ensure that the electrical cord will not separate from the line.
- That the electric plug to the helicopter is a standard and not a twist-type plug. It must pull free if the longline is jettisoned during an emergency.
- That there is no swivel between the helicopter and the remote hook unless an inline swivel is incorporated in the longline.
- After everything has been checked and attached, test to ensure that:
- The manual and electrical releases are operational on the helicopter cargo hook.
- The remote hook is functioning.

Exhibit 9.6 – Drawing of Typical Longline with Remote Hook Configuration.



Multiple Remote Cargo Hook System (Carousel Hook)

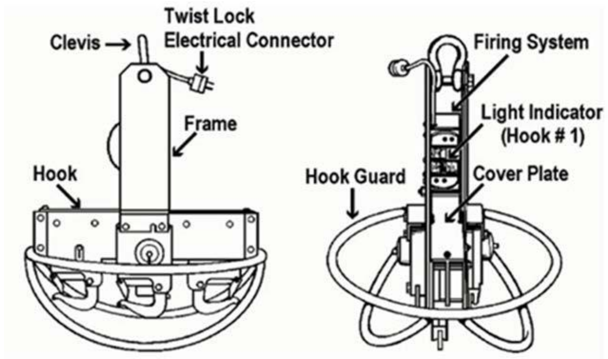
For additional information, see Equip Tips "Four Hook Carousel and Light Cargo Net System," USDA Forest Service, San Dimas Technology and Development Center, San Dimas, CA 91773.

This system is identical to the remote hook system, except that an integrated multiple remote cargo hook device (carousel) is substituted for the remote hook and remote hook guard. The carousels enhance efficiency by allowing the delivery of various loads to different locations.

A carousel consists of four or more individual hooks mounted together on a single hook guard. The pilot controls the release system from the cockpit.

Inspection of Remote Cargo Hook System (Carousel Hook). Check all components associated with the longline system, plus ensure that all electrical connections in the carousel are protected from dust and impact.

Exhibit 9.7 – Typical Four-Hook Carousel System.



Heavy Cargo Net

Cargo nets are used to transport cargo suspended beneath the helicopter from the cargo hook, permitting delivery without landing. Nets are usually constructed from braided polypropylene or nylon rope.

Cargo nets come in both round and square configurations.

Each net consists of a net mesh and a perimeter rope or ropes with tethering rings connecting the segments of the perimeter rope. The lines are attached to the net by loops with thimbles for reinforcement.

When tension is applied to the lines, during both load preparation and lifting, the net is pulled closed, similar to a drawstring. This type of cargo net is referred to as a purse net.

One or two steel rings are attached to the end of the lines. This is the attachment point to a swivel or leadline.

Capacity and Size of Cargo Nets

Nets come in the following commonly available sizes at 3000 and 6000 pound capacities:

- Square nets: 12’ x 12’ (3000 lb.) or 15’ x 15’ (6000 lb.).
- Round nets: 12’ (3000 lb.) or 15’ (6000 lb.) diameter.

Inspection and Maintenance of Cargo Nets

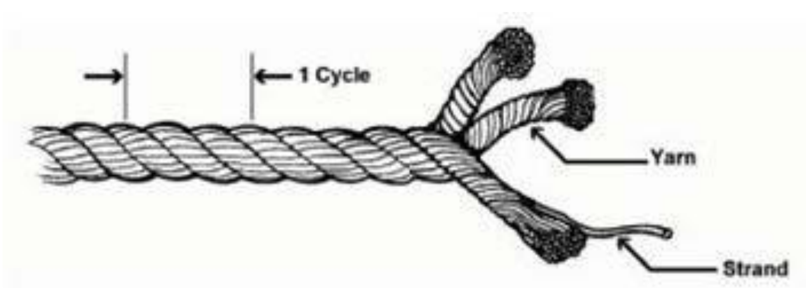
Rope embrittlement is caused by exposure to the sun’s ultraviolet rays and is the most common cause of net failure. Ultraviolet exposure is the most important factor in the degradation of the strength of the cargo nets constructed from polypropylene rope, not use or age. There is no visual or other field inspection technique that will guarantee that a cargo net is free from degradation due to ultraviolet exposure. However, if the net is free of brittleness, has no more than 10 percent broken strands in any two adjacent cycles, and there is no chalking or other visible damage, then the net is probably safe for use. If in doubt, remove from service.

To prevent ultraviolet damage, store cargo nets in bags or boxes. When in the field, stage nets in shaded areas when not in use.

When inspecting cargo nets, check:

- For broken or worn braids or strands, particularly in the center of the net.
- For rope embrittlement. Bend several areas of the cargo net’s rope 180 degrees back upon themselves. If there are brittle strands, they will audibly and visibly break. If more than one or two strands break per bend, do not use the net. Flag it as damaged and discard it, or return it to the manufacturer for repair.
- All rope loop thimbles for cracks, fractures and missing sections. Thimbles can sometimes be replaced by the manufacturer. On some of the heavier cargo nets, the mesh intersections are fixed with molded plastic crosses. These should be visually inspected for cracks and missing parts whenever the thimbles are inspected.
- Polypropylene nets for chalking. Run a hand over several of the ropes in the net, grasping the ropes lightly. If small, white, chalk-like fragments of the rope come off in your hand, then chalking has occurred. If chalking is present, it is likely that the net has received enough ultraviolet damage to cause embrittlement, and the net must be further inspected for broken strands before it is returned to service.

Exhibit 9.8 – Cargo Net Rope.



Lightweight Cargo Net

An inexpensive, lightweight cargo net constructed of synthetic cord is desirable for certain operations. Lightweight nets come in round or square configurations and have a minimum 10 foot and a maximum 12 foot diameter or side dimension. These nets usually weigh approximately 1.5 pounds.

The net may have a four-corner pickup instead of a drawstring enclosure. Rope intersections are knotted to prevent slippage. Each corner has a 4.5 inch opening and is knotted and bonded with fiberglass to the mess line. There are also three knotted and fiberglass attachments on each side to ensure rapid and complete deployment.

It is recommended that a metal, locking carabineer or pear ring be placed between the corner loops and the swivel.

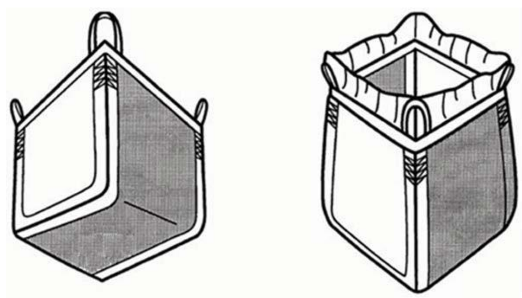
Lightweight cargo nets are rated at 300 pounds only. Do not over load nets.

Cargo Lift Bag

Cargo lift bags, also known as flexible intermediate bulk containers, are an inexpensive alternative to cargo nets. They are available in standard and custom sizes, are cubic in shape, and are made from an ultraviolet-resistant polypropylene fabric that “breathes.” Most styles have a safety band around the perimeter of the bag. Options include different liners, lifting straps, and filling and emptying capability through a bottom chute. A common size is 35” x 35” x 40”, which weighs 5 pounds.

> Cargo lift bags should not be flown empty due to the potential for tail rotor entanglement. If no cargo is available, 50 pounds of ballast should be placed in the bag. It should be flown at a reduced airspeed. Use according to agency direction.

Exhibit 9.9 – Typical Cargo Lift Bag.

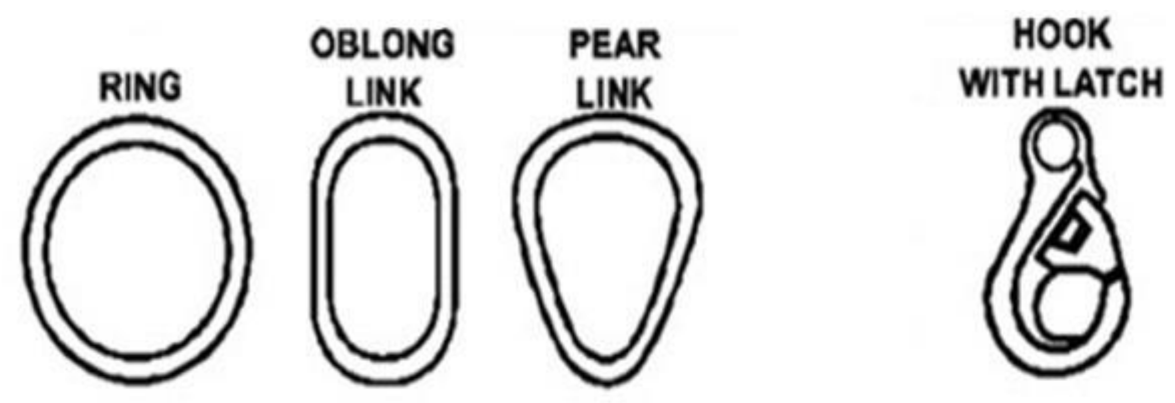


Rings, Links, and Hooks

Rings, links, and hooks are the connections between swivels, leadlines, cargo hooks, longlines, and remote hooks. The size, both inside and outside dimensions, of rings, links, and hooks is critical, particularly at the cargo hook connection point, due to the potential for inadvertent release or “hung loads.” Sizes must conform to the cargo hook manufacturer’s recommendations.

See Chapter 11 for more information on the cargo hook/ring interface.

Exhibit 9.10 – Rings, Links and Hooks.



Buckets

Buckets are typically used on fires to dispense liquids such as water, fire retardant, and foam. Buckets used for hauling water may have a foam injection system for adding foam concentrate to the water while in flight.

The Pilot remotely activates the bucket mechanism. Each bucket consists of an open-top shell, a bottom discharge door, control mechanism, support cable, and fittings. There are two basic shell designs, collapsible and rigid. A version of the collapsible type is also foldable. A Pilot-operated electrical switch mounted on the collective control must be the only switch to activate the discharge door.

Several methods are used to limit bucket capacity so that the weight of the water is within the allowable payload limit. These include cinch straps, zippers, port caps or plugs. Items used as part of the capacity limiting system should be fastened to the bucket to prevent loss or damage.

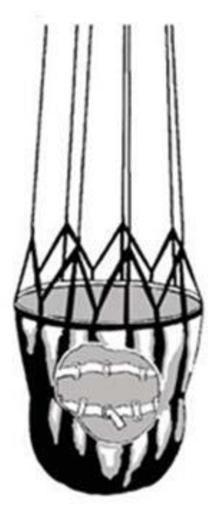
The weight of the bucket and capacity at each position or adjustment level must be marked on the bucket.

For other than tandem rotor helicopters, while conducting water bucket operations, airspeed must be limited to 80 KIAS or the airspeed limitation established by the Rotorcraft Flight Manual, whichever is less. Each operator, Pilot and helicopter manager should review the manufacturer's bucket operator's manual and limitations for the applicable bucket prior to use.

Longlines may be used during bucket operations. This allows access to different dip sites as well as reduces the amount of rotor wash experienced at the delivery site.

- If a longline is used for water bucket operations, then the longline must be a minimum of 50 feet in length to reduce the risk of entanglement with the tail rotor or tail boom.
- Pilots using longlines with water buckets must be approved for vertical reference longline operations.
- Lines of less than 50 feet are not authorized and pilots who are not approved for vertical reference longline operations must attach the bucket directly to the cargo (belly) hook for water bucket operations.

Exhibit 9.11 – Collapsible, Foldable Bucket



Helicopter Fixed Tank

A helicopter fixed tank is used to transport water, foam, or retardant to the fireline. The tank is attached to the belly of the helicopter. Some tanks require removal of the cargo hook.

Tanks are often filled with water from hoses connected to engines, fixed ground tanks, or other ground sources. When retardant is used, a portable retardant mixing site is located adjacent to the fill site. Tanks may also have onboard foam-injection systems.

Some helicopter fixed tanks have the capability to draw water via an extended nozzle or snorkel while hovering above the water source.

Do not use Lignin Sulfonate in fixed tanks. Dust abatement chemicals may damage the tank.

Specialized External Load Equipment

Specialized external load equipment is used to transport items whose dimensions or other characteristics preclude use of cargo nets. These include, but are not limited to:

Barrel Hooks/Clamps

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 Pilot to hook up loads without ground assistance. Not attaching the bungee allows the hooks to drop off the barrel once on the ground at an unattended site.

Do not fly over persons or structures when using barrel hooks/clamps. To reduce the possibility of an accidental load failure, use of a cargo net is recommended when transporting barrels.

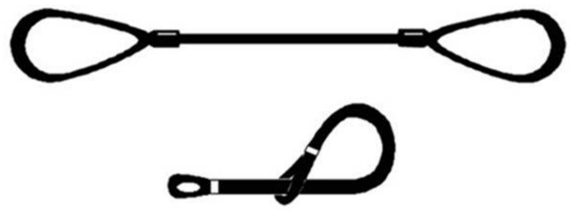
Exhibit 9.12 – Barrel Hooks/Clamps.

Chokers

Chokers are used primarily to transport logs, lengths of pipe, or other materials that are too long or bulky to be transported in a cargo net. They are made of wire rope, fabric strapping, chain, and other materials. Logging operations use a cable choker with a ball on the end that clips into a sliding catch further up the cable. The result is that the cable “chokes” down on the load when it is under tension. Chokers are rated at different strengths. Ensure that the equipment is rated appropriately and designed for lift work. Tow cables look like chokers, but are not designed for external load work.

Chokers are not to be used as leadlines.

Exhibit 9.13 – Typical Chokers.



Seed and Fertilizer Spreaders

Spreaders are typically self-contained in that only power and control is required from the helicopter for the device to operate. They are supplied complete with appropriate rigging and lines for connection to the helicopter cargo hook. In some cases, spreaders are supplied with their own internal combustion engine.

See manufacturer's literature for specific operating instructions and weights for load calculations.

Exhibit 9.14 – – Typical Seeder Configuration.

Helitorch

The helitorch is a self-contained unit used for aerial ignition. The torch dispenses gelled gasoline or diesel fuel and provides a hotter, faster, and longer ignition than other methods. The unit is jettisonable in an emergency. It is attached to the helicopter at a line length to give the pilot maximum visibility and control. The unit can be attached to any helicopter with a cargo hook and a 28-volt power supply. A complete helitorch system includes control cables, aluminum mixing paddle, extra barrel, spreader bar and augmented ignition system.

For further information, refer to the *NWCG Standards for Aerial Ignition*, PMS 501, https://www.nwcg.gov/publications/501.

See manufacturer's literature for specific operating instructions and weights for load calculations.

Exhibit 9.15 – Typical Helitorch.

Plastic Sphere Dispenser (PSD)

The PSD is an aerial ignition tool. The device functions by injecting glycol into a plastic sphere ("ping-pong ball") which contains potassium permanganate. An exothermic reaction starts, and the dispenser expels the primed sphere from the aircraft.

The main frame of the dispenser is constructed of welded aluminum. Power is supplied to the machine from the aircraft power supply through a quick-disconnect fitting and internal fusing. A central control panel contains all the electrical components and switches to operate the different stations such as the main drive, glycol pump, slow-fast speed and the emergency water supply.

For further information, refer to the *NWCG Standards for Aerial Ignition*, PMS 501, https://www.nwcg.gov/publications/501.

See manufacturer's literature for specific operating instructions and weights for load calculations.

Exhibit 9.16 – Typical Plastic Sphere Dispenser.

Slingable Water Bags

Slingable bags are flexible and somewhat self-supporting. They are used to transport and store various liquids such as potable water, water for firefighting, fuel, etc. These bags are designed to be attached to a swivel, which is then attached to the cargo hook or the remote hook/longline, depending on operational needs.

> Avoid placing bags on slopes unless there are personnel on the ground to secure the load and prevent it from rolling downhill. When transporting empty water bags, they must be taped into a compact package and attached to the leadline or longline with a swivel.

Exhibit 9.17 – Typical Slingable Water Bag, Less than 160 Gallons.

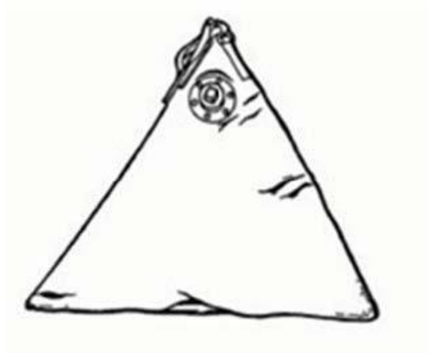


Exhibit 9.18 – Typical Slingable Water Bag, 300 Gallons.

Ground-Based Tank Systems for Helicopter Dipping and Filling

Portable Auxiliary Rigid Water Tanks

Portable auxiliary (rigid) water tanks are designed for water storage during fire suppression or other operations requiring a reserve water supply. Water may be mixed with retardant in the tank using a portable retardant blender. Tanks are available in 600 to 3000 gallon sizes.

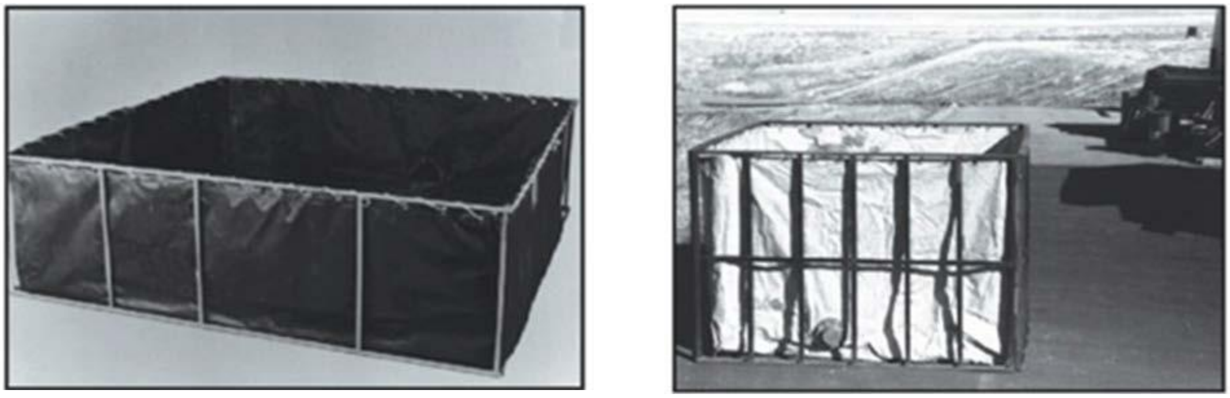
Tanks must be tethered to the ground and rocks placed in the bottom of the tank to prevent them from being displaced by rotor wash.

Inspect all tanks to ensure there are NO rings or protrusions that a snorkel or bucket could catch on. Remove snag hazards or shield them from snorkels or bucket assemblies. If the hazards can't be removed, or otherwise mitigated by shielding or wrapping, remove the tank from service.

Helicopters may dip out of tanks which are filled from either a natural water source such as a stream or from a mobile source such as a water tender.

Helicopters may be used to fill tanks to support fireline operations. This can significantly increase water efficiency, especially during mop up, particularly if tanks are strategically placed.

Exhibit 9.19 – Typical Portable Rigid Water Tank.



Self-Supporting, Open-Top Water Tanks.

Self-supporting, open-top water tanks are also called “pumpkin” tanks because of their bright orange color and pumpkin shape.

Pumpkin tanks come in many sizes and are used to store water or retardant. They may be filled by ground from a water or retardant source for helicopters to dip out of, or they may be supplied by helicopter to support hose lay operations.

Pumpkin tanks are designed to be transportable in a compact, collapsed state. A buoyant collar surrounds the top opening. Hydrostatic pressure supplies the only support.

The top opening of even the largest pumpkin tank may be too small for some buckets to be safely filled.

Exhibit 9.20 – Typical Self-Supporting, Open-Top Tank.

Chapter 10 – Personnel Transport

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, each passenger must meet the definition of authorized/official passenger.

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

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.

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 traveling 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.

Unauthorized Passengers

All personnel who are not official passengers must 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.

Government employees may not be passengers or aircrew members aboard helicopters operated as restricted category aircraft, unless specifically authorized by agency policy.

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.

News Media as Passengers

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.

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

General

A qualified Helicopter Manager or Flight Manager must be assigned to the mission. All requirements regarding use of PPE, flight following, load calculations, and hazard analysis must be followed.

Resource Missions

If the mission is special use, a Project Aviation Safety Plan must 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.

Incident Missions

The Incident Commander on Type I or II Incident Management Teams may authorize flights with media on board. On local unit fires, the line manager or their designee is the approving authority.

> Restricted category helicopters. Carriage of news media aboard restricted category aircraft is specifically prohibited.

Aircrew Member on Board during External Load Mission

As a general rule, only the Pilot must be aboard helicopters when conducting external load operations.

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 FAA exemptions to the FAR 91.119 Minimum Safe Altitudes may also require an observer on board during specific situations. Consult *NWCG Standards for Airspace Coordination*, PMS 520, https://www.nwcg.gov/publications/520.

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.

Personnel Transport Using Military Helicopters

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 *National Interagency Fire Center, Military Use Handbook*, https://www.predictiveservices.nifc.gov/intelligence/military/military_use.pdf, 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.

Project Operations

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

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 must adhere to the procedures outlined in this chapter.

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 must adhere to the procedures outlined in this chapter.

Load Calculations and Manifests

At project or incident helibases and helispots, large numbers of personnel are often moved via helicopter(s). To transport personnel via helicopter, the following guidelines apply.

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

Arrival of Personnel at the Helibase or Helispot

- The person in charge of a group of people needing helicopter transportation (for example, Crew Supervisor, Strike Team Leader, Chief-of-Party) must report to the person in charge of the helibase or helispot and provide a passenger manifest.
- The person in charge should maintain control of personnel at all times.
- 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.

Manifesting Personnel

The manifesting process tracks personnel being transported and ensures that allowable payload limitations are not exceeded. See Chapter 07, “Manifests” for more information.

Other Considerations

The Pilot’s knowledge of helispot location, hazards, etc. On helibases, the use of Aviation Locations Summary, HBM-2, to provide a briefing is required by the Helibase and Helicopter Manager.

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 aircrew or flight crew member is assigned to the flight to assist or,
- One of the passengers is qualified to assist.

Passenger Safety Briefing

A safety briefing must be given to every passenger prior to flight. The briefing should follow the format in the Helicopter Passenger Briefing Checklist. See Exhibit 10.2.

The safety briefing may be given by the Pilot or (as delegated by the Pilot) authorized and qualified personnel such as a Helicopter Manager, flight manager, HECM, or Loadmaster. The person giving the briefing must:

- Ensure that instructions are clear and understood.

- Ensure in-flight emergency procedures are included.

Loading Procedures

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

- Helicopter crewmembers or other authorized, trained personnel must assist in the loading operations.
- Personal items carried on board must be adequately secured.
- Wait for Pilot, helicopter crewmember, or other authorized personnel to give a clear signal for loading before approaching the helicopter.
- 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.
- 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. See ALSE Handbook located at https://www.doi.gov/aviation/library/guides.
- First person into the helicopter passenger compartment should move to center seat, or seat assigned by pilot, helicopter crewmember, or other authorized personnel.
- Find seat belt and fasten; if unable, advise the helicopter crewmember who will assist.
- Ensure that PPE is properly worn (that is, sleeves rolled down and collars up). See ALSE Handbook for PPE requirements.
- Large gear such as fire tools should be handled by helicopter crewmember or other authorized personnel.
- Ensure that all personnel understand the instructions given by pilot, helicopter crewmember, or other authorized personnel.

> When opening hinged doors to embark or disembark, passengers should keep one hand on the door at all times until the door is secured.

In-Flight Precautions

- No smoking during flight.
- Keep clear of controls. DO NOT TOUCH controls except in an emergency when, 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.

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.

> 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 crewmembers or other authorized personnel will normally accompany passengers from the aircraft to the safety zone.

> 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.

Exhibit 10.1 – Standard Helicopter Safety Briefing Checklist.

MANAGER BRIEFING WITH PILOT

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

Aircraft Card: Aircraft Approved for mission?

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

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.

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

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

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

Hazardous Materials: Identify any hazardous materials that will be transported and notify the Pilot. Take appropriate actions.

Exhibit 10.2 – Helicopter Passenger Briefing, OAS-84.

Pilot or designated Helitack must brief all passengers prior to flight.

1. Personal Protective Equipment.
   - Nomex Clothing (long-sleeved shirt and pants, or flight suit)
   - Approved Helicopter Flight Helmet or for fire crew transport only, hardhat.
   - All-Leather Boots.
   - Hearing Protection.
   - Nomex and/or Leather Gloves.
   - Survival Equipment as applicable (PFD, etc.).
2. NO Smoking in or around aircraft.
3. Approach and departure.
   - Stay clear of landing area during approach/departure.
   - Always approach/depart from the down slope (lower) side as directed by Pilot/Helitack.
   - Approach/depart helicopter in a crouch position, do not run.
   - Keep in pilot's view at all times.
   - Do not reach up or chase after loose objects.
   - Never go near the tail of the helicopter.
4. Tools and Equipment.
   - Secure light/loose items awaiting transport.
   - Assign personnel 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 how to operate.
6. In-Flight Discipline.
   - Follow pilot instructions.
   - Loose items inside of aircraft secured and manageable.
   - All baggage secured in aircraft or cargo compartment.
   - No movement inside aircraft once seated.
   - Never throw objects from the helicopter.
   - Keep clear of the flight controls at all times.

- Unbuckle only when directed to do so by Pilot or Helitack.
- Wait for Helitack personnel to open/close doors.
- Know location of first aid kit, survival kit, fire extinguisher, ELT, fuel and battery shutoff switch location and operation, radio operation.

7. In-Flight Emergency Procedures.

- Emergency Exits: Location and how to operate.
- Follow instructions of Pilot/Helitack personnel.
- Snug seat belt and shoulder harness; secure gear.
- Emergency Seating Position (three or four point restraint): Refer to Safety Alert No. Inspection Authorization (IA) SA 13-01.
    - Press your lower torso firmly against the seatback.
    - Grip the seat edge with your hands or place them under your legs.
    - Do not grasp the restraint harness.
    - Forward-facing seat lower your chin to chest.
    - Rear facing seat place your head back against the headrest or bulkhead.
- Move clear of the aircraft only after rotor blades stop or when instructed by the pilot or helicopter crew.
- Assist injured personnel.
- Assess situation, remove first aid kit, survival kit, radio, ELT and fire extinguisher. Render first aid. Attempt to establish contact.

Chapter 11 – Cargo Transport

Introduction

Use of the standard procedures outlined in this chapter will facilitate a safe and efficient cargo operation.

Risk is 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.

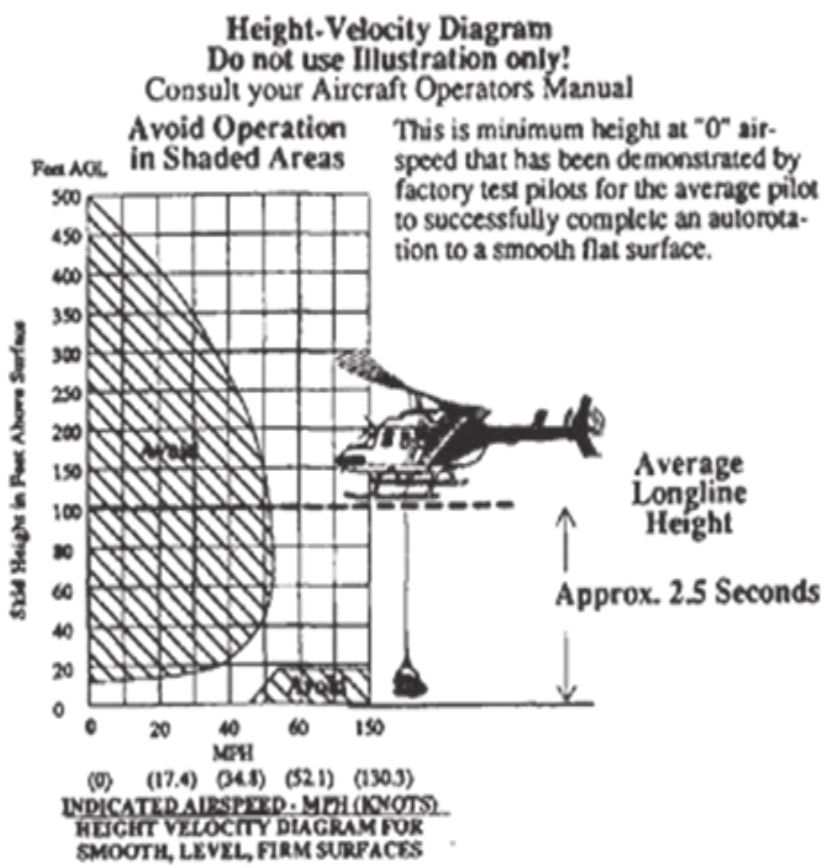
When cargo is transported incorrectly, there is the potential for dropped external loads, hazardous materials spillage in the helicopter, over-grossed aircraft, cargo interference with the rotor systems, or other serious safety hazards. Incorrect methods of rigging and transporting cargo have resulted in catastrophic accidents.

Longline Operations

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!

Exhibit 11.1 – Height-Velocity Diagram.



Qualified Personnel

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.

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 recommendations 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, a Loadmaster, and hookup person.

Pilot Qualification

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

Load Calculations and Manifests

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 for detailed information and instructions.

Aircrew Member on Board during External Load Missions

An aircrew member (for example, the Helicopter Manager) is allowed on board during external load operations, provided certain conditions exist or are met.

See Chapter 10 for further information.

Hazardous Materials Transport and Handling

A list of hazardous materials is contained in 49 CFR 172.101 Department of Transportation (DOT) Hazardous Materials Table.

Some hazardous cargo may be transported via helicopters under special conditions. See 49 CFR 172.

A list of hazardous materials commonly used on incidents, along with the correct transportation procedure for each, can be found in PMS 513, *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513, https://www.nwcg.gov/publications/513, or in local or state agency policy.

HazMat Special Permit, DOT SP 9198

USFS and DOI both have a Special Permit Authorization DOT-SP 9198 granted by the DOT. It exempts USFS and DOI from certain CFR regulations, provided that the materials are transported in conformance with *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513.

If an agency does not have an exemption from DOT, then all materials must be transported in accordance with 49 CFR Parts 171-175.

Requirements

Aviation transport of hazardous materials must conform to procedures contained in *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513. Personnel, including vendors, who engage in the transport of hazardous materials via aircraft, must have been trained in HazMat.

Per the OAS Tech Bulletin TB 2018-02, a copy of PMS 513, *NWCG Standards for Aviation Transport of Hazardous Materials*, the *Emergency Response Guidebook*, and DOT-SP 9198 must be carried aboard each aircraft transporting hazardous materials.

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 PPE according to the requirements found in Chapter 9.

For aviation operations using Active Duty or Reserve Military helicopters, and National Guard units officially "federalized," refer to Chapter 70 of the *National Interagency Fire Center, Military Use Handbook*, https://www.nifc.gov/nicc/logistics/references/Military_Use_Handbook.pdf, for specific policy and procedural information.

Cargo Preparation

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

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 *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513, or 49 CFR Parts 171-175?

Weighing 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.

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.
- The Loadmaster or Supply Unit should mark the destination clearly on the cargo using a heavy marker, or tag each piece.

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.

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 *NWCG Standards for Aviation Transport of Hazardous Materials*. PMS 513, 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 using the carousel hook system, make sure the Pilot is aware of the destination sequence.

Loading and Rigging Procedures

Internal Cargo

All internal cargo must 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 must 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.

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.

Proper Rigging Methods for External Cargo

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.

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 a 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 toward 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. Drogue chute equipment utilizes drag to assist a load with some directional control when in flight. Spoiler equipment should be applied to loads to defeat inherent aerodynamic lifting forces (like covering the leading edge of an airplane wing).

If special rigging equipment is to be considered when building these types of irregular loads, the following will be addressed prior to the mission.

- Equipment attachment and locations that ensures adequate separation between the specialized rigging equipment and the lifting helicopter in all lift phases of the project.
- Inspection of all rigging equipment is performed.
- Drogue chutes will be attached via swivel.
- A plan describing personnel roles when performing the lift.
- Adherence to any manufacturer's recommendations if utilizing commercially available equipment.
- Pilot consultation and final approval of any load flown.

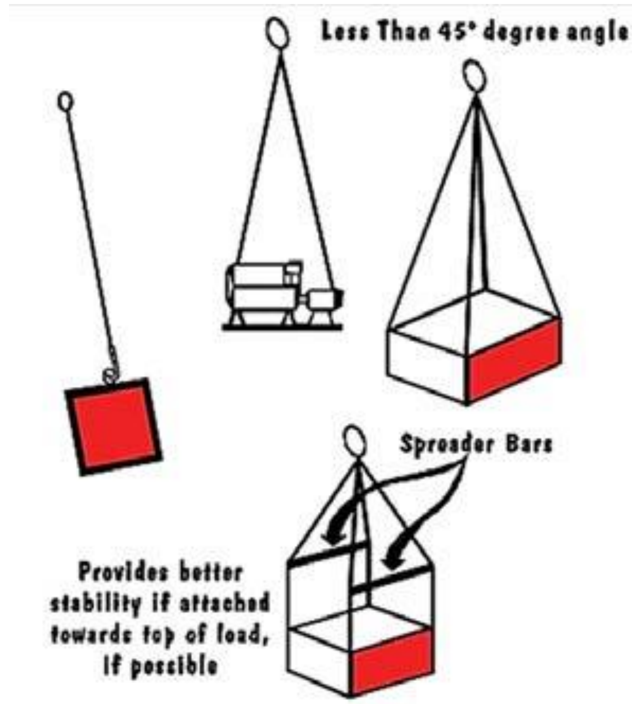
Drogue chutes will only be used on longline loads.

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.

Exhibit 11.2 – Single-, Two- and Four-Point Loads.



Cargo Net

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.

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.
- When using a purse net, 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.
- The use of fiber tape to gather the purse strings of a net is discouraged.
- 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 11.12.
- A swiveling cargo hook may be used in place of a separate swivel on some missions such as bale bombing.
- Multiple nets on one longline may be attached to the cargo hook by a leadline (and swivel!) so that it rides below the other. See Exhibit 11.12.
- Tag each load with destination and total weight of load (net, swivel and other accessories).

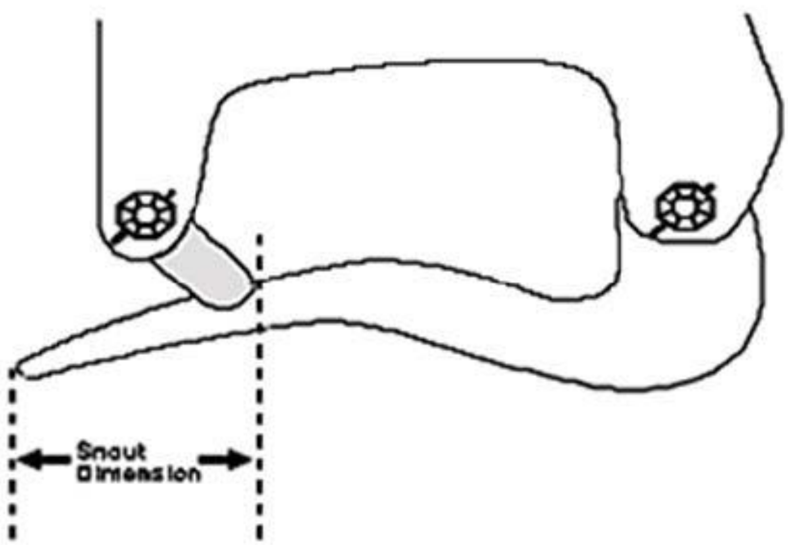
Cargo Hook/Ring Interface

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.

The size or shape of the ring is a significant factor in inadvertently released loads.

- 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.
- See cargo hook manufacturer specifications for acceptable ring size dimensions.

Exhibit 11.3 – Snout Dimension on a Cargo Hook.



Box-like Loads

Box-like loads usually fly very poorly, as they tend to spin. Use a “tail”, e.g., tree branch. Ensure the tail is well-secured to the bottom of the load. See Exhibit 11.4 for diagram of rope tied to load and branch. The branch is used as the tail of the load.

Exhibit 11.4 – Rigging a Box-like Load with a Tree Branch as a Tail.

Pipe

Pipe shackles or hooks allow a number of pipes to be carried.

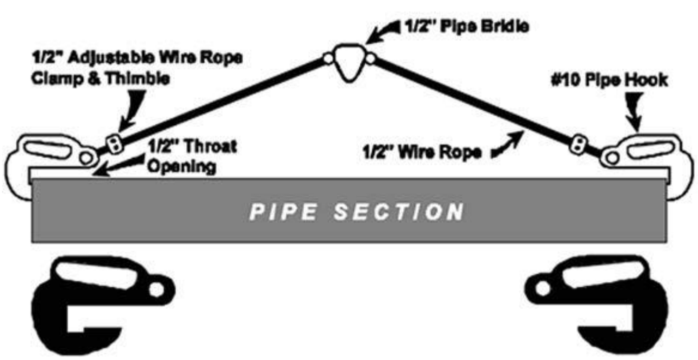
Use of chains as the connecting lines will work for loads of a weight that Type 3 helicopters can carry. Chains are easier to store than cables.

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.

Ensure the shackles are hooked on opposite ends of the same pipe.

Exhibit 11.5 – Rigging Loads of Pipe



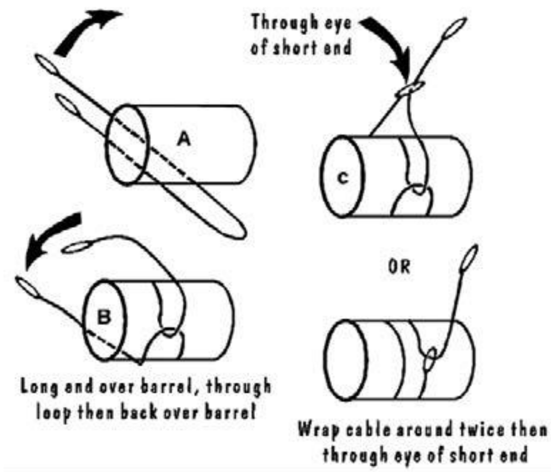
Barrels

Barrels may be rigged by using a choker 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.



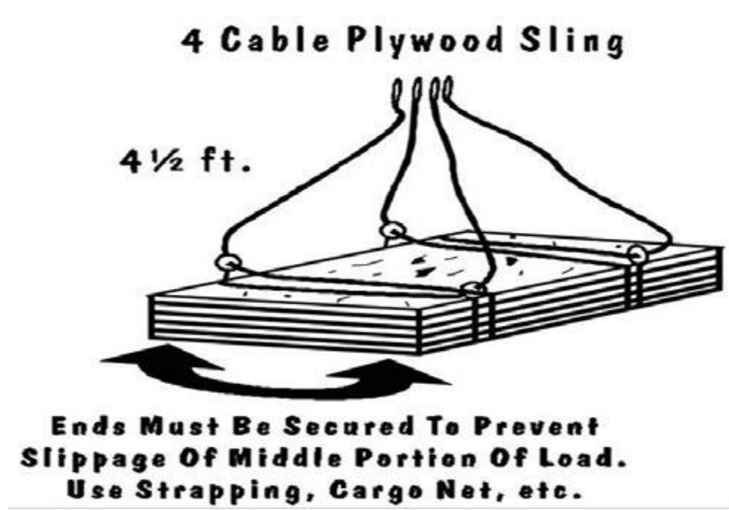
Plywood or Lumber

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.

As shown in the diagram below, ends must be secured to prevent slippage of middle portion of the load. Use strapping, cargo net, etc., to secure the middle items.

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 – Four Cable Plywood Sling.



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.

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 11.8 and 11.9.

Exhibit 11.8 – Rigging Wire Spools.

