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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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1 Chapter 01 – Introduction

2 Scope

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

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

12 For aviation operations using Active Duty/Reserve military helicopters, and National Guard units
13 officially “federalized” by the Department of Defense (DoD), see Chapter 70 of the *National*
14 *Interagency Fire Center, Military Use Handbook* for specific policy and procedural information located
15 at <https://www.nifc.gov/nicc/logistics/references.htm>.

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

19 There may be discrepancies between direction found in these standards and applicable helicopter
20 contract language. When discrepancies arise, the current helicopter procurement document should be
21 followed. However, if discrepancies cannot be resolved to the satisfaction of the vendor and government
22 representative, the contracting officer should be consulted.

23 Authority

24 The aviation directives of the participating agencies contain the authority to require implementation of
25 these standards as policy.

26 Fire Operations

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

30 Resource Operations

31 The United States Forest Service (USFS), Bureau of Indian Affairs (BIA), Bureau of Land Management
32 (BLM), and National Park Service (NPS) have adopted the NSHO as policy for all helicopter resource
33 operations.

34 Organization

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

1 Chapter 02 – Personnel

2 Introduction

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

5 Training, Qualification, and Currency Requirements

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

9 Training, qualification, and currency requirements for helicopter and helibase management positions on
10 incidents are established in the *NWCG Standards for Wildland Fire Position Qualifications*, PMS 310-1,
11 <https://www.nwcg.gov/publications/310-1>.

12 Additional interagency guides and handbooks that contain information can be found at:

- 13 • <https://www.nwcg.gov/committees/national-interagency-aviation-committee/publications>
- 14 • <https://www.nifc.gov/nicc/logistics/references.htm>

15 Helicopter Staffing Requirements

16 **Exhibit 2.1 – Minimum Staffing for Helicopter Operations.**

Helicopter Type	Federal Aviation Administration (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

- 17 • The minimum required staffing levels must be filled with fully qualified personnel. Trainees may
18 be ordered in addition to the minimum staffing levels.
- 19 • Call-When-Needed (CWN) helicopter and module should marry up away from the assigned
20 incident.

21 Helicopter Minimum Staffing Exceptions

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

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

1 **Limited Use Exception**

2 Helicopters designated as “Limited Use” may be staffed with fewer assigned Helicopter Crewmembers
3 than listed in Exhibit 2.1. A helicopter designated as Limited Use must be staffed by a fully qualified
4 Helicopter Manager, Single Resource (HMGB).

5 Requests for “Limited Use” will be documented using form Two-For-One Helicopter Manager (HMGB)
6 and/or Standard to Limited Request (HBM-14)

7 Typical missions performed by a Limited Use helicopter are those which do not require the support of
8 multiple Helicopter Crewmembers.

9 **2 for 1 Exception**

10 State/regional aviation managers may allow two (2) helicopters designated as “Limited Use” or Federal
11 Aviation Administration (FAA) Restricted Category or both types to be managed by one qualified
12 HMGB. The intent for 2 for 1 authorization is to be used as a stop gap measure (not long-term solution)
13 to fill a short-term Helicopter Manager (HMGB) need. The operational environment for which an
14 authorization is granted, should continually be evaluated to consider the complexities associated with the
15 incident including span of control, utilization, objectives, and experience level of the assigned HMGB.

16 Requests for “2 for 1” will be documented using form Two-For-One HMGB and/or Standard to Limited
17 Request (HBM-14).

18 Required elements for approval are:

- 19 • An order for another HMGB for the second helicopter has been placed and is actively trying to
20 be filled.
- 21 • Both helicopters are working out of the same helibase and are physically located side-by-side.
- 22 • A Helibase Manager (HEBM) is assigned.

23 **Alaska Exception**

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

26 **NWCG Incident Position Descriptions**

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

- 30 Helicopter Manager (HMGB), <https://www.nwcg.gov/positions/hmgb>,
- 31 Helicopter Crewmember (HECM), <https://www.nwcg.gov/positions/hecm>,
- 32 Helibase Manager (HEBM), <https://www.nwcg.gov/positions/hebm>,
- 33 Deck Coordinator (DECK), <https://www.nwcg.gov/positions/deck>,
- 34 Aircraft Base Radio Operator (ABRO), <https://www.nwcg.gov/positions/abro>,
- 35 Mix Master Retardant (MXMS), <https://www.nwcg.gov/positions/mxms>, and
- 36 Helicopter Coordinator (HLCO), <https://www.nwcg.gov/positions/hlco>.

1 **Non-NWCG Helicopter/Helibase Management Personnel Roles and Responsibilities**

2 Training, qualification, and currency requirements for Department of Interior (DOI) and USFS
3 helicopter and helibase management positions for resource missions are found in the *Interagency*
4 *Aviation Training (IAT) Guide* at <https://www.iat.gov/>.

5 An individual who supervises missions limited to: Point-to-Point transport of personnel to/from a
6 developed heliport/helibase or airport, reconnaissance missions below, and/or above 500 ft. Above
7 Ground Level (AGL), landings at/or takeoffs from improved or unimproved sites.

8 **Helicopter Manager – Resource**

9 A Resource Helicopter Manager is responsible for coordinating, scheduling, managing, and supervising
10 non-fire resource helicopter operations. Fire HMGB training and experience requirements are found in
11 the *NWCG Standards for Wildland Fire Position Qualifications*, PMS 310-1, and specific agency and
12 bureau policies.

13 **Pilot**

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

17 The pilot's decisions and judgment are final. No agency employee will explicitly or implicitly ask or
18 require a pilot to perform any mission or flight maneuver which compromises flight safety.

19 Pilot Duties and Responsibilities

- 20 1. Adheres to Federal Aviation Regulations (FARs), agency regulations (for agency pilots), and the
21 requirements of the procurement document (vendor pilots).
- 22 2. As applicable, coordinates with dispatcher, HMGB, and/or HEBM on project or incident
23 planning and logistics; reviews manifests and intended loads to ensure aircraft is capable of
24 performing the mission; is responsible for knowledge of hazards in area of operations.
- 25 3. Ensures that all aircraft and communications equipment are in good condition and operable;
26 performs flight following as required by the agency.
- 27 4. Carries a current Interagency Helicopter Pilot Qualification Card; ensures the Aircraft Data Card
28 is physically present in the aircraft; presents the card upon request.
- 29 5. Military, cooperator, and other-government agency aircraft may have non-carded aircraft or
30 pilots, but a copy of the approving document must be available.
- 31 6. Performs aircraft preflight using an approved checklist and preflight safety briefing of
32 passengers, or delegates the briefing responsibility to qualified personnel.
- 33 7. Completes helicopter load calculation using applicable aircraft flight manual Performance
34 Chart(s); ensures that payload does not exceed allowable payload.
- 35 8. Meets contract requirements for fueling using approved static bonding procedures.
- 36 9. Is responsible for the security of the aircraft.
- 37 10. Except in an emergency, does not deviate from flight plan without relaying change to appropriate
38 dispatch office or other flight following facility; does not descend below 500 feet AGL unless
39 such flight has been authorized in advance or an in-flight deviation is approved; makes no

1 descent below 500 feet AGL without first performing a high-level reconnaissance of the
2 operations area to identify hazards.

3 11. Wears personal protective equipment as required by agency directive (agency pilots) or the
4 procurement document (vendor pilots).

5 12. Completes flight payment documents per agency or procurement document direction.

6 13. Speaks English fluently and communicates clearly.

7 14. Responsible for transporting hazardous materials in accordance with federal, state, and local
8 requirements.

9 15. Follows FAA-approved company operational specifications.

10 **Helibase/Helispot Management**

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

13 For incident helibases hosting two (2) or more helicopters past one day a HEBM is required.

14 Further information on specific requirements for helibase and helispot management can be found in
15 Chapter 8 – Helicopter Landing Areas and Chapter 15 – Helibase and Helispot Management and
16 Operations or other appropriate chapter(s) of these standards.

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

19 **Helispot Manager**

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

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

27 Minimum training, qualification, and currency requirements of the Helispot Manager position on
28 incidents are outlined within the position of Helicopter Crewmember. The position requirements are in
29 the *NWCG Standards for Wildland Fire Position Qualifications*, PMS 310-1,
30 <https://www.nwcg.gov/publications/310-1>.

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

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

1 Helispot Manager Duties and Responsibilities

- 2 1. Obtain briefing from HEBM and obtain the following forms: Incident Action or Project Aviation
3 Safety Plan; Air Operations Summary, and Incident Radio Communications Plan (ICS 205), if
4 available.
- 5 2. Ensure that qualified HECMs are assigned to assist in helispot management, providing on-the-
6 job training as necessary; conduct regular briefings with helispot crew; ensure all assigned
7 personnel understand their responsibilities and authority; manage resources/supplies dispatched
8 to helispot.
- 9 3. Obtain necessary equipment and supplies for the operation of the helispot (tools, fire
10 extinguishers, wind indicators, etc.).
- 11 4. On incidents, ensure that all helispot personnel are capable of and prepared to perform fire
12 suppression duties in and around the helispot; ensure that helispot crew is equipped to remain
13 overnight, even in adverse weather conditions.
- 14 5. Obtain allowable payload information for the helispot for each assigned helicopter, utilizing
15 forms outlined in Appendices A and B.
- 16 6. Obtain transportation and report to the assigned helispot; establish radio communications with
17 the helibase; provide the HEBM with initial or additional information for the Aviation Locations
18 Summary, HBM-2.
- 19 7. Ensure that all helispot personnel and personnel to be transported wear required personal
20 protective equipment.
- 21 8. Ensure the helispot and landing pad is constructed and prepared properly to ensure safe use of
22 the highest gross weight helicopter and/or helicopter with the largest diameter rotor blades;
23 construct the helispot according to safety standards; if required, obtain approval prior to making
24 improvements.
- 25 9. Install wind indicators and sign the area perimeter as necessary; perform any necessary aerial and
26 ground hazard reduction and safety improvements.
- 27 10. Anticipate dust abatement needs and provide or request as necessary.
- 28 11. Make crash rescue equipment such as fire extinguishers available.
- 29 12. Number and map the helispot in coordination with the HEBM.
- 30 13. Ensure that flight routes and area hazards are made known to all pilots; ensure communications
31 and Parking Tender(s) are in place.
- 32 14. Complete manifests accurately for all flights originating from assigned helispot; perform
33 manifesting, briefing, and loading of personnel and cargo.
- 34 15. Return external load equipment (nets, leadlines, and swivels) and excess firefighting equipment
35 to the helibase promptly.
- 36 16. Inform HEBM of helispot activities; coordinate activities and requests for air support with the
37 HEBM.
- 38 17. If applicable, supervise, or perform water or retardant loading at helispot.
- 39 18. Maintain records and reports of helicopter activities for later inclusion in the Helicopter Daily
40 Use and Cost Summary and the Helicopter Management (HCM)-15.