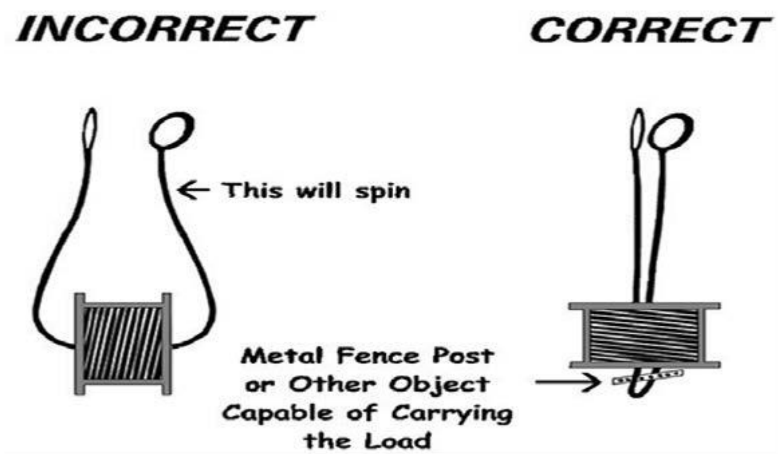
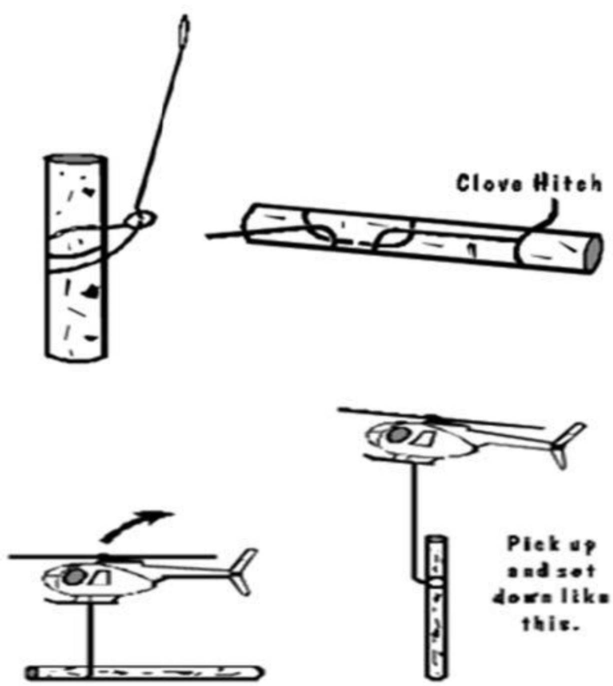


Exhibit 11.9 – Rigging a Single Pole or Log for Flight.



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.

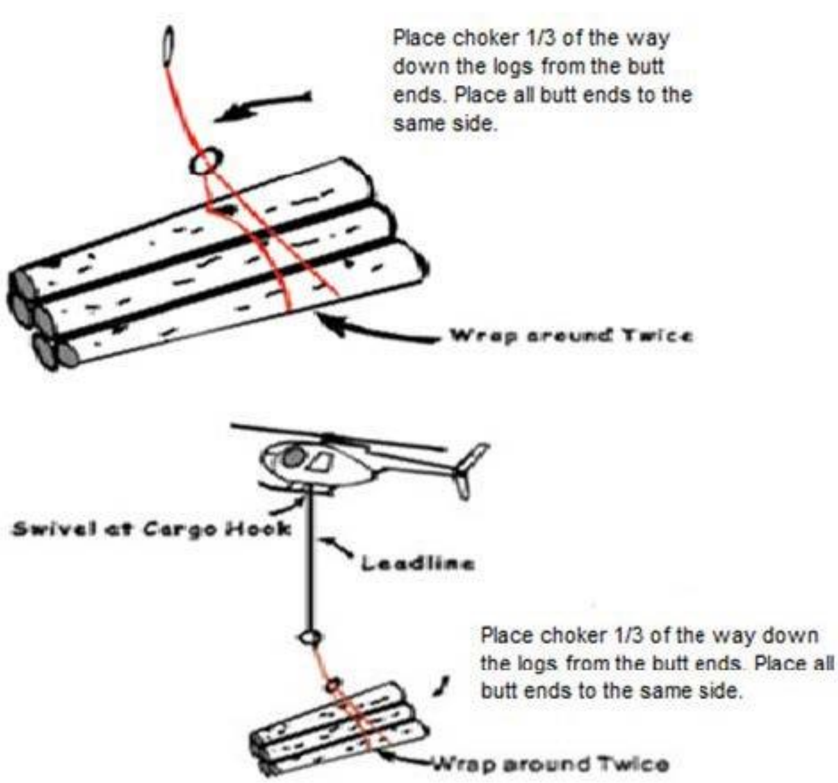
When the load is placed on the ground, the sling will loosen and can be easily removed by ground crew. A remote hook can be useful for releasing chokers, or when you want to retain the lead or longline.

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.

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.

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.

Exhibit 11.10 – Rigging Multiple Poles or Logs for Flight.



Hookup Methods

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

1. Hookup while the aircraft is on the ground.
2. Hover hookup attaching the rigged load directly to the cargo hook (no leadline).
3. Hover hookup using a leadline.
4. Hookup using a longline with or without a remote electric hook or carousel.

Preparation for the Hookup

Basic tasks should be performed prior to performing any external load operation.

- 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 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.

Hookup with Helicopter on the Ground

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

1. Pilot checks manual release to the cargo hook.
2. 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.).

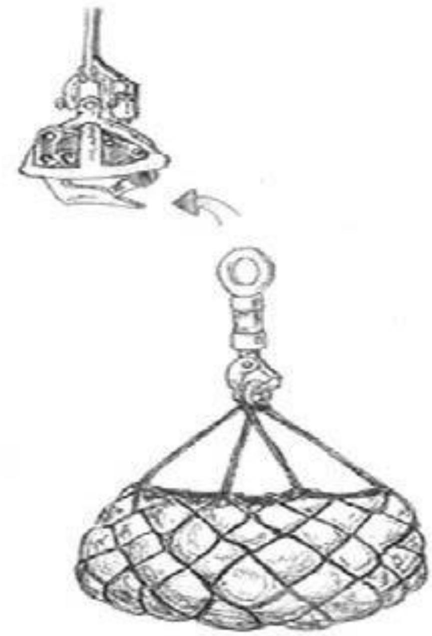
Run the leadline from the load swivel to the cargo hook, ensuring that the line is not near or looped over any skid.

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.

Exhibit 11.11 – Attaching Swivel to Hook.



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.

Hover Hookup with Leadline

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 hookup. If the Pilot is not carded for vertical reference, the bottom of the load must not be more than 50' below the cargo hook.

Exhibit 11.12 – Performing a Hover Hookup.

Hookup with Longline and Remote Electric Hook

Use of a longline with remote electric hook carousel allows the Pilot to place loads at different locations during the same mission.

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.

Exhibit 11.13 – Daisy Chain Configuration.

General Requirements for External Load Missions

Required Personnel

Hookup with helicopter on the ground

Only one person is necessary for this type of operation, since the PARK can accomplish the hookup, then exit and perform marshalling duties.

Hover hookup

Only trained and qualified personnel must perform hover hookup operations. It is recommended that two individuals perform the operation, a PARK and a hookup person.

Longline with remote electric hook

Two people are recommended, a PARK 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.

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 must receive radio communications from only one person.

Hover hookup with or without leadline

It is recommended that the PARK 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.

Hookup with Longline and Remote Electric Hook.

Radio communications between the Pilot and PARK or hookup person is required.

Briefings

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

Standard helicopter hand signals should be used.

- The Pilot should normally receive hand signals from one person.
- There may be instances where terrain dictates the need for two people to give hand signals.

Ensure that the ground crew and Pilot are thoroughly familiar with standard helicopter hand signals. For hover hookups, these should include:

- Use the “Move Downward” signal to indicate the helicopter’s height above the hookup person.
- Use the “Hold Hover” signal to indicate that the helicopter should hold while the hookup person leaves the area.

- Use the “Move Upward” signal to indicate load clearance.
- Use the “Clear to Takeoff” to indicate that it is clear to take off.

Emergency Procedures must be established between the Pilot and ground crew prior to external load operations.

- 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.

Exhibit 11.14 – Standard Helicopter Hand Signals.

External Load Operations

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

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 dip site, check first.

In areas of sloping terrain or with obstacles rising to one or more sides of the cargo pickup/delivery area or dip site, the Pilot must maintain rotor clearance from all obstacles equivalent to the landing area safety circle requirements stated in Chapter 8.

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.

If the helicopter rotor circle is within ½-rotor diameter of the highest obstacle, the pilot should consider increasing the longline length to increase the distance between the rotor and obstacle.

Personal Protective Equipment

See Chapter 9.

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.

Grounding

Static electricity may present a problem to the hookup person when attaching loads to hovering helicopters. 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.

Ways to reduce static shock:

- Allow the remote hook to touch the ground.
- Use rubber gloves.
- Ground 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 key the radio prior to the hookup person attaching the load.

Procedures for Hover Hookups

General

These are standard procedures for any hover hookup, regardless of whether a leadline is used. See exhibit 11.12

- 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 PARK should direct the Pilot by radio or standard helicopter 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 PARK should be far enough back of the load to remain visible to the Pilot at all times.
- The PARK 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 PARK should be approximately at the Pilot's "2 o'clock" position. For aircraft that are flown the left seat, the PARK should be approximately be at the pilots "10 o'clock" position.
- The PARK 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.
- 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 PARK may signal the Pilot to begin moving the load. The PARK 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 PARK must communicate this to the Pilot using the radio or hand signals.
- The hookup person should remain ready to take direction from the PARK should the load or line become snagged.
- The hookup person should never re-enter the load area beneath the hovering helicopter unless the PARK 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 or plugged.
- Appropriate risk management should be applied if the remote electrical hook becomes inoperative during the mission. This may include ground personnel manually releasing the load from the dysfunctional electrical remote hook.
- 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.

Longline With or Without Remote Electric Hook Procedures

Considerations and requirements for longline with or without remote electric hook operations include:

1. The sling load should be placed on the ground in the center of the loading area.
2. 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.
3. For safety purposes, the remote 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 remote hook.
4. Once the remote 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.
5. When attaching a load to the remote 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.
6. 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 remote hook.
7. The hookup person hooks the load to the remote hook and leaves the area. On approach or departure to the remote hook, the hookup person must not step over the longline when attaching the load.
8. Helicopter is then positioned above the load and the load is lifted from the ground and flown out.
9. 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 must not step over the longline when detaching the load.

Cargo Letdown

Cargo letdown is a system that allows the controlled descent of lighter cargo loads (water containers, chainsaws, backpack pumps, etc.) from a hovering helicopter into areas that preclude landing. Refer to agency policy.

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 airspeed. Drops must be made a safe distance from personnel on the ground.

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.

Cargo Freefall Use Criteria and Situations

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

1. The helicopter cannot land safely and the mission has been determined to be tactically essential.
2. Other methods of cargo transportation have been considered and cargo freefall has been determined to be the most efficient and economical method.
3. 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.
4. There is adequate clearance from obstructions in the flight path and at the drop zone.
5. All personnel involved have been thoroughly briefed. This will include the Pilot, spotter, dropper, and all ground personnel.
6. Positive air-to-ground communications are established.

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 establish a 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.
4. **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.
5. **Packing of Fragile 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.
6. **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.

7. **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.

Drop Procedure

The following procedures must be followed.

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

Chapter 12 – Fire Protection and Crash Rescue Procedures

Introduction

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. See Appendix C for the *Interagency Aircraft Rescue and Firefighting (ARFF) Apparatus, Personal Protective Equipment, and Training Specifications* for additional information.

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.

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 helibases, an accident demands an immediate and correct response to prevent serious injury or property damage.

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.

It is essential that employees act within the scope of their training for their protection and that of others.

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.

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

On-Site Accident Preparedness Planning

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.

Some of the information required for site-specific accident preparedness planning at helibases should be available in the local unit preparedness or accident preparedness plan. Information commonly available in the local unit plan includes:

1. Name and location of hospitals and burn units within or near the unit’s administrative boundaries.
2. Name, location, and method of contact for helicopter ambulance services.

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.
- 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).

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:

- Emergency Rescue Information, HBM-15.
- Emergency Medevac/Medical Transport Request, HJA-1.
- Helibase Diagram, HBM-10.
- Aviation Locations Summary, HBM-2.
- Daily Helicopter Operations Briefing, HBM-00.
- Helibase Manager's Reminders List, HJA-2.

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 below guides the user through 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.

Exhibit 12.1 – 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? Have the Pilots been informed of the crash rescue plan?
13. Are all helibase personnel briefed on the plan?

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

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.

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.

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 before every mission?
- 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 personnel been briefed in the event the helicopter makes an emergency landing at the helibase?
- Have helispot personnel been briefed in the event the helicopter makes an emergency landing at the helispot?

Exhibit 12.2 – Emergency Seating Positions.

1. Forward Facing Seat:
    - Press your lower torso firmly against the seat back.
    - Lower your chin to chest. Grip the seat edge with your hands or place them under your legs.
    - Do not grasp the restraint harness.

2. Rear Facing Seat:
    - Same as Forward Facing Seat except place your head back against the head rest or bulkhead.
3. Side Facing Seat:
    - Lean toward the front of the aircraft and brace your upper torso and head against whatever might be contacted, or move the head in the direction of impact to reduce flailing.
4. Move clear of the aircraft only after rotor blades stop or when instructed by the pilot or helicopter crew.
5. Assist injured personnel.
6. Assess situation, remove first aid kit, survival kit, radio, ELT and fire extinguisher. Render first aid. Attempt to establish contact.

See *Interagency Aviation Safety Alert 13-01 Helicopter Brace for Impact Positions*.

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?

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 positioned at a safe distance during helicopter start up?
- Have Parking Tenders been briefed on start-up emergencies and responses?

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:

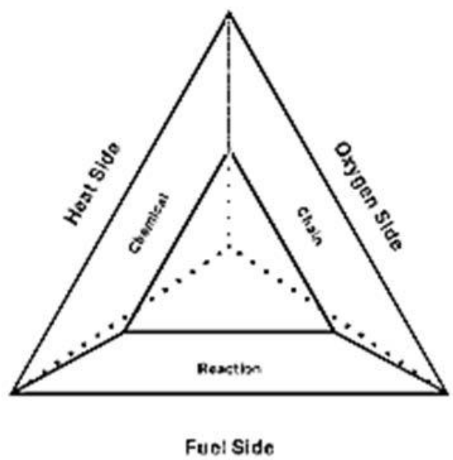
- Have adequate safeguards been provided to control vehicle and personnel movement on the landing area?
- Are there warning signs posted?

- 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?

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. Exhibit 12.3 depicts the tetrahedron with the heat side, oxygen side, and fuel side. This combination results in a chemical chain reaction to produce fire.

Exhibit 12.3 – Fire Tetrahedron



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.

Class A Fire

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 green triangle containing the letter “A”.

Class B Fire

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 (CO_2), 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 red square containing the letter “B”.

Class C Fire

Class C fires involve energized electrical equipment that may present a shock hazard. These fires require de-energizing the electrical equipment and applying CO_2 or halon. Extinguishers suitable for Class C fires are identified by a blue circle containing the letter “C”.

Class D Fire

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 yellow five-point star containing the letter "D".

A dry chemical extinguisher is not the same as a dry powder extinguisher.

Exhibit 12.4 provides a summary that lists the class of fire based on what type of material is burning and the type of fire extinguisher needed to quench the fire. The last column gives the corresponding symbol that would be on the appropriate fire extinguisher.

Exhibit 12.4 – Class of Fires.

Fire Class	Material Types	Extinguisher Type	Extinguisher Symbol
A	wood, cloth, paper, rubber, plastics	water	letter "A" inside green triangle c
B	flammable or combustible liquids	carbon dioxide, foam, dry chemicals or halon	letter "B" inside red square
C	energized electrical equipment that may present shock hazard	carbon dioxide or halon	letter "C" inside blue circle
D	combustible metals	dry powder	letter "D" inside yellow star

Extinguishing Capacity

Fire extinguishers are rated in accordance with American National Standards Institute (ANSI)/UL 711: Rating and Fire Testing of Fire Extinguishers. The ratings are described using numbers preceding the class letter, such as 1A-10B:C. The number preceding the "A" multiplied by 1.25 gives the equivalent extinguishing capability in gallons of water. The number preceding the "B" indicates the size of fire in square feet that an ordinary user should be able to extinguish. There is no additional rating for class "C", as it only indicates that the extinguishing agent will not conduct electricity, and an extinguisher will never have a rating of just "C".

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.

Extinguishers Types Most Commonly Used

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.

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.

Carbon Dioxide (CO_2)

Carbon dioxide (CO_2) 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 CO_2 is the possibility of losing consciousness or being suffocated in an enclosed space or low-lying place.

Dry Chemical

Dry chemical extinguishers are normally rated for Class B and C fires, but some are rated A, B, and C.

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 CO_2 under pressure. When the cartridge of the second type is punctured, CO_2 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.

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.

Halon

Halon extinguishers are generally rated for Class B and C fires. Some may have a Class A rating as well. Halon, like CO_2, 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.

Dry Powder

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

- 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.
- 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.

Requirements

Extinguishing Agent for Helicopter Landing Areas

The required extinguisher for helicopter landing areas is a 20A-120B: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.

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, PPE shall be worn at all times by helibase support personnel so as not to delay an immediate response to an accident.

> 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.

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 8 outlines the minimum requirements for fire extinguishers, evacuation kits, and crash rescue kits at helicopter landing areas.

<u>Fire extinguisher</u>

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

<u>Crash rescue kit</u>

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.

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.

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.

> It is not recommended that agency personnel in a (AFFF)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. See Appendix C for training and equipment requirements. Strategy and Tactics.

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.

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.

Helicopter Makes and Models

Crash rescue diagrams of many frequently used helicopters are provided in Appendix I 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.

Briefings

Since the diagrams provide only information generic to a model, they must be supplemented with a pilot aircraft briefing which addresses the specific features of each helicopter assigned. Briefing material should include, but is not limited to:

- Door operation.
- Location of battery and fuel cell.
- Location of emergency shut offs.
- Location and operation of emergency exits.
- Location and operation of the ELT.
- Location of the first aid kit and fire extinguisher(s).
- Operation of crew/passenger restraint devices.

All of the above items are part of the Helicopter Passenger 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.

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.).

Sequence of Actions

Recognizing that accidents are all different, there is a general sequence of actions to follow.

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.
- Do not approach until the rotors and other moving components are at rest.

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?

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.

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.

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.

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.

Rescue of Occupants

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

- Secure the area.
- Locate and then determine the condition of the occupants.
- Evacuate uninjured occupants first, if possible.
- Evacuate injured occupants.
- Document and/or photograph the location of any debris that must be disturbed in order to carry out rescue and/or fire suppression activities.

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 with fire 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 12.5.

Exhibit 12.5 – Seat Belt Cutter.

Fatalities

In an emergency triage situation, common sense dictates that personnel who have been fatally injured receive lower priority for extrication 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 agency or Incident Management Team (IMT) Public Information Officer (PIO) should be informed as soon as possible to deal with media inquiries. Follow Mishap Response Plan.

When bodies are either interfering with operations or are mentally affecting first responders, it is appropriate to move the bodies.

Critical Incident Stress Debriefing (CISD) may be needed after accident.

Fatalities are also discussed at the end of this chapter.

Extrication and Evacuation

Site safety precautions that should be considered: Aircraft wreckage sites can be hazardous for many reasons other than adverse terrain or climatic conditions. Personnel involved in the recovery, examination, and documentation of wreckage may be exposed to physical hazards such as hazardous cargo, flammable and toxic fluids, sharp or heavy objects, and disease. It’s important to exercise good judgment, use available protective devices and clothing, and use extreme caution when working in the wreckage.

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 extrication, it is critical that the helibase ABRO or other individual assigned be making the contacts identified in the Medical Plan, ICS 206 and/or Crash Rescue/Medevac/Evacuation Plan, HJA-4.

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 Emergency Medical Services - Helicopter Ambulance Request Information, HJA-1, to obtain and relay information. See Appendix B for further information. 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.

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.

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

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.

Remote Fuel Site Reminders List, HJA-3, is a job aid that can be used by Helibase Managers and Fueling Specialists.

Responsibilities

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.

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 and reported via SAFECOM.

Fuel Vendors

Vendors conducting business for the transportation, storage or dispensing of aviation fuels, including into-aircraft operations, must adhere to the procurement document provisions and specifications. These operations must be in accordance with the standards and procedures specified in applicable ANSI or National Fire Protection Association (NFPA) publications.

Pilots

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

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.

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 READ 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.

Types of Fuel

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

Aviation Gasoline (AVGAS)

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

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

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:

- Kerosene based (Jet A, Jet A-50, JP-8, and Jet A-1)
- Blends of gasoline and kerosene (Jet B and JP-4)

Most commercial operators use Jet A or Jet A-50. The military normally uses JP-4 and JP-8. The specifications for JP-8 are similar to Jet A except that JP-8 has required additives for anti-icing, anti-corrosion, and anti-static.

Identifying Types of Fuel

Fuel Color

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

Exhibit 13.1 – AVGAS Color

Grade	Color
AVGAS 80/87	red
AVGAS 100 LL	blue
AVGAS 100/130	green

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 will issue a Notice to Airmen (NOTAM) and a special alert bulletin to pilots warning of the color conflict.

Exhibit 13.2 – Turbine Fuel (Jet Fuel) Color

Grade	Color
Jet A, Jet A-50, Jet A-1, Jet B, JP-4, JP-8	clear or straw-colored

Fuel Equipment 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.

<u>Fuel Servicing Vehicles</u>

Each aircraft fuel servicing vehicle must be conspicuously and legibly marked with an identification decal to indicate the product contained in the vehicle. The markings must be on each side and the rear of the vehicle in letters at least 3” high. Decals on vehicles must be marked as follows:

Exhibit 13.3 – Fuel Servicing Vehicle Product Markings

Grade	Markings
AVGAS 80/87	white letters on red background
AVGAS 100 LL	white letters on blue background
AVGAS 100/130	white letters on green background
Jet A, Jet A-50, Jet A-1, Jet B, JP-4, JP-8	white letters on black background

<u>Valves and Piping at Permanent Storage Facilities</u>

Valves, loading and unloading connections, switches, and other control equipment must 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.

Hose Lines

Hose lines must be marked by decals or labeled adjacent to the nozzle to indicate the type of fuel dispensed.

Portable Storage Facilities

Containers

- Bulk Collapsible Tanks (Bladders and Rollagons). Large fixed collapsible tanking facilities, as well as their accessory fueling lines and equipment, must be marked or decal attached in accordance with the requirements for vehicles in Section V.
- 250 and 500 Gallon Collapsible Rollagons. Each end of a rollagon must be marked in letters at least 4" high with the type and/or grade of fuel in the container.
- 55-Gallon Barrels. The top head or sides of a 55-gallon barrel must 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.

Agency authorization is required for use of 55-gallon fuel barrels.

- 5-Gallon and Smaller Containers.
- All containers must be marked with the type and/or grade of fuel contained. In many cases the 5-gallon containers are marked by the fuel manufacturer.

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.

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.

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.

> 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
  - Particulates are present
  - Water is present

Fueling Hazard

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 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.

Be aware of conditions that introduce additional sources of ignition and/or increase the likelihood of fuel or fuel vapors escaping.

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.

> 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.

Ignition Sources

In any area 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.

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.

> 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.

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.

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

> "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.

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.

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.

Grounding Requirements

The NFPA no longer recommends grounding aircraft during refueling operations. Due to the particular difficulty involved in grounding helicopters at off-airport sites, the NFPA recommendation 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.

Bonding Requirements

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.

Pre-Bonding Inspection

Check condition of the bonding cable and plug. Procurement document language will usually state required bonding equipment condition.

Connecting the Bond

Bonding must be performed as follows, in order (omit grounding steps if not required):

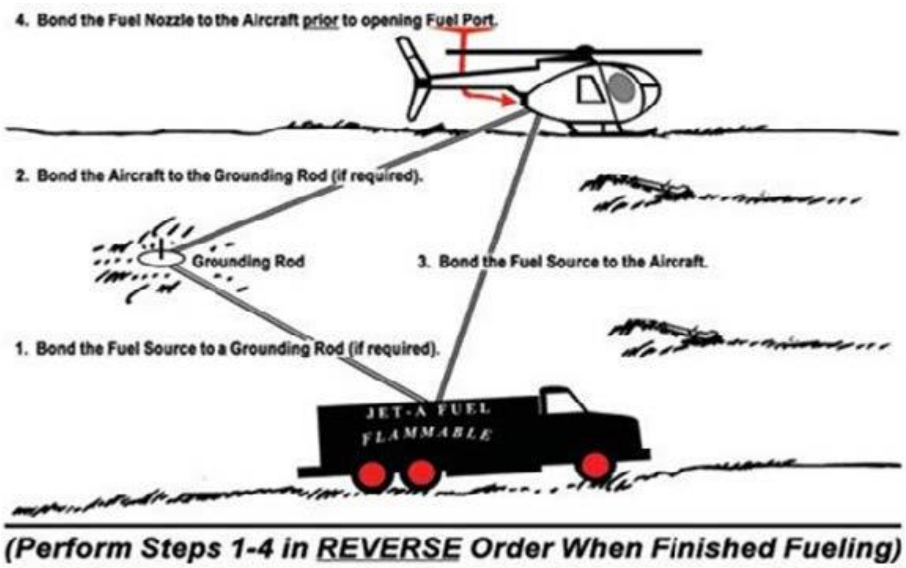
- Bond the fuel source to a grounding rod (if available and required).
- Bond the helicopter to the grounding rod (if available and required).
- Bond the fuel source to the helicopter.
- Bond the fuel nozzle to the helicopter prior to opening the fuel port.

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).

Exhibit 13.4 – Correct Bonding Procedure



Rapid Refueling

Hot refueling of helicopters is permitted if requested by the government representative. Equipment used for hot refueling operations must meet all NFPA 407 Standard for Aircraft Fuel Servicing requirements which is available at https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=407.

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

Government personnel must 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.

Vendor Fueling Operations

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.

Government Responsibility

The government representative (for example, Helibase Manager, Helicopter 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.

Government Participation

The government must not participate in vendor fueling operations. Personnel must 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.

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 must 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 must 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 must 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 must 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 procurement document specifications 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.

Fuel Servicing Vehicle Driver Qualifications

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

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.

General Guidance and Requirements

Prior to the start of operations, the refueling site manager (for example, FUEL) may use the Remote Fuel Site Reminders List, HJA-3, to ensure that operations are set up and conducted correctly. Parts of the HJA-3 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 OAS Aviation Fuel Handling Handbook located at https://www.doi.gov/aviation/library/guides for additional information.

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 ABRO and a PARK.

Personal Protective Equipment

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

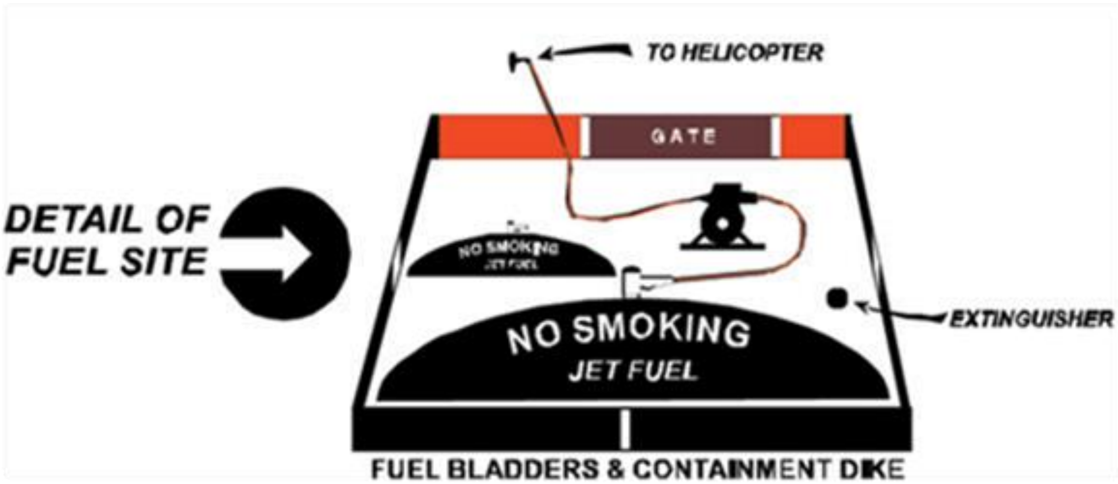
Fueling Site Layout

Fueling sites should be laid out according to the following general guidelines. Refer to the OAS Aviation Fuel Handling Handbook located at https://www.doi.gov/aviation/library/guides for additional information.

The fueling site should be separate from the main area of helicopter operations.

- There should be a minimum of 185 feet pad-to-pad separation between Type 1 helicopters.
- There should be a minimum of 140 feet pad-to-pad separation between Type 2 helicopters.
- There should be a minimum of 110 feet pad-to-pad separation between Type 3 helicopters.
- The fueling equipment at a fixed fueling site (pump, fuel source) must be at least 20 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 headwind.
- 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 13.5 – Government Fueling Site Layout



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 setup.
- 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.

Equipment Setup

<u>Distances</u>

- As stated above, the fueling equipment (pump, fuel source) at a fixed fueling site should be at least 20 feet outside the rotor disk of the nearest helicopter.
- The fuel source should be downwind of the aircraft exhaust to reduce the fire hazard.

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.

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.

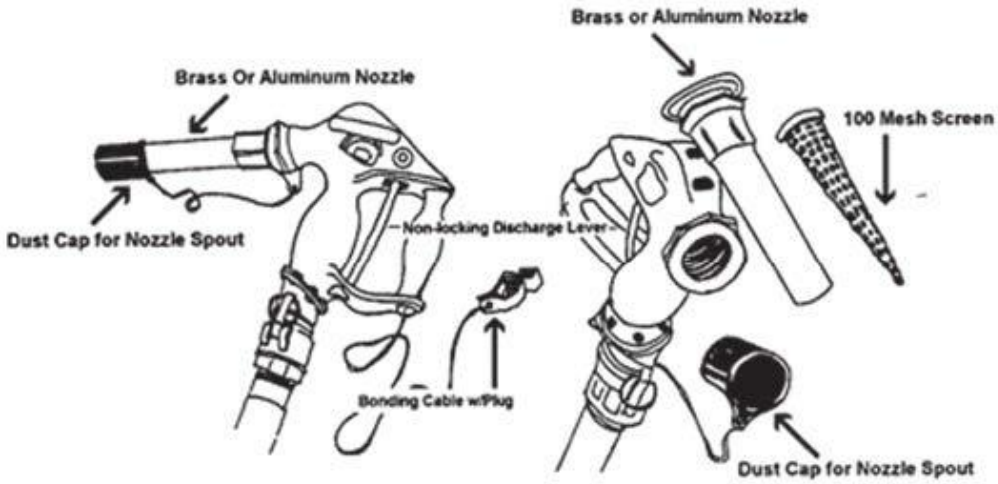
Aviation Fuel Nozzle Requirements

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.

> 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 13.6 – Fuel Nozzle Requirements.



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.

<u>Portable Fueling Equipment Pressure Differential Gauge(s)</u>

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 require 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.
  - Replace the element.
  - Re-check the pressure differential with new element in place.

<u>Flow Rate</u>

Per specification on pump rating, determine flow rate in gallons per minute (GPM):

- Re-circulate 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. Consider:
  - 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.
- Use clean gloves when changing elements; do not touch elements with dirty hands or 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.

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 Aircraft Fuel Facility Inspection Log, HCM-3. 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 must be performed prior to each use of the fueling site.

Daily Inspections

Fuel site and equipment must be visually checked daily for leaks. If found, follow local procedures for hazardous materials spills. 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.

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.

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.

Record Keeping

The HCM-3 must be used for required record keeping. The individual responsible for fueling and/or the fuel source will keep a record containing the following information:

1. Condition (clean, clear, bright, etc.) of the tank sump sample, filter sump sample and nozzle sample.
2. Flow rate in GPM to the nearest 1/10 gallon.
3. Filter change, reason and date.

Fuel Spills

The information in this section is consistent with all NFPA 407 Standard for Aircraft Fuel Servicing requirements which is available at https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=407. It 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 preventative maintenance of the fueling equipment. Close attention on the part of every person responsible for fueling is required to prevent fuel spillage. Personnel must follow the guidelines listed below.

Refer to Chapter 12 for crash rescue and firefighting procedures regarding fuel spills.

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.

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.

Spill 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, must be used when aircraft are fueled from drums.
- Pouring or gravity flow must 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.

Spill Mitigation Procedures

> 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.

> 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: a spill 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 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.

> 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.

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

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.

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

Introduction

Requirements for contract aircraft maintenance are found in the procurement document.

If questions arise concerning helicopter maintenance, consult with a DOI/USFS approved Maintenance Inspector as soon as possible.

Inspection

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

All Contract Aircraft

The aircraft has been inspected by DOI/USFS approved Maintenance Inspectors according to agency inspection criteria. Inspected aircraft will be issued an aircraft qualification card.

Military Aircraft

Military aircraft are not issued qualification cards.

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

Cooperator Aircraft

Cooperator aircraft are approved via Letter of Approval issued by the USFS/DOI-Office of Aviation Services Regional Office.

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 procurement document do not prohibit this activity. Additionally, some agencies require that mechanics are carded for specific aircraft.

When a Pilot functions as a mechanic, duty day and/or flight time limitations may be affected, per the procurement document or agency directive.

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.

Mechanic Approval

Generally, if the contract requires an on-site mechanic, the contract will require the mechanic meet certain interagency experience standards and possess a current qualification card.

Chapter 5 provides additional information regarding mechanic approval.

Maintenance Ferry Flight

Ferry flights may be necessary to relocate an aircraft to a suitable maintenance location for scheduled or unscheduled maintenance purposes. If the airworthiness of the aircraft is questionable, the vendor must seek authorization from the FAA prior to ferrying the aircraft to a site where repairs may be performed and no government passengers may be on board.

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 hours 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.

Scheduled Maintenance

Helicopters will be maintained in accordance with the vendor's FAA-approved 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:

Maintenance Specific Duties Performed by the Pilot

<u>Daily Preflight Check</u>

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.

<u>Helicopter Turbine Engine Power Check</u>

A Helicopter Turbine Engine Power Check will 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 Helicopter Turbine Engine Power Check will be accomplished by the vendor in accordance with the Rotorcraft Flight Manual. The results will be recorded and either kept in the helicopter or at the assigned work location. A record of the Helicopter Turbine Engine Power Check will be kept with the aircraft.

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

Helicopter turbine engine power 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.

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 to indicate all required functional/operation checks have been satisfactorily completed. Passengers are not permitted to be aboard the aircraft during test flights. Consult agency Maintenance Inspector for specific test flight requirements.

Inspections or Maintenance Performed by the Mechanic

50/100-Hour Inspections

The vendor will usually provide the necessary maintenance personnel and equipment to inspect and service the aircraft in the field. In order to minimize time out of service and 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.

Annual Inspection

An annual inspection is required once every 12 calendar months. This inspection is similar to the 100-hour inspection in scope and detail, and must be performed by a qualified A&P mechanic with IA. This inspection will not be overflown.

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.

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 will not be overflown unless the vendor has an FAA-approved extension from the manufacturer.

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.

Unscheduled Maintenance

A SAFECOM is used to report any condition, observation, act, maintenance problem, or circumstance with personnel or the aircraft that has the potential to cause an aviation-related mishap. Consultation with a DOI/USFS approved Maintenance Inspector prior to submission is encouraged.

USFS

Do not return aircraft having mechanical or equipment deficiencies to service until the aircraft has been approved by an authorized aircraft inspector.

When any unscheduled maintenance or repairs are performed for mechanical or equipment deficiencies, a DOI/USFS approved Maintenance Inspector and the Contracting Officer will be notified for “return to contract availability”, before the aircraft may again be allowed to fly under the contract. Depending on the complexity of the maintenance or repair, “return to contract availability” may be given by electronic or verbal means.

DOI

The vendor must immediately notify the COR and COTR of any change to any engine, power train, flight control or major airframe component or of any major repair following an incident or accident and must describe the circumstances involved.

DOI contracts do not require an aircraft to be returned to availability by a DOI/USFS approved Maintenance Inspector after maintenance. The vendor returns the aircraft to “service” after maintenance is completed with a logbook entry by the mechanic and by the pilot if a test flight was required. The Helicopter Manager returns it to “contract availability” when notified by the vendor that they are back in service.

DOI vendor aircraft operate under Federal Aviation Regulations and are maintained by trained and qualified maintenance professionals. DOI/USFS approved Maintenance Inspectors are available to help the on-site aircraft manager assess the efficacy and appropriateness of corrective actions documented by the vendor mechanic.

Examples where technical assistance from a DOI/USFS approved Maintenance Inspector may prove beneficial are:

- Any unscheduled maintenance action requiring a post maintenance test flight for the purpose of ensuring discrepancy correction.
- Anytime the manufacturer requires a Conditional Inspection be performed, e.g., hard landing, blade or prop strike, sudden stoppage, engine or rotor over-speed, engine or transmission over-temp, over-torque, engine compressor stall or surge.
- Any condition affecting flight control maneuverability or responsiveness.
- Any un-commanded jettison of external loads.
- Malfunctioning of vendor provided equipment such as buckets, seeders, torch equipment, etc.
- Any repair following an incident or accident.

State and local agencies

Consult agency directives.

Chapter 15 – Helibase and Helispot Management and Operations

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.

Helibase Managers should assure a method to access and share relevant electronic forms, documents and databases. These include:

- Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00.
- Helibase Manager's Reminders List, HJA-2.

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.

Coordination with Project Aviation Manager or ASGS and AOBD

Coordination, communication and cooperation with the Project Aviation Manager, ASGS, and AOBD are 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.

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:

1. Helibase Manager's Reminders List, HJA-2
2. Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00.

These are the primary management tools and job aids of the Helibase Manager. A complete review of checklist 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.

Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00

The use of the Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00, is mandatory at all multiple-helicopter bases by the start of the second operational period. It shall be completed on a daily basis thereafter.

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, HBM-10, Helispot Information Summary, etc.).

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 HBM-00 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.

If any item on the HBM-00 has not been accomplished, approval is required from the Incident Commander, Project Aviation Manager, or designee (for example, the AOBD). Detail the deviation on the HBM-00, General Message ICS 213 or other format. A signature from the official approving the deviation is required. This documentation must be attached to the HBM-00.

Pilots are required to sign the HBM-00 on a daily basis.

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 HBM-00. 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 the initial briefing will result in a smooth transition from initial/extended attack to incident management helibase operations, and should increase safety awareness and efficiency significantly.

Helibase Manager's Reminders List, HJA-2

The use of the Helibase Manager's Reminders List, HJA-2 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.

Briefing/Debriefing Schedule

Briefing and debriefing schedules vary according to incident or project requirements.

Note the necessity for the Helibase Manager and primary staff (DECK, ABRO) 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.

Briefing Time Frames

- Depending upon complexity of operations and Pilot duty day requirements, provide for adequate time prior to the "aircraft start" time shown on the Air Operations Summary, ICS-220.
- Remember, part of this period must be provided for helicopter preflight prior to the "aircraft start" time.
- Adjust times as necessary, but be prepared to meet "aircraft start" times identified.
- The Helibase Manager and primary staff should be preparing for the briefing at least 15-30 minutes prior to the scheduled start.
- All operational and safety problems identified during the previous nightly debriefing should be corrected. Remember to review the HJA-2.

Debriefing Time Frames

- The debriefing should be accomplished as soon as practical 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 the next day's plan.
- At this time, the next day's plan (if available) should be reviewed.
- 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.

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 HBM-00 Section I for personnel and organizational items that must be checked prior to the start of operations. Refer also to HJA-2 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 ASGS and/or AOBD 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 effectively. 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.

Helibase Setup and Layout

See Exhibit 15.1 for a typical helibase layout. HJA-2 Section I, Helibase Site Selection and Layout should be reviewed during initial site selection.

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, HJA-2, 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.

Obtaining Necessary Equipment

The Helibase Manager should work with incident supply unit leaders or local aviation managers to obtain required equipment for large incidents or project work.

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.
- PPE.
- Portable tanks and water bags.
- Tents.
- Aerial ignition equipment.
- Miscellaneous administrative and office supplies.

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.

Facilities and Layout Consideration

Operations and Communications Area

Refer to Exhibit 15.1 for an example. One of the first priorities is the establishment of a helibase operations and communications area. See Chapter 4 for additional information.

Location

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

Setup

Set up communications equipment in an area in which the ABRO 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.

Communications Equipment

The use of radio headsets to counter helibase noise is strongly encouraged. See Chapter 4 for more information.

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.

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.