1 19. If returned to the helibase, attend the nightly debriefing, and provide feedback on day's
2 operations; otherwise, provide by radio.

3 **Parking Tender**

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

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

9 Minimum training, qualification, and currency requirements of the Parking Tender position on incidents
10 are outlined within the position of Helicopter Crewmember. The position requirements are in the *NWCG*
11 *Standards for Wildland Fire Position Qualifications*, PMS 310-1,
12 <https://www.nwcg.gov/publications/310-1>, Parking Tender Duties and Responsibilities.

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

35 **Loadmaster (Personnel or Cargo)**

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

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

1 Minimum training, qualification, and currency requirements of the Loadmaster position on incidents are
2 outlined within the position of Helicopter Crewmember. The position requirements are in the *NWCG*
3 *Standards for Wildland Fire Position Qualifications*, PMS 310-1,
4 <https://www.nwcg.gov/publications/310-1>.

5 Loadmaster Duties and Responsibilities

- 6 1. Obtain briefing from DECK; obtain radio frequencies and other information necessary to
7 perform the job.
- 8 2. Ensure designation and signing of crew and cargo staging areas and of egress and ingress routes
9 to the deck.
- 10 3. Obtain sufficient personnel resources to load personnel and cargo; supervise personnel assigned
11 to loading positions, to include:
 - 12 a. Ensure the safety and welfare of personnel (both agency and contract) assigned; ensuring all
13 personnel understand their responsibility and authority; monitoring their actions to ensure
14 duties and responsibilities are correctly performed.
 - 15 b. Conducting briefings of subordinates.
- 16 4. Ensuring personal protective equipment is worn by both personnel assigned to the deck and by
17 personnel being transported.
- 18 5. Meeting timekeeping, eating, sleeping, and transportation needs.
- 19 6. Supervise the manifesting of personnel and cargo according to requirements.
- 20 7. Ensure that appropriate hazardous materials regulations are enforced as outlined in the *NWCG*
21 *Standards for Aviation Transport of Hazardous Materials*, PMS 513,
22 <https://www.nwcg.gov/publications/513>.
- 23 8. Ensure the pilot is aware of weight and nature of all loads being transported.
- 24 9. Supervise loading and unloading crews.
- 25 10. Ensure all passengers receive preflight briefings.
- 26 11. Ensure external load equipment is checked for proper operation before use.
- 27 12. Know and understand crash rescue procedures; inform personnel of helibase and helicopter crash
28 rescue procedures.
- 29 13. Coordinate with ABRO and Parking Tenders.
- 30 14. Coordinate frequently with the DECK; attend the nightly debriefing and provide feedback on
31 problems encountered; recommend corrective action.

32 **Dipsite Manager**

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

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

Dipsite Manager Duties and Responsibilities:

1. Obtain briefing from HEBM, (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 HEBM with initial and/or additional dipsite specific information for dissemination to assigned pilots and HMGBs.
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 HEBM 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 as requested.
16. Report to HEBM, 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 HEBM.

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.

1 All law enforcement aviation operations using helicopters must, depending on the mission profile, be
2 conducted either by a qualified resource or incident HMGB or by a Helicopter Flight Manager.

3 It is recommended that qualified LEOs fill the HMGB position.

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

8 Any law enforcement personnel participating as a Helicopter Crewmember, and not solely as a
9 passenger being transported, must meet the requirements for an Aircrew Member [see *Interagency*
10 *Aviation Training (IAT) Guide*, <https://www.iat.gov/> or agency aviation plan].

11 All law enforcement personnel filling helibase positions must meet the training, qualification, and
12 currency requirements of the position outlined in the *NWCG Standards for Wildland Fire Position*
13 *Qualifications*, PMS 310-1, <https://www.nwcg.gov/publications/310-1>.

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

17 Sensitive mission requirements may require security clearances of the pilot and/or vendor to ensure
18 mission integrity. Law Enforcement HMGBs are responsible for informing the scheduling unit of any
19 such requirements.

20 **Search and Rescue Helicopter and Helibase Personnel**

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

24 **Military Helicopter Personnel**

25 See Chapter 70 of the *National Interagency Fire Center, Military Use Handbook*, located at
26 <https://www.nifc.gov/nicc/logistics/references.htm>, for operational procedures regarding personnel
27 associated with the use of military aviation.

1 Chapter 03 – Operational Planning

2 Introduction

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

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

13 Developing Objectives and Contingency Planning

14 Objectives

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

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

20 Contingency Planning

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

- 24 • What if the flight is delayed?
- 25 • What if the passengers are late?
- 26 • What if the meals for the spike crews are not delivered as scheduled?

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

32 Risk Management

33 See, *NWCG Standards for Aviation Risk Management*, PMS 530, as well as other aviation risk
34 management publications at [https://www.nwcg.gov/committees/aviation-risk-management-](https://www.nwcg.gov/committees/aviation-risk-management-subcommittee/publications)
35 [subcommittee/publications](https://www.nwcg.gov/committees/aviation-risk-management-subcommittee/publications), for risk management as it applies to helicopter and helibase operations.

1 **How to Properly Refuse Risk**

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

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

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

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

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

22 If the assignment has been turned down previously and the supervisor asks another resource to perform
23 the assignment, they are responsible to inform the new resource that the assignment has been turned
24 down and the reasons why. Furthermore, the personnel need to realize that a turn down does not stop the
25 completion of the assigned operation.

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

29 If an unresolved safety hazard exists, the individual needs to communicate the issue/event/concern
30 immediately to their supervisor and document as appropriate, including filing an Aviation Safety
31 Communiqué (SAFECOM).

Twelve Standard Aviation Questions That Shout “Watch Out!”

1. Is this flight necessary?
2. Who is in charge?
3. Are all hazards identified and have you made them known?
4. Should you stop the operation on the flight due to change in conditions?
 Communications Weather Confusion
 Turbulence Personnel Conflicting Priorities
5. Is there a better way to do it?
6. Are you driven by an overwhelming sense of urgency?

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7. Can you justify your actions?
8. Are there other aircraft in the area?
9. Do you have an escape route?
10. Are any rules being broken?
11. Are communications getting tense?
12. Are you deviating from the assigned operations of the flight?

Anyone can refuse or curtail a flight when an unsafe condition may exist. Never let undue pressure (expressed or implied) influence your judgment or decisions. Avoid mistakes, don't hurry!

1 **Flight Missions, Profiles, and Categories**

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

6 **Point-to-Point Flight**

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

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

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

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

17 **Mission Flight**

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

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

25 **General Use or Special Use Flight**

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

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

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

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

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

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

10 Special use flight includes the following missions:

- 11 • Flights conducted below 500 feet AGL.
- 12 • Water or retardant application.
- 13 • Hover Fill operations. Prior agency authorization and training is required.
- 14 • HLCO and Air Tactical Group Supervisor (ATGS) operations.
- 15 • Aerial ignition activities.
- 16 • Night Vision Goggle operations.
- 17 • Offshore vessel or platform landings.
- 18 • Single-skid, Toe-in, hover Exit/entry Procedures (STEP). Prior authorization or exemption is
19 required.
- 20 • Takeoff or landing requiring special techniques due to hazardous terrain, obstacles, pinnacles, or
21 surface conditions.

22 **Specific Special Use Missions**

- 23 • Law Enforcement. See Chapter 16 – Law Enforcement for more information of law enforcement
24 specific missions and operational requirements.
- 25 • Search and Rescue. See Chapter 17 – Search and Rescue for more information of search and
26 rescue specific missions and operational requirements.
- 27 • Aerial Ignition. All aerial ignition operations must be conducted in conformance with the *NWCG*
28 *Standards for Aerial Ignition*, PMS 501, <https://www.nwcg.gov/publications/501>.
- 29 • Rappel. The use of rappel requires agency approval. Training, qualification, and certification
30 must be in accordance with agency policy. Tactical use of rappelling will be determined by the
31 individual agency.
- 32 • Short-Haul. The use of helicopter short-haul requires agency approval. Training, qualification,
33 and certification must be in accordance with agency policy. Tactical use of helicopter short-haul
34 will be determined by the individual agency.
- 35 • Aerial Capture, Eradication, and Tagging of Animals (ACETA). ACETA operations are
36 conducted primarily by DOI bureaus. For these operations, refer to the OPM – 33, located at
37 <https://www.doi.gov/sites/doi.gov/files/opm-33.pdf>. Bureaus may have additional guidance.

- 1 • Media. Transportation of media personnel may be conducted in government helicopters provided
2 media personnel meet the definition of “official passengers.” Refer to agency-specific direction
3 concerning level of approval needed to conduct flights with media on board. Media personnel
4 must adhere to all requirements (for example, personal protective equipment).
5 See Chapter 10 – Personnel Transport for more information.
- 6 • External Load Operations. External load operations include water bucket operations, seeding,
7 sling loads using either lead line/swivel/cargo hook or the swivel/remote electric hook/longline.
8 When planning an operation which will involve external loads, the personnel requirements and
9 operational procedures outlined in Chapter 11 – Cargo Transport, must be followed.

10 **Flight Planning and Scheduling Process**

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

16 **Elements of the Scheduling Process**

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

- 19 1. An Aircraft Flight Request/Schedule submitted by the user requesting the mission.
- 20 2. A cost analysis performed by the dispatcher or individual scheduling the flight.
- 21 3. Office of Management and Budget (OMB) Circular A-126,
22 <https://www.whitehouse.gov/omb/information-for-agencies/circulars/>, requires a formal cost
23 analysis only for point-to-point (administrative travel) flights.
- 24 4. Performance of a cost analysis of different makes and models of helicopters, as well as of
25 various vendors or other aircraft sources available, for all flights is recommended.
- 26 5. Refer to agency-specific direction concerning requirements for a cost analysis of mission-type
27 flight. The Interagency Helicopter Approval Performance Index (IHAPI) for Type 1 and 2 CWN
28 helicopters is recommended.
- 29 6. A Dispatch/Aviation Manager Checklist and hazard analysis performed by the requester
30 (assigned Helicopter/Flight Manager), the scheduler (the dispatcher and/ or aviation manager),
31 and for complex missions, the pilot.
- 32 7. Appropriate approvals. Higher-level approval may be required.
- 33 8. Agency-specific direction may require line manager approval for special use flights.
- 34 9. Administrative travel flights with senior federal officials on board require higher approvals and
35 documentation. See OMB Circular A-126, [https://www.whitehouse.gov/omb/information-for-](https://www.whitehouse.gov/omb/information-for-agencies/circulars/)
36 [agencies/circulars/](https://www.whitehouse.gov/omb/information-for-agencies/circulars/), for specific details.
- 37 10. Standard Aircraft Safety Briefing completed by the HMGB or project flight manager and pilot
38 just prior to the flight.
- 39 11. A post flight evaluation which identifies any problems encountered so that corrective action can
40 be taken on future flights.

1 **Frequency of Completion**

2 One-Time Missions

3 The elements of the flight planning scheduling process described above should be addressed or
4 completed for each flight mission.

5 Recurrent Special Use Projects and Operations

6 For recurrent flight missions of a similar nature in a special use environment, scheduling and approval
7 requirements are identified in the Project Aviation Safety Plan.

8 **Aircraft Flight Request/Schedule Preparation**

9 Flight request formats will vary among agencies. See Helicopter Flight Schedule (HBM-9A) for an
10 example.

11 For cooperator (civil), other-government agency, or National Guard aircraft, refer to agency-specific
12 direction and agreements for the approval process. For military aircraft, see the *National Interagency*
13 *Fire Center, Military Use Handbook*, located at <https://www.nifc.gov/nicc/logistics/references.htm>, for
14 ordering and approval process. Gaining approval for use of these types of aircraft is the joint
15 responsibility of the dispatcher, Unit Aviation Manager, and the individual requesting the aircraft.

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

20 **Aircraft Cost Comparison Analysis**

21 **Requirements**

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

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

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

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

31 **Documentation**

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

1 **Scheduling Aircraft with Vendors**

2 The following guidance applies primarily to project flights.

- 3 • Documentation of Contacts. Once a preliminary flight plan has been prepared and a cost
4 comparison performed, the scheduling dispatcher may contact a vendor to determine availability.
5 These contacts may be documented on a Resource Order form or other appropriate format.
- 6 • Vendor Review of Flight Request and Preliminary Flight Plan. During the scheduling contact,
7 the preliminary flight plan must always be reviewed with the vendor and preferably the pilot who
8 will fly the mission. Scheduler should relay an accurate itinerary and manifest along with the
9 desired sequence of events. Flight plans should be amended at this time, subject to aircraft
10 limitations, refueling needs, or other concerns identified by the vendor. More complex projects
11 may require in-person meetings with the vendor to plan the flight or project correctly.

12 **Obtaining Approved Pilots and Aircraft**

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

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

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

21 **Obtaining Necessary Equipment and Personnel**

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

26 **Analyzing Known Aerial Hazards**

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

30 **Aviation Project and Mission Planning**

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

33 **Identify Hazards and Manage Risks**

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

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

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

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

6 **Known Aerial Hazard Map**

7 Purpose

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

11 Applicability

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

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

19 Responsibility

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

- 23 • Particular emphasis should be placed on identifying those obstructions not normally indicated on
24 government published flight maps including old mining wires, stream flow gauges, areas of
25 extreme turbulence, etc.
- 26 • Military Training Routes (MTR) and Special Use Airspace (SUA) must be included on the
27 known aerial hazards map.
- 28 • Medical facilities (hospitals, clinics, etc.) with landing areas or heliports should be shown on the
29 hazard map. Those with air transport ("life flight") capability should be so indicated.
- 30 • All airports, landing strips and heliports/helibases should be added.
- 31 • Each flight request or Resource Order for non-point-to-point, mission-type flights, regardless of
32 altitude, must have known hazards identified or a hazard map attached.
- 33 • Instructions for completion. Potential hazards and emergency services as identified above must
34 be marked. Method of marking is optional but may be determined by agency-specific direction.
- 35 • The following will display aviation data standards: *NWCG Data Standards*, PMS 910,
36 <https://www.nwcg.gov/data-standards/aviation-hazards-plp>.
- 37 • The following FAA site will display standard symbols in the FAA Aeronautical Chart User's
38 Guide: https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/aero_guide/.

1 **Hazard Maps on Large Incidents**

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

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

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

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

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

20 **Helicopter Capabilities and Limitations**

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

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

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

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

30 Capabilities

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

34 Limitations

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

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

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

2 Anticipated Environmental Conditions

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

6 **Location Coordinates**

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

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

- 13 • To get DDD °MM.MMM' from DMS, divide the seconds by 60.
14 45° 14' 30" (divide 30 by 60) to get 45° 14.500.'
- 15 • To get DMS from DDD °MM.MMM,' multiply the decimal portion of the minutes by 60.
16 45° 14.500' (multiply .5 times 60) to get 45° 14' 30."

17 **Communication Plan**

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

21 **Airspace Coordination**

22 Personnel involved in helicopter operations must follow all processes and procedures outlined in the
23 *NWCG Standards for Airspace Coordination*, PMS 520, <https://www.nwcg.gov/publications/520>.

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

26 Identifying MTR, SUA, visual flight rules (VFR) airways, etc., which may impact air operations.

- 27 • Identifying these areas on the incident or project hazard map.
- 28 • Ensuring all pilots are briefed on these hazards.
- 29 • Ensuring that a Temporary Flight Restriction (TFR) is in place when appropriate. Notices to Air
30 Missions (NOTAMs) are advisable for some project work, e.g., horse herding, construction
31 longline, etc.
- 32 • Reporting any violations through the SAFECOM reporting system.
- 33 • Ensuring the TFR is canceled when no longer necessary.

34 **Obtaining Approved Pilots and Aircraft**

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

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

7 **Flight or Driving Time and Duty Day Limitations**

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

11 **Personal Protective Equipment and Aviation Life Support Equipment**

12 Requirements for personal protective equipment are determined by the type of flight and found in the
13 *Interagency Aviation Life Support Equipment (ALSE) Handbook*. The type of ground operation being
14 performed also will determine PPE required, e.g., hover hookup or working around operating
15 helicopters. [https://www.doi.gov/sites/doi.gov/files/interagency-aviation-life-support-equipment-](https://www.doi.gov/sites/doi.gov/files/interagency-aviation-life-support-equipment-handbook-guide-v3.0.pdf)
16 [handbook-guide-v3.0.pdf](https://www.doi.gov/sites/doi.gov/files/interagency-aviation-life-support-equipment-handbook-guide-v3.0.pdf)

17 **Preflight/Passenger Safety Briefing**

18 A briefing covering both the specifics of the intended mission and helicopter safety is required. A
19 standard Aircraft Safety Briefing must be provided to all passengers by the HMGB or Helicopter Flight
20 Manager (DOI) and pilot just prior to the flight. For more information see Chapter 10 – Personnel
21 Transport.

22 **Manifest**

23 All personnel and cargo must be listed on the manifest with their weights. All hazardous materials must
24 be identified on the manifest. All personnel on the manifest must meet the definition of, “Qualified Non-
25 Crewmember,” “authorized passenger,” or “official passenger.”

26 **Post Flight Evaluation**

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

29 **Project Aviation Safety Plans**

30 **Purpose**

31 Flight operated as special use must have a completed and approved Project Aviation Safety Plan (PASP)
32 prior to flight.

1 **Applicability**

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

5 **Responsibilities and Requirements for Completion**

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

8 Plans are generally completed in the following sequence:

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

18 **Routing and Filing**

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

21 **Annual Review and Update**

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

25 **Content**

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

- 27 1. Project Name and Objectives – Provide a brief description of the project and its objectives.
- 28 2. Justification – Indicate why the project will require the use of aircraft in special use flight
29 conditions/environments and list the most practical alternative for completion of the project.
- 30 3. Project Dates – Dates the project will begin and end. These may be approximate, since exact
31 dates of flights may not be known.
- 32 4. Location – Enter descriptive location and include a map clearly showing area where flights will
33 occur. Aerial hazards must be clearly indicated. Identify airports, helibases, helispots, and/or off-
34 airport landing areas from which operations will occur.
- 35 5. Projected Cost of Aviation Resources – Enter cost coding, projected flight hours and cost,
36 projected miscellaneous expenses (overnight charges, service truck mileage, etc.), and total cost
37 of the aviation portion of the project.

- 1 6. Aircraft – Specific aircraft information may not be known at the time of initial PASP completion.
2 Identify anticipated project needs such as aircraft type, capabilities, performance minimums,
3 configuration, ancillary equipment (e.g., bucket, seeder, longline, floats, fuel truck) and/or
4 missions for which the aircraft must be approved. Once aircraft is secured/ordered, document
5 vendor/fleet aircraft to be used, registration number, aircraft type, and missions for which the
6 aircraft is approved.
- 7 7. Pilot – Specific pilot information may not be known at the time of initial PASP completion, but
8 pilot mission qualifications necessary to complete the project should be identified. Once known,
9 identify the pilot(s), including aircraft types and missions for which they are qualified.
- 10 8. Participants – List individuals involved in flights, their project responsibilities, qualifications
11 (Aircrew Member, Flight Follower, Fixed-Wing Flight Manager, HMGB, etc.), and qualification
12 expiration dates.
- 13 9. Communication Plan, Flight Following, and Emergency Search and Rescue – Identify the
14 procedures to be used.
- 15 10. Aerial Hazard Analysis – An aerial hazard analysis with attached map will be provided to the
16 pilot before the flight. Flights made in confined areas (e.g., deep, narrow canyons) require that a
17 prior ground and/or aerial survey of hazards be made. A copy of the hazards map will be
18 provided to the pilot prior to any project flight. The necessary temporary flight restrictions and
19 coordination with the Federal Aviation Administration and, if appropriate, military authorities,
20 must be accomplished prior to project.
- 21 11. Personal Protective Equipment (PPE) – Identify the protective equipment and clothing for the
22 operation as required in the *Interagency ALSE Handbook*
23 <https://www.doi.gov/aviation/library/guides>. Survival equipment (extra water, flotation devices,
24 sleeping bags, etc.) beyond the normal PPE complement may be required.
- 25 12. Weight & Balance / Load Calculations – The pilot is responsible for the accurate completion of
26 weight and balance load calculations. Trained aviation personnel will ensure that aircraft
27 scheduled are capable of performing the mission(s) safely and within the capability of the aircraft
28 selected. The helicopter or fixed-wing manager will ensure that manifests and weight and
29 balance load calculations are completed properly and completed daily. Specific aircraft
30 performance planning documentation may not be available at the time of initial PASP
31 completion but must be documented along with the PASP prior to the implementation of the
32 project.
- 33 13. Risk Assessment – Utilize the principles within the *NWCG Standards for Aviation Risk*
34 *Management*, PMS 530, or other bureau-approved risk assessment process. The *NWCG Risk*
35 *Management Workbook*, PMS 530-1, <https://www.nwcg.gov/publications/pms530-1>, includes
36 additional tools, such as a Risk Assessment Worksheet, Risk Assessment Matrix, and an
37 inventory of hazards and identified mitigations associated with those hazards, to assist in the
38 completion of a risk assessment specific to your project and/or mission. The overall risk level
39 assigned to a project is determined by the highest post-mitigation rating and must not be an
40 average of the associated individual risks.
- 41 14. Signatures – Line Manager or appropriate level of approval based on the risk assessment or other
42 bureau requirement.