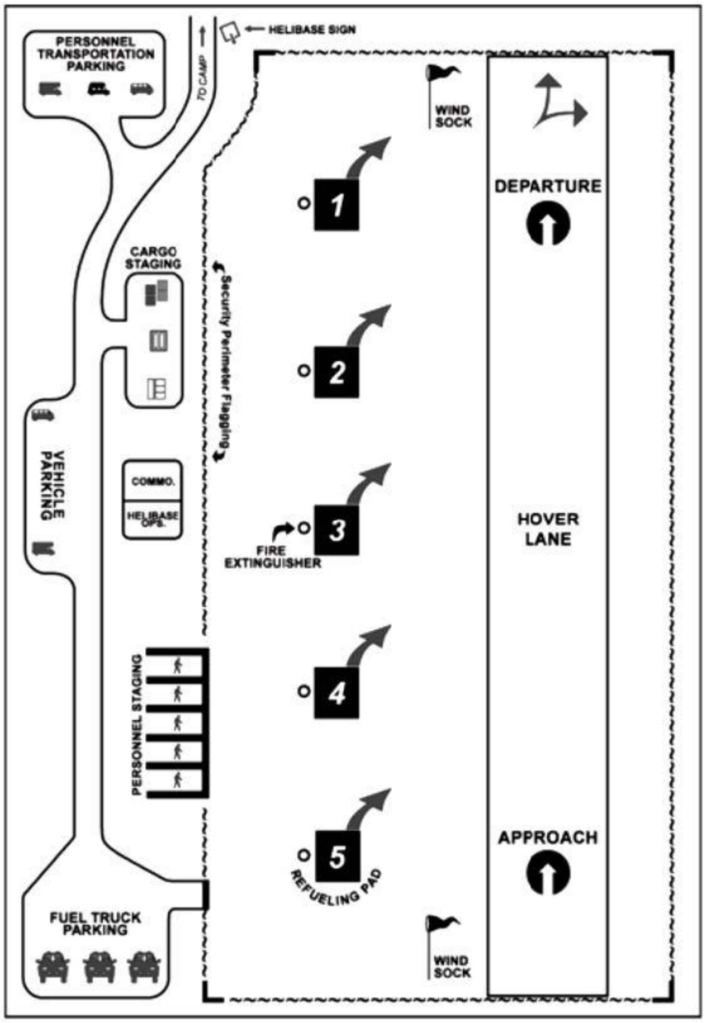
Approach and Departure Paths

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, HBM-10. See Exhibit 15.1

Exhibit 15.1 – Example of the Helibase Facilities, Hazard, and Flight Route Map, HBM-10, Filled Out.



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).

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 HBM-10.

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 HBM-10.

Helibase Security

Cordon off the helibase to control vehicle and foot traffic.

Request security as needed.

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.

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 HBM-10.

Weighing

Set up scales for weighing personnel and cargo.

> 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.

Signing

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

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.

Display Board

A display board is an essential part of any helibase operation to facilitate information posting, exchange, and briefing requirements. Refer to Exhibit 15.2.

- 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, HBM-10.
- 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, HBM-00.
- Load calculations for representative elevations and temperatures for all helicopters assigned, or Helicopter Load Capability Summary - Multiple Helispots and Fuel Loads, HCM-10.
- Allowable Payload Chart, HBM-4.
- Emergency Rescue Information, HJA-4A.
- Standard Aircraft Safety Briefing.

Helibase Eating Area and Arrangements

An area for eating meals should be established and posted on the HBM-10.

The Helibase Manager should coordinate immediately with the Project Aviation Manager or the ASGS regarding meal arrangements.

Helibase and Vendor Personnel Sleeping Area

One or two general sleeping areas for personnel should be immediately designated and posted on the HBM-10. Sleeping areas should be well away from the helibase operational area, hover lanes, and flight paths to avoid the effects of rotor wash.

The Helibase Manager should make his/her sleeping area known to the ASGS 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.

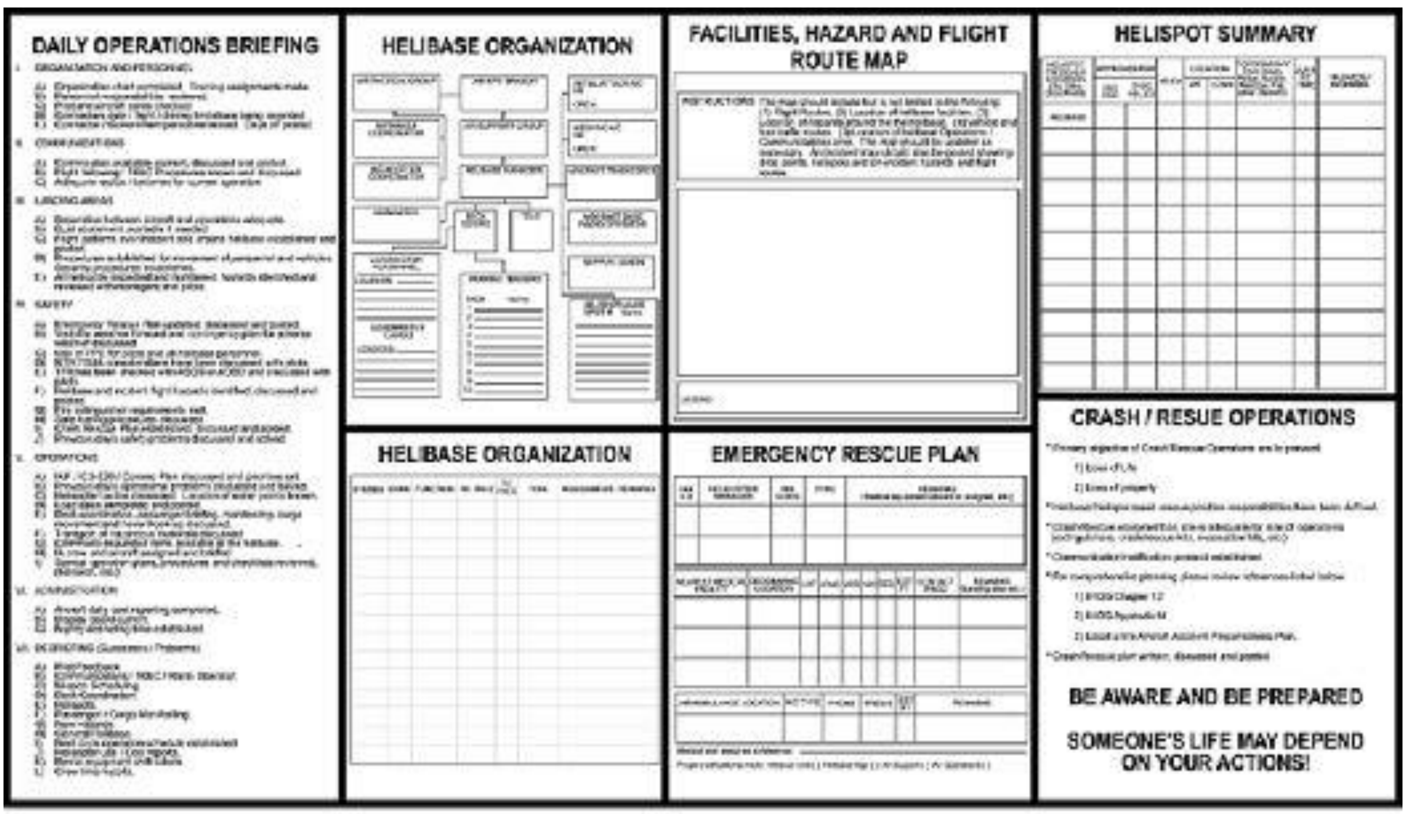
Modifying the above by allowing Pilots to sleep in motels or other available facilities on a rotating basis every third night.

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.

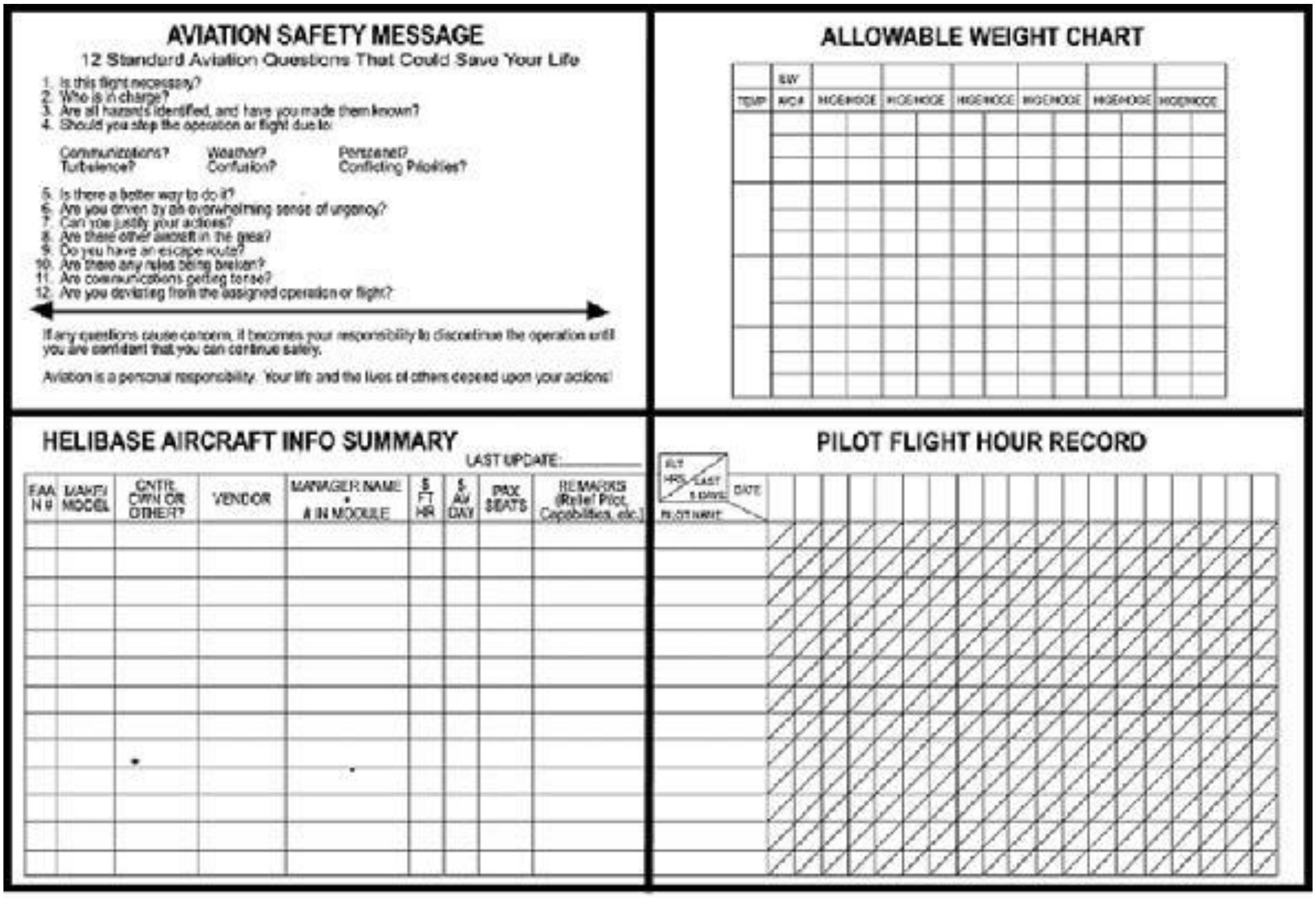
All sleeping areas shall be policed prior to the morning briefing and all equipment and supplies secured.

Exhibit 15.2 – Example of a Helibase Display Board, Part 1 of 2.



NFES 2866 S-371 Helibase Manager, Helibase Display Board Part 1 (2007)

Exhibit 15.3 – Example of a Helibase Display Board, Part 2 of 2.



NFES 2867 S-371 Helibase Manager, Helibase Display Board Part 2 (2007)

Helispot Considerations

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.

Consider assigning more than one helicopter crewmember to busy helispots.

Consider assignment of a Helicopter Manager or Helibase Manager to helispots at large camps.

Helicopter Crewmember who 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.

Establishing Helispots

All helispots must be approved regarding hazards and capability (HIGE or HOGE) by the appropriate incident or resource project authority. Pilots are a good source of input.

The AOBD is responsible for the establishment of all helispots. In the absence of an AOBD, the ASGS is responsible. In the absence of the ASGS, the Helibase Manager is responsible. On resource projects without a full aviation staff, the Helibase Manager or Helicopter Manager is responsible. In any case, close coordination with and authorization by the local Resource Advisor to construct helispots is required.

Refer to Chapter 8 for additional landing area information.

The Aviation Locations Summary, HBM-2, should be initiated and updated as new helispots are established. Its primary use is for Pilot safety briefings.

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) 20A-120B: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. The Single Helicopter Load Capability Planning Summary - Multiple Helispots and Fuel Loads, HCM-10, 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).

> 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.

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. Final approval for helispot use rests with appropriate agency authority or delegate.

Some of the considerations regarding facilities and layout of helibases also apply to helispots. Refer to HJA-2 Section II, Helispot Site Selection and Layout, for items which should be checked during the establishment of any helispot. Also refer to Chapter 8 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 ingress-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.

Dipsite Considerations

Personnel and Organization

Dipsite management may enhance safe and efficient operations. A dipsite is staffed at the discretion of the Helibase Manager based on expected dipsite activity, accessibility and risks involved. The Helibase Manager is responsible for ensuring appropriate personnel are assigned and briefed.

- Personnel managing dipsites should maintain communications with the Helibase Manager and Division Supervisor.
- Communicate and coordinate with the public, law enforcement and/or public safety official(s) to assure that the public are clear of dipsite operations and not exposed to hazards, when applicable.
- Include all Dipsite personnel in a post operational debrief.

Establishing Dipsites

The dipsite should be located as close to the incident area as practical that allows for quick turnaround, easy access, and lots of water. The dipsite will be identified by name and mapped and placed on the Aviation Locations Summary Form, HBM-2. Other considerations when establishing dipsites should include:

- Permission should be obtained for both water usage, land owner(s) and other affected entities prior to use.
- Attention will be given to hazards associated with the spread of non-native aquatic species and will be addressed.
- Flight paths of aircrafts to incident and overflight risks to the public.

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 dipsite. This equipment includes:

- Incident Action Plan or Project Aviation Safety Plan, Air Operations Summary (ICS-220), Communications Plan (ICS-205), and local Mishap Response Plan/Crash Rescue Plan, commensurate with incident complexity.
- One (1) dry chemical, 20A-120B:C rated fire extinguisher.
- One (1) crash rescue kit.
- VHF-FM Radio(s) and VHF-AM Radio(s).
- GPS device.
- Mobile phone.
- Fiber/Electrical tape.
- Necessary pump/hose kits, fuel, and pump parts (if applicable).
- Food and water.
- Extra Batteries.

- Wind indicator(s).

Layout Considerations

The proper selection and improvement of dipsites is essential to both the safety and efficiency of helicopter operations. Dipsites that are poorly located or without improvements may lead to a mishap. At a minimum, inadequate Dipsites heighten risk, increase Pilot workload, and may result in inefficient operations. The layout should allow visibility, assure rotor clearance from hazards and minimize public and firefighter exposure to hazards. Other considerations include:

- Dipsite selection should provide for approaches and departures in several directions. Approach/departure paths should be aligned with the prevailing wind. Avoid one-way and "hover-hole" dipsites.
- Dipsites should be free of hazards i.e. dust, trees, power lines, structures and located in areas with clear flightpaths.
- Perform any necessary hazard reduction and safety improvements to the dipsite using recommendations from pilots, aerial supervision and land owner or land management direction.
- Dipsites can be difficult to monitor as they may not have road access, in these cases, Air attack may be the best tool for monitoring hard to reach dipsites.
- Identify nearby landing area(s) that may be used for helicopter equipment troubleshooting and/or emergency landing.
- Place wind indicators as needed.
- Post warning and informational signs as appropriate.
- Make crash rescue equipment such as fire extinguishers and crash rescue kits available, visible, and accessible as appropriate for the site.
- Identify staging areas for water tenders, routes of ingress and egress, and coordinate movement with the dipsite manager and dipsite activity. Personnel/vehicle staging areas should not be under approach/departure or near the emergency landing site.
- Coordinate with PIO and/or law enforcement/public safety official(s) to assure that the public are clear of dipsite operations.
- Dipsites located in rivers or large bodies of water may require a boat to appropriately manage dipsite operations.

Communications

Communications is one of the most important aspects of helibase operations. A good Communications Plan and network will greatly increase chances of success.

Communications problems must be solved immediately. Close coordination with the AOBD or Project Aviation Manager is essential. See Chapter 4 for more information.

- HBM-00 Section II, Communications, must be completed on a daily basis prior to the start of operations.
- HJA-2 Section IV, Communications, should be reviewed as needed by the Helibase Manager.

Safety

Safety items as specified in HBM-00 Section IV 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.

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 HJA-2 Section V.

Operations

HBM-00 Section V, Operations, must be completed on a daily basis prior to the start of operations.

The Helibase Manager should review HJA-2 Section VI, Operations.

Demobilization of Aircraft and Personnel

The Helibase Manager should review HJA-2 Section VII, Demobilization, when it is anticipated a helicopter will be demobilized. Although use of Helicopter Demobilization Information Sheet, HBM-09, is optional, it facilitates the orderly demobilization of air and associated ground resources.

Rehabilitation

The Helibase Manager should review HJA-2 Section VIII, Rehabilitation, 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.

Demobilization and Deactivation of the Helibase

Aside from the physical cleanup considerations of demobilization addressed in HJA-2 Section VIII, Rehabilitation, 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 HJA-2 Section V.

Additional Considerations

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 *National Interagency Fire Center, Military Use Handbook* for specific policy and procedural information.

Pilot Informational Needs

Most Pilot informational needs are provided through use of the HBM-00 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 current copy of the following:

- Incident or Project Map marked with hazards, helispots, drop points, dip sites, etc.
- Air Operations Summary, ICS 220.
- Incident Radio Communications Plan, ICS 205.

It is the Helibase Manager's responsibility to communicate hard-copy needs of the above to the ASGS, AOBD or Project Aviation Manager.

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 Maintenance and Avionics Inspectors.

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

Close adherence and attention to the items in the HBM-00 and HJA-2 will usually ensure a positive evaluation. The evaluation team completes the following:

- Reviews the HBM-00 items, checking for compliance.
- Reviews the HJA-2 items, checking for compliance.
- Evaluates management relationships to determine if coordination and communication are occurring.
- Determines if training opportunities are being offered.
- Reviews maintenance and avionics inspectors' findings.

Chapter 16 – Law Enforcement

Introduction

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.

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. This may also apply to the MOU or Letter of Authorization (LOA) being used. The helicopter manager must be familiar with these documents to ensure that the aircraft are being used appropriately.

Agency-specific policy may exempt law enforcement from some standard helicopter operating procedures. 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 or in agency-specific policy must follow the procedures outlined in previous chapters.

The leader of each law enforcement mission will complete a rapid risk assessment. For examples, refer to Chapter 3.

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 Helicopter Manager and Resource HECM.

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 latters aircraft and Pilots.

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 must adhere to all agency policy except those personnel involved in operations defined as covert. Special exemptions granted by the agency will then apply, but only in specific areas defined in the exemption.

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

Rappel and Short-Haul Operations

All rappel and short-haul missions conducted by agency law enforcement personnel must conform to the procedures as outlined in their agency requirements.

Use of the Incident Command System Aviation Structure

The use of the Incident Command System is recommended for all law enforcement aviation operations, including incidents-within-incidents.

Aerial Supervision/Airspace Coordination

For operations involving multiple aircraft, it is recommended that an aerial supervisor be assigned (ATGS, HLCO) to perform aerial supervision and airspace coordination duties. This individual may operate from either a fixed-wing aircraft or helicopter.

The requirements of FAR CFR 91.119 regarding maintaining minimum safe altitudes from persons or property on the ground apply.

Also see *NWCG Standards for Airspace Coordination*, PMS 520, https://www.nwcg.gov/publications/520, for specific criteria regarding air space.

Flight Following, Resource Tracking and Communications

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

Grid Map Reference

The area where flights will occur is gridded on a map and each grid area is given a code. The flight plan and grid map are 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-in is performed using coded grid references rather than geographical location descriptors.

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 must meet the requirements outlined in Chapter 4.

Satellite Flight Following

Flight following via an automated reporting satellite system is highly recommended, since no voice communication is necessary. The military often has this option available. The helicopter manager can ask for a contact number for the facility that is tracking the aircraft in the event that radio communications with the aircraft are lost.

Personnel and Equipment Approval and Carding

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

Non-Emergency Operations

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

Use of other law enforcement agency, DoD, National Guard, or Coast Guard aircraft flown by that agency's Pilots 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 non-carded Pilots who have been approved under the MOU or LOA.

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 often involve search and rescue or medevac operations being conducted by local authorities using public agency, military, commercial or private aircraft.

- Authorization must be given on a case-by-case basis by the law enforcement officer in charge or Incident Commander. Verbal approval is acceptable, but should be followed up with written documentation.
- A written justification statement must be prepared by the law enforcement officer in charge or the Incident Commander and submitted to the appropriate Aviation Manager within 24 hours of the completion of the mission. A SAFECOM should be submitted as soon as practical.

Helicopter Capabilities and Limitations

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

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 policy exemption, when flying undercover in a suspect's helicopter.

When using military aircraft, use of a PPC is acceptable.

Helicopter Landing Areas

Standards outlined in Chapter 8 must 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.

Equipment Requirements and Maintenance

Refer to Chapter 9 for standard requirements and procedures.

Exemptions from aviation PPE requirements are agency-specific and must 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.

Law enforcement operations may require the use of specialized equipment. In these situations, consult with the local Unit Aviation Manager.

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.

Transport of Injured Officers

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

Transport of Canines

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

Transport of Prisoners

When prisoners are transported by aircraft, the following guidelines must be used. These guidelines are 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 LEO sitting next to the prisoner. It is not advisable to seat a prisoner where the prisoner has access to the Pilot or controls.
- LEOs at the receiving landing area should be briefed and available for pickup and transportation of the prisoner.

Cargo Transport

Refer to Chapter 11 for standard requirements and procedures.

The following specifically applies to law enforcement operations.

Transport of Evidence

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

Transport of Hazardous Materials

With the exception of defensive equipment, all transportation of hazardous materials during law enforcement operations must follow the procedures of *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513. Weapon control, readiness for use, and method of transport is the responsibility of the LEO.

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 aircraft, the following safety precautions must be taken.

- Brief Pilots on weapons type(s) and safety policy.
- Long guns (shotguns, rifles, etc.) must not have a round in the chamber unless the tactical situation as determined by the LEO dictates, the Pilot has been briefed, and all agency guidelines and requirements are followed.
- Hand guns may be loaded and must be holstered.
- Fully automatic weapons must 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.

Transport of Pyrotechnic Devices

When carrying pyrotechnic devices in the aircraft, follow safety procedures in *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513.

Transport of Hazardous Chemicals

When carrying hazardous chemicals in the aircraft, the following safety precautions must be taken.

- Brief Pilots on material and safety policy.
- All clandestine laboratory paraphernalia must be transported under the direction of a designated hazardous materials response team.

Fire Protection and Crash Rescue

See Chapter 12 for standard requirements and procedures.

Fueling Operations

See Chapter 13 for standard requirements and procedures.

Helicopter Maintenance

See Chapter 14 for standard requirements and procedures.

Maintenance requirements for cooperator or military aircraft should be established by MOU or LOA.

It is essential that a thorough preflight check of the aircraft be made to detect sabotage.

Helibase and Helispot Management and Operations

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

Law Enforcement Helibase

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

Law Enforcement Helispots

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

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 it may be prudent for the agency to provide security.

Fuel Truck

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

Administration

Appendix D provides guidance on helicopter administration, including Contracting Officer, Contracting Officer’s Representative, and PI 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

Introduction

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

All activities not covered in this chapter must 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 SAR missions, it is critical that SAR personnel possess thorough knowledge of all aspects of helicopter operations.

The leader of each helicopter SAR mission must implement the rapid risk assessment and management techniques discussed in Chapter 3.

> It is very easy to become caught up in the urgency of a mission, especially those involving life-threatening situations. Regardless of the emergency, never forget to follow basic helicopter procedures.

Personnel Duties and Responsibilities, Qualifications, Certification and Training

All SAR aviation operations should be conducted by qualified Helicopter Managers and crew members in accordance with agency requirements for Resource Helicopter Manager and Resource HECM.

Operational Planning

Types of Missions:

- Reconnaissance.
- Low-level flight.
- Short-Haul.
- STEP.
- 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.

Rappel, Cargo Letdown, STEP and Short-Haul Operations

The use of rappel, cargo letdown, STEP or short-haul requires approval, training and qualifications in accordance with agency policy.

Use of the Incident Command System Aviation Structure

Use of the Incident Command System (ICS) is recommended for all SAR operations, including incidents-within-incidents.

Aerial Supervision and Airspace Coordination

For operations involving multiple aircraft, it is recommended that an aerial supervisor (ATGS, HLCO) be assigned to perform aerial supervision and airspace coordination duties. This individual may operate from either a fixed-wing aircraft or helicopter.

The requirements of [FAR CFR 91.119] regarding maintaining minimum safe altitudes from persons or property on the ground apply.

Additional information is referenced in *NWCG Standards for Airspace Coordination*, PMS 520, https://www.nwcg.gov/publications/520, for specific criteria regarding airspace.

Flight Following and Communications.

Flight following procedures as described in Chapter 4 must be followed.

Personnel and Equipment Approval and Carding.

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

> The agency managing the SAR operation may have a LOA or MOU that allows use of other-agency or military aircraft that contains standards for Pilot and aircraft approval.

Emergency Operations

In certain life-threatening emergencies, it may be necessary for personnel to deviate from policy. This may include seating configuration, PPE and riding in unapproved aircraft and/or with unapproved Pilots. A SAFECOM outlining the deviation from policy should be submitted as soon as practical.

Don't become part of the emergency! Choose an aircraft capable of meeting performance requirements for the mission.

The following must govern emergency situations where deviation from policy occurs:

Authorization must be given on a case-by-case basis by the Incident Commander (IC). Verbal approval is acceptable, but should be followed up with written documentation.

A written justification statement must be prepared by the IC and submitted to the appropriate Aviation Manager within 24 hours of the completion of the mission. A SAFECOM should be completed as soon as practical.

Non-Emergency Operations

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

Helicopter Capabilities and Limitations.

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

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 a PPC is acceptable.

Helicopter Landing Areas

Standards outlined in Chapter 8 must be followed.

It is recognized that landing areas may not always be optimal. Nevertheless, particular care should be exercised in selecting landing sites for SAR operations.

Equipment Requirements and Maintenance

Refer to Chapter 9 for standard requirements and procedures.

Exemptions from aviation PPE requirements are agency-specific. These generally apply to the use of alternative PPE for extreme environmental conditions. The IC has the authority to invoke the waiver and this should be documented as specified in the waiver document.

SAR operations may require the use of specialized equipment. In these situations, consult with the local Unit Aviation Manager.

High-visibility flight suits for SAR personnel are highly recommended to allow Pilots to more readily locate personnel on the ground.

Personnel Transport

See Chapter 10 for general requirements and procedures.

During emergency operations, some requirements for PPE for personnel transport may not be met. 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 mission management.

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

Transport of Medical 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.
- The use of PPE for patients is case dependent. Factors to consider include the nature of the injury/illness, urgency of the injury/illness, and the ability to monitor the patient's condition.

Transport of Canines

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

Cargo Transport

Refer to Chapter 11 for standard requirements and procedures.

Fire Protection and Crash Rescue

See Chapter 12 for standard requirements and procedures.

Fueling Operations

See Chapter 13 for standard requirements and procedures.

Helicopter Maintenance

See Chapter 14 for standard requirements and procedures.

Maintenance requirements for cooperator or military aircraft should be established by MOU or LOA.

Helibase and Helispot Management and Operations

See Chapter 15 for standard requirements and procedures.

Appendix A – Helicopter Management Forms and Checklists

Introduction

This appendix provides standardized forms for the management and operation of a single helicopter. Such standardization helps to implement common procedures among participating agencies to meet mutual safety, efficiency, fiscal management, and contract administration objectives. The forms also provide a basis for training development and presentation.

The Helicopter Management Forms and Checklists are found at https://www.nwcg.gov/publications/510.

Applicability

The forms in this appendix are used by Helicopter Managers, whereas those in Appendix B and Appendix C are to be used in the management of helibases.

However, several of the Helicopter Management (HCM-series) forms contribute to the informational requirements of the Helibase Management (HBM-series) forms. It is therefore essential that Helicopter Managers use these forms as appropriate or required when operating as part of a helibase organization.

Some of the forms are required for all helicopter operations; some are required only for incident operations. Others are optional and may be used at the discretion of the Helicopter Manager or local aviation management staff as part of the unit's helicopter operation. Certain optional forms may be required by the air operations staff at an incident or project due to a specific management informational need.

The use and applicability of other contracting forms such as Contract Instruction, Notice-to-Proceed, etc., are discussed in agency contract administration guides.

Exhibit A.1, Helicopter Management Forms Summary, on the following pages is a summary listing of the HCM-series forms, including information concerning the purpose of the form, the HCM test form number, whether a form is optional or required for all or only certain situations, responsibility for completion, and frequency of completion. The Helicopter Manager may use this chart as a quick-reference guide to form requirements. The pages following the chart contain a comprehensive discussion of each form.

Helicopter Managers for Exclusive-Use and CWN should obtain copies sets of all forms so that they may respond to different management requirements encountered.

Electronic HCM Forms

The electronic load calculation is available as a training tool or may be used in lieu of the booklet form. The form is an Excel worksheet and makes automatic computations as data is entered by the Pilot or government representative. It is really no different than the paper version; Equipped Weight, Computed Gross Weight and Gross Weight Limitations must be derived by flight manual reference and entered by the pilot.

Please be aware of the following important notes:

- Save to hard drive prior to using.
- The entire worksheet is protected. The format and function cannot be altered. Worksheets can be completed, named and saved individually.
- As the cursor is moved over a field, a Comment Box will appear offering explanation or instruction for that field.
- Information is entered into the yellow fields by the user.
- The blue cells are locked and data cannot be entered by the user. They perform automatic functions.
- If the electronic format is used for actual helicopter operations, the form may be printed out in color or in black & white, signed by the Pilot and Helicopter Manager and retained.
- Full-size, fillable HCM forms are available at http://www.nwcg.gov/publications/510.

Exhibit A.1 – Helicopter Management Forms Summary.

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
Aircraft Contract Daily Diary, OAS-137 or HCM-1	Provide daily documentation of contract activities, significant occurrences, deficiencies, actions by the contractor or government, etc.	Required	Pilot and Helicopter Manager	Per helicopter/day	Actions, discrepancies, etc. Should be documented as they occur. Form may be adjusted for specific needs
Call-When-Needed Pre-use Checklist, HCM-2	Ensure the helicopter and service truck meet requirements and specifications contained in the procurement document.	Required for CWN or ARA	Helicopter Manager	Once prior to use	Discrepancies should be reported to the Contracting Officer and appropriate Aviation Manager. Do not use the aircraft or service truck until discrepancies are corrected and approval is received.
Aircraft Fuel Facility Inspection Log, HCM-3	Provide an inspection format for aircraft fuel facilities.	Required for government fuel facilities	Helicopter Manager	Per local agency policy	All government-owned facilities and contractor owned facilities as specified in the procurement document.
Helicopter Turbine Engine Power Assurance Check, HCM-4	Gather engine performance data which when graphed may indicate power fluctuations that may lead to engine failure.	Information required other forms OK.	Pilot or Helicopter Manager	Per contract	Data may be graphed on HCM-5. Information must be recorded. Other formats are acceptable.
Turbine Engine Performance Trend Analysis, HCM-5	Graph information recorded from HCM-4.	Information required other forms OK.	Pilot or Helicopter Manager	Per contract	This information must be trended in some manner. Other formats are accepted.

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
Helicopter Information Sheet, HCM-6	Provide air operations personnel with information regarding the pilot, ground crew and aircraft.	Required	Helicopter Manager	Once upon arrival at incident or project	Form should be completed before leaving home unit for Exclusive-Use Aircraft or at the beginning of CWN use, and presented to Helibase Manager on arrival at incident. Form may be adjusted for specific needs
Helicopter Crew Information Sheet, HCM 7	Provide air operations personnel with information regarding assigned crew and qualifications.	Required	Helicopter Manager	Once upon arrival at incident or project	Form should be completed before leaving home unit for Exclusive-Use aircraft or at the beginning of CWN use, and presented to Helibase Manager on arrival at incident. Form may be adjusted for specific needs
Interagency Helicopter Load Calculation, OAS-67/FS5700-17	Ensure helicopter is capable of carrying a specified load to an identified elevation at a given density altitude.	Information required, other forms OK	Pilot and Helicopter Manager	Daily & prior to flight	Complete a new calculation with changes in temperature, altitude, etc. Post appropriately.
Interagency Helicopter Passenger/Cargo Manifest, HCM-9	Allow the helicopter manager to track passengers and weights.	Information required, other forms OK	Helicopter Manager	Per flight	A manifest must be completed for each flight. Other formats are acceptable.
Helicopter Load Capability Summary Multiple Helispots and Fuel Loads, HCM-10	Allow the Helicopter manager to plan missions safely and efficiently to different elevations and temperatures at varying fuel loads.	Optional	Helicopter Manager	Incident or projects	Must be based on completed load calculations for all temperatures and elevations shown.

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
Aircraft Dispatch Form HCM-11	Provide Helicopter Manager and Pilot with information that may be critical to flight safety.	Optional	Helicopter Manager or Aircraft Dispatcher	Per dispatch	Used upon dispatch to an incident. Other formats are acceptable.
Pilot Flight Time/Duty Day Cumulative Log, HCM-12	Track pilot duty and flight time to ensure specification are not exceeded	Required	Helicopter Manager	Per pilot	Required for all pilots.
Fuel Servicing Driver Duty Day Cumulative Log, HCM-13	Track driver duty time and days off to ensure specifications are not exceeded	Optional	Helicopter Manager	Per driver	This form is used to keep track of extended standby time and days off only. The driver is responsible for tracking DOT duty time.
Mechanic Duty Day Cumulative Log, HCM-14	Track mechanic duty time and days off to ensure specifications are not exceeded.	Required	Helicopter Manager	Per mechanic	This form is used to keep track of extended standby time and days off only.
Helicopter Daily Use and Cost Summary, HCM-15	Summarizes helicopter use and costs for each helicopter on an incident or project.	Required	Helicopter Manager	Per helicopter/day	Must be completed at the end of the operational period.

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
Helicopter Contractor Performance Assessment Report System, per contract. HCM-16	Enable Helicopter Manager to evaluate the contractor on performance.	Per procurement document	Helicopter Manager	End of assignment	Send a copy to the Contracting Officer at the end of each assignment.

Aircraft Contract Daily Diary, OAS-137 or HCM-1

Purpose

The purpose is to provide daily documentation of contract activities.

Applicability

The form is required for all Exclusive-Use contract helicopters, fire and project, as well as fire CWN. Its use is also encouraged for rental helicopters utilized for more than one day.

Responsibility and Instructions for Completion

It is the responsibility of the Helicopter Manager to complete the form on a daily basis. The Helicopter Manager should document significant occurrences, deficiencies, actions by the contractor or government, etc.

If nothing of significance occurred, an entry indicating such should be made. Higher levels in the contract administration structure (for example, the Contracting Officer's Representative) are encouraged to utilize a continuous documentation log rather than the single-sheet format shown here.

Routing and Filing

Routing and filing is indicated at the bottom of the form and is as follows:

White - Project Inspector (PI in DOI) or COR in USFS).

- Yellow - Contracting Officer.
- Pink - Local Air Officer (USFS), State/Regional/Area Air Officer (DOI), or as identified by state/local agencies.
- Copies should be routed to appropriate personnel concurrently with copies of agency flight payment documents.

Posting

None

Related Forms

HCM-2, Call-When-Needed Pre-Use Checklist, is the start of contract documentation for CWN helicopters.

Certain occurrences that are documented on the Aircraft Contract Daily Diary may require submission of an agency incident/hazard report.

CWN Pre-Use Checklist, HCM-2

Purpose

The purpose is to ensure fire CWN or fire rental helicopters meet requirements and specifications as contained in the procurement document.

Applicability

The form is required to be completed for all fire CWN or fire rental helicopters prior to use. It may also be utilized for project rental helicopters as a checklist to document the condition of the helicopter. However, not all of the items indicated as required for fire are required for projects.

Responsibility and Instructions for Completion

Pre-use inspections should be accomplished prior to arrival of the helicopter at the incident by the Helicopter Manager, an agency aircraft inspector, or other authorized aviation management personnel.

The Helicopter Manager is responsible for either ensuring the inspection has been completed (ask for signed copy from vendor), or completing the checklist prior to the utilization of the helicopter.

Discrepancies must be reported immediately to the aircraft contracting organization, as well as to the state, area, or regional aviation officer or his/her representative. Do not use the aircraft until discrepancies have been rectified and/or permission is given to utilize the aircraft.

Completion is self-explanatory.

Routing and Filing

The Helicopter Manager should keep the completed form unless requested to route it differently.

Posting

None.

Related Forms

Aircraft Contract Daily Diary, OAS-137 or HCM-1, should be initiated simultaneously with the CWN Pre-Use Checklist, HCM-2. Discrepancies should be noted on the OAS-137 or HCM-1.

Aircraft Fuel Facility Inspection Log, HCM-3

Purpose

The purpose is to provide an inspection format for aircraft fuel facilities to ensure that fuel quality is maintained and fuel spills do not occur.

Applicability

The information on this form is required for:

- all fixed or mobile helicopter fueling facilities operated by the government, or
- vendor-owned facilities on government land that is operated by a vendor.

Responsibility and Instructions for Completion

The vendor is responsible for inspecting vendor-owned facilities located on government land, or government-owned facilities for which the vendor is contractually responsible. For example, the vendor is required to maintain and fill a remote fuel cache.

The government shall ensure that inspections are performed with the frequency indicated.

A government representative (for example, the Helicopter Manager or local Unit Aviation Manager) is responsible for inspecting government-owned facilities.

Items are checked according to the frequency indicated. Refer to Chapter 13, Fueling Operations, for further information.

Remote facilities for which the required frequency of inspection (for example, daily or weekly checklist items) is not feasible must be fully inspected prior to the use of fuel in the facility.

Routing and Filing

For facilities for which the vendor is responsible, the vendor shall provide the government representative (for example, the Helicopter Manager or PI) with a copy of each monthly inspection. A copy shall be furnished to the COR in federal agencies, and to an appropriate individual as identified by state and local agencies.

For facilities for which the government is responsible, the contract PI shall furnish a copy of each monthly inspection to aviation management personnel as identified by the agency.

Posting

None.

Related Forms

Any discrepancies regarding facilities for which the vendor is responsible should be noted on OAS-137. The Helicopter Manager should file an agency incident/hazard report concerning any fuel cache discrepancies, regardless of who has the responsibility for maintaining the site. For fuel spills at the site, other local, state, and federal reporting regulations apply.

Helicopter Turbine Engine Power Assurance Check, HCM-4

Purpose

The purpose is to gather engine performance data which, when graphed with subsequent power checks, may indicate power fluctuations that potentially could lead to engine failure.

Applicability

This form is optional. The vendor or agency Pilot is required to complete the power assurance check every 10 hours of flight for all fire Exclusive-Use and fire CWN helicopters and for project Exclusive-Use contracts. 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 conditions, i.e., weather, smoke.

The power assurance check shall be accomplished by the contractor in accordance with the Rotorcraft Flight Manual or approved company performance monitoring program. The results shall be recorded and kept in the helicopter or at the assigned work location. A current record of the power assurance checks will be maintained with the aircraft. 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.

Responsibility and Instructions for Completion

The Pilot is responsible for completing the form and furnishing a copy to the Helicopter Manager.

Since power check procedures differ according to make and model of aircraft, refer to the Flight Manual and record appropriate readings according to procedures specified.

Chart definitions are as follows:

- PA = Pressure Altitude.
- OAT = Outside Air Temperature.
- N1 = Gas Producer Speed.
- N2 = Engine RPM.
- T.O.T. = Turbine Outlet Temperature.
- T.P.T. = Tail Pipe Temperature.
- I.T.T. = Inter Turbine Temperature.
- Type of Check = Hover.
- Performance Reading = TOT/ITT values and/or % of RPM from aircraft instruments.
- Chart Reading = TOT/ITT values and/or % of RPM from performance chart.
- Margin Difference = Difference between the aircraft performance and chart values.

Routing and Filing

The Pilot furnishes the Helicopter Manager with a copy of the Power Trend Analysis; it becomes part of the contract file.

Posting

None.

Related Forms

Information may be transferred to Helicopter Turbine Engine Performance Analysis Chart, HCM-5.

Helicopter Turbine Engine Power Assurance Check, HCM-4.

Turbine Engine Performance Trend Analysis, HCM-5

Purpose

The purpose is to graph the data collected every 10 hours from the HCM-4. When graphed with subsequent power checks, power fluctuations that might lead to engine failure may be indicated.

Applicability

This form is optional. The information on this form is required to be maintained in accordance with the procurement document.

Responsibility and Instructions for Completion

The Pilot is responsible for graphing the data.

Routing and Filing

None.

Posting

The graph should be posted at the permanent helibase and taken with the service truck (not the helicopter) on off-unit incidents or projects.

Related Forms

HCM-4 is utilized to record values for input to the HCM-5.

The Helicopter Manager should document discrepancies on the agency incident/ hazard report and note them on OAS-137.

Turbine Engine Performance Trend Analysis, HCM-5.

Helicopter Information Sheet, HCM-6

Purpose

The purpose is to provide the Helibase Manager and other operations branch personnel with information concerning the helicopter, the Pilot, and the vendor's ground crew (driver/mechanic) assigned to multiple-aircraft helibases.