Chapter 04 – Communications, Flight Following, and Resource Tracking

Introduction

Pilots, dispatchers, and HMGBs 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, HEBM, 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 SUA).

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.

Point-to-Point Flights

- 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.

- 1 • An agency VFR flight plan with radio/telephone check-in at intervals specified in the flight plan
2 that meets agency policy. Intervals vary for point-to-point and mission flights.
- 3 • Satellite based Automated Flight Following (AFF) system as described in Chapter 50 of the
4 *National Interagency Mobilization Guide*, <https://www.nifc.gov/nicc/mobguide/index.html> or the
5 procurement document.

6 Mission Flights

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

14 Law Enforcement Flights

- 15 • For specialized flight following procedures during law enforcement operations, see
16 Chapter 16 – Law Enforcement.

17 **Documentation of Flight Following**

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

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

26 **Check-in Facilities**

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

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

33 Check-in Requirements

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

35 Point-to-Point Flight

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

1 Mission Flight

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

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

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

16 Law Enforcement Flights.

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

19 **Check-in Information**

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

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

28 **Failure to Meet Check-in Requirements**

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

31 **Resource Tracking**

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

1 **Methods of Resource Tracking**

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

5 Point-to-Point Flights (including ferry flights)

- 6 • Resource tracking may be performed by phone or VHF-FM radio (if the aircraft is equipped).
- 7 • It is required that the HMGB or pilot make resource tracking check-ins, usually via telephone,
8 prior to takeoff, and at final destination.
- 9 • The Scheduling Dispatcher will specify check-in requirements for each stop en route and may
10 designate an alternate dispatch to contact with check-ins.

11 Mission Flights

12 Flight following and resource tracking become the same.

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

18 **Communication Systems**

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

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

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

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

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

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

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

6 **Aircraft Communication Systems**

7 **Aircraft VHF-AM Radio**

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

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

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

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

20 **Aircraft VHF-FM Radio**

21 Refer to the procurement document for required FM radio equipment.

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

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

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

29 800MHz Radios – Many emergency response and law enforcement agencies use 800MHz radio systems.
30 Aircraft may have 800MHz radio capabilities.

31 **Satellite and Cell Phones**

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

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

1 **Helibase Communications**

2 There are two major factors to consider regarding helibase communications:

- 3 • The system itself, consisting of hardware, frequency assignments, and the location at which
4 communication with aircraft is performed; and,
- 5 • The individuals who are responsible for helibase communications.

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

8 **General Considerations**

9 The following standards should be consistently followed:

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

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

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

23 Ensure that problems are brought to the attention of the air operations staff or Project Aviation Manager.
24 The Communication Unit Leader and/or local radio technician are helpful resources in solving
25 communications problems.

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

30 Organization

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

34 The key position under the HEBM that directly manages the communication flow is the ABRO.

1 Helibase Communications and Flight Following Forms

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

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

15 Incident Communications Plan and Frequencies

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

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

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

25 Helibase Air Traffic Control: This describes the coordination of departing and arriving air traffic at the
26 helibase with other aircraft. This function is commonly performed by the ABRO using the Takeoff and
27 Landing Coordination (TOLC) frequency and/or assigned helibase frequency.

28 Flight Following

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

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

36 Deck Communication and Coordination

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

1 Air-to-Air Tactics

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

4 Air-to-Ground Tactics

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

9 Command

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

15 Support/Logistics

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

19 Air Guard

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

23 **Communication Requirements and Options**

24 Frequency Compatibility

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

27 Radio Traffic and Radio Discipline

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

- 32 • The Air Guard frequency must not be used for any function other than its intended uses which
33 include air-to-air emergency contact and coordination, ground-to-air emergency contact, and
34 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.

Frequency Monitoring

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.

Switching From One Frequency to Another

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

1 additions, changes, and deletions must be coordinated through the Communication Unit Leader (COML)
2 on incidents and with dispatch on projects. A specific time for the changeover to occur should be
3 established to avoid confusion.

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

5 Separate or Combined Functions

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

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

15 Issuing Air Traffic Information and Advisories

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

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

22 Pilots need to know the following:

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

31 Request Acknowledgment from Each Aircraft

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

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

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

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

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

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

10 Special Operations

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

Exhibit 4.1 – Incident Communications Diagram.

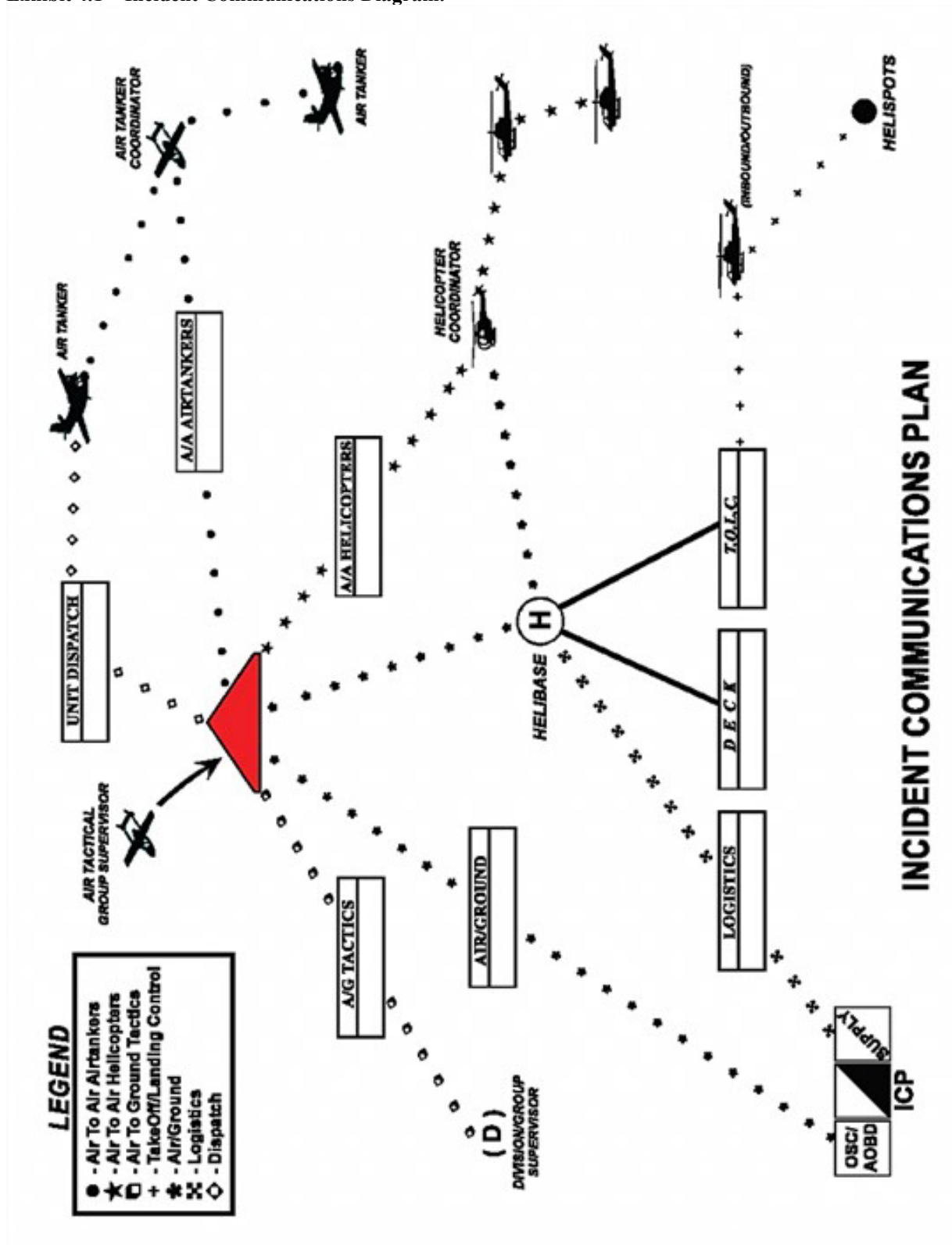


Exhibit 4.2 – ABRO Advisories to Pilots

1 *WHEN HELICOPTER CONTACTS HELIBASE.*

- 2 • Helicopter#_____, _____ Helibase.
 - 3 • Winds are _____ MPH from the _____.
 - 4 • Include the following information depending on the situation.
 - 5 • There is no reported traffic or,
 - 6 • (List Aircraft) is outbound from _____ to _____ and/or,
 - 7 • (List Aircraft) is inbound from _____ to _____.
 - 8 • Be advised of _____ (list pertinent airspace activity).
 - 9 • Land at Pad _____.
-

10 *BEFORE A HELICOPTER DEPARTS HELIBASE.*

- 11 • Helicopter#_____, _____ Helibase, on _____.
 - 12 • Winds are _____ MPH from the _____.
 - 13 • Include the following information depending on the situation.
 - 14 • There is no reported traffic or,
 - 15 • (List Aircraft) is outbound from _____ to _____ and/or,
 - 16 • (List Aircraft) is inbound from _____ to _____.
 - 17 • Be advised of _____ (list pertinent airspace activity).
 - 18 • Depart at your discretion.
-

19 **EXAMPLE:**

20 Helicopter (5NR) Five November Romeo, Side Lake Helibase on Victor.

21 Winds are 5 miles per hour from the west.

22 Helicopter (0PA) Zero Papa Alpha is outbound from the Helibase to H-1.

23 Be advised of troop shuttle activity from the Helibase to H-1 and airtanker activity in Division Alpha.

1 Incident Airspace Communications

2 Temporary Flight Restriction (TFR)

3 A TFR is a type of NOTAM. A TFR defines an area restricted to air travel due to a hazardous condition,
4 a special event, or a general warning for the entire FAA airspace. The text of the actual TFR contains the
5 fine points of the restriction.

6 Fire Traffic Area (FTA)

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

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

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

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

18 Standard FTA Communication Procedures

19 Initial Communication (ICOM) Ring

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

24 NOCOM Ring

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

27 FTA Entry Procedures

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

30 Aviation personnel must follow FTA entry procedures 12 NM from the center point of the incident as
31 described in the *NWCG Standards for Aerial Supervision*, PMS 505,
32 <https://www.nwcg.gov/publications/505>, for further information.

33 Scenario 1: Aerial Supervision Is On-Scene

- 34 • Notify the dispatch center of your position.
- 35 • Change to incident frequencies.
- 36 • Give 12-mile radio call to aerial supervision. Give your distance and cardinal direction from
37 incident, and altitude.

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

13 Scenario 2: Aerial Supervision is Not On-Scene, but Other Aircraft Are

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

1 Scenario 3: There Are No Aircraft On-Scene

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

11 **Standard Scripts (Adapted from *NWCG Standards for Aerial Supervision, PMS 505*)**

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

15 Flight Following Departure Standard Script:

- 16 1. Tail Number or Designated Identifier
- 17 2. Identify Frequency
- 18 3. Departure location
- 19 4. Number onboard
- 20 5. Fuel on board
- 21 6. Estimated Time En route (ETE)
- 22 7. Destination
- 23 8. Confirm AFF

24 **Example:**

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

26 “Six eight x-ray, Boise Dispatch.”

27 “Helicopter six eight x-ray is off Boise, five on board, two-point five hours fuel, one hour and five
28 minute ETE to the Blues Incident, confirm AFF.”

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

30 “Six eight x-ray copies.”

1 Key Points

- 2 • Identify yourself as Helicopter.
- 3 • State the frequency you are transmitting on.
- 4 • It may be useful to state the full tail number when operating in areas with high fire activity or
5 when operating outside of your typical dispatch zone.
- 6 • A heading or flight route may be useful to include should AFF not be in use, or when the flight
7 path is not direct due to terrain, weather, en route recon, etc.

8 FTA Calls in the Blind Standard Script:

- 9 1. Receiving unit
- 10 2. Tail number or Designated Identifier
- 11 3. Distance and cardinal direction from incident
- 12 4. Altitude
- 13 5. Intent
- 14 6. “Any traffic please advise”
- 15 7. Frequency

16 Example:

17 “Blues fire traffic, Helicopter six eight x-ray is twelve miles to the southwest, at five thousand five
18 hundred feet (5500’ MSL), inbound, any traffic please advise on one-two-two-point nine-two-five
19 (122.925.)”



NWCG Fire Traffic Area (FTA)

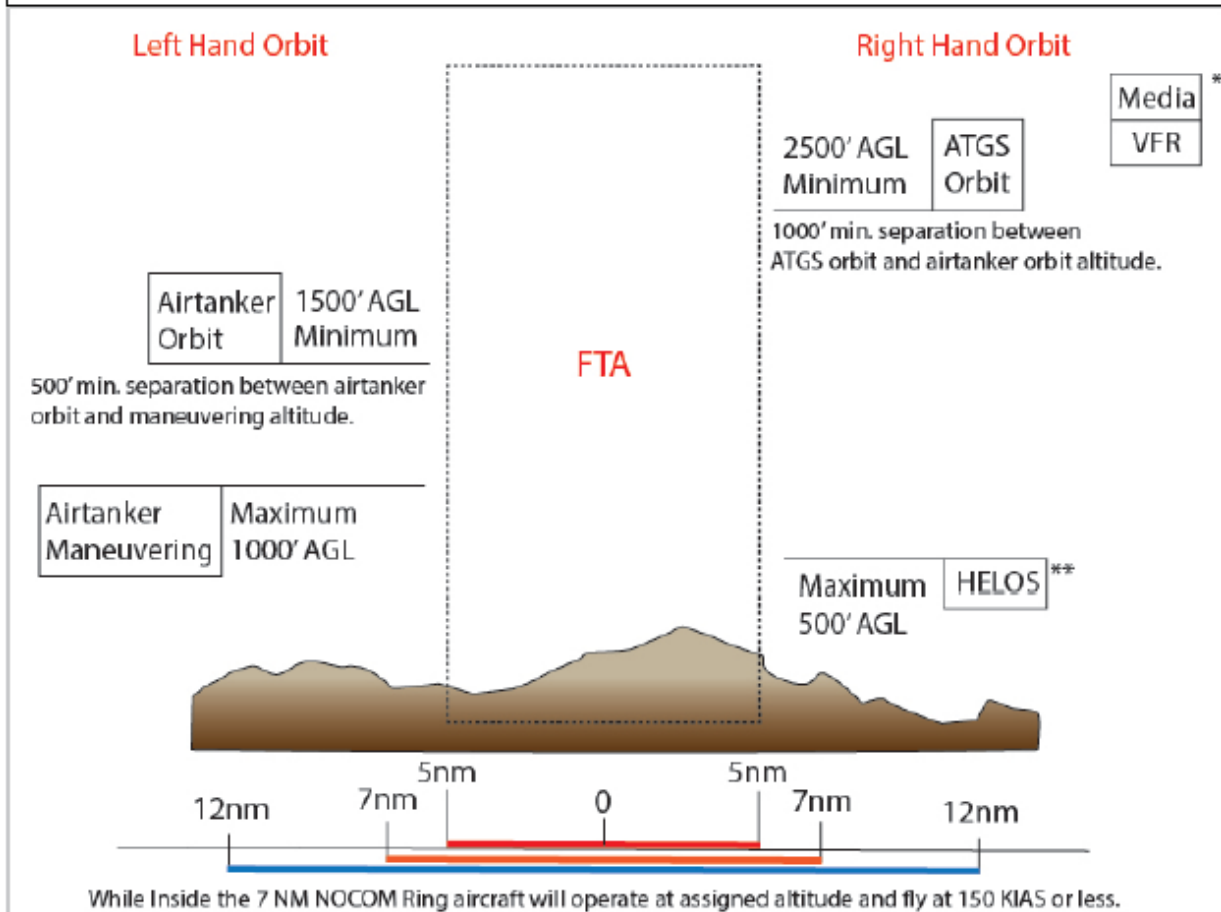
**NWCG Standards for Aerial Supervision,
PMS 505, <https://www.nwcg.gov/publications/505>**

*****Clearance is required to enter the FTA*****

Initial Radio Contact: 12 nm on assigned air tactical frequency.

No Radio Contact: Hold a minimum of 7 nm from the incident.

Note: Airtanker maneuvering altitude determines minimum airtanker and ATGS orbit altitudes. Assigned altitudes may be higher and will be stated as MSL.



* Media and IAA Aircraft: Maintain VFR separation above highest incident aircraft or at the altitude assigned by the controlling aircraft.

** Helicopters: Fly assigned altitudes, orbits, and routes.

Airtanker Base As Assigned	Air Guard 168.625 Tx Tone 110.9	Air to Air As Assigned	National Flight Following 168.650 Tone 110.9 TX and RX
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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 MOU 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 contract inspections of the aircraft, pilots, mechanics, fuel service vehicles, and associated equipment. The cards are valid for up to 13 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 and/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 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>.

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

3 **Responsibility for Checking Carding or Approval Prior to Use**

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

6 If any discrepancy is found during this process the flight must not proceed and the HMGB must call the
7 scheduling office immediately.

8 **Standards for Interagency Cooperator Type 2 and 3 Helicopters**

9 The *NWCG Standards for Interagency Cooperator Type 2 and 3 Helicopters*, PMS 525-1, contains the
10 aviation standards developed for cooperating fire agencies. These standards are intended for use by
11 federal, state, and local cooperating agencies entering into agreements for the use of aviation assets
12 utilized in the Interagency Fire program. The Interagency CWN and On Call helicopter contracts were
13 used to develop these standards. In addition, the standards have been rewritten to accommodate Public
14 Aircraft Operations (PAO) specific issues such as the use of non-certificated aircraft see, *NWCG*
15 *Standards for Interagency Cooperator Type 2 and 3 Helicopters*, PMS 525-1, for more information at
16 <https://www.nwcg.gov/publications/525-1>.

17 **Interagency Helicopter Pilot Qualification Card**

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

21 The pilot must have a current interagency card (OAS-30B) showing authorizations for the mission(s) to
22 be performed.

23 Field personnel, including the Contracting Officer's Administrative Representative (COAR)/Contracting
24 Officer's Representative (COR) or Project Inspector (PI), do not have the authority to suspend or revoke
25 a pilot's card. Only the agency contracting officer or other agency-designated official may suspend or
26 revoke the card.

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

29 If the pilot is to be used for a special use mission, then that use must be noted with the inspector's
30 initials in the column next to the Authorized Missions.

31 **Helicopter Data Card**

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

35 **Mechanic Qualification Card**

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

1 **USFS Procedure.**

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

4 **DOI Procedure.**

5 Depending upon whether or not they have also been approved on a USFS contract, they may or may not
6 possess a Mechanic Card. The lack of a card does not preclude the mechanic from functioning as such
7 on a USFS incident, provided the aircraft is operating under a DOI procurement agreement.

8 **Service Truck Data Card**

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

14 See Chapter 13 – Fueling Operations for further information.

15 **Aircraft Fuel Facility Inspection and Carding**

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

20 Depending on agency policy, an inspection sticker for the facility may be issued. The sticker should be
21 located in an area secure from the elements. A copy of the inspection must also be maintained by the
22 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/help/guides/basic_aviation_safety_guide_2013_05.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 – Helicopter Load Calculations and Manifests and Appendix A – Helicopter Management Forms and Checklists address the specifics of the Interagency Helicopter Load Calculation form (OAS-67/FS 5700-17/HCM-8), which is the primary planning tool for determining if the helicopter is capable of lifting a load at a given temperature and elevation.

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

5 **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

6 **Weight and Balance**

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

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

15 **High Density Altitude**

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

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

- 23 • The allowable payload will be reduced.
- 24 • Increased turnaround time for delivery of water/retardant drops.
- 25 • With bucket/tank operations, the reduction in water volume may not allow penetration of any
26 significant canopy and reduce drop effectiveness due to wind drift.

- 1 • The aircraft's responsiveness will be affected, and the pilot must anticipate the aircraft flight
2 control inputs.
- 3 • The high density altitude and variable wind are going to greatly reduce the helicopter's ability to
4 safely slow down to below Effective Translational Lift (ETL) airspeed.
- 5 • Hovering spot drops should be avoided in areas with high density altitude.