It summarizes most, if not all information relating to each individual helicopter operation at a helibase, thus relieving the Helibase Manager from having to obtain this information at various times over the course of the incident or project.

Applicability

The information on this form is required for large fire operations and projects.

Responsibility and Instructions for Completion

The Helicopter Manager for both Exclusive-Use contracts and CWN is responsible for completing the form prior to or immediately after arrival at an incident or project helibase.

The Helibase Manager is responsible for obtaining the HCM-6 immediately upon arrival of a helicopter at an incident or project.

Exclusive-Use Helicopters. All information available at the start of the season should be entered, and multiple copies made for distribution upon arrival at an incident or project. Information concerning incident/project order number, aircraft request number, and maintenance and vendor crew information should be completed upon arrival at an incident or project.

CWN helicopters. All information should be completed when the CWN crew assembles and joins up with the helicopter.

Routing and Filing

The form is submitted to the Helibase Manager upon arrival at an incident or project. The ASGS or AOBD is responsible for routing an informational copy to the Resources Unit Leader.

Posting

None.

Related Forms

Helicopter Crew Information Sheet, HCM-7, should be submitted concurrently. Information from the HCM-6 is used to complete Helibase Aircraft Information Summary, HBM-3.

Helicopter Crew Information Sheet, HCM-7

Purpose

The purpose is to provide the Helibase Manager and other air operations branch personnel with information concerning helicopter crews assigned to helicopters at incident or project helibases. It identifies order numbers for CWN crews, qualifications, training needs, days off, etc.

It relieves the Helibase Manager from having to obtain this information at various times over the course of the incident or project. It is especially valuable for filling helibase positions and training assignments.

Applicability

The information on this form is required for large fire operations and projects.

Responsibility and Instructions for Completion

Individual blocks on the form are self-explanatory.

The Helicopter Manager for both Exclusive-Use contracts and CWN is responsible for completing the form prior to or immediately after arrival at an incident or project.

The Helibase Manager is responsible for obtaining the HCM-7Information Sheet immediately upon arrival of a helicopter at an incident or project.

Exclusive-Use Helicopters. All information available at the start of the season should be entered, and multiple copies made for distribution upon arrival at an incident or project. Information concerning incident/project order number, aircraft request number and last day(s) off is to be completed upon arrival at an incident or project.

Call-When-Needed Helicopters. All information should be completed when the CWN crew assembles and joins up with the helicopter.

Routing and Filing

The form is submitted to the Helibase Manager upon arrival at an incident or project. The ASGS or AOBD is responsible for routing an informational copy to the Resources Unit Leader.

Posting

None.

Related Forms

HCM-6 should be submitted concurrently with HCM-7. Information from HCM-7 is used to complete Helibase Organization Chart, HBM-1, ensuring that only qualified individuals fill helibase positions.

Interagency Helicopter Load Calculation, OAS-67/FS 5700-17

Purpose

The purpose is to ensure that the aircraft is capable of carrying a specified load to an identified elevation at a given density altitude.

Applicability

Refer to Chapter 7 for further information.

Responsibility and Instructions for Completion

Refer to Chapter 7 for further information.

Routing and Filing

Refer to Chapter 7 for further information.

Posting

Refer to Chapter 7 for further information.

Related Forms

OF-252 is used to document manifest information under one “umbrella” load calculation.

Helicopter Load Capability Summary Multiple Helispots and Fuel Loads, HCM-10, may be used to summarize load calculation information and plan flights. However, data for altitudes, temperatures, and fuel weights indicated must be supported by load calculations completed from the appropriate chart(s). Allowable Payload Chart, HMB-4, is completed from individual load calculations. Load calculation, manifest, and flight time information is summarized on Helicopter Daily Use and Cost Summary, HCM- 15, and is utilized to complete the agency flight payment document.

Interagency Helicopter Passenger/Cargo Manifest, HCM-9

Purpose

Refer to Chapter 7 for further information.

Applicability

Refer to Chapter 7 for further information.

Responsibility and Instructions for Completion

Refer to Chapter 7 for further information.

Routing and Filing

Refer to Chapter 7 for further information.

Posting

Refer to Chapter 7 for further information.

Related Forms

OAS-67/FS 5700-17 is used to document manifest information under one “umbrella” load calculation. Load calculation and manifest totals are collated on HCM-15. Manifests are utilized to complete the agency flight payment.

Helicopter Load Capability Summary Multiple Helispots and Fuel Loads, HCM-10.

Purpose

The purpose is to enable the Helicopter Manager to plan mission loads safely and efficiently to different elevations or helispots at different temperatures with different fuel loads.

Applicability

The form is optional, but should be used on incidents or projects where multiple helispots have been established. It may be required by the incident air operations staff.

Responsibility and Instructions for Completion

The Helicopter Manager is responsible for ensuring the form is completed and updated as new helispots are established.

- Block 1: Aircraft Information. Enter information as indicated.
- Block 2: Allowable Payloads. Complete the matrix by calculating allowable payloads, both HIGE and HOGE, with full or working fuel load, to different helispots or elevations for temperatures appropriate to the area.
- It is essential that the load calculation form and appropriate flight manual performance charts be used to determine allowable payloads. A load calculation form must be completed for every temperature, elevation, and fuel load indicated on the form. However, once a load calculation is completed, the information on HCM-10 may be utilized in conjunction with the OF-252.
- Block 3: Payload Adjustments. Depending on the size helicopter and fuel capacity, enter increased payload capability in pounds as fuel weight is reduced.

  Utilizing the load calculation form, HCM-10 should be updated as additional helispots are established.

Routing and Filing

At multiple-aircraft helibases, the Helicopter Manager should submit the form to the Helibase Manager.

Posting

The form should be posted on the helibase display board.

Related Forms

OAS-67/FS 5700-17 is used to calculate information.

Loads are documented on OF-252.

Allowable Payload Chart, HBM-4, Flight Following Log HBM-5; and Resource Capability Planning Chart, may be completed from information supplied on HCM-10.

Aircraft Dispatch, NIFC HCM-1

Purpose

Provide the Helicopter Manager and Pilot with dispatch information critical to flight safety and efficiency (note that block numbers correspond exactly to those on the dispatcher's Resource Order).

Provide accurate information concerning individual incidents during multiple-fire situations.

Provide information (for example, incident number and Hobbs Meter start/end readings) essential for accurate completion of agency payment documents.

Applicability

This form is optional. If utilized, it should be completed for all fire helicopter initial attack missions, both Exclusive-Use contract and CWN. It is not intended to be used for mission dispatch, other than initial attack, at incident helibases.

Responsibility and Instructions for Completion

The Helicopter Manager completes the form.

The Dispatcher provides the information to the Helicopter Manager prior to or immediately after dispatch by phone or by radio.

Routing and Filing

Copies are kept as part of the helicopter crew file.

Posting

None.

Related Forms

Agency flight payment document can be completed from information entered (for example, billing numbers).

Pilot Flight Time/Duty Day Cumulative Log, HCM-12

Fuel Servicing Driver Duty Day Cumulative Log, HCM-13.

Mechanic Duty Day Cumulative Log, HCM-14.

Purpose

The purpose of these forms is to enable the Helicopter Manager to track contract or CWN Pilot, Driver, and Mechanic flight time or driving time (as applicable), as well as duty day, so that limitations are not exceeded.

Applicability

HCM-12 and HCM-14 are required for all contract aircraft. It is also mandatory for CWN and rental aircraft used for more than four continuous days. It is advisable to initiate these forms immediately at the start of any incident CWN or rental use.

Responsibility and Instructions for Completion

Helicopter Managers are responsible for making entries to the form on a daily basis for the period of the contract, or for CWN, for the period of use.

If completing the electronic version, refer to electronic help text for correct procedure on entering Pilot day off to ensure cumulative flight time feature works.

It is the responsibility of Helicopter Managers to inform the Helibase Manager of flight time, driving time, or duty day limitations that may interfere with planned operations.

Posting

None at incident helibases. It may be posted at the permanent helibase for exclusive-use contracts crews, but must be taken on off-unit dispatches.

Routing and Filing

No routing is necessary. Completed logs become part of the contract file.

Related Forms

OAS-137.

An agency incident/hazard report is submitted if limitations are exceeded.

Helicopter Daily Use and Cost Summary, HCM-15

Purpose

The purpose is to enable the Helicopter Manager to summarize daily use and costs for the helicopter.

Applicability

The form is required on incidents to which an IMT Type 1 or 2 is assigned. However, the air operations staff on an IMT Type 1 or 2 will usually require that the Helibase Manager(s) submit summaries from the day of initial attack. Helicopter and Helibase Managers should therefore be prepared to furnish this information once an IMT is assigned.

It may also be required on projects at the Project Aviation Manager's option.

Responsibility and Instructions for Completion

Each Helicopter Manager is responsible for completing the HCM-15 at the end of each day's operational period. The Helicopter Manager submits it to the Helibase Manager.

Use totals are gathered from load calculations and manifest forms. The Helicopter Manager should ensure:

- If daily flight guarantees are not met for CWN or rental helicopters, that these costs are included on the summary.
- If daily/hourly availability or guarantee costs on exclusive-use contract helicopters are already paid from pre-suppression funding, that these costs are not included on the summary.
- Mobilization costs (for example, ferry time to the incident, service truck miles, etc.) must be included on the first Summary submitted.
- Demobilization costs should be estimated and a final summary submitted to the Helibase Manager prior to the departure of the helicopter from the incident or project.

Posting

None.

Routing and Filing

The Helicopter Manager gives the summary to the Helibase Manager. A copy of each helicopter's cost summary should be made part of the helibase file.

Related Forms

Helicopter load calculations and manifests forms are used to complete the summary. The Helibase Manager completes Helibase Daily Use and Cost Summary, HBM-11, from helicopter summaries.

Contractor Performance Assessment Report System (CPARS)

Purpose

The purpose of the form is to provide vendor performance information to the contracting official for agencies that utilize it.

Applicability

CPARS are mandatory for DOI and Forest Service for CWN and Exclusive-Use contract agreements.

Responsibility and Instructions for Completion

Government representative is responsible for making entries to the form at the conclusion of any assignment or mandatory availability period. It is the vendor's responsibility to provide the form to the contracting official as identified by procurement document.

Posting

None at incident helibases.

Routing and Filing

Vendor responsibility to have form completed and submitted to the appropriate contracting official.

Related Forms

None

Appendix B – Helibase Management Forms and Checklists

Introduction

This appendix provides standardized forms for the management and operation of helibases. A discussion of helibase related Incident Command System (ICS) forms, checklists, evaluations, and job aids, is also included. The Helibase Management Forms and Checklists are found at https://www.nwcg.gov/publications/510.

Such standardization helps to implement common procedures among participating agencies to meet mutual safety, efficiency, fiscal management, and contract administration objectives. The forms also provide a basis for training development and presentation.

Applicability

The forms in this appendix are to be utilized by Helibase Managers, whereas those in Appendix A are utilized by Helicopter Managers in the management and operation of a single helicopter.

However, several of the Helicopter Management (HCM-series) forms contribute to the informational needs of the Helibase Management (HBM-series) forms.

It is therefore essential that Helicopter Managers use these forms as appropriate or required when operating as part of a helibase organization, and that Helibase Managers ensure that appropriate HCM forms are completed timely and accurately.

Some of the forms are required for all helibase operations, and some are required only for incident operations. Others are optional and may be used at the discretion of the Helibase Manager. Certain optional forms may be required by the air operations staff at an incident or project due to a specific management informational need.

Chart B-1 on the following pages is a summary listing of the HBM-series and other checklists and job aids. Included is information concerning the purpose of the form, the HBM form number, whether a form is optional or required for all or only certain situations, responsibility for completion, and frequency of completion. The Helibase Manager may use this chart as a quick- reference guide to form requirements. The pages following the chart contain a comprehensive discussion of each form.

All Helibase Managers should obtain sets of all forms so that they may respond to different management requirements encountered. Recognizing that at most incidents, or prior to a project's start that copies may be reproduced. Appendix F, Form HJA-2 provides recommendations concerning the number of forms to carry in the Helibase Manager's Kit.

Helibase Management (HBM) Forms

NOTE: The Helibase Management (HBM) forms or checklists that are required must be completed or implemented by the second operational period on incident helibases or helispots to which two or more helicopters are assigned.

On project helibases with two or more helicopters assigned, the required forms must be completed or implemented prior to the start of the first day's operations. The requirement for project helibases is stricter than that for incidents due to the ability of the project's Helibase Manager to plan in advance of the operation.

Exhibit B-1 – Helibase Management Forms Summary.

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
All required forms must be completed and implemented by the start of the second operational shift when two or more helicopters are assigned to an incident base. On project helibases where two or more helicopters are assigned, they must be completed or implemented at the start of the first operational shift.					
Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00)	To provide a briefing outline for Helibase Managers.	Required.	Helibase Manager and Pilots Initial	Per helicopter/day	
Helibase Organization Chart (HBM-1)	To identify by name those persons filling helibase positions.	Required. Data does not have to be documented on this form.	Helibase Manager or Deck Coordinator	Updated daily.	Obtain information on qualifications from HCM-7 Helicopter Crew Information Sheet.
Helibase Complexity Analysis (HBM-1A)	To assist in determining helibase complexity assessment and Decision Support.	Required for evaluating Helibase Complexity.	Helibase/Aviation Manager	Prior to the start of a project or as needed as complexity changes.	
Aviation Locations Summary (HBM-2)	To provide information on helispots, dipsites, and other locations pertinent to the aviation operation.	Required.	Helibase Manager	Updated daily	Brief all new pilots and managers as appropriate.

Title	**Purpose**	**Required or Optional**	**Responsibility of Completion**	**Completion Frequency**	**Remarks**
Helibase Aircraft Information Summary (HBM-3)	To provide Air Operations staff with a summary on assigned.	Required	Helibase Manager	Update as new aircraft are assigned.	Copies to Air Support Group Supervisor (ASGS) and Air Operations Branch Director (AOBD).
Allowable Payload Chart (HBM-4)	To provide helibase management personnel a means to plan mission loads safely and efficiently.	Optional	Helibase Manager	Update as new aircraft or aviation locations are assigned.	Use information from Aviation Locations Summary, Load Calculations, and Helicopter Load Capability Summary
Flight Following Log (HBM-5)	To enable the ABRO to record flight following information so the location of an aircraft is known.	Optional	Aircraft Base Radio Operator	As needed	Information from the form is required, but other forms may be used.
Flight Hours Tracking-Multiple Helicopters (HBM-5A)	To allow tracking of helicopter flight time over the course of the day	Optional	ABRO or Aircraft Timekeeper	As needed	Ensures there will be sufficient flight time for required missions and enables flight time to be spread equitably over all assigned aircraft

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
Helibase Mission Request Log (HBM-6)	To establish an orderly mission request process for use by the Helibase Manager in prioritizing and assigning helicopters	Required.	Helibase Manager or Aircraft Timekeeper	At end of operational shift	Copies to Finance Unit and ASGS/AOBD
Helibase Daily Use and Cost Summary (HBM-7)	To track cost and use on an incident or project	Required	Helibase Manager	Incident or projects	Copies to Finance Unit and ASGS/AOBD
Helibase Communications Plan (HBM-8)	To track currently assigned frequencies being used by the helibase	Optional	Helibase Manager	As changes occur	Ensure updates are completed as changes occur
Helicopter Demobilization Information (HBM-9)	Provides information on demob times, routes, stops and layovers	Optional	Helicopter Manager	As helicopters are demobed	Copy to AOBD and Demob Unit
Helicopter Flight Schedule (HBM-9A)	Provides flight itinerary information to dispatch system	Optional	Helicopter Manager	As helicopters are demobed	Copy to AOBD and Demob Unit and applicable dispatch center
Facilities, Hazard, and Flight Route Map (HBM-10)	Provides helibase layout, local flight hazard, and flight route information	Optional	Deck Coordinator	Complete as needed	When used, ensure hazard information and flight routes are depicted

Title	Purpose	Required or Optional	Responsibility of Completion	Completion Frequency	Remarks
Helibase Cumulative Cost Summary (HBM-11)	Allows tracking of helibase costs over the course of an incident or project	Optional	Helibase Manager	Update daily	Use information from HBM-7
Helitack Crew Performance Rating (HBM-12)	Provides a format for rating helitack crews on helicopter/helibase specific missions	Optional	Helibase Manager	At end of assignment	Copy in helibase file and copy sent to crew's home unit
Helibase Personnel Performance Rating (HBM-13)	Provides a format to rate single resource personnel on helicopter/helibase specific missions	Optional	Assigned Supervisor at incident/project	At end of assignment	Copy in helibase file and copy sent to crew's home unit
Two-For-One HMGB and/or Standard to Limited Request (HBM-14)	An approval system to allow a manager to manage two limited or restricted category helicopters, or designate a standard category aircraft as limited use	Optional	State or Regional Aviation Manager	Each occurrence	Other methods of approval may be used, depending on agency policy

Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00)

Purpose

The purpose of the Daily Helicopter Operations Briefing/Debriefing Checklist is to provide the Helibase Manager with the means to brief all helibase personnel, including Pilots. The form also provides for feedback from all helibase operational areas and Pilots at the nightly debriefing.

Applicability

The checklist is required and must be implemented by the second operational period on incident helibases, or on helispots to which two or more helicopters are assigned. On project helibases with two or more helicopters assigned, the form must be implemented prior to the start of the first day's operations.

Responsibility and Instructions For Completion

The Helibase Manager is responsible for ensuring the form is initially completed and for completing the checklist on a daily basis thereafter. All personnel assigned to the helibase, including Pilots, must review the checklist. It must also be used for post-operational debriefings. Pilots must sign or initial the checklist daily to indicate that they have received a briefing.

The Briefing Section should be covered with all helibase personnel and Pilots present. All Pilots must initial the checklist to indicate that they have been briefed.

The Debriefing Section should be covered with all helibase personnel and Pilots present.

Anyone not present for either briefing must be briefed individually.

The checklist may be used for a seven-day period, after which a new one must be initiated. Enter the appropriate date(s) below each day on the new checklist.

The blank blocks below each day are for the Helibase Manager to initial, to indicate the item has been completed and/or discussed.

The checklist items themselves are self-explanatory. Further guidance on each item is found in the appropriate chapter of the Interagency Helicopter Operations Guide.

Refer to Appendix H, Helibase Manager's Reminders List, which addresses one-time 'start- up' items (for example, helibase location considerations).

Any deviation from established procedures must be approved by the appropriate higher level of authority

Routing and Filing

After a checklist has been completely used (that is, after seven days), it should be placed in the helibase file for later inclusion in the incident or project file.

Posting

The current form shall be posted on the helibase display board.

Related Forms

Helibase Management (HBM) forms and HCM forms are not specifically discussed within the checklist. However, many items may be initialed as complete through completion of these forms.

Appendix H, Helibase Manager's Reminders List, may be used by the Helibase Manager as a job aid to ensure that daily checklist items have been addressed. The Helibase Manager may incorporate parts of the Reminders List in the briefing or debriefing as appropriate.

The *NWCG Standards for Aerial Ignition*, PMS 501, https://www.nwcg.gov/publications/501, contains Helitorch and Plastic Sphere Dispenser Operations Checklists. They should be used as a supplement, not in lieu of, the Daily Helicopter Operations Briefing/Debriefing Checklist.

Helibase Organization Chart (HBM-1)

Purpose

The purpose is to establish, by name, those positions filled on a helibase, as well as provide other information concerning aircraft and radio frequencies assigned.

Applicability

The form is required and must be initiated by the second operational period on incident helibases or helispots to which two or more helicopters are assigned. On project helibases with two or more helicopters assigned, the form must be completed prior to the start of the first day's operations.

Responsibility and Instructions for Completion

Refer to Exhibit B-1, Helibase Management Forms Summary. Refer also to Chapter 15 for further information on making daily assignments. The Helibase Manager is responsible for completion. Names are entered at the start of helibase operations. Position assignments are reviewed daily, and appropriate changes in the chart are made as needed. The Helibase Manager must ensure that personnel assigned to fulfill a function are qualified (see "Related Forms" below).

Routing and Filing

No routing is necessary. The form becomes part of the helibase file.

Posting

The form is posted on the helibase display board. Information may also be transferred to an organization board carried by many helicopter crews.

Related Forms

Forms HCM-7, Helicopter Crew Information Sheet, should be consulted prior to making assignments in order to ensure qualified personnel are filling positions. Frequencies are obtained from the day's ICS- 220, Air Operations Summary and the ICS-205, Incident Radio Communications Plan.

Helibase Complexity Analysis (HBM-1A)

Purpose

The Helibase Management Complexity Analysis is intended to assist a HEBM/AOBD/Unit Aviation Manager in assessing the complexities of operations at their Helibase(s). This is a risk analysis tool that will help to quantify the complexity of a helibase operation and support a decision to request an additional HEBM / HEBM (T) or limit current aviation flights until mitigations can be made to conditions that threaten to exceed oversight capacity of a helibase operation.

Applicability

This analysis is applicable to all helibases.

Responsibility and Instructions for Completion.

This complexity analysis would be completed by the helibase/aviation manager.

Routing and Filing

This complexity analysis would be routed through the helibase/aviation manager’s supervisor. The form becomes part of the helibase file.

Posting

This form is not required to be posted.

Related Forms

This analysis is related to HBM-1 since it is will be used to determine the management at a Helibase.

Aviation Locations Summary (HBM-2)

Purpose

The purpose is to provide information concerning helispots and other landing areas (for example, dip sites) for load planning purposes, hazard identification and safety, and Pilot briefings.

Applicability

The form is required and must be initiated by the second operational period on incident helibases or helispots to which two or more helicopters are assigned. On project helibases with two or more helicopters assigned, the form must be completed prior to the start of the first day's operations.

Responsibility and Instructions for Completion

Refer to Chapters 8 and 15 for further information. The initial reconnaissance of the incident for purposes of helispot site selection provides a timely opportunity to initiate the form. The Helibase Manager is responsible for completion. Often the Helispot Managers and Helibase Manager will jointly complete the Summary. Pilots should always be consulted and briefed concerning the information on the Summary. It should be updated as necessary (additional helispots, helispot improvement to accommodate larger helicopters, etc.).

Routing and Filing

The Summary becomes part of the helibase file.

Posting

The Summary is posted on the helibase display board as soon as it is completed.

Related Forms

The Summary is supplemented by a topographic map showing the locations of all helispots, dip sites, hazards, etc.

Helibase Aircraft Information Summary (HBM-3)

Purpose

The purpose is to provide the Helibase Manager and air operations staff with an informational summary on all aircraft assigned to the helibase(s).

Applicability

The form is required for fires with a Type 1 or 2 Incident Management Team assigned, and if requested by project personnel.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for completion, and usually delegates this responsibility to the Aircraft Timekeeper. Information is obtained from Forms HCM-6, Helicopter Information Sheets, and Forms HCM-7, Helicopter Crew Information Sheets, submitted by Helicopter Managers upon arrival at the incident or project. The form should be updated as additional aircraft arrive.

Routing and Filing

A current copy of the form is routed to the ASGS and to the AOBD. The form becomes part of the helibase file.

Posting

The Summary is posted on the helibase display board.

Related Forms

Form HCM-6, Helicopter Information Sheet and Form, HCM-7 Helicopter Crew Information Sheet, provide the necessary information.

Allowable Payload Chart (HBM-4)

Purpose

The purpose is to provide helibase management personnel with the means to plan mission loads safely and efficiently. The completed forms can quickly provide the Helibase Manager with information on which aircraft are suitable for different loads to different helispots.

Applicability

Information on this form is optional. It may be required for by the Helibase Manager to facilitate planning.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for ensuring forms are initially completed and updated as new aircraft arrive on the incident or as new helibases/helispots are established. Actual completion is usually performed by the Deck Coordinator or Loadmasters. Enter the allowable IGE/OGE loads for the range of temperatures which may be encountered at the helispot during the day. These figures may be obtained from Form HCM-11, Single Helicopter Load Capability Planning Summary – Multiple Helispots and Fuel Loads. The form should be updated as additional aircraft arrive. A new form should be completed as additional helispots are established.

Routing and Filing

No routing is necessary. The form becomes part of the helibase file.

Posting

The form is posted on the helibase display board.

Related Forms

Form HCM-8, Helicopter Load Calculation; Form HCM-10, Single Helicopter Load Capability Planning Summary - Multiple Helispots and Fuel Loads; form HBM-4, Allowable Payload Chart.

Helibase Flight Following Log (HBM-5)

Purpose

The purpose is to enable the ABRO to perform helicopter flight following quickly and efficiently, with knowledge of where any given helicopter is at any time.

Applicability

The form is optional and should be implemented by the second operational period on incident helibases or helispots to which two or more helicopters are assigned. (It is recommended that the form be implemented on any incident helibase where flight following is being performed on-site, that is, not through the unit dispatch office.) On project helibases with two or more helicopters assigned, the form must be implemented prior to the start of the first day's operations

Responsibility and Instructions for Completion

The Helibase Manager is responsible for flight following at a helibase. The Helibase Manager usually delegates this responsibility to the ABRO, who becomes responsible for implementing and making entries on the form. The Radio Operator should inform the Helibase Manager immediately if a helicopter fails to meet a required check- in. Completion of individual blocks on the form is self-explanatory.

Routing and Filing

No routing is necessary. The form becomes part of the helibase file.

Posting

None. The ABRO usually keeps the form at the helibase communications area.

Related Forms

The form should be used in conjunction with HBM-5 (Flight Following Log) and HBM-6 (Helibase Mission Request Log).

Flight Hour Tracking (Multiple Helicopters) (HBM-5A)

Purpose

The purpose is to enable the Helibase Manager to track cumulative flight hours over the course of a day on multiple-aircraft projects or incidents. It ensures that there will be sufficient flight time for tasks assigned for the end of the operational period, and that flight time is spread fairly evenly among the helicopters available. The primary intent is not to track Pilot flight time/duty day, even though this information can be entered at the top of the form.

Applicability

The form is optional. It may be required by the Helibase Manager or air operations staff to facilitate planning. It is recommended that it be used on helibases with a large number of helicopters where tracking of flight time is more difficult.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for ensuring completion. Actual completion is usually performed by the Aircraft Timekeeper. Entries are self-explanatory. The Helibase Manager and Helicopter Managers should make entries with whatever frequency (hourly, every four hours, etc.) that is deemed necessary.

Routing and Filing

None.

Posting

None, although it may be posted on the display board. (The Aircraft Timekeeper usually keeps the form in the helibase communications area).

Related Forms

Form HCM-12, Pilot Flight Time/Duty Day Cumulative Log

Helibase Mission Request Log (HBM-6)

Purpose

The purpose is to establish an orderly and documented mission request process for use by the Helibase Manager in tracking, prioritizing, and assigning helicopter missions.

Applicability

The form is required and must be implemented by the second operational period on incident helibases or helispots to which two or more helicopters are assigned. On project helibases with two or more helicopters assigned, the form must be implemented prior to the start of the first day's operations.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for entering mission requests as received from personnel authorized to request them (for example, Operations Chief or Project Aviation Manager, AOBD, Air Tactical Group Supervisor, Incident Dispatch, etc.)

This responsibility is usually delegated to the ABRO or Aircraft Timekeeper.

Personnel receiving mission requests should ensure that personnel are authorized to request them, and that the proper chain-of-command is followed.

Initial entries should be made at the morning's briefing from the ICS-220 Air Operations Summary or project plan. If the number or scope of missions conflict with available aircraft, obtain priorities from ASGS or AOBD and enter priority in far left- hand column.

Completion of individual blocks on the form is self-explanatory.

Routing and Filing

No routing is necessary. The form becomes part of the helibase file.

Posting

None.

Related Forms

Form ICS-220, Air Operations Summary.

Helibase Daily Use and Cost Summary (HBM-7)

Purpose

The purpose is to enable the Helibase Manager to meet cost/use reporting requirements of the air operations staff on an incident and of the Project Aviation Manager on a project.

Applicability

The form is required on incidents to which a Type I or II IMT is assigned. However, the air operations staff on a Type I or II Team will usually require that the Helibase Manager(s) submit summaries from the day of initial attack. Helicopter and Helibase Managers should therefore be prepared to furnish this information once an IMT is assigned.

It may also be required on projects where the Project Aviation Manager requires cost summaries.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for completing this form. This responsibility is usually delegated to the Aircraft Timekeeper.

Entries are made from information provided by Helicopter Managers on Form HCM-15, Helicopter Daily Use and Cost Summary. The Helibase Manager should ensure:

- If daily flight guarantees are not met on ARA helicopters, that these costs are included on the summary.
- If daily/hourly availability or guarantee costs on exclusive-use contract helicopters are already paid from pre-suppression funding, that these costs are not included on the summary.

Routing and Filing

The form is routed to the air operations staff on incidents or to the Project Aviation Manager on projects prior to the end of the day. It becomes part of the helibase file.

Posting

None.

Related Forms

Forms HCM-15, Helicopter Daily Use and Cost Summary, submitted by each Helicopter Manager provide information on individual helicopter costs.

Helibase Communications Plan (HBM-8)

Purpose

The purpose is to provide radio frequency information to pilots and helicopter crews.

Applicability

The form is optional in both incidents and projects, but may be required by air operations staff or Unit Aviation Managers.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for completing the form. It is essential that the Air Operations Branch Director (AOBD) or Air Support Group Supervisor (ASGS) communicate and coordinate with the Communications Unit Leader (COML) concerning frequency needs and assignments. The frequencies on the ICS-205 must match those identified on the ICS-220 Air Operations Summary and on form HBM-1, Helibase Organization Chart.

Routing and Filing

The AOBD should ensure that sufficient copies of the ICS-205 are made available for use by the Helibase Manager, Takeoff and Landing Coordinator, Aircraft Base Radio Operator and Pilots.

HINT: To lessen the amount of paperwork the Pilot must deal with in the cockpit, it is helpful if the AOBD requests that applicable aviation radio frequencies be incorporated into a corner of the Incident or Project Map that is distributed each day. This can be accomplished by writing out the frequencies and functions (for example, Air-to-Air 122.925) on a small piece of paper, taping it to the map, and making copies for the Pilot.

Posting

A copy should be posted on the helibase display board.

Related Forms

As stated, frequencies and their functions must match those on the ICS-220, Air Operations Summary and on form HBM-1, Helibase Organization Chart.

Helicopter Demobilization Information Sheet (HBM-9)

Purpose

The purpose is to enable the Helibase Manager to provide demobilization information on air and associated ground resources to the Planning Section so it may be relayed timely and accurately.

Applicability

The form is optional. It may be required by the Helibase Manager or air operations staff to facilitate timely transmittal of helicopter demobilization information.

Responsibility and Instructions for Completion

The Helibase Manager and Helicopter Manager, along with the Pilot, are mutually responsible for completing the form when a decision to demobilize the resource has been made.

Completion is self-explanatory. Update if travel routes and times change, or decision to hold the resource is made.

Routing and Filing

Route the form to the ASGS or AOBD, who is responsible for ensuring the information is relayed to the Planning Section and applicable dispatch center.

Posting

None.

Related Forms

None.

Helicopter Flight Schedule (HBM-9A)

Purpose

The purpose is to enable the Helibase Manager to provide demobilization information on air and associated ground resources to the Planning Section so it may be relayed timely and accurately.

Applicability

The form is optional. It may be required by the Helibase Manager or air operations staff to facilitate timely transmittal of helicopter demobilization information.

Responsibility and Instructions for Completion.

The Helibase Manager and Helicopter Manager, along with the Pilot, are mutually responsible for completing the form when a decision to demobilize the resource has been made.

Completion is self-explanatory. Update if travel routes and times change, or decision to hold the resource is made.

Routing and Filing

Route the form to the ASGS or AOBD, who is responsible for ensuring the information is relayed to the Planning Section and applicable dispatch center.

Posting

None.

Related Forms

HBM-9A Helicopter Fight Schedule.

Facilities, Hazard, and Flight Route Map (HBM-10)

Purpose

The purpose is to enable the Helibase Manager to brief Pilots and other personnel on the location of helibase facilities, touchdown pads, and flight routes inbound to and outbound from the helibase.

Applicability

The form is optional and should be completed by the second operational period on incident helibases or helispots to which two or more helicopters are assigned. On project helibases with two or more helicopters assigned, the form should be completed prior to the start of the first day's operations.

Responsibility and Instructions for Completion

Also refer to Chapters 8 and 15 for further information. The Helibase Manager is responsible for completion. The Helibase Manager may delegate this responsibility to the TOLC or the Deck Coordinator, who in turn may delegate to the best artist available. Pilots should be consulted regarding flight route, location of facilities, landing pads, etc.

The map should include, but is not limited to, the following:

- Inbound/Outbound Flight routes.
- Location of all landing pads, i.e., personnel, cargo, and fueling.
- Location of hazards on and around the helibase.
- Vehicle parking (fuel, helibase personnel, crews, cargo).
- Location of helibase operations and communications area.

The map should be updated as necessary (realignment of helibase, addition of landing pads, whenever locations change, and facilities are added, etc.). A date/time should be indicated on the map.

Routing and Filing

Pilots should be briefed utilizing the latest map. No additional routing is necessary. The map becomes part of the helibase file.

Posting

The map is posted on the helibase display board.

Related Forms

The Incident Map showing helispot locations and incident area hazards is a separate map.

Helibase Cumulative Cost Summary (HBM-11)

Purpose

The purpose is to ensure accurate cost tracking over the course of an incident or project.

Applicability

The form is optional for fire and project use. Air operations staff will request completion when required.

Responsibility and Instructions for Completion.

The Helibase Manager is responsible for completing this form, but may be delegated to other helibase staff. Entries are made from the individual HBM-7 forms.

Routing and Filing

The form should become part of the Helibase documentation file on large fires, and give to the project manager for projects.

Posting

None.

Related Forms

Forms HBM-7 Helibase Daily Use and Cost Summary.

Helitack Crew Performance Rating (HBM-12) and Helibase Personnel Performance Rating (HBM-13)

Purpose

Utilized to rate crews and single resources in performance of duties on the helibase.

Applicability

The forms are required on all incidents where an incident management team is assigned and optional on projects.

Responsibility and Instructions for Completion

The forms will be completed by the appropriate helibase supervisor.

Routing and Filing

A copy should be mailed to the employees or crews home unit supervisor, and one copy kept for the fire package.

Posting

None.

Related Forms

None.

Two for One HMGB and/or Standard to Limited Request (HBM-14)

Purpose

Document authorization from the appropriate State or Regional Aviation Manager to allow one manager to manage two (2) restricted category or limited use designated Helicopter Manager, or to allow a standard category helicopter to be designated for limited use. Refer to Chapter 2 for more information.

Applicability

The form is optional, but authorization by the appropriate Aviation Manager must be documented.

Responsibility and Instructions for Completion

The information must be provided by the AOBD, ASGS, Helibase Manager, Helicopter Manager, or Unit Aviation Manager.

Posting

The authorization should be held by the requesting official until the request is no longer needed or is no longer valid.

Routing and Filing

No routing is necessary. Completed logs become part of the contract file.

Related Forms

None.

Emergency Rescue Information, HBM-15

Purpose

The purpose is to identify primary and secondary medevac helicopters in the event of injuries to personnel or in the event of an aircraft mishap and the locations of medical facilities.

Applicability

The form is required and must be completed by the second operational period on incident helibases or helispots to which two or more helicopters are assigned. On project helibases with two or more helicopters assigned, the form must be implemented prior to the start of the first day's operations.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for ensuring the form is completed and for reviewing the Plan on a daily basis during pre-operations briefings.

Most information is available from the local unit dispatch office. Completion of the form is self-explanatory. Update the form as aircraft assignments change. Refer to Chapters 12 and 17 for additional information.

Routing and Filing

The form becomes part of the Incident Crash Rescue Plan.

Posting

The form is posted on the helibase display board.

Related Forms

Form HJA-4, Crash Rescue/Medevac/Evacuation Plan, and HJA-1, Emergency Medevac/ Medical Transport Request.

The purpose is to provide additional information which is not on a Resource Order or other dispatch request but which is necessary to respond safely and efficiently to a request for helicopter EMS services.

Appendix C – Emergency Response

Introduction

Time is an extremely critical factor in responding to overdue, missing, or crashed aircraft. Personnel responsible for aircraft flight following cannot justify any delay in initiating emergency response procedures based on the possibility that a pilot or Helicopter Manager has forgotten to perform a check-in. Immediate positive action is necessary: the longer the delay in locating the overdue or missing aircraft, the less chance the occupants have to survive an accident.

SOMEONE'S LIFE MAY DEPEND ON YOUR ACTIONS.

If fire response vehicles are obtained to provide crash rescue protection on a helibase, standards for equipment, personnel, and training are included in memorandum NWCG Memorandum #37-2010, NWCG Interagency Aircraft Rescue and Firefighting (ARFF) Apparatus, PPE, and Training Specifications (https://www.nwcg.gov/executive-board/correspondence#collapse-2010).

Emergency Response Preparedness Plan

Local Unit Responsibility

Each local dispatch or other flight following office should have an Aircraft Accident Preparedness Plan or Aircraft Crash, Search and Rescue Guide. Information in this plan or guide on emergency response procedures should be pre-completed in the event of a mishap. This plan will be reviewed and updated annually or as needed.

Purpose

The purpose of the plan is to establish standard emergency response procedures that local line officers will follow in all cases when an aircraft meets applicable criteria of "Overdue," "Missing," or "Crashed."

Applicability

The plan will be used in situations where an aircraft meets overdue, missing, or crashed criteria.

Contents

Emergency response plans and guides may be formatted in a variety of ways, provided the user (that is, the individual making the initial response to the emergency) can easily reference the appropriate situation and then follow a generic checklist of actions to be taken for that situation.

Helibase Manager Responsibility.

Upon arrival at an incident or prior to commencement of a project, the Helibase Manager should acquire information from the local unit's emergency response plan and complete the following forms:

- HJA-4, Crash Rescue/Medevac/Evacuation Plan.
- HBM-15, Emergency Rescue Information.

Helibase personnel must be prepared to respond to requests for medevac operations. Review of HJA-1, Medical Incident Report (9-Line Form from Incident Response Pocket Guide, PMS 461) should be completed during the helibase emergency response preparedness so a timely, safe and effective response can be achieved.

Emergency Response Procedures

A "Mayday Call" indicates that the Pilot of an aircraft is experiencing an in-flight emergency. The Dispatcher or ABRO must listen closely since the Pilot may be relaying location information essential to dispatch of rescue services.

A Dispatcher or ABRO must always be on duty at the radio during mission-type flights. Helicopter personnel should also closely and continuously track the aircraft's location so that accurate location information can be relayed in an emergency.

After receiving a mayday call, the radio operator should attempt to contact the aircraft to determine the nature of the emergency. If the aircraft has landed safely and there is no need to order emergency services, then the responsible Unit Aviation Manager or Helibase Manager should be contacted and appropriate action taken.

During emergency situations involving an overdue, missing, or crashed aircraft, close coordination between the local unit dispatch office and the helibase is critical to the success of the search and rescue operation.

Medical Incident Report, part of ICS-206WF

Purpose

This form is part of the ICS-206 WF. Use items one through nine to communicate situation to communications/dispatch.

Applicability

The form is optional but should be used for all requests for helicopter EMS, including "life flight" helicopters and incident helicopters assigned to medevac missions. Completion is not required for medevac transport from established helispots or the helibase.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for ensuring the form is completed when requests for such services are received. This responsibility is usually delegated to the ABRO.

Ensure that as much information is completed as is possible or available. Particular attention should be paid to radio frequencies, particular with "life flight" helicopters, and to the availability of fuel either en route to the scene or to the medical facility. Completion of specific blocks on the form is self-explanatory.

Routing and Filing

The form becomes part of the Incident Crash Rescue Plan.

Posting

None.

Related Forms

ICS-206, Medical Plan; HJA-4, Crash Rescue/Medevac/Evacuation Plan; HBM-15, Emergency Rescue Information.

Appendix D – Contract Administration, Agency Flight Payment Documents

Introduction

Administration of an aircraft contract is a joint responsibility of the unit for which the aircraft has been procured and the office with contracting authority, with ultimate responsibility vested in the Contracting Officer. Administrative functions are generally delegated to the local unit level.

One party to any government aircraft contract is the United States of America, the sovereign political entity on behalf of which the contract is entered into.

All persons involved in making and administering U.S. government contracts act solely as agents of the United States, commonly called Contracting Officers (COs), and have only the authority delegated to them.

Contract File

Contracting Officer's Representatives (COR) and Project Inspectors (PI) should maintain a contract file. At a minimum, this file should consist of:

- A copy of the contract, with all contract modifications.
- Delegations of authority.
- A bid price summary that specifies contract costs for all pay items.
- Copies of all flight payment documents.
- Copies of all contract daily diaries.
- Correspondence from or to the COR/PI and the vendor or CO.