6 **Day/Night Flight Limitations**

7 **Day Visual Flight Rules (VFR) Only**

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

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

17 **Authorization for Night Flying Operations**

18 Night operations are unique and require agency authorizations.

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

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

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

29 **Tactical Night Operations**

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

33 **Logistical Operations**

34 Pilots may operate at night under the following conditions:

- 35 • Agency and contract pilots may, with agency-specific approval, solo-pilot single-engine
36 helicopters at night for ferry and maintenance purposes.

- 1 • Transportation of passengers at night in a single-engine helicopter is prohibited.
- 2 • Agency and contract pilots may, with agency-specific approval, fly twin-engine helicopters at
- 3 night for ferry, transportation of passengers, and maintenance purposes.
- 4 • Conduct all night helicopter operations, other than NVG operations, in one of the following
- 5 ways:
- 6 ○ To and from airports and heliports having FAA-approved lighting.
- 7 ○ To and from airports and helibases approved by the regional or state aviation manager.

8 **Emergency Operations**

9 The principles and procedures of risk management and analysis outlined in *NWCG Standards for*
 10 *Aviation Risk Management*, PMS 530, <https://www.nwcg.gov/publications/530> must be applied to any
 11 decision regarding conducting a nighttime emergency operation, particularly those conducted in adverse
 12 conditions of fog, mountainous terrain, etc.

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

15 **Instrument Flight Rules (IFR) Flight Limitations**

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

18 Flights into IFR conditions must be conducted only when weather minimums meet or exceed those
 19 prescribed in the Code of Federal Regulations (CFR), 14 CFR 135 for helicopter IFR operations.

20 **Wind Restrictions**

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

25 **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

26 **Helicopter Operating in Snow-Covered Areas**

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

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

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

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

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

22 **Helicopter Flight Over Congested and Densely Populated Areas**

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

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

28 14 CFR 133 – External Load Operations, requires the submittal of a congested area plan to the FAA for
29 approval prior to the commencement of operations over congested or populated areas. Congested area
30 plans provide the protocols necessary to ensure that no hazard exists to the public during flight
31 operations. Measures include traffic management, flight routes, crowd control, and vacating the public
32 from locations where flight routes and operations occur.

33 For unplanned incidents, such as emergency response activities, an FAA-approved congested area plan
34 is not practical. Emergency operations conducted on behalf of the government for the sake of public
35 safety, may rarely require external load operations over congested areas, but do not relieve the
36 government of risk management responsibilities.

37 Incident personnel must implement risk management procedures to ensure a sterile operating area, free
38 from operational hazards to the public to the greatest extent possible and discontinue any such
39 operations if they present an unreasonable risk to the public.

40 Incident Management personnel will implement the risk management procedures listed below as soon as
41 practical.

1 Standard risk management procedures include:

- 2 • Select helicopter operation sites that reduce or completely negate the need to fly over roads,
3 buildings, and the public.
- 4 • Keep public at least 500 feet from helicopter operation sites, including approach and departure
5 routes.
- 6 • Pilots are to fly routes, including approach and departure, avoiding overflight of the public and
7 limit overflight of incident personnel.
- 8 • Where flight operations cannot avoid buildings, roads, and/or the public:
 - 9 ○ Coordinate with pilot to identify procedures and flight routes (where practicable) to minimize
10 public risk.
 - 11 ○ Manage vehicular and pedestrian traffic where overflights will occur.
 - 12 ○ Manage crowd locations (for example, campgrounds, parks, crowds that gather to watch,
13 etc.) where overflights will occur.
 - 14 ○ Where flights cannot avoid overflight of buildings, incident personnel will ensure that
15 buildings are vacant.

16 Continually evaluate the risk to the public due to external load overflight vs public safety concerns
17 associated with the emergency incident. Discontinue operations and/or implement additional risk
18 management procedures when public safety is in question.

19 **Supplemental Oxygen Requirements**

20 In 14 CFR Part 135 Commuter and on Demand Operations, in unpressurized aircraft the required
21 minimum flight crew must use supplemental oxygen for that part of the flight that exceeds 30 minutes
22 above 10,000 feet through 12,000 feet MSL. Above 12,000 feet MSL each member of the flight crew
23 must use supplemental oxygen during the entire portion of the flight at those altitudes, more information
24 see 14 CFR 135.89 – Pilot Requirements: Use of oxygen at [https://www.ecfr.gov/current/title-](https://www.ecfr.gov/current/title-14/chapter-I/subchapter-G/part-135/subpart-B/section-135.89)
25 [14/chapter-I/subchapter-G/part-135/subpart-B/section-135.89](https://www.ecfr.gov/current/title-14/chapter-I/subchapter-G/part-135/subpart-B/section-135.89).

26 **Lockdown of Controls**

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

28 In general, when trained ground, or Qualified Non-Crewmember personnel are available to assist in
29 loading and unloading, the pilot should remain at the controls when the rotors are turning.

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

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

1 **Military Helicopter Limitations**

- 2 • The use of military aircraft must comply with the requirements established in the *National*
3 *Interagency Fire Center, Military Use Handbook* located at:
 - 4 ○ <https://www.nifc.gov/nicc/logistics/references.htm>
- 5 • Military helicopters and flight crews, including National Guard and Coast Guard, must be
6 agency-approved by letter or card. A copy of this letter must be available.
- 7 • Military performance planning cards (PPC) may be used, at the discretion of military pilots, in
8 lieu of the Interagency Helicopter Load Calculation form (OAS-67/FS 5700-17/HCM-8).
- 9 • Helicopter management personnel should be aware that military radios may not be compatible
10 with operation radios and should be checked prior to use.
- 11 • Military helicopters might not be configured to carry cargo. If they are, use military external load
12 equipment, provided it meets military safety standards.

13 For further information, refer to the *National Interagency Fire Center, Military Use Handbook*
14 <https://www.nifc.gov/nicc/logistics/references.htm>, or local agreements with military authorities such as
15 the National Guard.

Chapter 07 – Helicopter Load Calculations and Manifests

Introduction

Interagency Helicopter Load Calculation form (OAS-67/FS 5700-17/HCM-8) 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 – Helicopter Management Forms and Checklists 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-8083-21B Helicopter Flying Handbook located at:

https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/helicopter_flying_handbook/helicopter_flying_handbook.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 Textron™ models. Some performance charts are designed for no-wind conditions.

- 1 • Performance charts are predicated on the helicopter engine(s) meeting the engine manufacturer's
2 specific torque values as determined by performing a Helicopter Turbine Engine Power
3 Assurance Check.
- 4 • Errors, high or low, may result when plotting the maximum computed gross weight on the
5 helicopter performance chart. Use of enlarged copies of charts is recommended to reduce errors.
- 6 • Structural limitations such as maximum skid weight, as opposed to performance limitations, may
7 cause confusion. Ensure that personnel understand the difference between these limitations.

8 **Agencies Not Using the Interagency Helicopter Load Calculation Form (OAS-67/FS 5700-** 9 **17/HCM-8)**

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

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

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

19 **Cooperator (Civil) and Other-Government Agency Helicopters**

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

23 **Military Helicopters**

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

26 For aviation operations using Active Duty/Reserve Military helicopters, and National Guard units
27 officially federalized by the DoD, refer to Chapter 70 of the *National Interagency Fire Center, Military*
28 *Use Handbook*, <https://www.nifc.gov/nicc/logistics/references.htm>, for specific policy and procedural
29 information.

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

33 **Restricted Category or Limited Use Helicopters**

34 Load calculations must be completed for all flights. The same rules apply as those for standard category
35 helicopters regarding omitting the weight reduction for external, jettison able loads, provided the pilot
36 concurs.

1 **Responsibility for Completion of Load Calculations**

2 **Pilot**

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

5 The pilot must utilize the applicable charts in the aircraft flight manual, referencing them each time a
6 load calculation is initiated.

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

9 **Government Representative**

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

14 **Mutual Responsibility**

15 After completion of the Interagency Helicopter Load Calculation form, the pilot and government
16 representative must sign the form.

17 **Determining Load Capability Using Appropriate HIGE/HOGE Aircraft** 18 **Performance Charts**

19 **General Requirements**

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

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

24 Appendix A – Helicopter Management Forms and Checklists provides instructions for completion of
25 Form HCM-10, Helicopter Load Capability Planning Summary – Multiple Helispots and Fuel Loads.
26 Use of this format is for planning purposes only.

27 **Specific Requirements**

28 Frequency of Completion

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

- 31 • Completion of a new load calculation is required when there is a change of:
 - 32 ○ +/- 5 degrees Celsius in temperature.
 - 33 ○ +/- 1,000 feet change of altitude.
 - 34 ○ Helicopter Equipped Weight.
 - 35 ○ Flight Crew Weight.

1 Other Qualified Use of Load Calculations or Manifests

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

6 The manifest includes a second set of pounds (LBS), Fuel, Pressure Altitude (PA), Outside Air
7 Temperature (OAT) and HIGE/HOGE/HOGE-J as a means to use the fuel burn to adjust allowable
8 payload.

9 Routing and Filing

10 **Incident.** The HMGB is responsible for submitting copies of all load calculations and manifests to the
11 HEBM, or IC. These copies become part of the incident file.

12 **Project.** The HMGB is responsible for submitting all load calculations and manifests to the Unit
13 Aviation Manager or designee.

14 Determining Pressure Altitude

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

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

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

21 Determining Temperature

22 Temperature can be determined by:

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

31 Determining Helicopter Equipped Weight

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

34 Determining Flight Crew Weight

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

1 Determining Fuel Weight

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

- 4 • Avgas = 6.0 pounds/gallon
- 5 • JetFuel = 7.0 pounds/gallon

6 **Operating Weight**

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

8 Maximum Computed Gross Weight

9 In order to safely operate a helicopter at varying altitudes and temperatures, the helicopter's
10 performance capability must be determined. This is done by referring to the performance charts
11 provided with helicopter flight manuals. The maximum computed gross weight is obtained from the
12 appropriate performance charts.

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

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

21 Current aircraft configuration and temperature range must match with the correct performance chart.
22 Performance planning will be performed in accordance with, and in reference to, performance data and
23 limitations contained within the FAA-approved flight manual or FAA-approved Flight Manual
24 Supplement. Planning will be determined at zero wind. With agency approval the operator may use
25 computer programs for performance planning in lieu of flight manual performance charts if the FAA has
26 approved them in the company's operating specifications. Reference the procurement document for
27 specific details.

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

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

1 ***Performance Enhancement Charts (Also Called “Wind Charts”) That Attempt To Take Advantage Of***
2 ***Prevailing Winds Are Not Authorized.***

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

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

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

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

23 **Fixed Weight Reduction**

24 The fixed weight reduction is required for all non-jettisonable loads. The fixed weight reduction is
25 optional (mutual agreement between pilot and HMGB) when carrying jettisonable loads (HOGE-J)
26 where the pilot has total jettisonable control. The appropriate weight reduction value for make and
27 model can be found in the current helicopter procurement document.

28 All internal loads will be downloaded in accordance with the weight reduction chart. For external,
29 jettisonable loads, the government representative may suggest the omission of the fixed weight
30 reduction. However, the final decision will be made by the pilot if they decide it would be prudent to do
31 so.

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

34 **Gross Weight Limitations**

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

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

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

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

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

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

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

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

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

23 **Managing Helicopter Bucket Payloads**

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

28 The following procedures must be used for all bucket operations:

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

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

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

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

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

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

1 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	<input type="checkbox"/>
2 DESTINATION	PA	OAT	<input type="checkbox"/>
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	HÖGE	HÖGE- J
7a PERFORMANCE REF <small>(List page, do not from FIM)</small>			
7b COMP GROSS WT <small>(FM Performance Section)</small>			
8 WT REDUCTION <small>(Req for all Non-Jettisonable)</small>			
9 ADJUSTED WEIGHT <small>(7b minus 8)</small>			
10 GROSS WT LIMIT <small>(FM Limitations Section)</small>			
11 SELECTED WEIGHT <small>(Lower of 9 or 10)</small>			
12 OPERATING WEIGHT <small>(From Line 6)</small>			
13 ALLOWABLE PAYLOAD <small>(11 minus 12)</small>			
14 PASSENGERS/CARGO MANIFEST			
15 ACTUAL PAYLOAD <small>(Total of all weights listed in item 14)</small> <small>Line 15 must not exceed Line 13 for the intended mission.</small>			
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 ($\pm 1000'$ in elevation or $\pm 5\text{o C}$ 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. HMGB completes items 14 and 15.

1. **DEPARTURE** – Name of departure location and current PA, read altimeter when set to 29.92) and 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 $2\text{o C}/1000'$ 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. Copilot, 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 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 HMGB) 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)

1 limitation or a Maximum Gross Weight Limit for External Load (jettisonable). Limitations may
2 vary for HIGE, HOGE, and HOGE-J.

3 11. **SELECTED WEIGHT** – The lowest weight, either line 9 or 10, will be entered for all loads.
4 Applicable limitations in the flight manual must not be exceeded.

5 12. **OPERATING WEIGHT** – Use the value entered in Line 6.

6 13. **ALLOWABLE PAYLOAD** – Line 11 minus Line 12. The maximum allowable weight
7 (passengers and/or cargo) that can be carried for the mission. Allowable Payload may differ for
8 HIGE, HOGE, and HOGE-J.

9 14. **PASSENGERS AND/OR CARGO** – Enter passenger names and weights and/or type and
10 weights of cargo to be transported. Include mission accessories, tools, gear, baggage, etc. A
11 separate manifest may be used.

12 15. **ACTUAL PAYLOAD** – Total of all weights listed in item 14. Actual payload must not exceed
13 allowable payload for the intended mission profile, i.e., HIGE, HOGE, or HOGE-J.

14 **Both Pilot and Helicopter Manager must review and sign the form.** Check if hazardous materials
15 (HazMat) are being transported. Manager must inform the pilot of type, quantity, and location of
16 HazMat onboard.

17 Manifests

18 A listing of all passengers and cargo being transported is required for each flight. This should be
19 accomplished on the Interagency Helicopter Passenger/Cargo Manifest, HCM-9. Each manifested trip's
20 actual payload must not exceed the allowable payload from the load calculation, unless changes in the
21 fuel load have been communicated by the pilot and documented on the manifest.

22 Crews may provide a manifest using their own format and this practice is acceptable as long as the
23 information on the Interagency Helicopter Passenger/Cargo Manifest, HCM-9 form is accurate.

24 The manifest must include:

- 25 • Helicopter #.
- 26 • Pilot Name.
- 27 • Time and Date.
- 28 • Departure and Destination.
- 29 • Pressure Altitude.
- 30 • Outside Air Temperature.
- 31 • Allowable Payload for HIGE/HOGE/HOGE-J.
- 32 • Hazardous Materials weight and location.
- 33 • Actual payload.
 - 34 ○ Full name of each passenger.
 - 35 ○ Weight of each passenger and personal gear.
 - 36 ○ Weight of additional cargo.
- 37 • Current fuel in pounds.

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

4 **Responsibility for Completion**

5 It is the responsibility of the HMGB or other authorized individual to complete a manifest prior to each
6 flight leg flown. It is the responsibility of the pilot to ensure the actual payload on a manifest does not
7 exceed the allowable payload.

8 **Routing and Filing**

9 **Incident** The HMGB is responsible for submitting copies of all load calculations and manifests to the
10 HEBM or IC. These copies become part of the incident file.

11 **Project** The HMGB is responsible for submitting all load calculations and manifests.

1 Chapter 08 – Helicopter Landing Areas

2 Introduction

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

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

10 When a site is used for more than one day as an operational base for two or more helicopters, it should
11 be operated as a helibase, and a HEBM is required.

12 Planning

13 Good planning prior to the start of a project or during the initial stages of an incident will contribute to
14 safe, efficient operations. Conversely, poor site selection will hinder the management and adversely
15 affect the safety of the operation. However, do not hesitate to relocate if safety and/or efficiency can be
16 improved.

17 The Helibase Manager’s Reminders List (HJA-2) contains specific criteria to consider when selecting a
18 helibase or helispot site.

- 19 • Helibase Manager’s Reminders List (HJA-2) Section I should be reviewed during initial
20 helibase site selection.
- 21 • Helibase Manager’s Reminders List (HJA-2) Section II should be reviewed whenever a helispot
22 is established.

23 The selection of an area or areas on which to land the helicopter(s) is an important planning activity.
24 When possible, the pilot(s) should have input. The following general requirements should always be
25 considered.

- 26 • The types of activity and volume of traffic will affect selection, as well as initial and later
27 development of the landing area(s).
- 28 • The site should lend itself to economic and environmentally sensitive development to the size
29 which will accommodate the type of helicopters and volume of traffic expected in both the short-
30 and long-term. Anticipate future needs.
- 31 • Weather (i.e., potential for smoke or fog inversions, winds) plays a significant role in the
32 location of facilities, both short- and long-term.

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

35 Permanent Helibase

36 A careful study should be made of local, state, and federal laws, rules, and regulations relating to
37 construction of a permanent helibase. Site selection should provide for adequate approach and departure

1 paths which avoid housing areas, schools, churches, and any other facilities that might be disturbed by
2 low-flying helicopters.

3 **Accommodation for Different Helicopter Types (Sizes)**

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

6 **Planning and Construction Specifications**

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

9 **Temporary Helibases and Helispots**

10 Helibase or helispot construction, can cause a double impact – the impact of an abrupt or unnatural
11 opening in the landscape, and the impact resulting from cut-faces of stumps and boles of trees or shrubs.

12 The area should not be considered as a landing site if it cannot be built to safe standards or negative
13 environmental impacts cannot be mitigated. Minimum Impact Suppression Tactics (MIST) should be
14 reviewed prior to construction in wilderness or sensitive areas. See *NWCG Incident Response Pocket*
15 *Guide (IRPG)*, PMS 461, <https://www.nwcg.gov/publications/461>.

16 **Unimproved Landing Area**

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

20 **Initial Planning**

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

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

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

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

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

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

36 Good planning for project operations should preclude poor site selection. The rapidity with which
37 incidents occur sometimes results in a poor site being used initially. If a poor site for either the helibase

1 or a helispot has been selected, do not hesitate to relocate if a better site can be established. Do this
2 immediately during the initial stages of the transition from initial or extended attack, or prior to the start
3 of the project. Otherwise, unacceptable delays in operational and logistical support, as well as safety
4 hazards, may result.

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

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

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

27 **Site Ownership and Approval**

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

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

35 **Private Ownership**

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

39 Consideration must be given to the following:

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

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

6 Rehabilitation of the land is often an issue.

7 **Public Ownership**

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

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

12 **Role of the Finance Section Chief or Local Agency Administrative Officer**

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

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

21 **Use of Airports and Airstrips**

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

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

28 **Helispots**

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

31 **Water Sources**

32 The same considerations addressed above apply to the location and use of water sources for dipping or
33 bucket/tank fill operations. Do not assume that each pond or lake is managed by the government.

34 Provisions for replenishment of water sources can be made if use of water is an issue. The use of water
35 additives (foam or retardant), as well as invasive aquatic species, are additional issues to discuss with
36 agency Resource Advisors and private landowners. See *Guide to Preventing Aquatic Invasive Species*
37 *Transport by Wildland Fire Operations*, PMS 444, <https://www.nwcg.gov/publications/444>.

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

3 **Landing at Unimproved Landing Sites**

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

7 Conversely, the government representative or pilot has the option to advise that they do not feel
8 comfortable landing at a site selected and may decline to land at the site.