Types of Contracts and Ordering Agreements

- Exclusive-Use Contract. Exclusive-Use contracts are those awarded for a specific time period. During this time period the government has exclusive use of the helicopter. The government may, at its option, release the helicopter for other work for a specified period of time.
- National Call-When-Needed Contract. USFS awards a national contract for Type 1 and 2 helicopters. Vendors are not required to respond unless they accept an order to provide services.
- Type 3 Call-When-Needed Contracts. USFS units (e.g., forests or regions) award Type 3 Call-When-Needed Contracts. Vendors are not required to respond unless they accept an order to provide services.
- On-Call Contracts. AQD awards On-Call Contracts for use on projects as well as fire. Vendors are not required to respond unless they accept and order to provide services.
- Aircraft Rental Agreements. AQD establishes these ordering agreements with terms that are negotiated between AQD and various vendors. Once a vendor is hired, they are bound by the terms of the agreement. Vendors are not required to respond unless they accept an order to provide services.

Authority of Government Personnel

Before any person takes an action on behalf of the United States, he/she needs to ascertain whether authority to take the action has been given.

Disputes with Vendors

Disputes that cannot be readily resolved at the local level by the PI/COR/COAR should be referred to the CO.

Generic Duties and Responsibilities of Contracting Personnel

Contracting Officer (CO) or Administrative Contracting Officer (ACO)

The CO or ACO (USFS) is responsible for all contracting actions including contracting procedures and methods, contract legality, compliance with existing laws and regulations, contract administration and terminations. The CO may delegate certain contract functions.

In the contract administration function, decisions on claims and disputes are final, appealable only to the Board of Contract Appeals or Court of Claims.

The CO or ACO is the only individual who may modify or change a contract.

- USFS. For all national contracts, the ACO is located in Boise, ID. For other aviation contracts, the ACO is located in the Regional Office.
- AQD. For all aviation contracts, the CO is located in Boise, ID or Anchorage, AK.

Contracting Officer's Technical Representative (COTR)

The COTR is directly responsible to the Contracting Officer for assuring compliance with the technical provisions of the contract. The COTR conducts initial inspections and approves the vendor's equipment, facilities, and personnel prior to, and periodically during, contract performance. The COTR may discuss changes or modifications in equipment or other requirements of the contract, but may not commit the Government to such changes, modifications, or adjustments without going through the CO.

- USFS. For all national contracts, the COTR is located in Boise, ID. For other contracts, the COTR may be located in the Regional Office.
- AQD. For all aviation contracts, the COTR is located in Boise, ID or Anchorage, AK.

Contracting Officer's Representative (COR)

The COR is directly responsible to the CO for monitoring contract performance. The COR is primarily responsible for assuring compliance with the administrative provisions of the contract. The COR maintains communications with the vendor concerning day-to-day operations, though this may be further delegated to a PI. The COR may represent the CO in making minor allowances which do not modify the price, or other provisions of the contract. The COR is responsible for verifying the work performed upon which payment is based. The COR may recommend to the CO proposed changes and adjustments to the contract in order to meet the demands of the work. The COR may discuss changes or modifications in equipment or other requirements of the contract, but may not commit the Government to such changes, modifications, or adjustments without going through the CO.

- USFS. For all national contracts, the COR is assigned at the Agency's option. For other contracts, the COR may be the Helicopter Manager.

- AQD. For all aviation contracts (except the National CWN contract), and unless otherwise stated by agreement, the COR is assigned at the Bureau's or Office's option. For example, the State Aviation Manager in the Bureau of Land Management is usually the COR. For the National CWN contract, the CO-PI relationship is direct, with no COR assigned.

Project Inspector (PI)

The PI is designated by the COR to assist in implementing the COR's instructions, as required. Responsibilities of the PI may include:

- Verifying services performed by the vendor.
- Ensuring vendor's compliance with contract specifications and provisions. Discussing daily work requirements and ordering service within the contract provisions.
- Discussing problems which occur with the vendor and recommending solutions to the COR.
- Completing Form HCM-1, Aircraft Contract Daily Diary. Any problems of a serious nature are brought immediately to the attention of the COR and CO.
- USFS. For all national contacts, the Helicopter Manager is the PI. For other contracts, the Helicopter Manager may be the PI.
- AQD. For all aviation contracts, unless otherwise stated by agreement, the PI is assigned at the Bureau's or Office's option. For example, both the District Aviation Manager and the Exclusive-Use Helicopter Manager in the Bureau of Land Management may have Project Inspector duties.

Exhibit D.1 – OAS Contract Administration Organization.

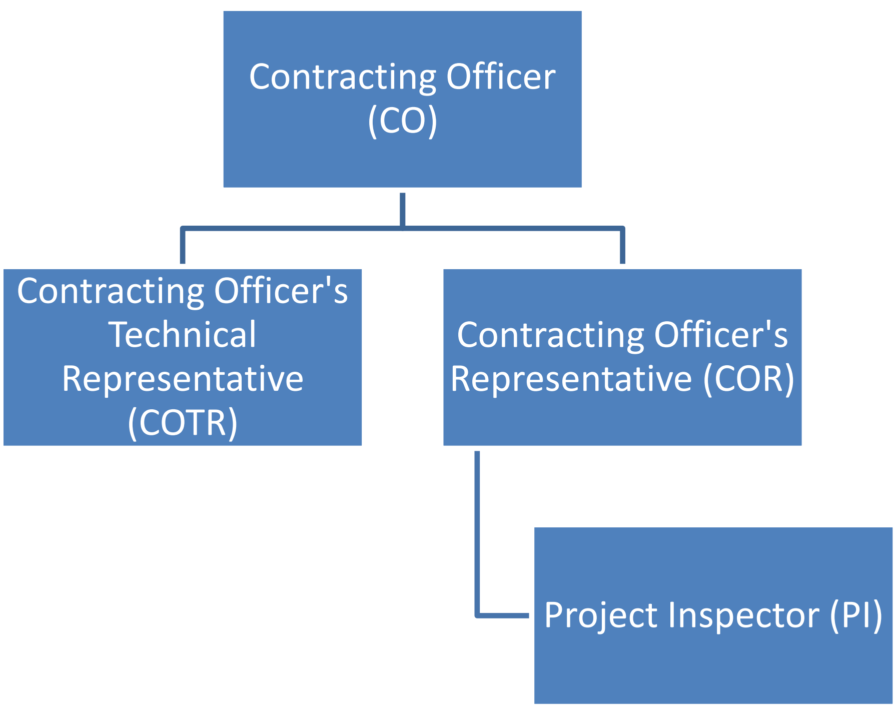
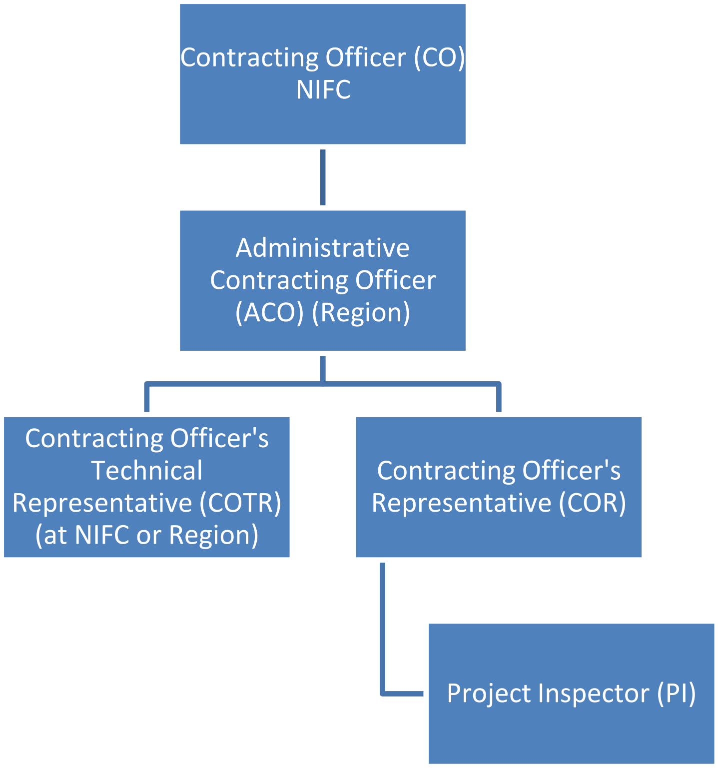


Exhibit D.2 -- USFS Contract Administration Organization.



Flight Payment Documents

The proper completion of flight payment documents is essential to the correct, timely payment of vendors.

To meet OMB Circular A-123, Internal Control Review, and OMB Circular A-126, Improving The Management and Use of Government Aircraft, close attention should be paid to the processes and procedures outlined in Appendix A, Helicopter Management Forms and Checklists, and to the instructions contained in this appendix.

Services Ordered and Received by the U.S. Forest Service

All flight time, daily availability and other authorized charges or deductions shall be recorded on a Flight Use Report in Aviation Business System (ABS). At the end of each day data shall be entered and reviewed by the Government and the Contractor’s Representative.

Approved invoices will be packaged electronically for payment on a semi-monthly basis for submission through the ABS process and electronically forwarded to the contractor for review and approval. Corrections shall be returned electronically to the designated representative for resolution. Upon approval, the package will be electronically forwarded to the Albuquerque Service Center (ASC) for payment.

Invoices accumulated during the first half of the month will be processed for payment about the 15th and those accumulated during the last of the month will be processed about the 1st of the following month.

Go to Aviation Business System (https://www.fs.fed.us/business/abs/?tab=tab_e) "Getting Started" for instructions and more information.

Services Ordered and Received by AQD

Vendors shall make electronic payment invoice requests through a controlled electronic invoice and reporting system. All flight time, daily availability and other authorized charges or deductions shall be recorded on an OAS23e. A copy, signed by the Pilot and Government Representative, of the 23e is submitted to the vendor for uploading to the Aviation Management System (AMS). Supporting invoices and/or documentation shall be attached electronically to the report.

Payment invoices are to be submitted no sooner than every two weeks or upon conclusion of a project.

Appendix E – Helitack Crew and Helibase Preparedness Reviews

Introduction

An evaluation of exclusive-use helicopter crews and designated helibases should be conducted as part of pre-season readiness. The local unit should have adequate time, as identified by the evaluators, to respond to the evaluation and to identify corrective action planned or already taken.

The Helitack Crew and Helibase Preparedness Review forms are found at https://www.nwcg.gov/publications/510.

Purpose

The purpose of the Helitack Crew and Helibase Preparedness Review is to evaluate the general readiness of the helicopter module and identify and correct any safety or operational deficiencies related to the helicopter base or crew. It should be stressed that the evaluation process is meant to be a constructive process.

Applicability

The format as contained in the Helitack Crew and Helibase Preparedness Review is optional. However, individual agency manual or handbook direction may require completion through reference to the NSHO. If used, it should be completed for all contract helicopters and crews stationed at permanent helibases.

If the review format is edited to accommodate local or agency needs, care must be taken to ensure the minimum requirements of the review, as set forth in the NSHO, are not diminished.

You will need to have the following items for the review:

Checklist Item #	Documentation
• D1	Helicopter/Helibase Operations Plan
• D1	Unit Aviation Plan
• E10	Latest Safety Inspection documentation
• K1-K2	Documentation for listed items
• L4	Red Card for each employee
• L5	IDP for each employee
• L5	Documentation for listed items
• L7	Documentation for listed items
• L9	CDL license for drivers (where applicable)
• L11	Job Hazard Analysis (JHAs)
• L11	Documentation of Tailgate Safety Sessions.

Responsibility and Instructions for Completion

Aviation management at the Regional, State, or Area level is responsible for facilitating the evaluation. Conducting the evaluation can be delegated to the Unit Aviation Manager. Annual evaluations are recommended. The crew and vendor should be allowed sufficient time (for example, 1-2 weeks) between contract start and the evaluation.

Completion of individual items is self-explanatory. The following is recommended as an overall approach:

The Helitack Manager should use the evaluation as a checklist to prepare for the visit by the team. It can also be used for self-evaluation throughout the season.

In order to cover all functional areas in a reasonable amount of time, it is recommended that each member of the evaluation team cover a separate functional area, with others on the team concurrently completing their assigned area.

A closeout with local fire and aviation management personnel, to review positive aspects of the evaluation as well as deficiencies, is essential. The evaluation team should follow this up with written documentation to the local Line Officer.

A follow-up, either formal or informal, should be made to ensure corrective action has been taken to rectify deficiencies.

Routing and Filing

Formal submission to the local Line Officer is recommended, with follow-up reply from the local unit as to corrective actions planned or already taken. Regional, State or Area aviation management should keep past evaluations on file in order to ensure that items identified in previous visits have been addressed.

Helitack Crew and Helibase Preparedness Review Team Conducting This Evaluation.

> It is recommended that Section L, Helitack Crew, be addressed LAST in the evaluation. During the course of the inspection, items addressed in other sections will provide much of the information needed to make the evaluation of personnel.

Section **Page**

The following additional sheets are available on the electronic version of this checklist:

Appendix F – NSHO Helibase Job Aids Package

Introduction

The Job Aids included in this appendix are forms, checklists or worksheets that have been developed to assist Aviation Managers as they perform their duties. These Job Aids help to organize information, thought processes and workload and are a means for standardized documentation. The forms also provide a basis for training development and presentation.

The Helibase Job Aids Forms and Checklists are found at https://www.nwcg.gov/publications/510.

Applicability

These Job Aids have been developed to assist Aviation Managers as they perform their duties. Each of the Job Aids have a specific purpose to assist in four different general topic areas; Emergency Response, Helibase Management, Management of Remote Fuel Sites and Risk Management. These forms are all optional but the information that some of them contain is required to be documented.

Aviation Managers are encouraged to use these forms as appropriate to ensure all items are considered and actions are documented.

Exhibit F-1 is a summary listing of the HJAs. Included is information concerning the purpose of the form, the HJA form number, whether a form is optional or if information is required, responsibility for completion, and frequency of completion. The pages following the chart contain a discussion of each form. Aviation Managers should reproduce sets of these forms so they are available when or as needed.

Exhibit F-1. HJA Forms Summary

Form Name	Purpose	Form Number – Optional or Required	Individual Responsible for Completion	Frequency	Remarks
Emergency Medevac/Medical Transport Request	To provide additional information for aircraft responding to a medevac or medical transport	HJA-1 Optional	Aircraft Base Radio Operator	As medical incidents occur	See Appendix C for further information
Helibase Manager's Reminders List	Enables the Helibase Manager to review items, systems, and procedures applicable to helibase operations	HJA-2 Optional	Helibase Manager	Daily or as needed	
Remote Fuel Site Reminder List	Enables the Helibase Manager to review items, systems, and procedures applicable to remote fuel site operations	HJA-3 Optional	Helibase Manager	During initial establishment of helibase and updated as necessary	
Crash Rescue/ Medevac/Evacuation Plan	Provides procedures and protocols for crash rescue, medevac and helibase evacuation missions.	HJA-4 Information is Required, can be on another form	Helibase Manager	During initial establishment of helibase and updated as necessary	See Appendix C for further information
Risk Assessment Worksheet	Worksheet to document hazards and mitigations	HJA-5 Optional	Aviation Manager	Pre-operational planning tool	See also Appendix G
Risk Assessment and Mitigation	Worksheet to document pre and post mitigations	HJA-6 Optional	Aviation Manager	Pre-operational planning tool	See also Appendix G
GAR Model Risk Assessment Worksheet	Worksheet to document risk assessment	HJA-7 Optional	Aviation Manager	Pre-operational planning tool	See also Appendix G

Emergency Medevac/Medical Transport Request (HJA-1)

Purpose

The purpose is to have a form readily available to ABROs so they can ensure all pertinent information is obtained and relayed during emergencies that involve helicopters.

Applicability

The form is optional but should be used for all requests for helicopter EMS, including “life flight” helicopters and incident helicopters assigned to medevac missions. Completion is not required for medevac transport from established helispots or the helibase.

Responsibility and Instructions for Completion

The Helibase Manager is responsible for ensuring the form is completed when requests for such services are received. This responsibility is usually delegated to the ABRO.

The information on this form supplements information that is relayed to the Helibase from the Medical Incident Report (9-Line). Ensure that as much information is completed as is possible or available. Particular attention should be paid to radio frequencies, particular with “life flight” helicopters, and to the availability of fuel either en route to the scene or to the medical facility. Completion of specific blocks on the form is self-explanatory.

Posting

None.

Routing and Filing

The form becomes part of the Incident Crash Rescue Plan.

Related Forms

HJA-4 Crash Rescue/Medevac/Evacuation Plan, and HBM-15 Emergency Rescue Information.

Helibase Manager’s Reminders List (HJA-2)

Purpose

The purpose of the Helibase Manager’s Reminders List is to provide the Helibase Manager with a comprehensive list of items, procedures and systems required for helibase and helispot management and operations. If items on the Reminders List are adequately covered, then the Daily Helicopter Operations Briefing/Debriefing Checklist should show few, if any, discrepancies.

Applicability

Use of the Helibase Manager’s Reminders List is optional, but highly recommended on all multiple aircraft helibases prior to or immediately after the start of air operations. Review of the list at appropriate times during the course of an incident or project is also recommended.

Responsibility and Instructions for Completion

The Helibase Manager should review the Helibase Manager’s Reminders List upon arrival at multiple-aircraft operations and should review all or parts of the list on a daily basis thereafter.

One-time “start-up” items, such as helibase location considerations, should be re-evaluated at appropriate times.

The items on the list are self-explanatory. If uncertain, further guidance can be found in the appropriate chapter of this guide.

Posting

None. However, the Helibase Manager may post a copy on the helibase display board.

Routing and Filing

None.

Related Forms

All of the Helibase Management (HBM) forms and several of the HCM forms are discussed. The Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00), covers some but not all of the items contained in the Reminders List.

Remote Fuel Site Reminders List (HJA-3)

Purpose

The purpose of the Remote Fuel Site Reminders List is to provide the Helibase Manager and/or Fueling Specialist with a comprehensive list of items, procedures and systems pertaining to remote site fueling operations.

Applicability

Use of the Remote Fuel Site Reminders List is optional but highly recommended for Government-operated fueling operations.

Responsibility and Instructions for Completion

The Helibase Manager should review the list upon arrival at remote site fueling operations and on a daily basis thereafter. The list can be inserted into the Fireline Handbook.

Posting

None. However, the Helibase Manager may post a copy on the helibase display board.

Routing and Filing

None.

Related Forms

The Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00), requires that fueling operations be conducted safely. Use of this appendix will help meet this objective.

Crash Rescue/Medevac/Evacuation Plan (HJA-4)

Purpose

Provides procedures and protocols for crash rescue, medevac and helibase evacuation missions.

Applicability

A Crash Rescue plan is required for all helibases and should be completed by the second operational period. Other versions of this plan may be used.

Responsibility and Instructions for Completion

The Helibase Manager is responsibility for completing an incident specific plan it should also include the local crash rescue Plan, crash rescue diagrams from Appendix M, HJA-4A, and HJA–B.

Helibase personnel should be informed of information contained in this plan, and a crash rescue drill should be done as practical.

Routing and Filing

The Helibase should retain a copy for the Helibase files, and a copy should be given to incident Medical Unit for familiarization.

Posting.

Plan should be posted on Helibase Information Board or other conspicuous location.

Related Forms

Emergency Rescue Information (HBM-15) and Emergency Medevac/Medical Transport Request (HJA- 1).

Risk Assessment / Risk Management Worksheets (HJA-5, HJA-6, HJA-7)

Purpose

The purpose is to provide a standardized description of recognized hazards, Likelihood, Severity and Outcome of proposed mitigations to identified risks. The form standardizes the risks and potential outcomes of those risks assumed by employees engaged in aviation operations to supervisors and line officers for signature or plan revision.

Applicability

The form will be completed as part of an aviation organizations annual plan. It will also be included as part of a Project Aviation Safety Plan and updated as often as the parameters of the project change. The form should be completed for each mission.

The Information is required. The specific form is not.

Routing and Filing

Routing and filing is indicated at the bottom of the form and is as follows:

Risk Level	Appropriate Management Level for Risk Decision	
	Fire	Project
High	Incident Commander or Operations Section Chief	National Program Manager
Serious	Incident Commander or Operations Section Chief	Line Manager
Medium	Air Operations Branch Director	Project Aviation Manager
Low	Helibase Manager	Helicopter or Flight Manager

Posting

The mission cannot proceed without approval from the appropriate level. The residual risks must be communicated to employees for consideration.

Related Forms

Green-Amber-Red (GAR) Risk Assessment Worksheet.

Additional blank HJA-5, HJA-6, HJA-7 forms are available in the HJA forms package, https://www.nwcg.gov/publications/510.

Operational Risk Assessment – Green-Amber-Red (GAR) Form

Purpose

The mission risk mirrors the colors of a traffic light. If the total risk value falls in the GREEN ZONE (1-35), risk is rated as low. A moderate level of risk is indicated when the total risk value falls in the AMBER ZONE (36-60), and should the total value fall in the RED ZONE (61-80), you should ensure that all effective control measures have been implemented prior to starting the operation. The Amber and Red risk levels must also be evaluated at a higher level in the organization than the helicopter/Helibase Manager, so that the organizational risk acceptance levels are aligned with the expected benefit of the operation.

The GAR Model provides a general assessment of operations and allows management to set the standard for risk. Any concern for elevated risk levels in one or more of the categories may require an in depth assessment using a more specific assessment.

Assigning numerical values and colors to hazards using the GAR Model is not the most important part of this risk assessment. The importance lies in the team discussions, which lead to an understanding of the threats, how they will be controlled, and what standards management expects personnel to maintain. This allows decision making, and threat and error management, to be properly aligned with the organization.

Applicability

The form is a time critical Safety Risk Management tool that applies to missions/flights.

Routing and Filing

Daily or mission specific risk assessments should be performed. Refer to specific agency policy for documentation, routing and filing requirements.

Posting

No requirement for posting.

Related Forms

Risk Assessment Worksheets.

Appendix G – Safety Risk Management Process

Introduction

This appendix introduces concepts and terms and provides tools to assess and manage risks within the interagency helicopter operations community. It is organized to follow the five -step process of risk management beginning with hazard identification.

- Properly managing risks allows you to:
- Protect lives and conserve resources by avoiding unnecessary risks.
- Make more informed decisions.
- Identify feasible and effective control measures where specific standards do not exist.
- Improve opportunity for successful mission accomplishment.

Safety Risk Management Assumptions

- Risk is inherent in all aviation missions, operations and activities.
- Risk can be effectively mitigated if understood and appropriate action is taken.
- Everyone is responsible for utilizing Safety Risk Management concepts, tools and techniques.

Safety Risk Management Principles

Four principles govern all actions associated with Risk Management. These continuously employed principles are applicable before, during and after all tasks and operations by individuals at all levels of responsibility:

Accept no unnecessary risk

Unnecessary risk comes without a commensurate return in terms of real benefits or available opportunities. Everything involves risk. The most logical choices for accomplishing a mission are those that meet all objectives with the minimal acceptable risk.

Make risk decisions at the appropriate level

Making risk decisions at the appropriate level establishes clear accountability. The appropriate decision maker is the person who allocates resources and implements controls to mitigate or eliminate risks associated with planned operation (i.e., loss of mission effectiveness, normal wear and tear on material).

Risk decisions should be elevated to the next level in the management chain upon determining that controls available to him/her will not reduce residual risk to an acceptable level.

Accept risk when benefits outweigh the costs

All identified benefits should be compared against all identified cost. Even high-risk operations may be undertaken when a clear knowledge that the sum of the benefits exceeds the sum of the cost. Balancing cost and benefits is a subjective process, and ultimately the balance may have to be determined by the appropriate decision maker.

Integrate risk management principles into planning at all levels.

Integrate Safety Risk Management into planning at all levels and as early as possible. This provides the greatest opportunity to make well informed risk decisions and implement effective risk controls. Risk assessments of operations and activities are most successful when they are accomplished in the normal sequence of events (the planning of a mission or activity) by individuals directly involved in the event, and not as a last minute or add-on process. Any amount of planning that can be accomplished, even in a time constrained environment, is better than no planning at all.

If the safety risks are assessed as intolerable, the following questions become relevant:

- Can the hazards and related safety risk(s) be eliminated? If the answer is yes, then action as appropriate is taken and documented. If the answer is no, the next question is:
- Can the safety risk(s) be mitigated? If the answer is no, related activities must be cancelled. If the answer is yes, mitigation action as appropriate is taken and the next question is:
- Do any residual safety risks exist? If the answer is yes, then the residual risks must be assessed to determine their level of tolerability as well as whether they can be eliminated or mitigated as necessary to ensure an acceptable level of safety performance.

Terms

Safety Management System (SMS)

Is a quality management approach that integrates the practices of controlling risk and safety-related processes into an organized safety culture and business management model. Safety Risk Management is a tool within Safety Management.

Safety Risk Management (SRM)

Is a formal system of hazard identification, essential in controlling risk to acceptable levels. It is a formal process that describes the system, identifies the hazards, assesses the risk, analyzes the risk, and controls the risk. The Safety Risk Management process is embedded in the mission planning process and throughout mission operations.

The Safety Risk Management process should be applied to:

- Initial designs of systems, organizations, and/or products
- The development of operational procedures
- Identified hazards
- Planned changes to operational processes

Risk

Is the composite of predicted severity (how bad) and likelihood (how probable) of the potential effect of a hazard in its worst credible (reasonable or believable) system state. Risk is the future impact of a hazard that is not controlled or eliminated. It can be viewed as future uncertainty created by the hazard. If it involves skill sets, the same situation may yield different risks.

Example: If the aircraft is not properly bonded, then static electricity builds which can result in static discharge that may ignite the fuel vapor leading to a potential explosion.

Safety Risk Assessment involves an analysis of identified hazards that includes the following components:

- The severity of a safety outcome; AND
- The probability that it will occur. AND
- The amount of time the hazard will be exposed.

Operational Risk Management (ORM)

ORM is a process of identifying and controlling hazards. The goal of ORM is to manage risk so the mission can be accomplished with minimum loss. ORM is also a decision making tool to systematically help identify operational risks and benefits and determine the best course of action for any given situation.

Hazards

A hazard is a present condition, event, object, or circumstance that could lead to or contribute to an unplanned or undesired event such as an accident. It is a source of danger.

Example: Pilot fatigue is a hazard because the pilot may not realize he or she is too tired to fly until serious errors are made. Humans are very poor monitors of their own mental condition and level of fatigue. Fatigue can be as debilitating as drug usage, according to some studies.

Controls

Policies or devices that work to mitigate or eliminate risk to assets, lives, or mission completion.

Example: Organizations can implement a rule of 12 hours of crew rest prior the start of a duty day that includes flying, and limiting the length of that day to 12 hours.

Likelihood

Sometimes referred to as “vulnerability,” the level of possibility of occurrence of something that may impact people, property or resources.

Example: When departing for a flight in weather conditions that are “Ceiling and Visibility (CAV) OK”, which is pilot speak for “clear skies” the likelihood of a weather-related incident are low. Conversely departing when the CAV is 1000ft and lightning has been spotted within 10nm has a significantly higher likelihood of a weather related event.

Total Risk

The sum of identified and unidentified risks.

Identified Risk

Risk that has been determined through various analysis techniques. The first task of system safety is to identify, within practical limitations, all possible risks.

Example: The mission requires the helicopter be operated near its performance limit. Exceeding the performance limit may result in a potential failure.

Unidentified Risk

Risk not yet identified. Some unidentified risks are subsequently identified when a mishap occurs. Some risk is never known.

Example: Unforeseen weather changes, clear air turbulence, hazards not properly identified on a hazard map.

Unacceptable Risk

Risk that cannot be tolerated by the managing activity. It is a subset of identified risk that must be eliminated or controlled.

Example: A Visual Flight Rules rated pilot deciding to fly in Instrument Flight Rules conditions.

Acceptable Risk

Acceptable risk is the part of identified risk that is allowed to persist without further engineering or management action. Making a decision to proceed is a difficult yet necessary responsibility of management. This decision is made with full knowledge that it is the user who is exposed to the risk.

Example: Leaving the ground in an aircraft carries with it a certain amount of risk. When the skill and training of the pilot reach a level that sufficiently overcomes the risk, then the level of risk is acceptable.

Residual Risk

Residual risk is the risk remaining after system safety efforts have been fully employed. It is not necessarily the same as acceptable risk. Residual risk is the sum of acceptable risk and unidentified risk. This is the total risk passed on to the user.

Example: Flying carries an amount of known risk, and a certain amount that could arise during the flight that wasn't planned for.

Levels of Safety Risk Management

We categorize Safety Risk Management into three levels:

Strategic

Long-term planning, usually embedded in policy. An organization's determination of acceptable levels of risk is found in the organization's culture, policy, handbooks, guides and training curriculum.

Deliberate

Deliberate Safety Risk Management refers to pre-mission/activity planning and involves the full formal application of the complete 5-Step Risk Assessment process. Deliberate Safety Risk Management should be implemented in advance of the planned operational mission. Always include the experience, expertise and knowledge of personnel to identify known hazards/risks and strategies to effectively mitigate risks for the specific mission. The Project or Aviation Safety Plan is at the “Deliberate” level.

Time Critical

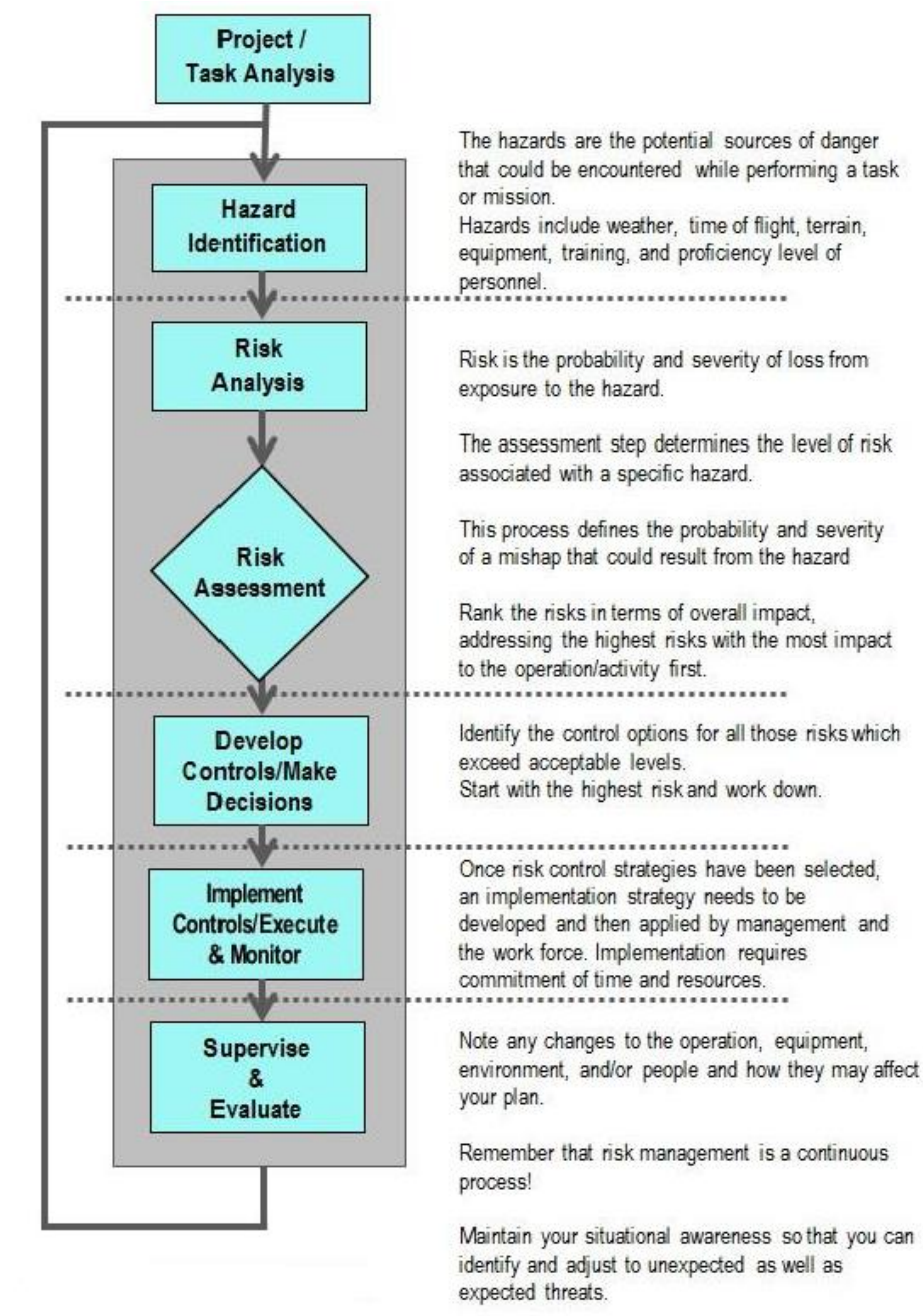
During the execution or tactical phase of operations. It can be an informal, mental risk assessment using basic Safety Risk Management process steps to identify and mitigate hazards in the new or changing situation. A rapid risk assessment or GAR falls into “Time Critical”.

The Five-Step Process

A systematic approach to Safety Risk Management is useful. We use a five-step process for managing risk:

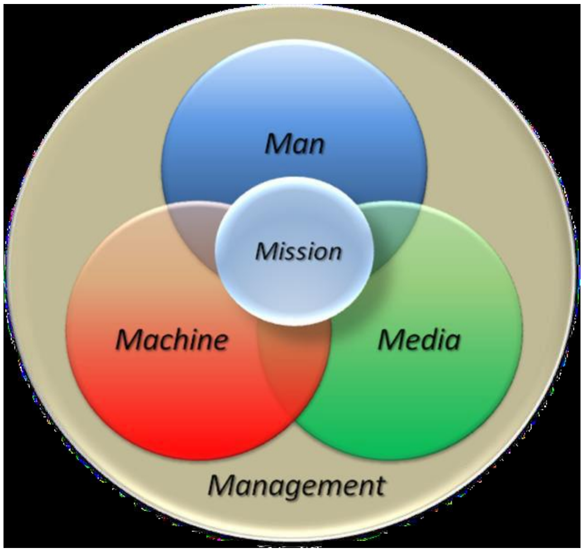
1. Identify the hazard
2. Assess the risk
3. Analyze risk control/mitigation measures
4. Make control decisions and implement controls
5. Supervise and review

Successful Safety Risk Management relies upon the cyclical nature of the process. At any point, reassessment may require going back through the cycles to address impacts and changes.


Project /
Task Analysis
Hazard
Identification
Risk
Analysis
Risk
Assessment
Develop
Controls/Make
Decisions
Implement
Controls/Execute
& Monitor
Supervise
&
Evaluate
The hazards are the potential sources of danger that could be encountered while performing a task or mission.
Hazards include weather, time of flight, terrain, equipment, training, and proficiency level of personnel.
Risk is the probability and severity of loss from exposure to the hazard.
The assessment step determines the level of risk associated with a specific hazard.
This process defines the probability and severity of a mishap that could result from the hazard
Rank the risks in terms of overall impact, addressing the highest risks with the most impact to the operation/activity first.
Identify the control options for all those risks which exceed acceptable levels.
Start with the highest risk and work down.
Once risk control strategies have been selected, an implementation strategy needs to be developed and then applied by management and the work force. Implementation requires commitment of time and resources.
Note any changes to the operation, equipment, environment, and/or people and how they may affect your plan.
Remember that risk management is a continuous process!
Maintain your situational awareness so that you can identify and adjust to unexpected as well as expected threats.

Step 1 - Identify Hazards/Risks

Successful missions, or mishaps, do not just happen; they are indicators of how well a system is functioning. The basic cause factors for mishaps fall into the same categories as the contributors to successful missions—Man, Media, Machine, Mission and Management. These are referred to as “The 5 Ms.” The 5 Ms provide a logical approach to categorize and evaluate potential hazard.



1. **Mission**

   The mission is the purpose or central function of the system. This is the reason that all the other elements are brought together. Always ask yourself:

   - Is this flight necessary?
   - Is there a better way to do it?

   Define the mission objectives, what is the desired outcome. The complexity of the mission should be understood, well defined and obtainable.

2. **Man**

   This is the human element of a system and possibly the area of greatest variability and thus the majority of risks. Identify the hazards of this element by considering the following human elements:

   Crew experience

   - Flight proficiency
   - Knowledge

   Crew composition

   - Knowledge of each other
   - Cohesiveness
   - Changes to the crew

Fitness for flight

- Physical state
- Mental state

Selection

- Right person psychologically/physically, trained in event proficiency, procedural guidance, habit pattern

Performance

- Awareness, perceptions, task saturation, distraction, channelized attention, stress, peer pressure, confidence, insight, adaptive skills, pressure/workload, fatigue (physical, motivational, sleep deprivation, circadian rhythm)

Personal Factors

- Expectancies, job satisfaction, values, families/friends, command/control, discipline (internal and external), perceived pressure (over tasking) and communication skills
- Other considerations may include supervision and cultural norms (national, organizational, professional).

3. Machine

This is the hardware and software. The aircraft and all associated equipment required for the mission. When accessing the hazards related to the machine consider:

- Capabilities and limitations
- Certification
- Reliability
- Support
- Special equipment

Other considerations:

Machine

Used as intended, limitations, interface with man

Design

Engineering reliability and performance, ergonomics

Maintenance

Availability of time, tools, and parts, ease of access

Logistics

Supply, upkeep, repair

Tech data

Clear, accurate, usable, and available

4. Management

Management controls many aspects of our work:

Policy

CFRs, FARs, agency policy

Procedures

Manuals and SOPs

Standards

Company policy

Controls

Crew standardization, training, and limitations

Media

Media is the environment in which the mission will be executed. These are external, largely environmental forces:

Climate

Ceiling, visibility, temperature, humidity, wind, precipitation,

Operational environment

Terrain, wildlife, vegetation, man-made obstructions, daylight, darkness. Landing/takeoff areas: Gravel, dirt, ice, mud, dust, snow, etc.

Hygienic environment

Ventilation/air quality, noise/vibration, dust, contaminants.

Step 2 – Assess the Hazards/Risks

Risk Assessment Tools and Methods – Risk Matrix

There are many models that many be used to assess risk, e.g. the Risk Assessment Matrix (a part of the Safety Management System approach, commonly used with deliberate risk assessment), the GAR Model (more commonly used with time-critical risk assessment) or the Severity/Probability/Exposure (SPE) Model (which addresses specific hazards and calculates in exposure as a third factor).

Risk Assessment Matrix

Your organization may use a different list of categories, letters, colors, or numbers for severity, likelihood, and risk assessment codes. However, the purpose and concept are the same in that you are breaking it down into categories from least risk to most risk.

For each hazard identified, determine the associated degree of risk in terms of likelihood and severity. The result of the risk assessment is a prioritized list of hazards, which ensures that controls are first identified for the most serious threat to mission or task accomplishment. The hazard list is intended for use as a guide to the relative priority of risks involved and not as an absolute order to follow.

Severity

This is an assessment of the potential consequence that can occur as a result of a hazard and is defined by the degree of injury, illness, property damage, loss of assets (time, money, personnel), or effect on the mission or task. Consideration must be given to exposure potential. For example, the more resources exposed to a hazard, the greater the potential severity. Severity categories are assigned according to the following criteria:

Table 1: Severity Categories

CATEGORY	DEGREE OF SEVERITY
Category I: Catastrophic	The hazard may cause death, loss of facility/asset or result in grave damage to national interests.
Category II: Critical	The hazard may cause severe injury, illness, property damage, damage to national or service interests, or degradation to efficient use of assets.
Category Ill: Marginal	The hazard may cause minor injury, illness, property damage, damage to national, service or command interests or degradation to efficient use of assets.
Category IV : Negligible	The hazard presents minimal threat to personnel safety or health, property, national, service or command interests, or efficient use of assets.

Likelihood

This is an assessment of the likelihood that a potential consequence may occur as a result of a hazard and is defined by assessment of such factors as location, exposure (cycles or hours of operation), affected populations, experience, or previously established statistical information. Likelihood categories are assigned a letter according to the following criteria:

Table 2: Likelihood Categories

DEGREE OF LIKELIHOOD	DESCRIPTION
Frequent (A)	Continuously or often encountered during each mission.
Probable (B)	Encountered several times during the course of many missions.
Occasional (C)	Encountered sporadically during the course of many missions.
Remote (D)	Encountered infrequently, but changes are remote.
Improbable (E)	Encountered only rarely, chances are possible but unlikely.

Complete a Risk Assessment Matrix. Combine the severity with the likelihood to determine the level of risk for each hazard.

Chart G-1: Risk Assessment Matrix

	Severity			
Likelihood	IV Negligible	III Marginal	II Critical	I Catastrophic
Frequent A			4	
Probable B		3		High
Occasional C		2	Serious	
Remote D	1	Medium		
Improbable E	Low			

Risk Levels

At this stage, you are assigning a level of risk to each hazard, based upon where it falls on the Risk Assessment Matrix.

RISK LEVEL	DESCRIPTION
1 Low	The risk involves little or no impact on mission accomplishment. Hazards are those normally associated with flight (possibility of bird strike, mechanical, malfunction, etc.).
2 Medium	Degree of risk is such that the mission can almost certainly be accomplished safely. Hazards exist, but can be mitigated.
3 Serious	Risk is high enough that there is uncertainty as to whether the mission can be accomplished without an accident and/or loss of life or serious injury. Hazards may or may not be able to be mitigated.
4 High	The combination of severity and likelihood indicate the hazard has a greater than 50% chance of exceeding control measures and the result will be critical or worse. Benefit to risk must be carefully weighed and planners ensure that: 1) emergency response resources are positioned for immediate use, 2) approval is made by the highest official in the local organization, and 3) crewmembers are well rested, briefed and aware of the known threats and their controls.

Risk Assessment Pitfalls

- The following pitfalls should be avoided during the assessment:
- Over Optimism: Not being totally honest or not looking for root causes.
- Misrepresentation: Individual perspective may distort the data.
- Alarmism: “The sky is falling” or “worst case” estimates are used regardless of their possibility.
- Indiscrimination: All data is given equal weight.
- Prejudice: Subjective or hidden agendas are used vice facts.
- Inaccuracy: Bad or misunderstood data nullify accurate risk assessment.
- Enumeration: Difficulty in assigning a numerical value to human behavior.

Risk Assessment Tools and Methods

Green-Amber-Red (GAR)

This model differs from the Safety Risk Matrix (described above) in several ways. First, it provides a more general analysis of the operational system. Second, it provides a qualitative rating scale for each of the categories that correspond to the identified areas of risk. It is important to remember that Safety Risk Management is a process that continues throughout the mission. Each assessment model provides a method of evaluating risks as they apply to every mission. The following categories comprise the GAR Model:

Supervision

A person designated to provide supervision acts as a control for the risk undertaken. This may be as simple as checking that operations are proceeding according to approved standards. Supervisory control considers the experience, training, proficiency, other qualifications of the supervisor; whether that person's situational awareness, leadership, and communication are effective; and if the required supervision is actually taking place. To effectively provide control the supervisor must:

Know the goals of the operation (planning),

Be able to affect the system (leadership, communication, decision making),

Have a model (plan) of the system and

Be able to ascertain the state of the system (situational awareness).

The higher the degree of risk, the more the supervisor needs to focus on observing and the larger picture. A supervisor who is easily distracted by hands-on tasks is not an effective safety control in high-risk conditions.

Planning

Consider how informed you and other resources are, how accurate the information is, and the amount of time available to plan for and evaluate the existing and emerging conditions.

Team Selection

Evaluate the character and competence of the individuals to be used. If individuals must be replaced during the operation, assess new team members and how they will interact with those already engaged.

Team Fitness

Assess both the physical and mental state of the team. Consider the amount and quality of duty/rest a crewmember has had and their exposure to sources of stress. The stage of team development should also be scrutinized; it will impact the level of complexity the team is able to manage.

Communication

Evaluate the available communication systems according to: their technical capability, infrastructure, reliability, and the organization's culture. Determine how any barriers to effective communication may be bridged, and identify how errors may be rectified.

Contingency Resources

Contingency planning should be a normal part of all operational planning. These resources are activated only under certain predetermined conditions and/or in emergencies. Consider their activation requirements, response time, and how they would be used.

Environment

Consider factors affecting the performance of people as well as the capabilities and limitations of other resources. These may include the time of day, temperature, humidity, precipitation, wind and other dynamic weather conditions. Terrain affects wind and weather patterns and can both provide benefits and hide other hazards from view.

People are affected by the organizational environment as well. The overt culture of an organization may appear to be one thing when below the surface it is actually something else. Be realistic and truthful regarding the culture of the organization; provide goals and expectations that are understood by all.

Event or Incident Complexity

Careful team selection is of key importance in bringing together individuals with the requisite character and competency. Newly developing teams are equipped with a variety of individual skills. Time is needed for them to develop, and leadership must adapt as the team evolves. Often, they must overcome barriers to successfully integrate. They might be capable of handling simple tasks without much preparation. However, the demands of more complex operations may require that time be set aside for training/team interaction, in order for them to develop the necessary trust and competency to function effectively.

Calculating Risk Using GAR Model

To compute the total risk level, assign a number from 0 (No Risk) to 10 (High Risk) for each of the eight previously identified categories. The individual risk category scores are then totaled. This personal estimate is a starting point for the subsequent discussion, which should include as many of the participants as is practical. This discussion is more important than the actual numbers assigned.

Category	Level of Risk
Supervision	
Planning	
Team Selection	
Team Fitness	
Communication	
Contingency Resources	
Environment	
Complexity	
Total	

Color Coding Risk

The mission risk mirrors the colors of a traffic light. If the total risk value falls in the GREEN ZONE (1-35), risk is rated as low. A moderate level of risk is indicated when the total risk value falls in the AMBER ZONE (36-60), and should the total value fall in the RED ZONE (61-80), you should ensure that all effective control measures have been implemented prior to starting the operation. The Amber and Red risk levels must also be evaluated at a higher level in the organization than the helicopter/Helibase Manager, so that the organizational risk acceptance levels are aligned with the expected benefit of the operation.

The GAR Model provides a general assessment of operations and allows management to set the standard for risk. Any concern for elevated risk levels in one or more of the categories may require an in depth assessment using a more specific assessment.

Assigning numerical values and colors to hazards using the GAR Model is not the most important part of this risk assessment. The importance lies in the team discussions, which lead to an understanding of the threats, how they will be controlled, and what standards management expects personnel to maintain. This allows decision making, and threat and error management, to be properly aligned with the organization.

SPE Model

The SPE Model is used in situations addressing specific hazards, adding in exposure as a factor: Risk = Severity X Probability (Likelihood) X Exposure

Step 3 – Develop Controls/Make Decisions

It is assumed a list of known or expected hazards associated with the proposed/planned aviation mission has been compiled in Step 1 of the 5-Step Process. Those hazards were analyzed and evaluated until they were characterized as risks during Step 2. Step 3 deals with developing controls—or mitigating strategies—and making decisions on how to implement those controls.

The main ways to control a hazard include:

Elimination (including substitution):
Remove the hazard from the workplace

Engineering Controls
Includes designs or modifications to plants, equipment, ventilation systems, and processes that reduce the source of exposure

Administrative Controls
Controls that alter the way the work is done, to include: policies, SOPs, procedures, standards, training, etc.

Personal Protective Equipment
Equipment worn by individuals to reduce exposure such as contact with chemicals or exposure to noise. These methods are also known as the "hierarchy of control" because they should be considered in the order presented (it is always best to try to eliminate the hazard first, etc.).

Effectiveness	Type of Control
Most Effective	Elimination or Substitution
	Engineering Controls
	Administrative Controls (Awareness, Training, Procedures)
Least Effective	Personal Protective Equipment

Source: http://www.ccohs.ca/oshanswers/hsprograms/hazard_control.html#_1_4

The STAAR Model

One tool for developing control measures in a Safety Risk Management process is the “STAAR” model. The STAAR model describes the concepts whereby managers and operators attempt to mitigate known or anticipated risks associated with a proposed aviation operation:

- Spread
- Transfer
- Avoid
- Accept
- Reduce

A comprehensive listing of all the control measures possible for each identified risk should be honed down to the best/most appropriate controls for each risk based on time, resources, and funds expected to be available to conduct the aviation operation.

The completed Safety Risk Assessment worksheet is reviewed after the mission as part of the debrief/after action review (AAR) (Step 5 of the Safety Risk Management process) to identify ineffective (or overly restrictive) mitigation controls. Once the AAR is completed, the Safety Risk Assessment worksheet can be filed for future use the next time a similar mission is conducted.

Step 4 - Implement Controls

Leaders and staff are responsible to ensure that risk controls (identified in Step 3 of the Safety Risk Management process) are integrated into SOPs, written and verbal orders, mission briefings, and other plans. It is critical that risk controls are understood at all levels. It is important to provide a vision of the end state and describe successful implementation.

Employees are responsible to understand and comply with established risk controls, and to advise leadership when those risk controls are not effective.

Within the Interagency Helicopter Operations community, risk controls can be implemented in:

Departmental Manuals (DMs)

Operational Procedures Memorandums (OPMs)
Forest Service Manuals

Handbooks & Guides

Checklists

There are numerous checklists that help to implement risk controls (see the Bureau/Agency specific operations checklists, and the Aviation Operations Checklist.)

Briefings

Briefings allow leaders to communicate their risk controls and risk tolerance expectations to their employees. Back-briefs involve the employee repeating the risk controls to the leader so that both have the same understanding.

Tailgate Sessions

Tailgate sessions are a commonly used technique in the interagency community to provide training and to increase communications between leaders and employees.

Rehearsals

Rehearsing the mission or individual elements (i.e., Communications Plan) is another technique to ensure that the risk controls established in the operations plan (or Project Aviation Safety Plan) are properly understood by all participants. Sand table exercises and flight simulators are means of rehearsing a mission.

Training

One common means used to reduce risks in aviation is through training. Some courses such as A-100 (Basic Aviation Safety) provide a broad look at the policies and procedures used to protect our people and accomplish our missions. Other courses such as A-312 (Water Ditching and Survival) are designed to reduce the specific risks faced by personnel who fly over water. Departmental-level training is often supplemented by Bureaus and local units when their missions involve risks that are not adequately covered by Departmental training (i.e. Helicopter Underwater Egress Training (HUET), cold weather survival training for personnel in Arctic environments, etc.).

Equipment

New or specialized equipment can be used to implement risk controls. A bureau/agency responsible for long-range low-level airplane missions may look to a new aircraft that has better performance, better visibility, longer range, etc. to replace an older model aircraft. A bureau/agency that flies offshore may require their aircraft to have externally mounted life rafts with integral EPIRBs (Emergency Position-Indicating Radio Beacon).

Step 5 – Supervise and Evaluate

Supervise

Monitor the operation to ensure the controls are effective and remain in place and changes which require further Safety Risk Management are identified. Supervise to assure action is taken when necessary to correct ineffective risk controls and reinitiate the Safety Risk Management steps in response to new hazards.

Any time the personnel, equipment or tasking change or new operations are anticipated in an environment not covered in the initial Safety Risk Management analysis, the risk control measures should be re-evaluated.

Evaluate

This process should be systematic. Modes of evaluation include internal review, external audit, red teaming, exercises, and after action reviews. Additionally, for every adopted Safety Risk Management action there is an expectation that the action will create some identifiable positive benefit.

The value of testing the effectiveness of strategies using these methods is that it provides different perspectives on the success of the Safety Risk Management approach and the capabilities of the organization.

When a decision is made to assume risk, the cost/benefit involved should be recorded. If an accident or negative consequence occurs, proper documentation allows for the review of the risk decision process to see where errors might have occurred or if changes in the procedures or tools lead to the consequences.

Both types of monitoring - effectiveness and situational awareness - are essential if Safety Risk Management efforts are to be effective over time.

Feedback

In this step of the Safety Risk Management cycle, consider the following questions:

- How well is my chosen course of action working?
- Has anything changed that requires altering my existing Safety Risk Management measures? (5Ms – Man, Machine, Media (environment i.e. weather), Mission, Management)
- Are there current trends and/or potential future developments that could require altering my existing Safety Risk Management measures?

A review by itself is not enough. A feedback system must be established to ensure that the corrective or preventative action taken was effective and any newly discovered hazards identified during the operation are analyzed and corrective action taken.

Feedback can be in the form of briefings, AAR, lessons learned, benchmarking, database reports, etc.

It is unlikely that every risk analysis will be perfect the first time. When risk analyses contain errors of omission or commission, it is important that those errors be identified and corrected. Without this feedback loop, we lack the benefit of knowing if the previous forecasts were accurate, contained minor errors or were completely incorrect.

The overall effectiveness of these implemented controls must also be shared with other organizations that might have similar risks to ensure the greatest possible number of people benefit.

Change Management

Change management is the application of a structured process and set of tools to achieve a desired outcome.

Change is perhaps the most significant factor in managing risks at the operational level. When you think about the variety of flight missions conducted by DOI or the USFS they may seem unique, but in fact they are almost always variations of missions conducted hundreds of times before.

What distinguishes one mission from another--whether it is wildfire, offshore, migratory bird, wild horse capture, or point-to-point--are changes involving Personnel, Equipment, Terrain, Weather, Management and Mission parameters.

When change management is done well, people feel engaged in the change process and work collectively toward a common objective, realizing benefits and delivering results.

After Action Review (AAR)

The AAR is a learning tool and should detail the actions of the crew during the assignment. Technical, operational, and human elements of crew performance should be discussed as appropriate. Both good and sub-standard performance should be addressed and analyzed. The content of each AAR may vary widely, depending upon the events. Crew members benefit from AARs through the acquisition of acquire a more complete knowledge of both the technical and human factors problems that they confront, enabling them to develop plans for doing better in the face of similar problems in the future. (Further guidance for conducting an AAR can be found at https://www.nwcg.gov/wfldp/toolbox/aar.

Guidelines for the AAR

We live in an environment where we know we will have an AAR, and we will have to say out loud what worked and what didn't. That leads to asking tough questions during the planning phase or rehearsals so that you know you have it as right as you can get it. No subordinate will let the boss waffle on something for long before challenging him to say it clearly because it will only come out later in the AAR. As a consequence, AAR meetings create a very honest and critical environment well before they begin.

Begin with a reiteration of the house rules, even if everyone present has already heard them a hundred times: Participate. No thin skins. Leave your rank at the door. Take notes. Focus on our issues, not the issues of those above us. (The participants' supervisors hold their own AARs to address issues at their level.) Absolute candor is critical. To promote a sense of safety, senior leaders stay focused on improving performance, not on placing blame, and are the first to acknowledge their own mistakes.

Timing the AAR

The AAR is a learning tool. Time it to occur when the crew is ready and able to learn. As a leader or supervisor, you need to plan the AAR so that it can be as effective as possible.

End of the Day

Generally, AARs conducted immediately after the shift will provide the best learning. This is the time when most things are still fresh in the mind both technically and emotionally. Unless the feelings associated with an event are very strong, crew members will not retain an emotional memory of it for long.

Split Format

This format is the second-best choice when a full post-shift AAR cannot be implemented: for example, when you have a tired crew but also have important things to discuss. In the split format, the "What really happened?" part of the AAR is explored at the first opportunity, but the remaining part of the briefing is postponed until later. The "What really happened?" stage requires the most emotional recall and focuses only on recalling the events of the action. Analysis and creative thinking are needed for the latter stages, and a crew with no mental energy will have difficulty with this format, these stages are delayed until the crew is ready to learn.

Start of the Day

Conducted prior to morning briefing, this type of AAR enables crew members to retain many details from the previous day. Crew members are generally not as interactive or engaged as they would be right after the event. Although better than nothing, an AAR conducted the next morning is hard to get started and to keep moving.

End of Assignment

Unlike the post-shift AAR, this AAR is usually more academic and global in nature because most of the emotional aspect and much of the detail is missing. This type of briefing does not have to be conducted in the four-question AAR format. Since the post-shift AAR is concentrated on daily performance, the post-assignment de-briefing may concentrate more on large events, operational procedures, shelved, or organization-related issues.

AAR Benefits

Crew members acquire a more complete knowledge of both the technical and human factors problems that they confront, enabling them to develop plans for doing better in the face of similar problems in the future. Source: https://www.nwcg.gov/wfldp/toolbox/aar.

SAFECOM

The Aviation Safety Communiqué (SAFECOM) database fulfills the Aviation Mishap Information System (AMIS) requirements for aviation mishap reporting for the Department of Interior agencies and the U.S. Forest Service. Categories of reports include incidents, hazards, maintenance, and airspace. The system uses the SAFECOM Form OAS-34/FS-5700-14 to report any condition, observation, act, maintenance problem, or circumstance with personnel or the aircraft that has the potential to cause an aviation-related mishap. The SAFECOM system is not intended for initiating punitive actions. Submitting a SAFECOM is not a substitute for "on-the-spot" correction(s) to a safety concern. It is a tool used to identify, document, track and correct safety related issues. A SAFECOM does not replace the requirement for initiating an accident or incident report.

References

Federal Aviation Administration Advisory Circular, AC No: 120-92a, Introduction to Safety Management Systems for Air Operators (2010) http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%20120-92A.pdf

FAA Systems Safety Handbook Chapter 15 https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/risk_management/ss_handbook/media/Chap15_1200.pdf

ICAO Doc 9859 – Safety Management Manual, Third Edition(2013) http://www.icao.int/safety/SafetyManagement/Documents/Doc.9859.3rd%20Edition.alltext.en.pdf

Air Force Pamphlet 90-803 https://static.e-publishing.af.mil/production/1/af_se/publication/afpam90-803/afpam90-803.pdf

DOI OPM-06 https://www.doi.gov/sites/doi.gov/files/migrated/aviation/library/upload/OPM-06.pdf

After Action Review (AAR)

Purpose

The AAR is a learning tool. Time it to occur when the crew is ready and able to learn. As a leader or supervisor, you need to plan the AAR so that it can be as effective as possible.

Applicability

The information is required. There is no specific form is a time critical Safety Risk Management tool that applies to potential lessons that may be learned subsequent to mission/flight or daily. Refer to specific agency policy for applicability requirements.

Routing and Filing

Refer to Agency or unit specific policy for determining when to conduct an AAR and how the content should be distributed.

Posting

No requirement for posting

Related Forms

SAFECOM - OAS-34/FS-5700-14

Question	Purpose
What was supposed to happen? What actually happened? Why were there differences?	These questions establish a common understanding of the work item under review. The facilitator should encourage and promote discussion around these questions. In particular, divergences from the plan should be explored.
What worked? What didn't? Why?	These questions generate reflection about the successes and failures during the course of the project, activity, event or task. The question 'Why?' generates understanding of the root causes of these successes and failures.
What would you do differently next time?	This question is intended to help identify specific actionable recommendations. The facilitator asks the team members for crisp and clear, achievable and future-oriented recommendations.

Appendix H – Incident, Hazard and Accident Reporting

Introduction

A significant portion of an effective aviation safety management program is to ensure hazardous situations or unsafe actions are reported in a timely manner. Written reports are analyzed by aviation program managers to determine if and what kind of corrective actions should be taken and to track trends.

Situations that Warrant a Written Report

Some of the definitions below supplement those found in the glossary. They may vary slightly among agencies but are generally applicable to all agencies.

Aviation Hazard

An aviation hazard is any condition, act, or set of circumstances that compromise the safety of personnel engaged in aviation activities. These hazards may address, but are not limited to, such areas as:

- Deviations from policies, procedures, regulations and instructions as contained in Manual and Handbook Releases, Interim Directives, standard operating guides, etc.
- Hazardous materials handling and/or transport
- Flight following
- Deviation from planned operations, flight plan, type of use (for example, general to special-use)
- Failure to utilize PPE or ALSE
- Inadequate training, or failure to meet training requirements
- Failure to utilize load calculations and/or manifests correctly
- Weather conditions
- Ground operations
- Pilot procedures
- Fuel contamination
- Unsafe actions by Pilot, air crew, passengers, or support personnel.

Maintenance Deficiency

A Maintenance Deficiency is a defect or failure causing mechanical difficulties encountered in aircraft operations, not specifically identified as an incident or aviation hazard.

Aircraft Incident

An aircraft incident is an unplanned event that results in damage which is less than serious aircraft incident criteria, or injury not requiring medical attention. A situation involving an aircraft and/or personnel which has the potential of resulting in an accident is also classified as an aircraft incident. Note that the USFS also has a classification of "Incident with Potential" to cause an accident. Examples of incidents are:

- Injury to Personnel. Injury requiring only first aid.
- Damage to Aircraft. Any damage less than significant (and less than accident criteria) when engines/rotors are turning and there is an intent to fly. When in doubt, respond to the occurrence as if it were an accident. The accident investigators will determine whether the occurrence is classified as an incident or accident.
- Forced Landing. A landing necessitated by failure of engines, systems, or components which makes continued flight impossible, and which may or may not result in damage or injury.
- Precautionary Landing. A landing necessitated by apparent impending failure of engines, systems, or components or incapacitation of the flight crew which makes continued flight inadvisable.
- Aircraft Ground Mishap. A mishap in which there is no intent to fly; however, the power plants and/or rotors are in operation and damage incurred requiring replacement or repair of rotors, propellers, tires, wheels, wing tips, flaps, etc., or an injury is incurred requiring first aid.
- Ground Damage to Aircraft. A mishap not specifically addressed as an incident above, where the aircraft or component incurs damage requiring repair or replacement before flight. Powerplants and/or rotors may or may not be in operation.
- Near Mid-Air Collision. When airborne aircraft encroaches within 500 feet of another airborne aircraft, or a Pilot or crew member determines that a collision hazard existed between two or more aircraft.

Accident

The accident definition is lengthy and fairly technical. If in doubt as to whether the occurrence was an incident ("Damage to Aircraft") or an accident, treat it as an accident. The investigation team will make the final determination as to classification.

Reports and Forms

The agency with operational control of the aircraft at the time of the occurrence will complete a written report SAFECOM (incident/hazard form) and submit it through agency channels.

USFS or DOI Bureaus/Agencies

The Aviation Safety Communiqué (SAFECOM), OAS-34 /FS 5700-14. The SAFECOM form, instructions and database is available at https://www.safecom.gov/.

The SAFECOM is a confidential safety reporting and feedback system for accident prevention. It is a tool used to encourage the reporting of any condition, observance, act, maintenance problem, or circumstance that has the potential to cause an aviation or aviation-related mishap. Data obtained from the system is monitored to identify emerging hazards, share critical safety information, document and track safety issues and identify training needs. It is also used for reporting positive safety actions and mishap prevention measures.

The SAFECOM system is not intended for initiating punitive or disciplinary actions and is not to be used for claims or contract evaluation /determination purposes. The goal of the SAFECOM system is to create a reporting culture that encourages open and honest reporting that improves the safety of aviation operations. SAFECOMs should be utilized in tailgate safety sessions, after action reviews, and briefings only after they have been properly managed through the system.

Submitting a SAFECOM is not a substitute for "on-the-spot" correction(s) to a safety concern. It is imperative that safety issues be addressed at the local level as well as being documented in a SAFECOM. SAFECOM managers at all levels may have additional corrective actions and input.

SAFECOM managers at all levels are responsible for protecting personal data and sanitizing SAFECOMs prior to any distribution and/or posting to the public. The SAFECOM system contains Personal Identifiable Information (PII) which is to be protected and safeguarded. In the event of an accident, dissemination of accident investigation information must be in accordance with NTSB law.

A SAFECOM does not replace the requirement for initiating a mishap report. Mishaps shall be reported immediately by the most expeditious means available in accordance with the bureau or agency Mishap Response Plan.

In order for SAFECOMs to be effective as an accident prevention tool, they should be reported as soon as possible to the agency with operational control of the aircraft at the time of the event. SAFECOMs can be submitted online at SAFECOM or via phone at 888-464-7427. Hard copies of the OAS-34/FS-5700-14 form can be faxed to OAS at 208- 433-5007; USFS at 208-387-5735 or submitted through the Unit/Forest Aviation Officer.

Do not waste time trying to figure out if an event is an accident. If you have an event with an aircraft that results in damage or injury, no matter how slight, REPORT IT to DOI or USFS by calling 1-888-4MISHAP (888-4MISHAP).

State and Local Agency Reports

Reference local formats. Federal personnel managing helibases or engaging in helicopter missions for state or local agencies should complete the state or local format. If none exists, complete a SAFECOM and submit it to the local unit.

Appendix I – Crash Rescue Diagrams

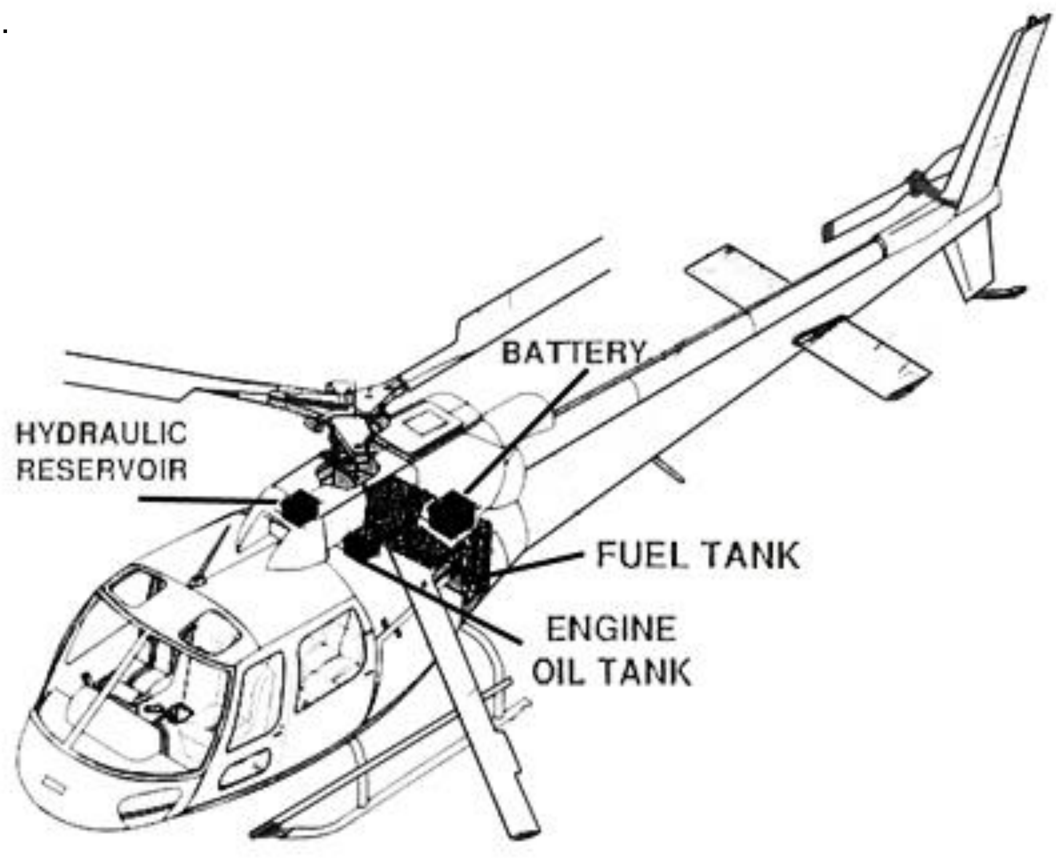
Introduction

This appendix provides typical diagrams of various makes and models of helicopters. The intent is to provide crash rescue personnel on helibases or other locations with general information concerning aircraft layout, emergency ingress and egress, and emergency procedures for fuel and electrical power shutoff.

It is essential that helibase and other personnel with crash rescue responsibilities, or who may be assigned such responsibilities, receive a briefing by the Pilot on the specific characteristics of the helicopter with which they are working.

Airbus AS350 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

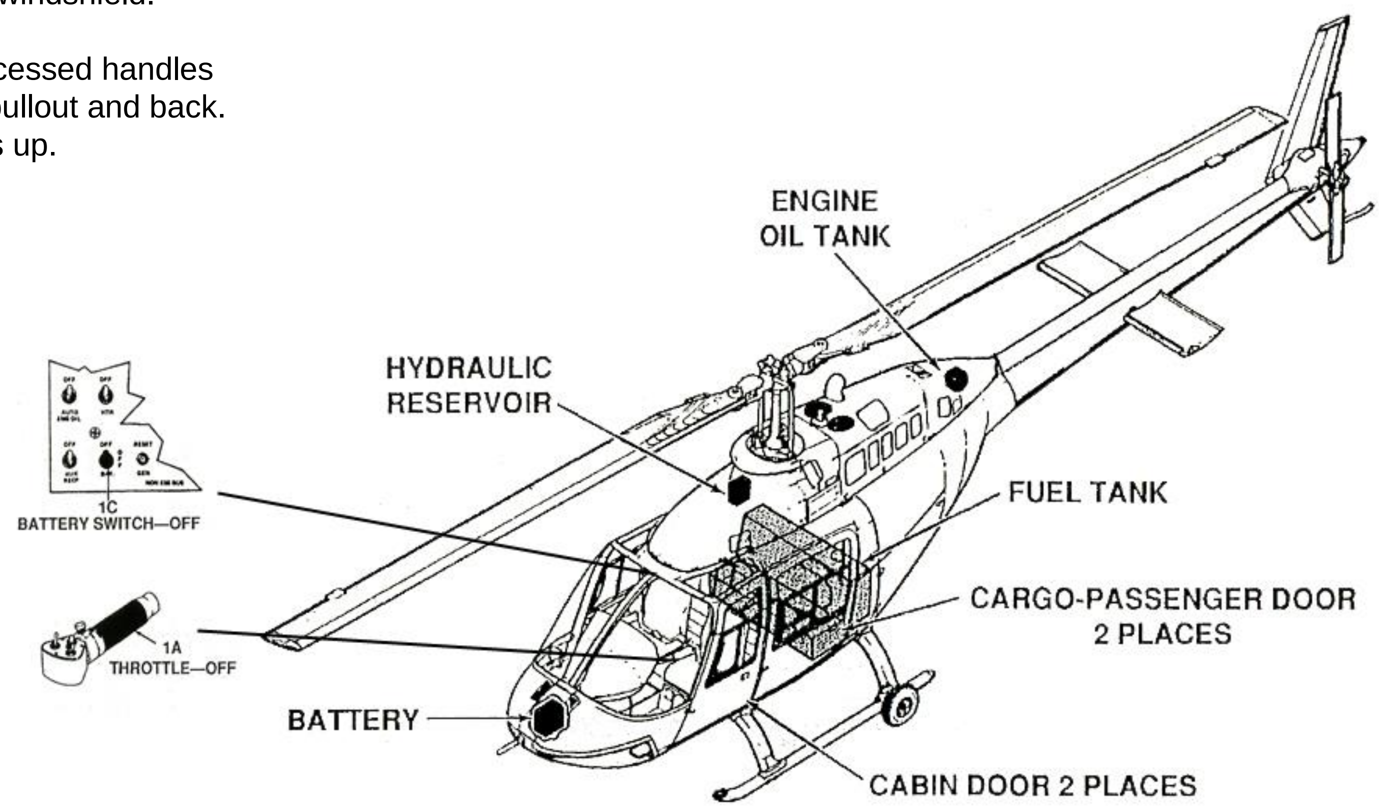


Bell 206B Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.

*All doors have recessed handles pointing forward, pullout and back. Inside pull handles up.



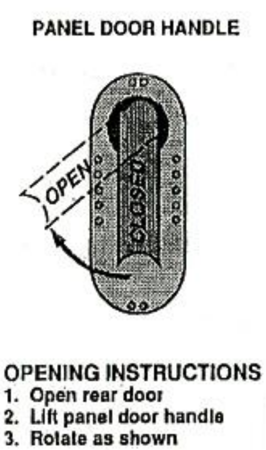
Bell 206L Crash Rescue

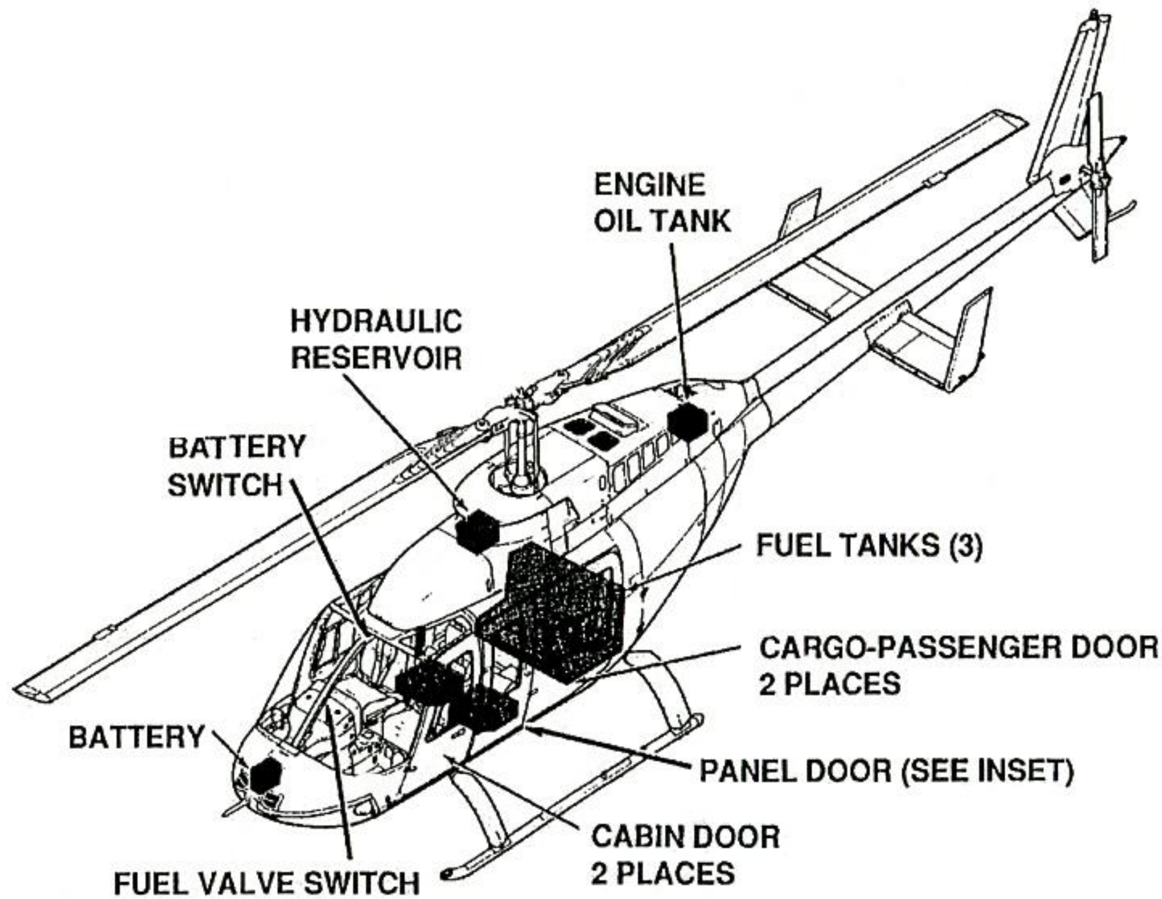
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* If cabin or passenger doors fail to open, break windows or windshield.

*Pilot and passenger doors have recessed handles pointing forward. Outside-pull out and back. Inside-pull up.



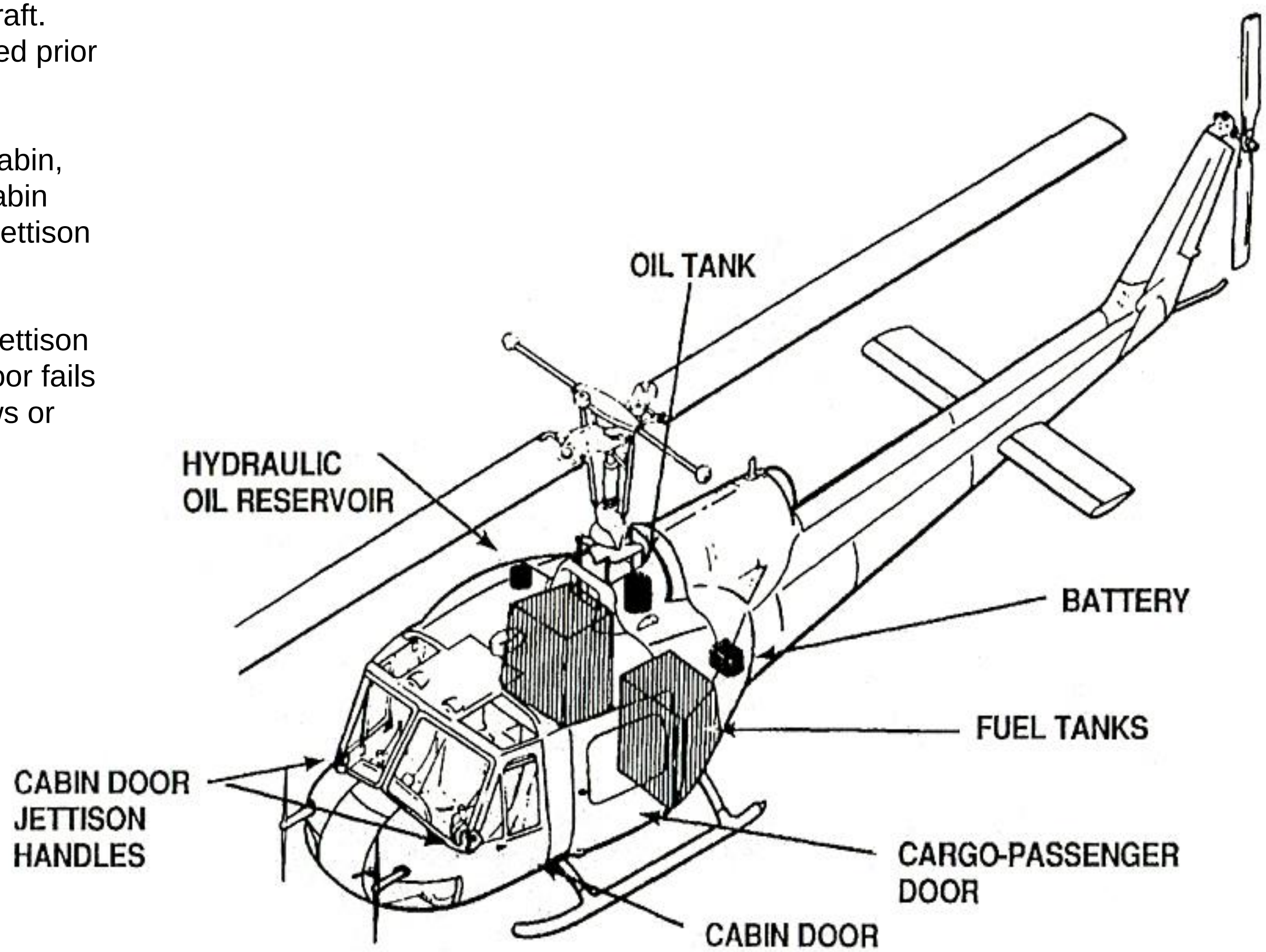


Bell 204B Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.

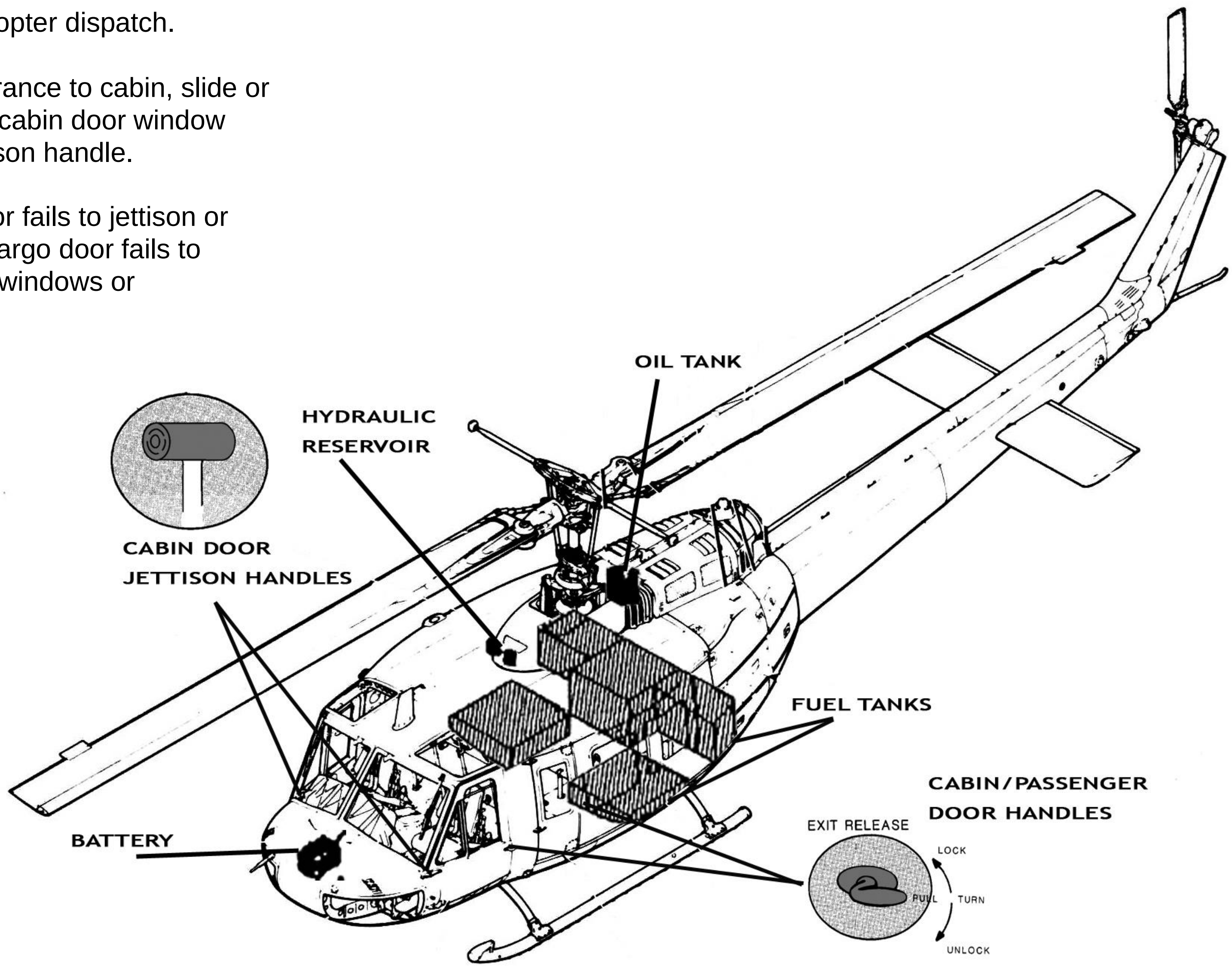


Bell 205 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



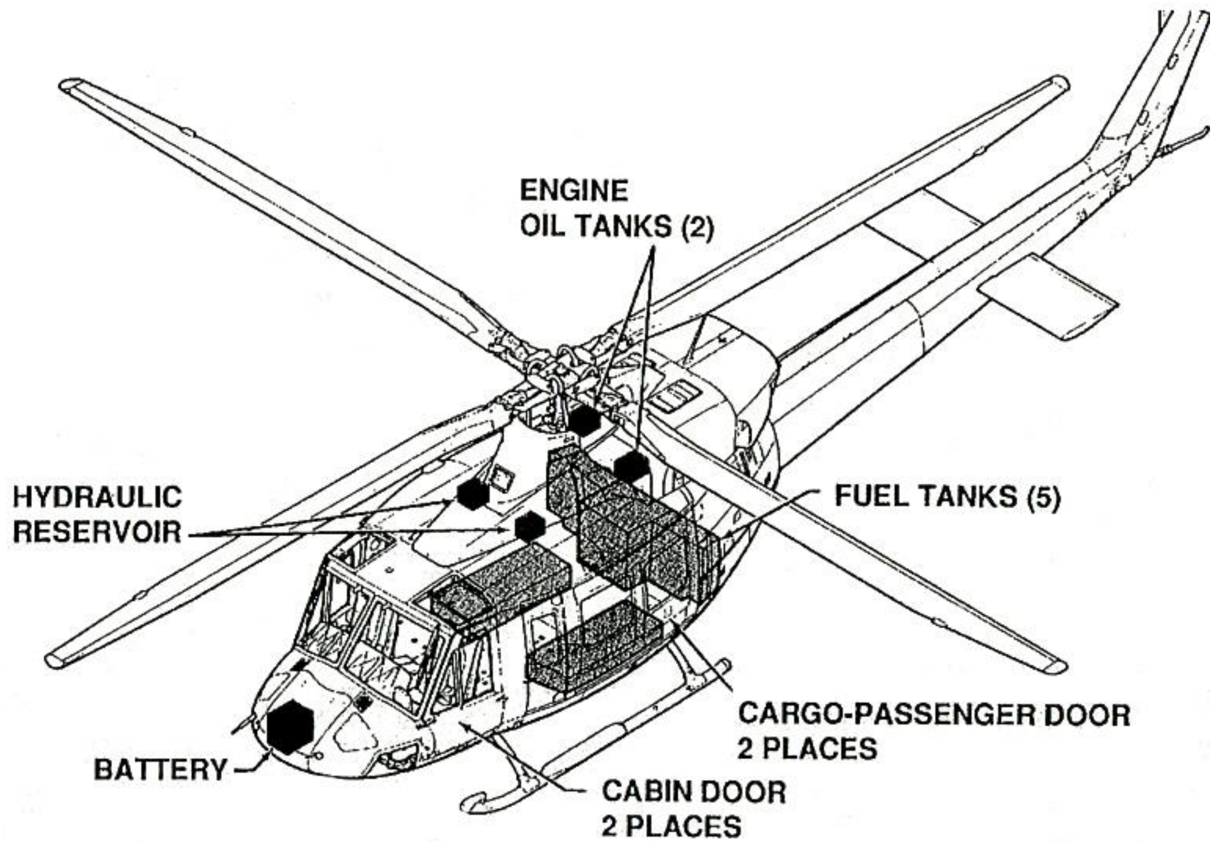
Bell 412 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* Pull both fire extinguisher "T" handles located on instrument panel, top center. "T" handles activates extinguishers and shuts off fuel valve.

*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



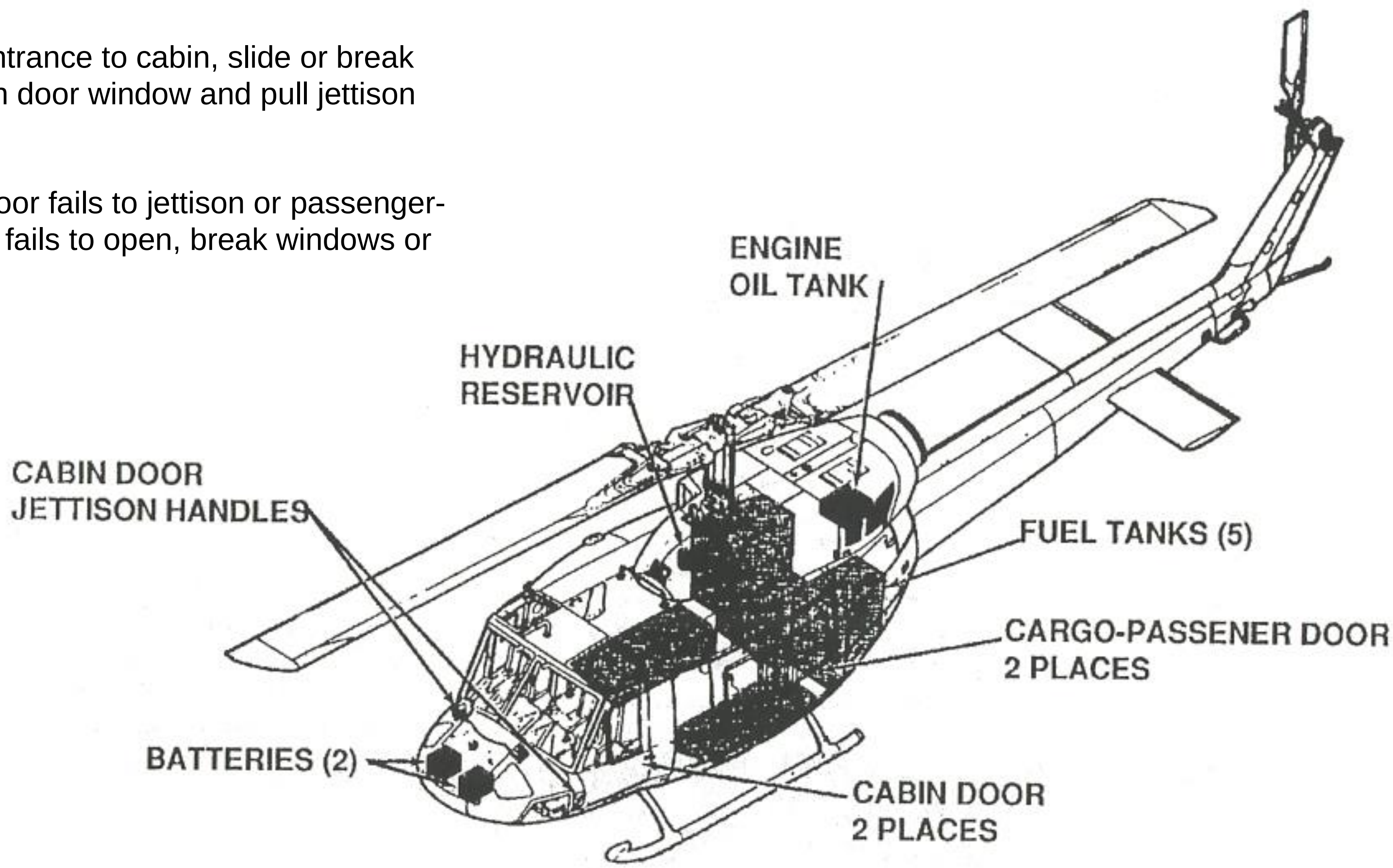
Bell 214 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* Pull both fire extinguisher "T" handles located on instrument panel, top center. "T" handles activates extinguishers and shuts off fuel valve.

*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

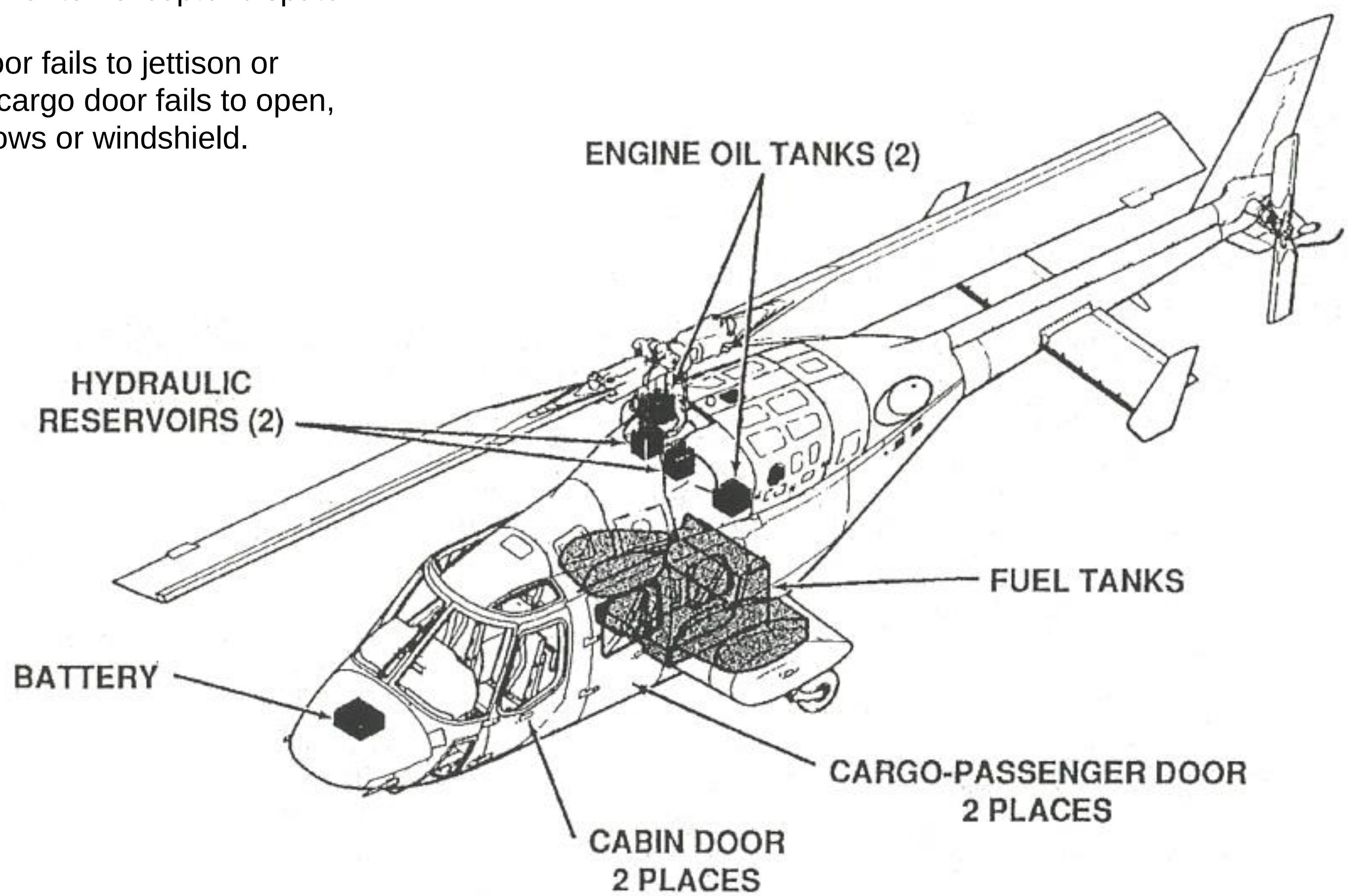
* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



Bell 222 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



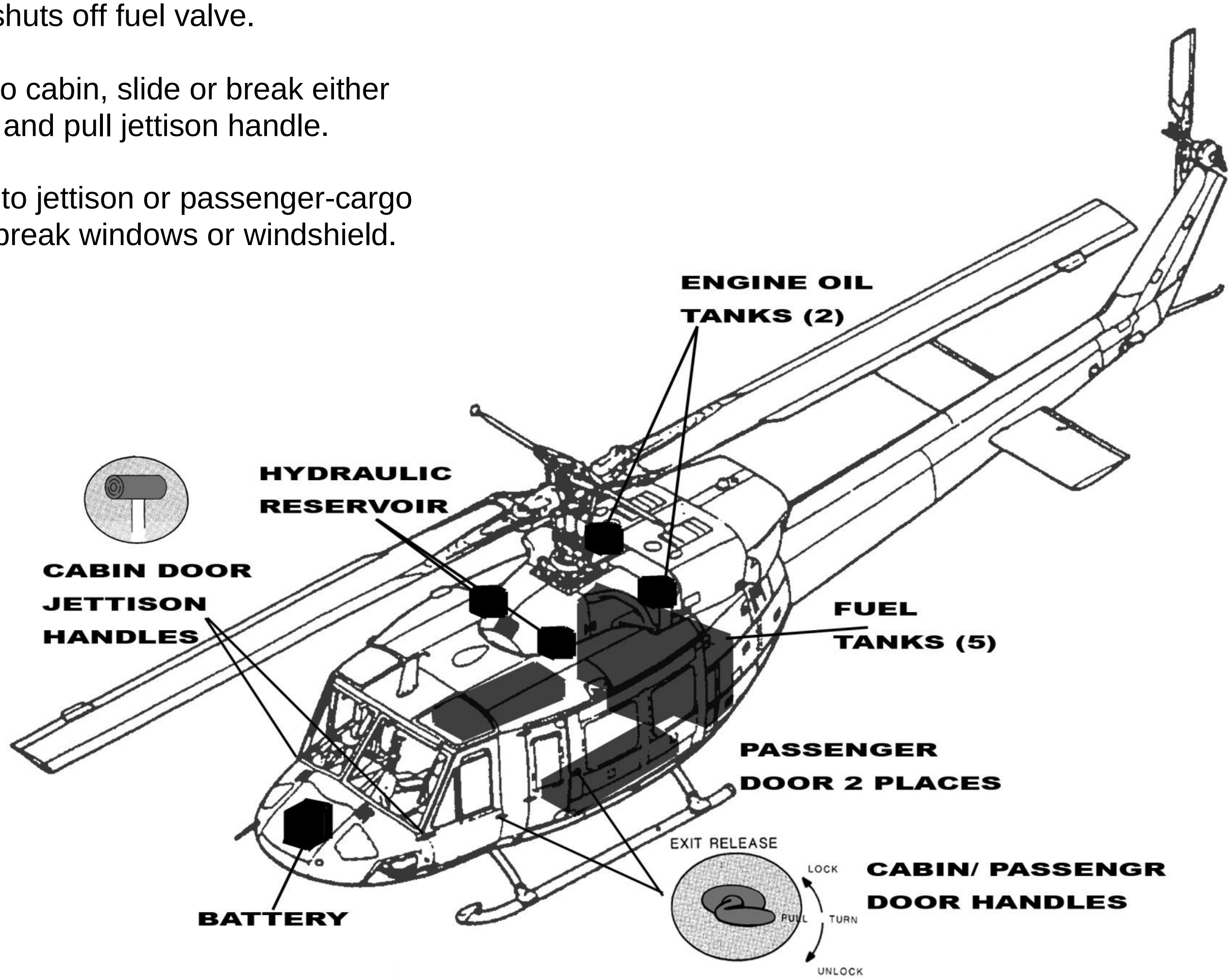
Bell 212 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* Pull both fire extinguisher "T" handles located on instrument panel, top center. "T" handles activates extinguishers and shuts off fuel valve.

*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



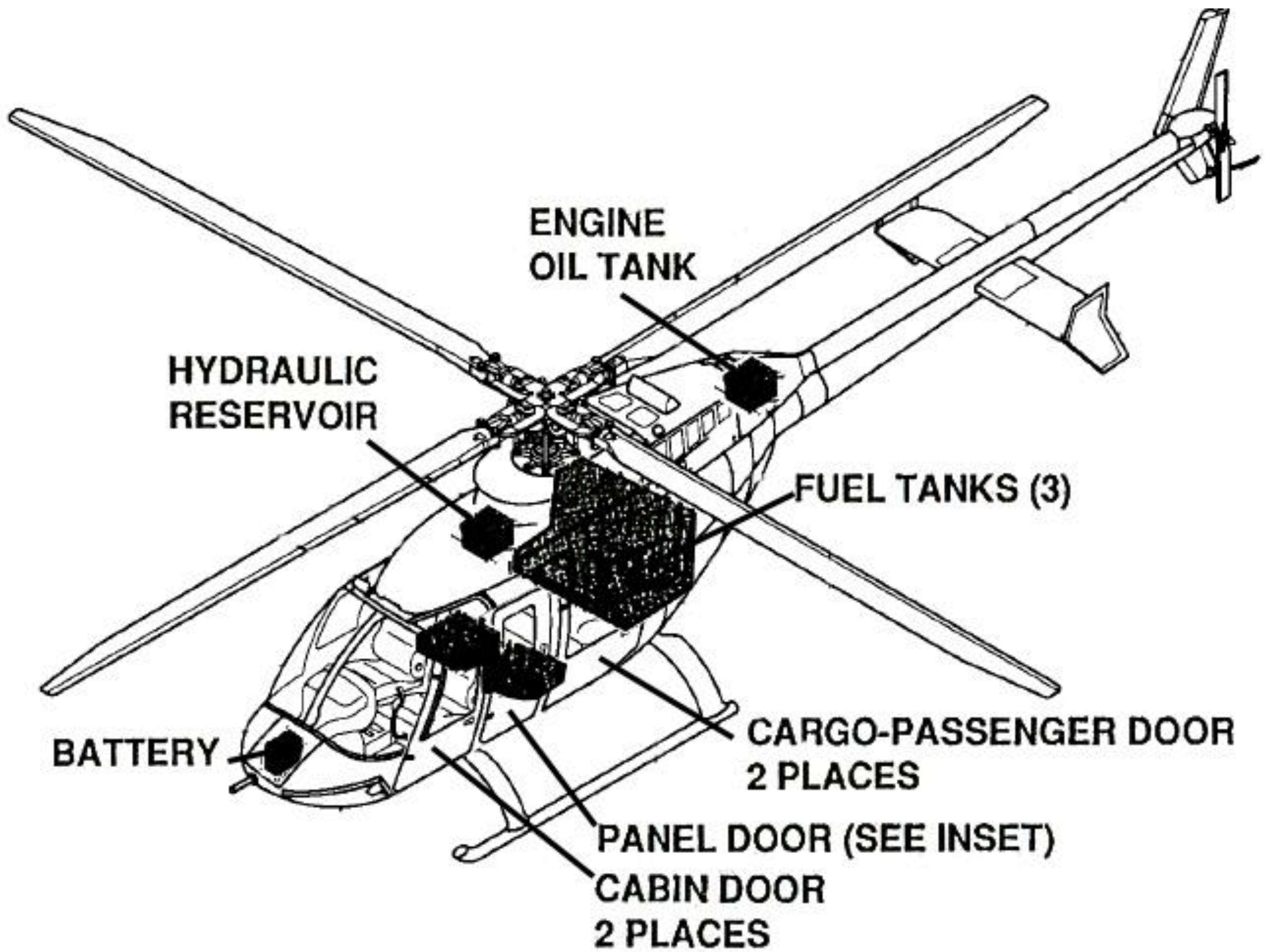
Bell 407 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

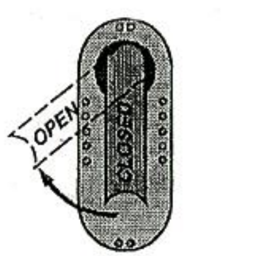
*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* If cabin or passenger doors fail to open, break windows or windshield.

*Pilot and passenger doors have recessed handles. Outside-pull up. Inside-pull back.



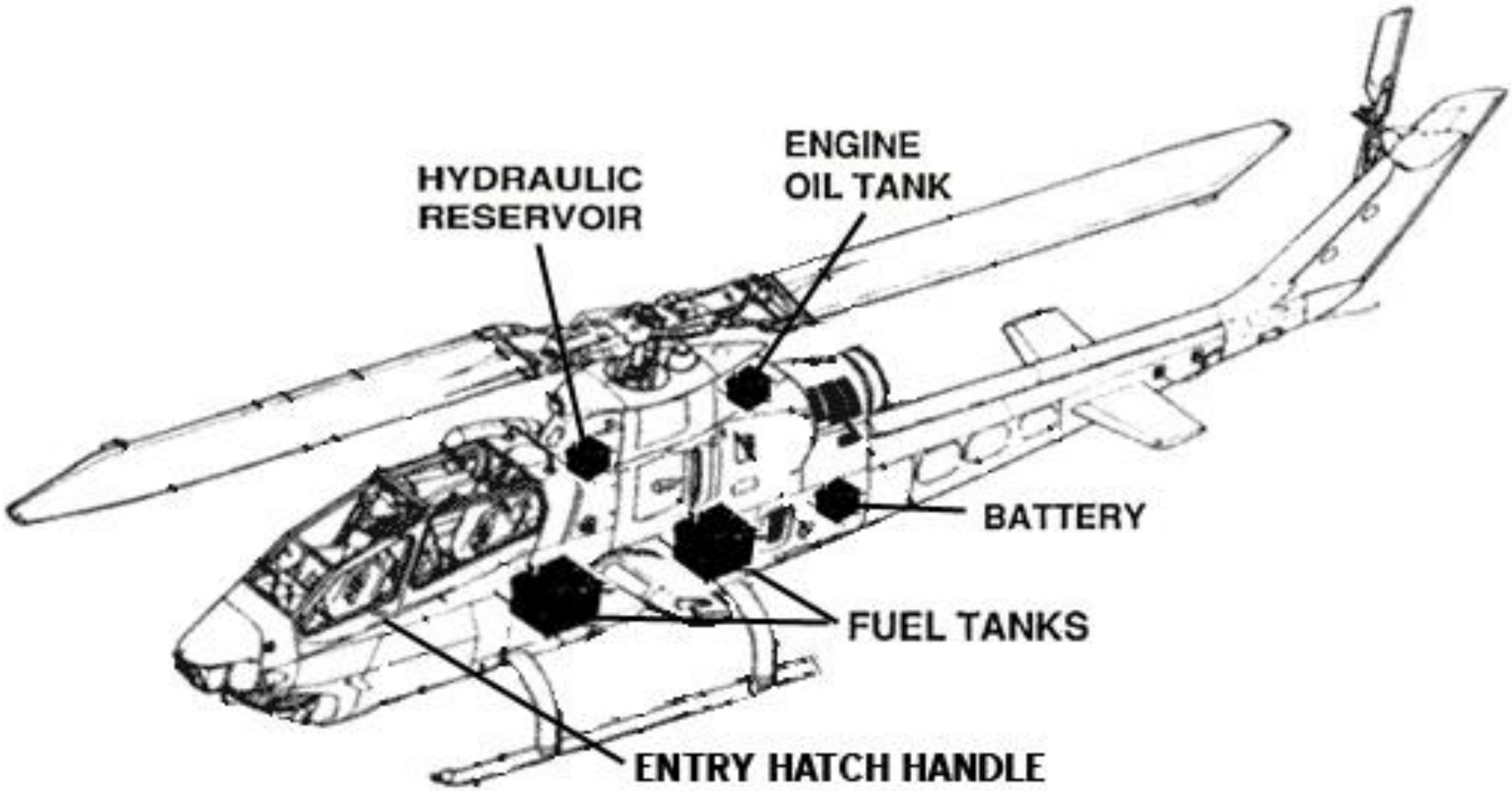
PANEL DOOR HANDLE



OPENING INSTRUCTIONS
1. Open rear door
2. Lift panel door handle
3. Rotate as shown

Bell 209 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.



Sikorsky S-64 Crash Rescue

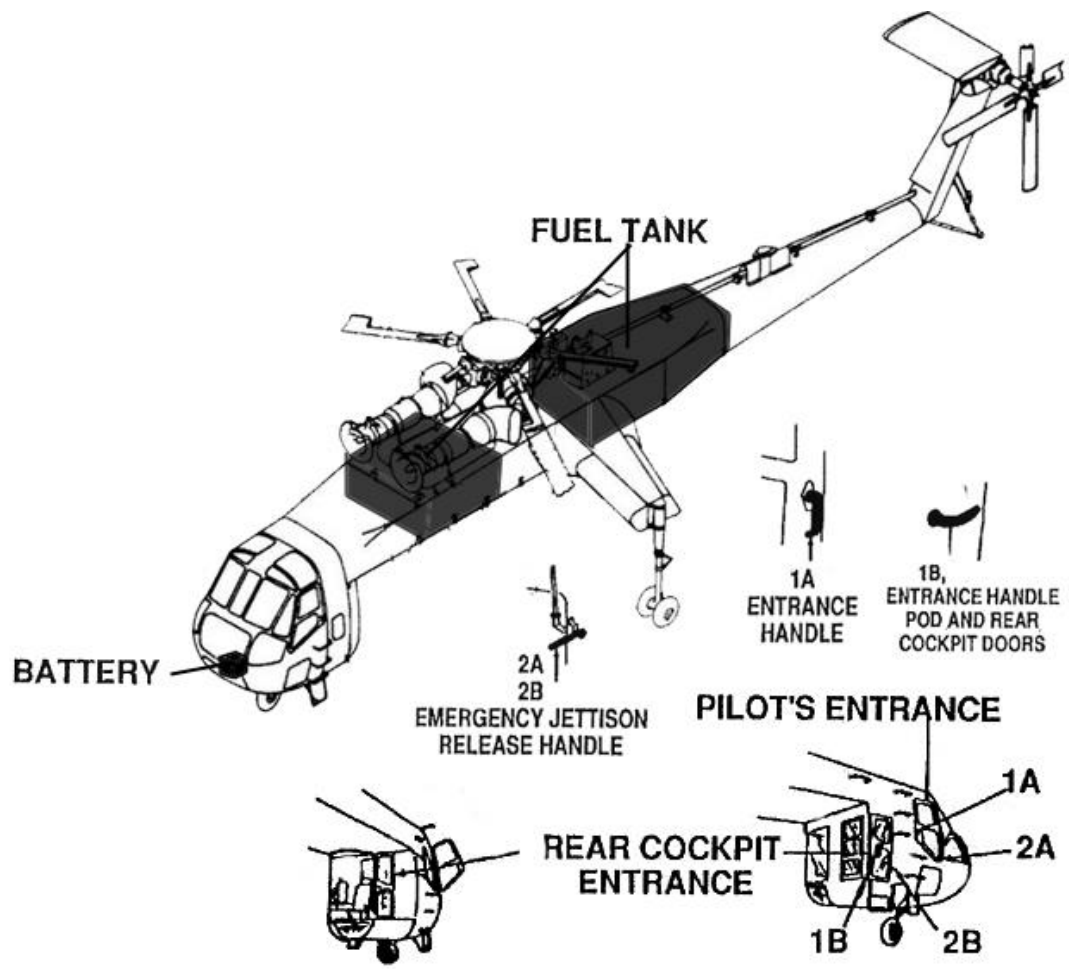
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

1. Normal Entry
A. Rotate entrance handle located on aft edge of pilots/co-pilots er swing door out.

B. Rotate entrance handl edge of rear cockpit entra right side of crew compar door out.

2. Emergency entry
A. Rotate emergency jett handle, located at forwar of pilot's/co-pilot's entran door out.

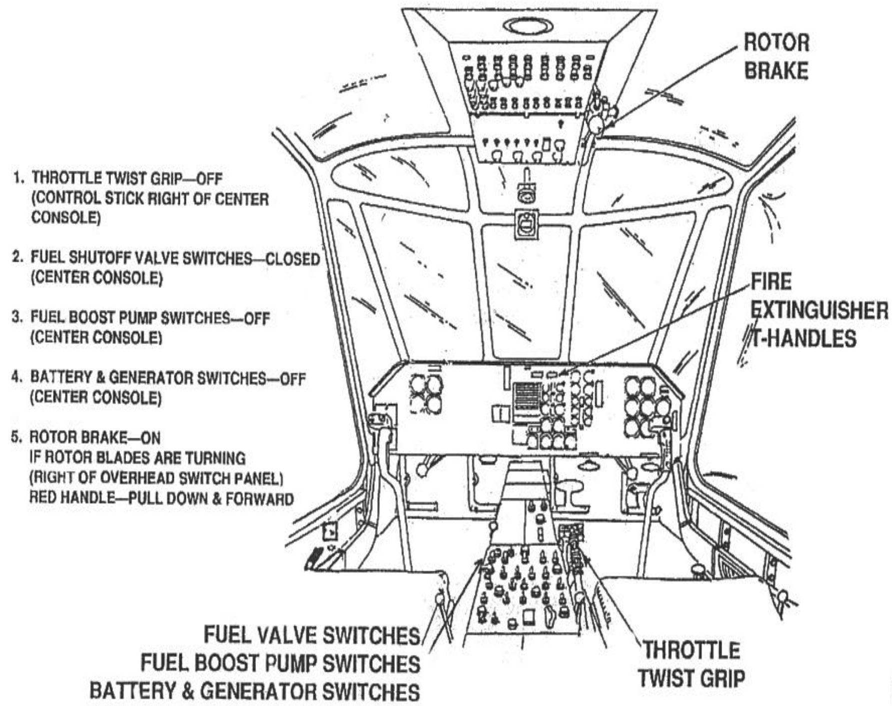
B. Rotate emergency jett handle, located at forwar of rear cockpit entrance c side of crew compartmer

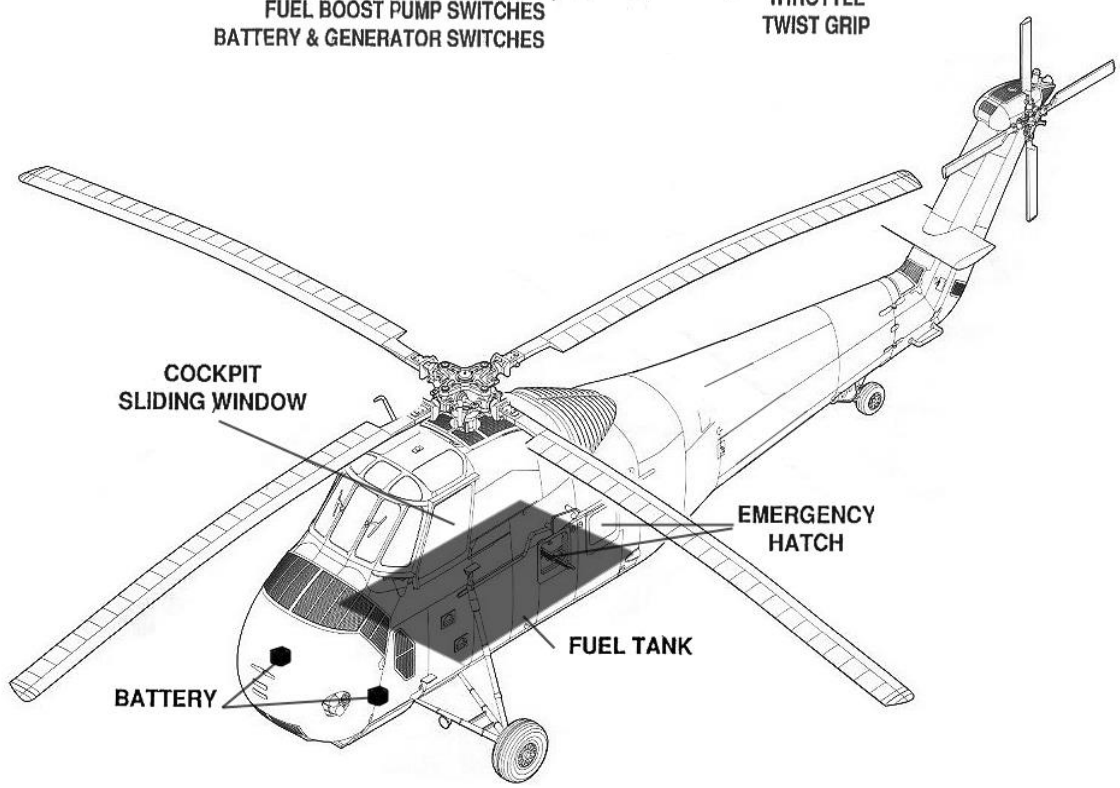


Sikorsky S-58 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

Cockpit sliding windows, cargo , passenger doors and emergency escape hatches can be jettisoned by pulling appropriate emergency release handles.





Sikorsky S-70/UH-60 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

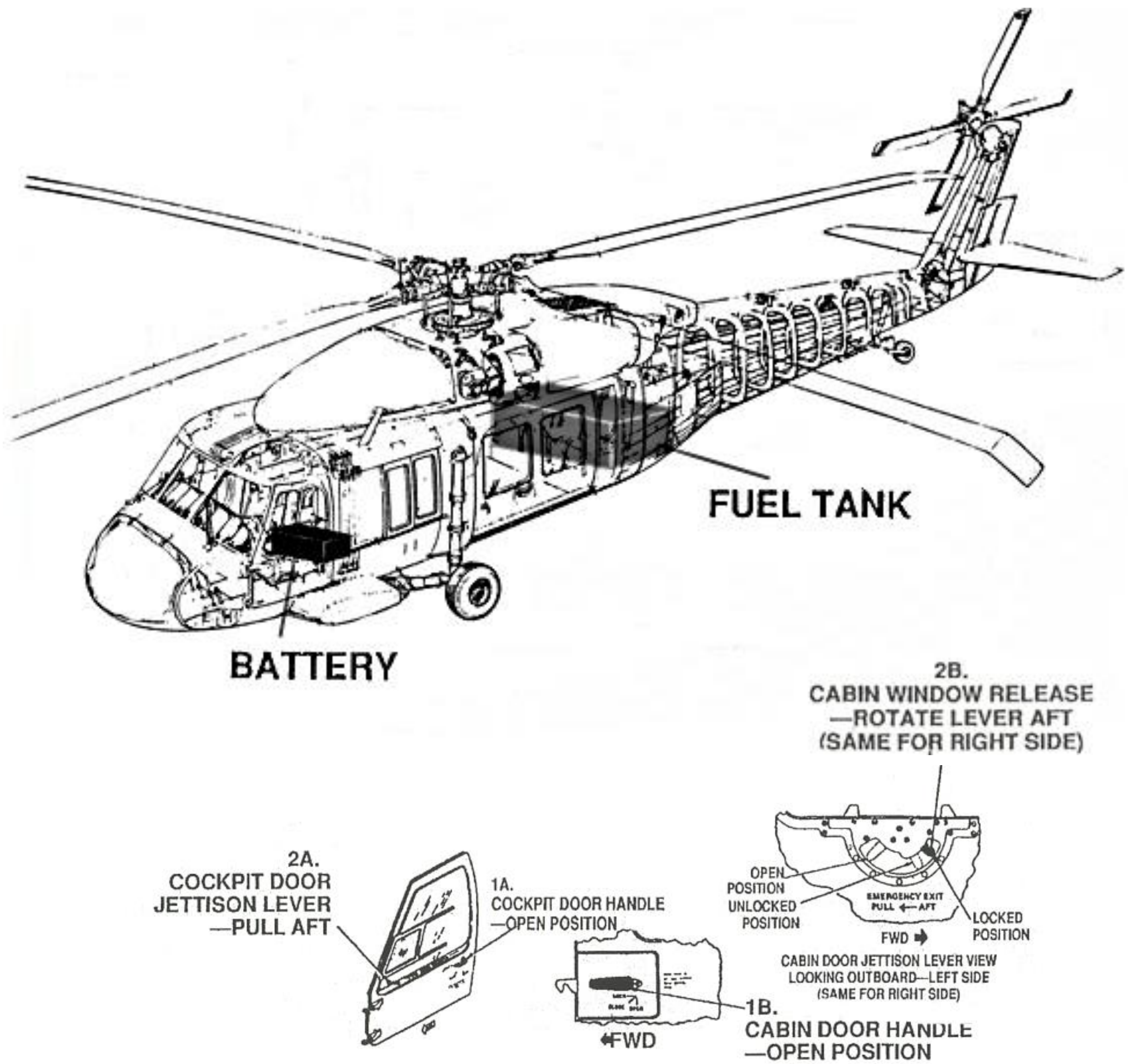
1. Normal Entry
A. Turn cockpit door handle counterclockwise to the open position to open door.

B. Turn cabin door handle counterclockwise to the open position and slide door aft.

2. Emergency entry
A. Break window in cockpit door and pull jettison lever aft to release door hinges.

B. Break window in cabin door and rotate emergency handle located below each window to the aft open position. Rotate bottom of window out to remove window.

***See back for emergency shutdown procedures**

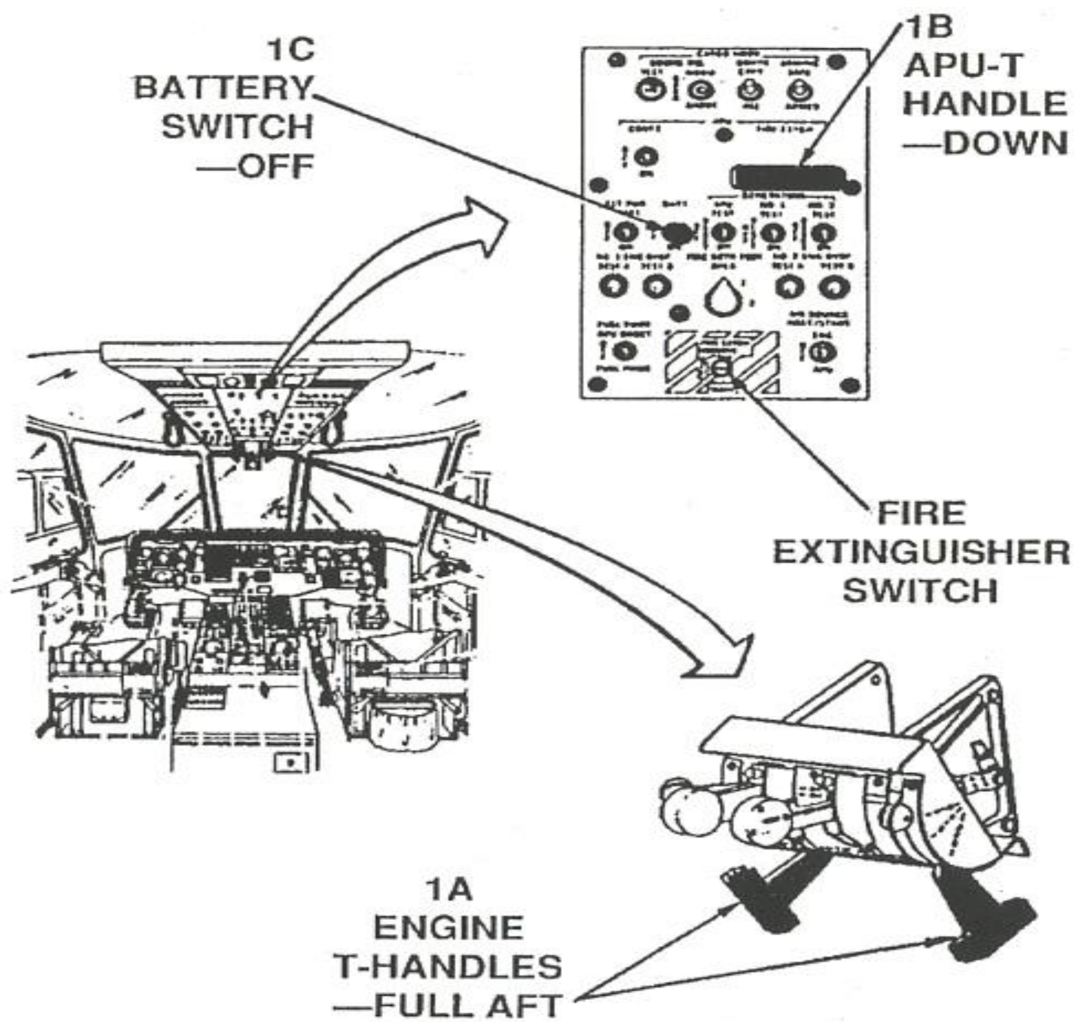


Sikorsky S-70/UH-60 Shutdown procedures

1. Engine Shutdown
Note: To activate the installed fire extinguishing system, One "T" handle must be pulled. Agent is discharged to last "T" handle pulled. Then reposition the fire extinguisher switch from off to main or reserve. Battery switch must be in the on position.

A. Pull engine emergency "T" handles located on control quadrant, full aft.
B. Pull APU "T" handle located on upper console, down.
C. Place battery switch, located on upper console, to the off position.

2. Aircrew-Passenger extraction.
Note: All aircrew seats have a complete lap belt and dual torso restraint shoulder harness attached to a rotary release buckle.



Sikorsky S-61 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

Shut down procedures

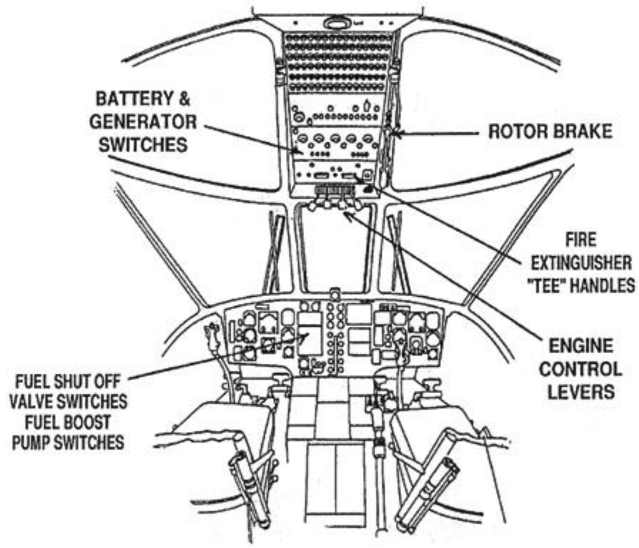
1. Engine control levers - off (center overhead-forward) pull aft then down to clear detent at end of arc.

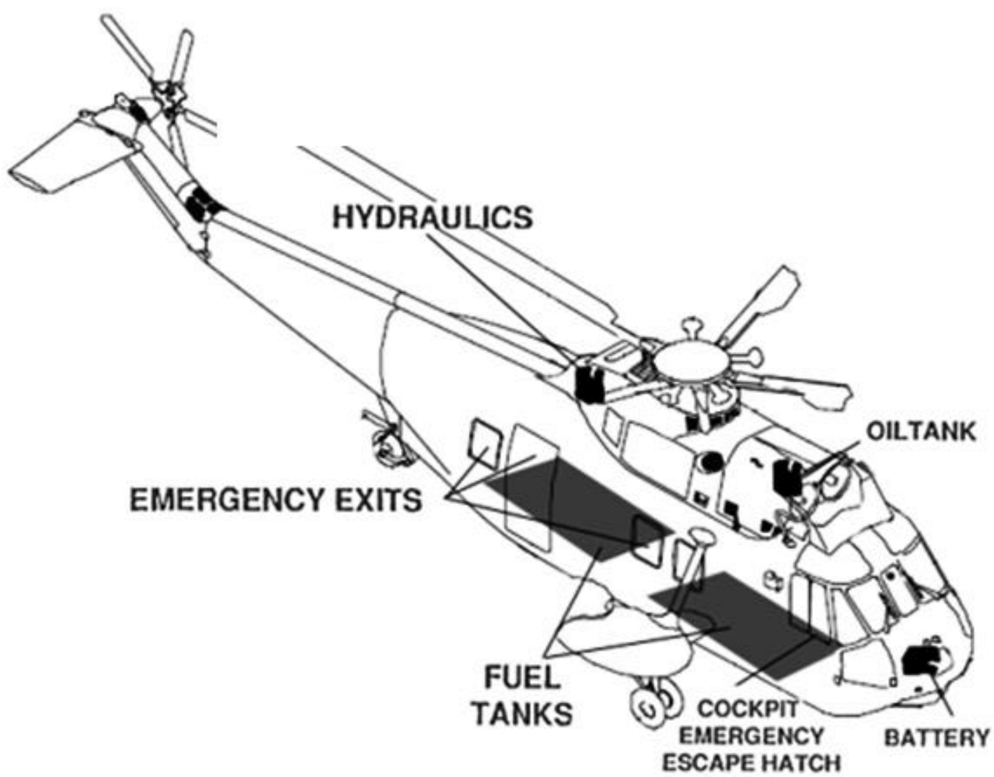
2. Fuel shutoff valve switches - closed (Center of instrument panel)

3. Fuel boost pump switches - off (center of instrument panel)

4. Battery & generator switches - off (overhead switch panel.)

5. Rotor brake - on If rotor blades are turning. (Right of overhead switch panel.) Red handle - pull down and forward.



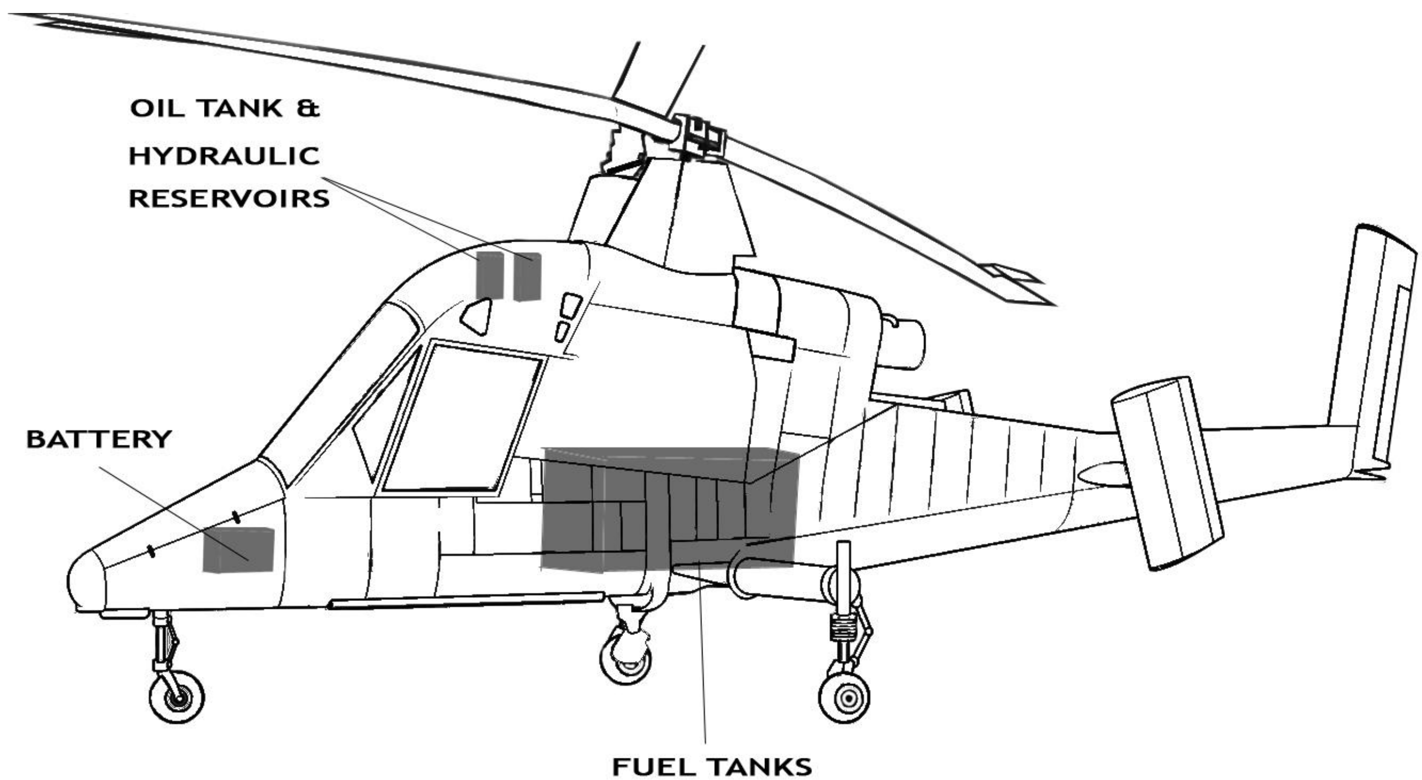


Kaman K-1200 K-MAX Crash Rescue

Location of switches, equipment a
emergency shutdown procedures
vary for individual aircraft. Crews s
be briefed prior to helicopter dispa

* WARNING: APPROACH FROM FRONT.

* If cabin door fails to jettison fails to open, break windows or windshield.



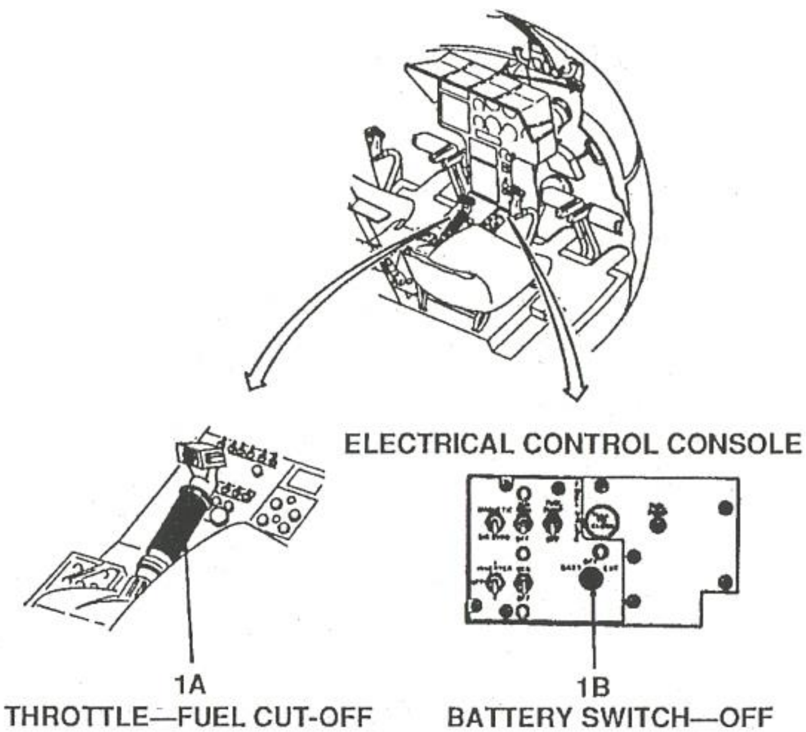
McDonnell Douglas (Hughes) 500 C Crash Rescue

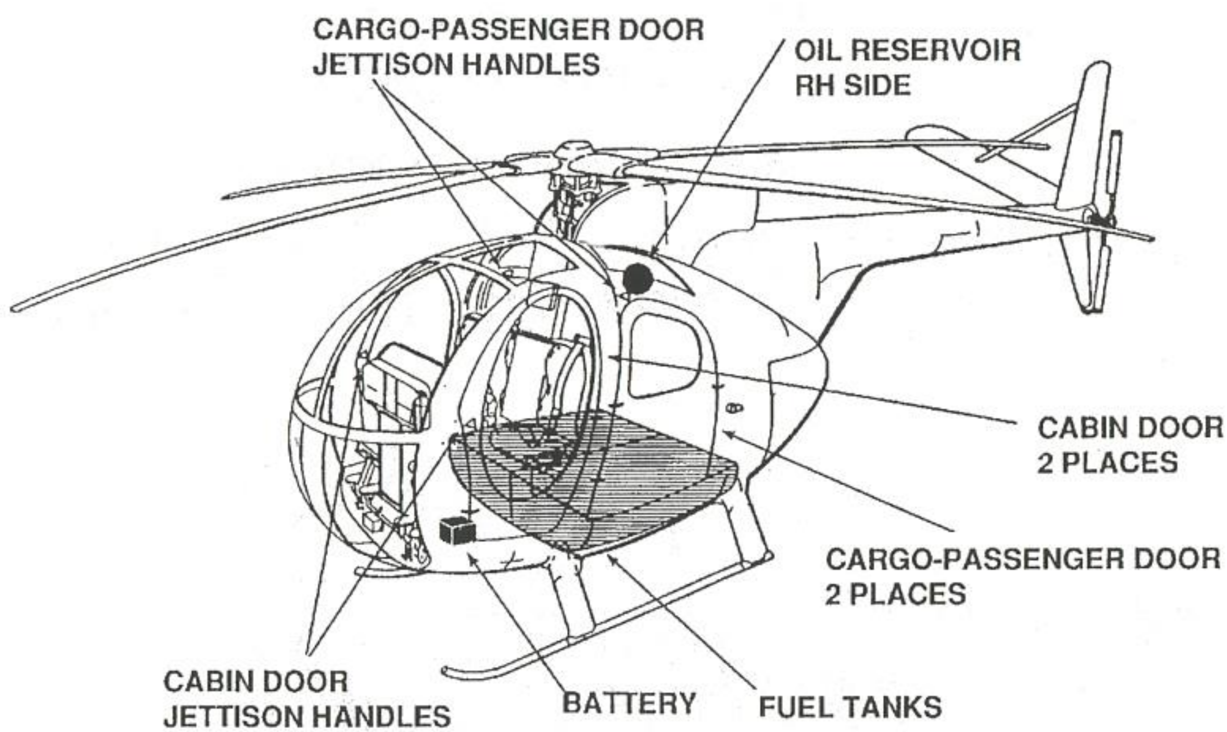
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

1. Engine shutdown

A. Rotate throttle control, located on the pilot and copilot collective levers, to fuel cut-off position.

B. Place battery switch, located on electrical control console, to off position.





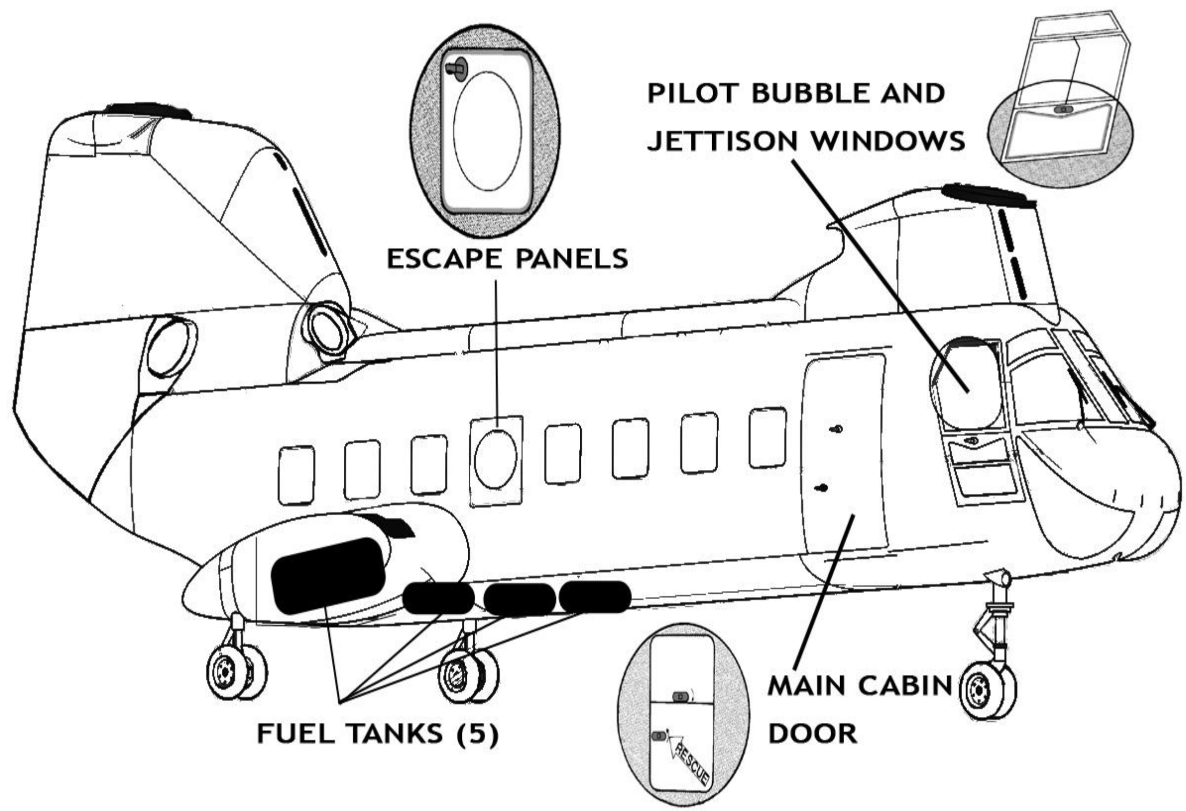
Boeing Vertol BV-107 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

The following procedures will be followed in the event of fire or other emergency during hot refueling:

1. Fuel valves-closed
2. Boost pumps-off
3. Engine condition levers (ECLs)-stop
4. Pilot & copilot emergency doors/bubbles-jettison

(Consider location of fire due to location of refueling point before jettisoning cockpit doors.)
5. Aircraft-evacuate
6. Fire extinguisher-Direct on fire



Boeing Vertol BV-234 Crash Rescue

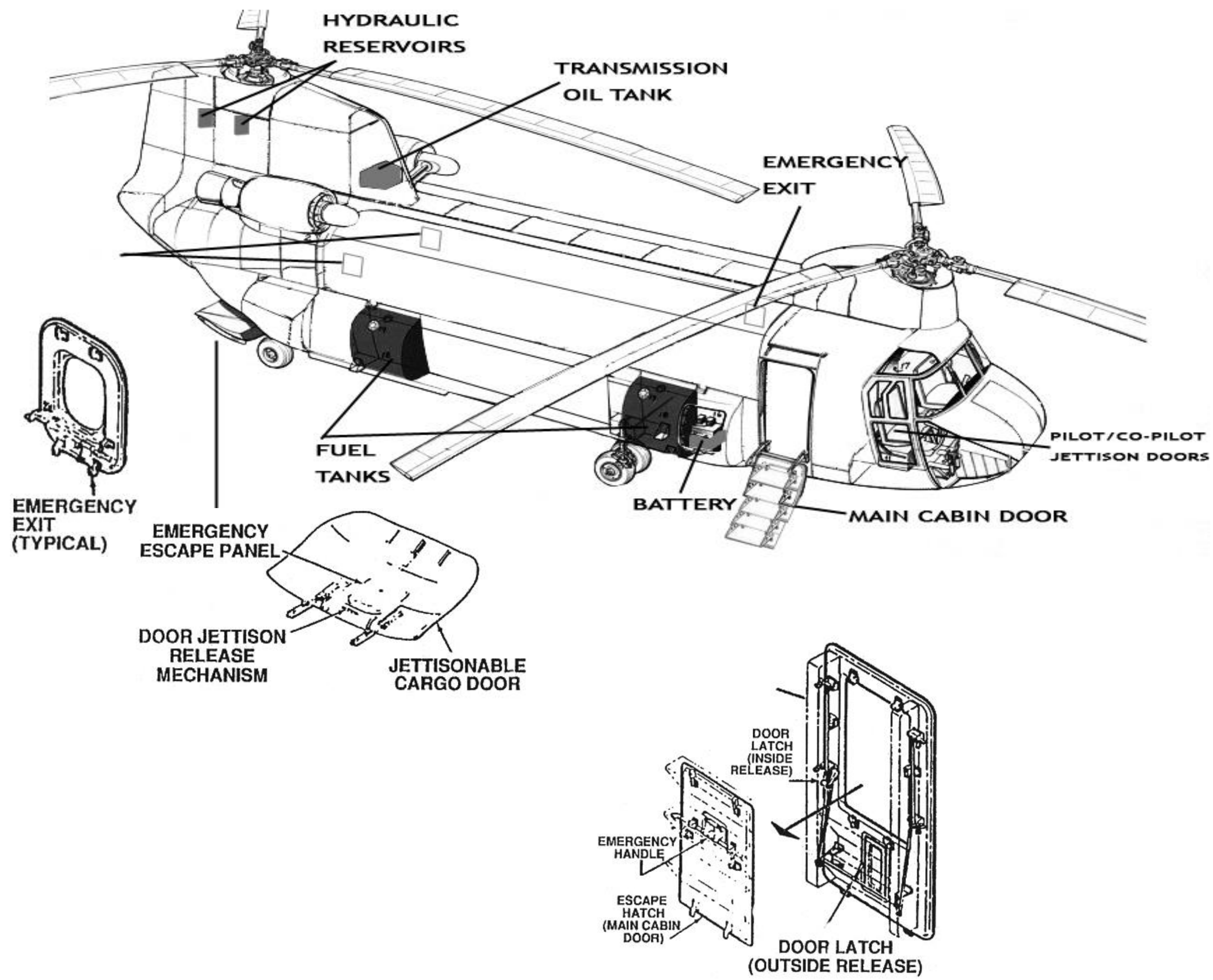
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

The following procedures will be followed in the event of fire or other emergency during hot refueling:

1. Engine condition levers (ECLs)-stop
2. T-Handles - pull
3. Boost pumps - off
4. Pilot & copilot emergency doors/bubbles-jettison

(Consider location of fire due to location of refueling point before jettisoning cockpit doors.)

5. Aircraft-evacuate
6. Fire extinguisher-Direct on fire



Boeing CH-47 Crash Rescue

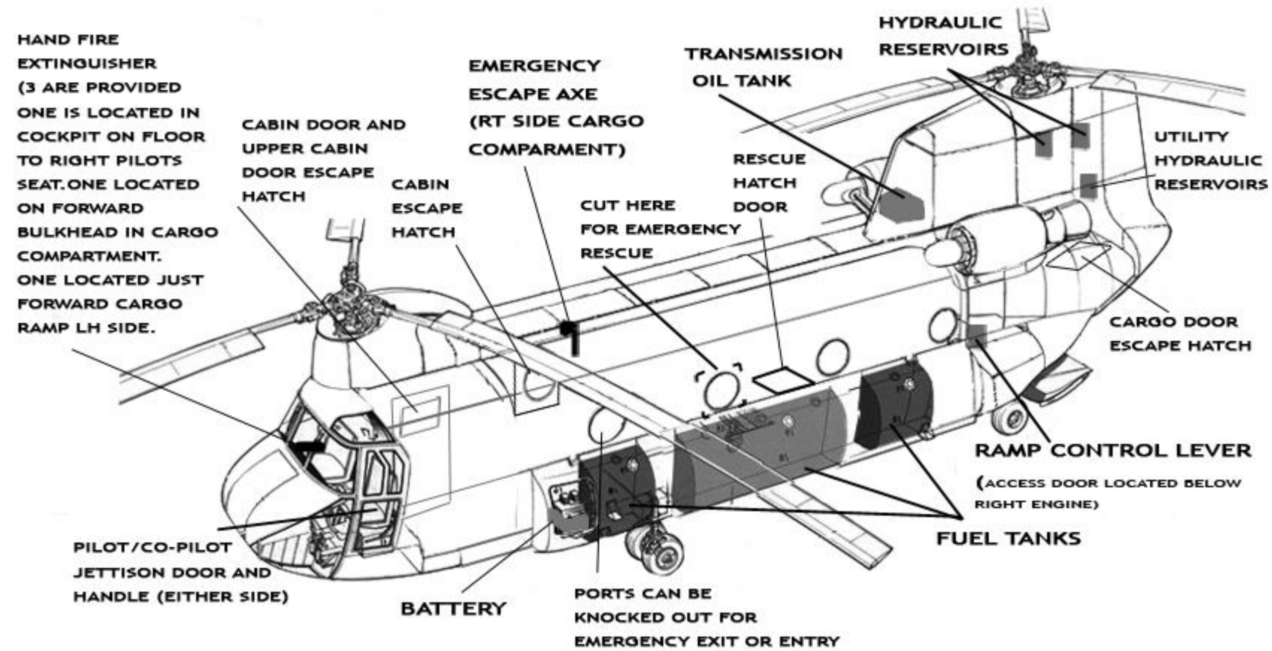
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* Emergency entrance to cockpit is gained through jettison doors by actuating handled labeled door jettison push trigger, turn handle, if door does not fall away, pull away.

*Emergency entrance to cargo compartment is gained through cabin door or upper door escape hatch, cabin escape hatch, and cutout panels. All escape hatches can be opened by pulling the yellow tab out and pushing the panel in.

*An access door to the cargo ramp control lever is located on the right side of the aircraft below the right engine. Ramp may be lowered, providing emergency entrance, by placing the control lever in the down position.

Seven first aid kits are provided. One is located in passageway between cockpit and cargo compartment. Six are located in cargo compartment, three on each side.



*A rescue hatch located in floor of cargo compartment may be used for emergency exit if lower rescue door has been previously opened.

***See back for emergency shutdown procedures.**

Boeing CH-47 Engine Shutdown

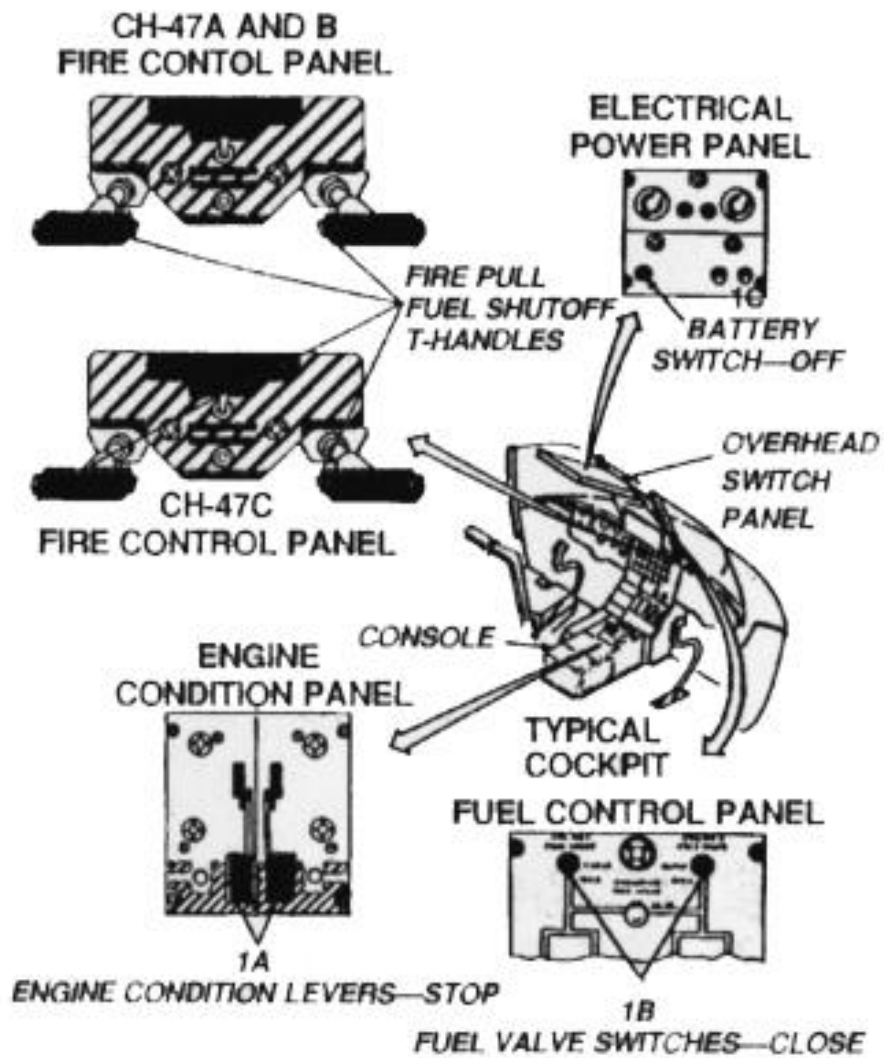
1. Normal Shutdown

A. Position engine condition levers, located on control pedestal, to stop.

B. Position fuel valve switches, located on overhead fuel control panel, to close.

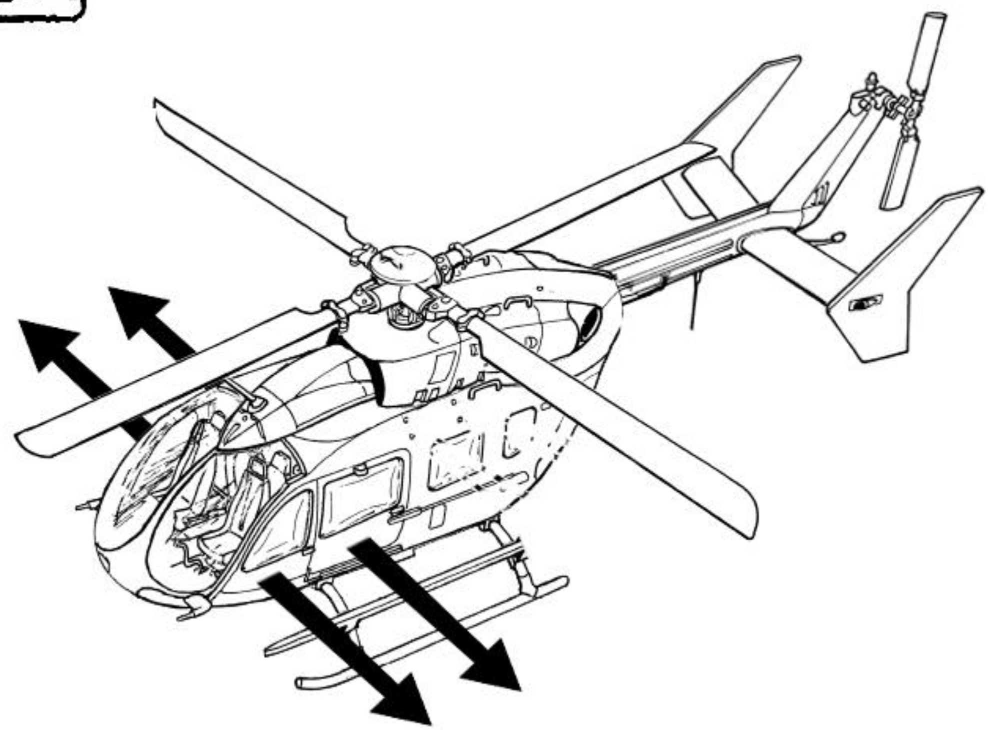
C. Position battery switch, located on overhead electrical control panel, to off.

Note:
If engines fail to shutdown, pull fuel shutoff T-handle, located at top of instrument panel, out.



Eurocopter UH-72 Crash Rescue

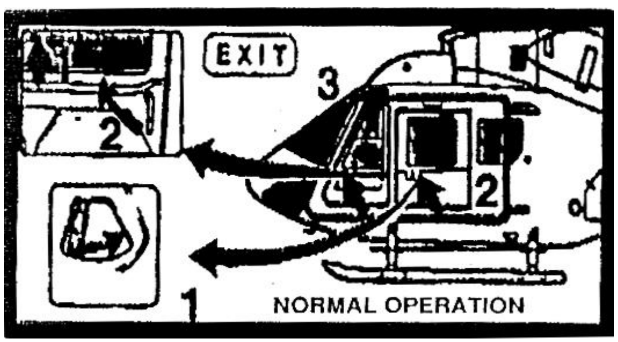
Location of switches, equipment ar
emergency shutdown procedures r
vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

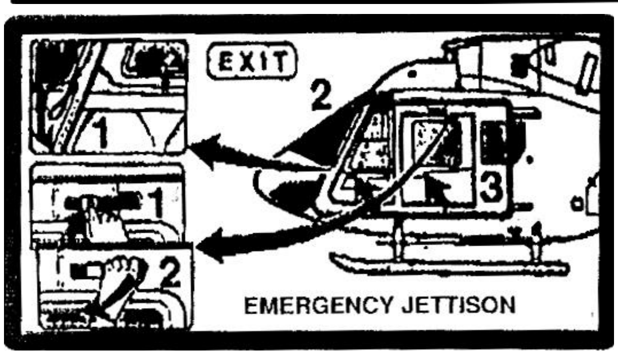


Emergency procedures

1. Passengers - Alert/evacuate
2. Both emergency fuel valves - close
3. Both fuel supply pumps - off
4. Both power levers - off
5. Battery and generators - off

Extinguish fire with hand fire extinguishers.





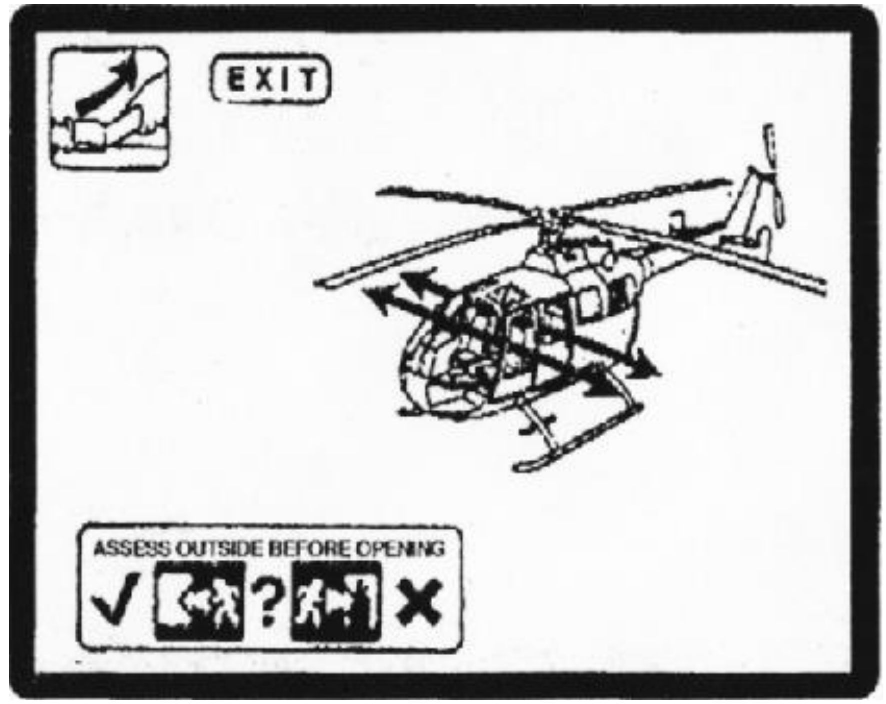
Eurocopter BO-105 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

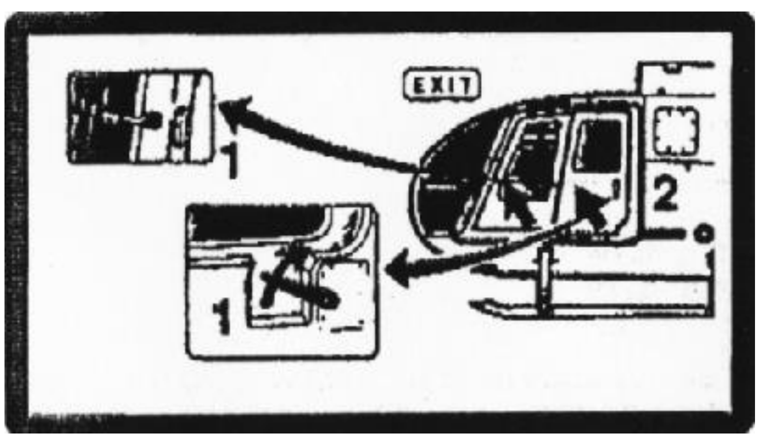
Emergency procedures

1. Passengers - Alert/evacuate
2. Both emergency fuel valves - close
3. Both fuel supply pumps - off
4. Both power levers - off
5. Battery and generators - off

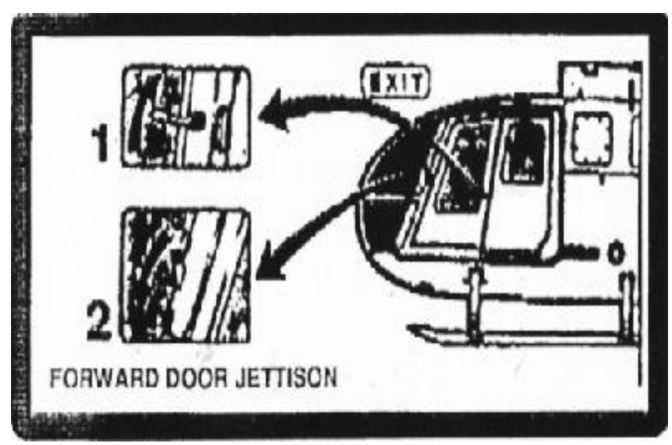
Extinguish fire with hand fire extinguishers.



Normal Operation

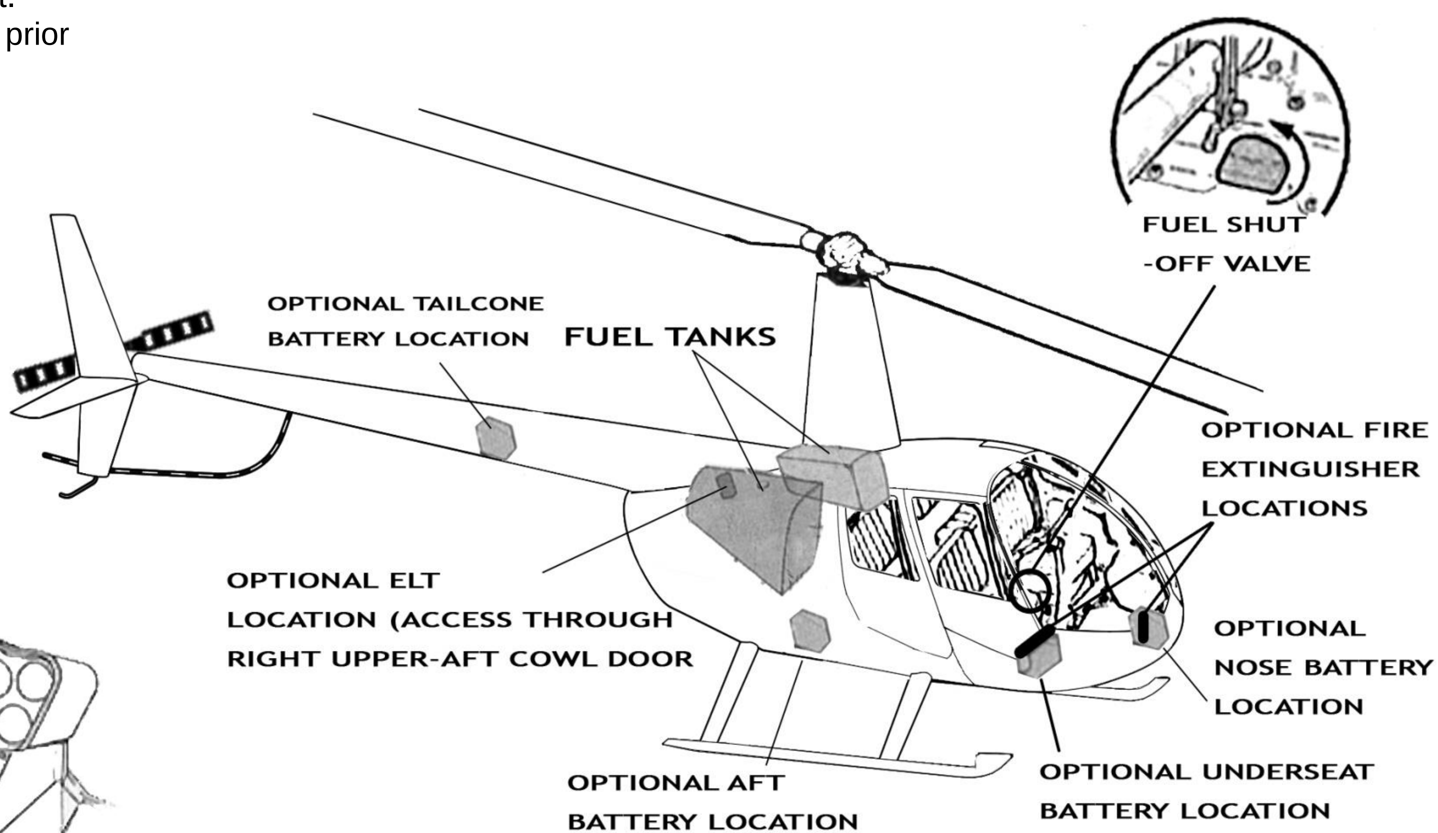


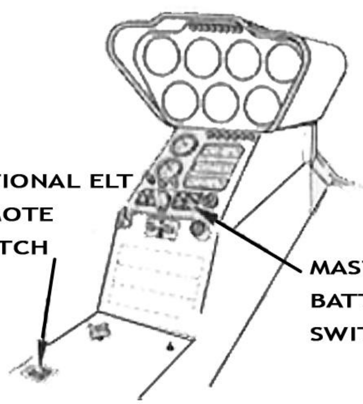
Emergency Operation



Robinson R-44 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.





The *NWCG Standards for Helicopter Operations (NSHO)* is developed and maintained by the Interagency Helicopter Operation Guide Unit (IHGU) and Interagency Helicopter Operations Subcommittee (IHOPS), under the direction of the National Interagency Aviation Committee (NIAC), an entity of the National Wildfire Coordinating Group (NWCG).

Previous editions: 2016, 2014.

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