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

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

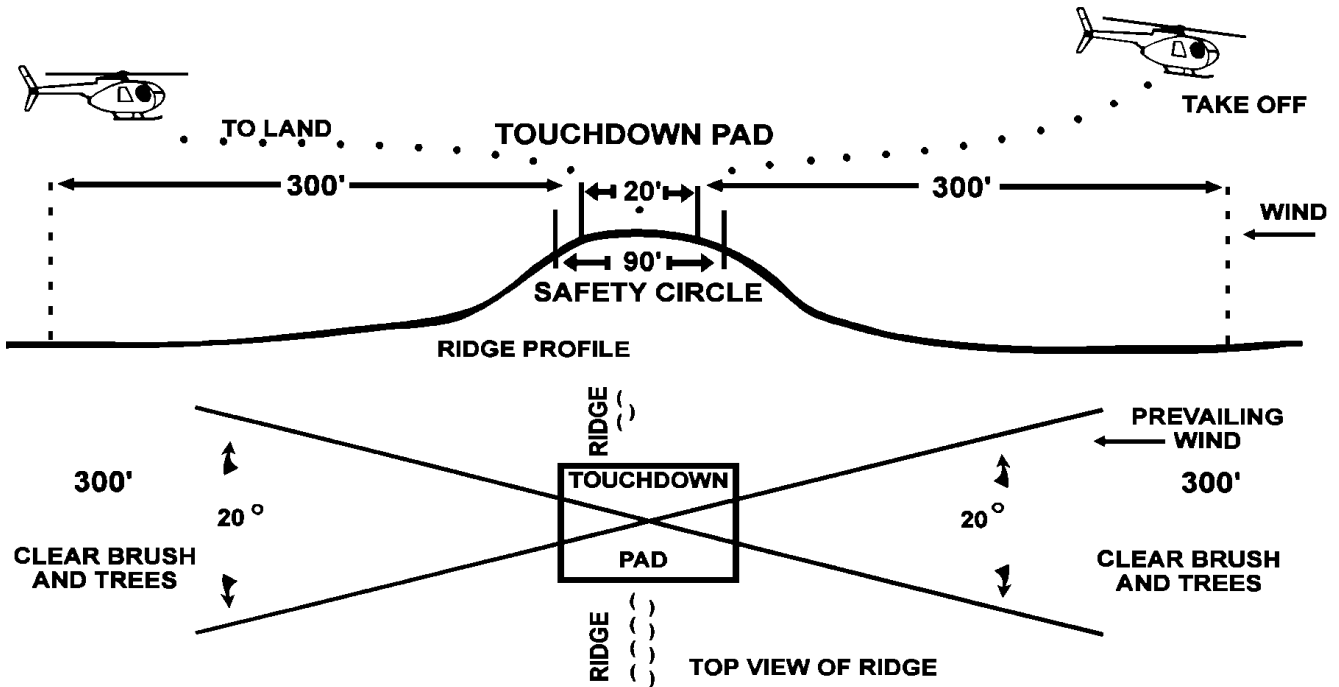
17 The appropriate authority (agency determined) should identify the level of improvement and approve the
18 extended use of unimproved landing areas.

- 19 • For large fire operations, extended use will be approved by the AOBD or designee.
- 20 • For initial attack operations, the HMGB must make this determination.

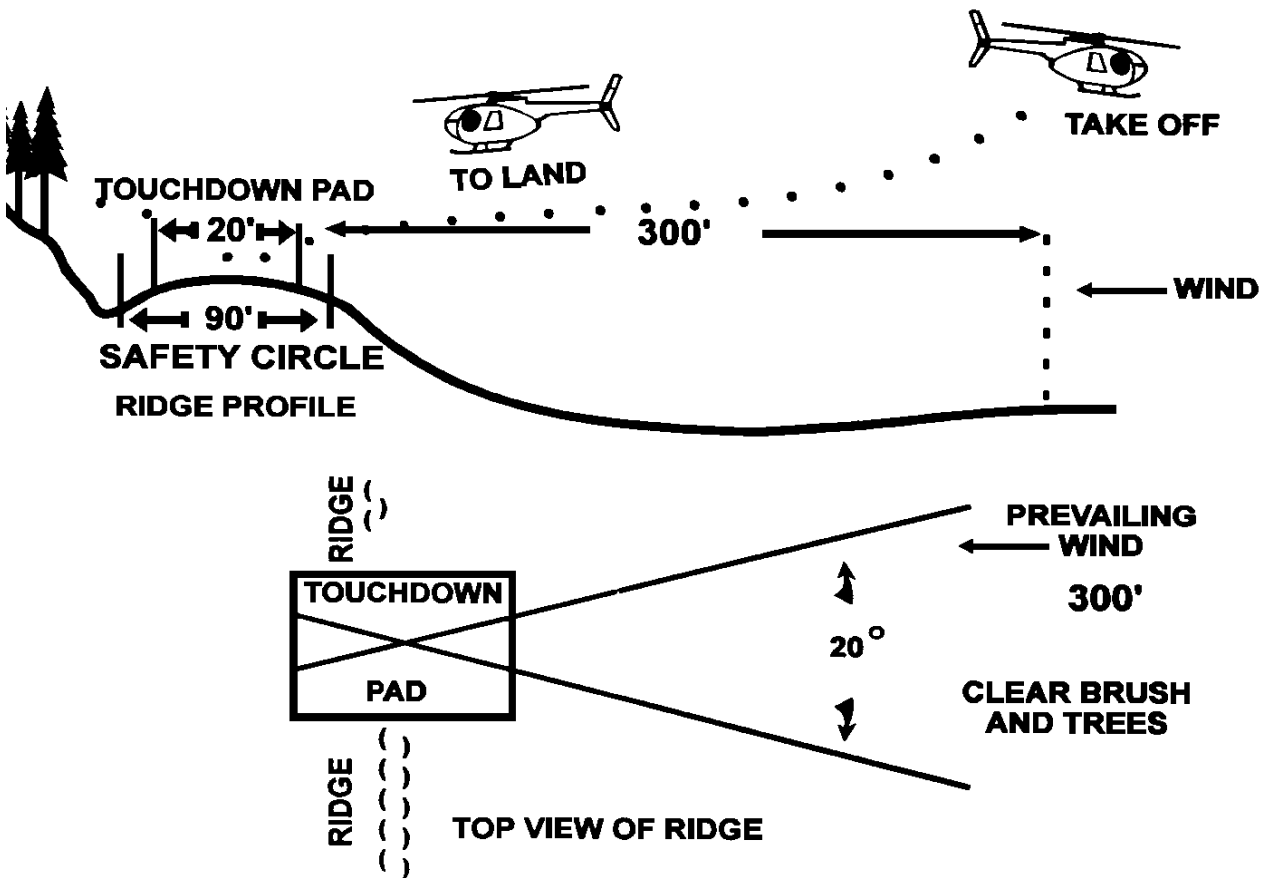
21 **Construction and Improvement**

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

1 Exhibit 8.1 – Diagram of Two-Way Helispot.



2 Exhibit 8.2 – Diagram of One-Way Helispot.



1 **Hand Construction**

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

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

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

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

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

17 **Mechanized Construction**

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

23 **Landing Area Specification**

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

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

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

32 As a general rule, safety circles should be at a minimum 1.5 times the rotor diameter. In addition,
33 separation between safety circles should be at a minimum one rotor blade(s) diameter. The following
34 charts depict minimum pad, safety circle and separation requirements.

35 (See Advisory Circular AC 150/5390-2C Heliport Design-4/24/2012,

36 https://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5390_2c.pdf)

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

1 **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'

2 **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'

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

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

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

10 **Helicopter Flight Over Congested and Densely Populated Areas**

11 Consider flight paths prior to establishing landing areas to assure flights with external loads are not
12 conducted over congested areas and densely populated areas.

13 Refer to Chapter 6 for specific details regarding flight over congested and densely populated [areas](#).

14 **General Locations for Helispots and Unimproved Landing Sites**

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

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

1 Lakes or Rivers

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

6 Canyon Bottoms

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

9 Meadows

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

13 Snow Areas

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

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

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

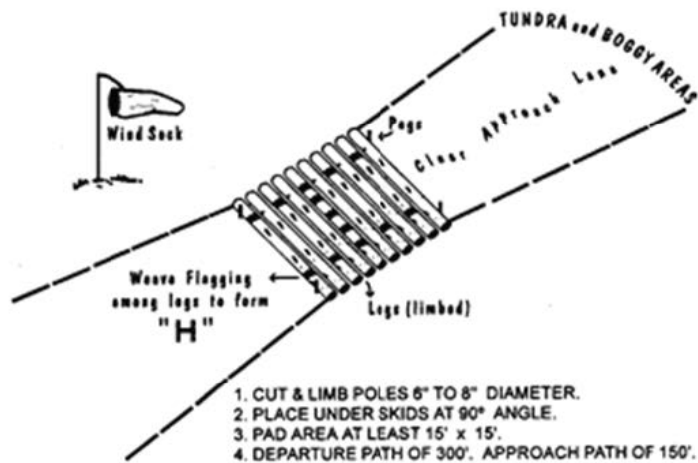
26 Tundra and Boggy Areas

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

29 A log-deck pad may also be used. Cut and limb at least ten poles, 20 feet long and approximately 6" to
30 8" in diameter. Use these to build a square touchdown pad. Place at right angles to the helicopter skids.
31 The poles must be able to support the largest helicopter to be used. Secure the outer logs to prevent
32 rolling or separation.

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

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



2 **Surface Features and Requirements**

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

5 Slope

- 6
- Avoid sloped pads that have over 9:1 slope ratio (6° or 11%) or 1.3"/foot slope.
- 7
- Pads must be as level as possible at temporary helibases and helispots.

1 **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

2 **Safety Circle**

- 3
- 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.
- 5

6 **Touchdown Pad**

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

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

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

14 **Approach/Departure Path**

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

1 **Winds**

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

4 **Full Performance Takeoff and Landing**

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

7 **Minimum Width**

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

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

18 **Exhibit 8.7 – Distance from Obstacles.**

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

19 **Approach**

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

22 **Departure**

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

26 **Downdraft Areas**

27 Avoid downdraft areas on lee sides of ridges.

1 **Required Equipment and Facilities**

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

4 Refer to [Chapter 9](#) – Equipment Requirements and Maintenance for specific details regarding fire
 5 extinguisher requirements.

6 **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
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

Requirement	Permanent Helibase	Temporary Helibase	Helispot
Identifiable, marked touchdown pads	Required	Required	Required
Hazard map	Required	Required	N/A
First aid kit	Required	Required	Recommended

1 Markings for Aerial Identification

2 Helibases

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

7 Helispots

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

10 Log-deck Touchdown Pad

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

13 Snow Areas

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

18 Miscellaneous Markings

- 19 • Painted rocks or well-secured and weighted signal panels may be used to outline a touchdown
20 pad or landing area.
- 21 • Color markings should provide sufficient contrast with the background area. Reflective material
22 may be used. If paint is to be used, it must be environmentally acceptable (for example, a water-
23 based paint).
- 24 • Known hazards outside the safety circle such as poles, pipes, and high vegetation should be
25 marked with colored ribbon or other means. Known hazards must also be marked on the Known
26 Aerial Hazard Map at helibases and should be noted on form HBM-2, Aviation Locations
27 Summary, which identifies helispot hazards.

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

1 **Dust Abatement**

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

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

11 **Water**

- 12 • Commonly available.
- 13 • Economical.
- 14 • Can be applied via ground or aerial delivery.

15 **Lignin Sulfonate**

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

20 Application considerations for lignin sulfonate include:

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

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

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

1 **Procedures for Landings**

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

6 **Load Calculations**

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

10 **High-Level Reconnaissance**

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

13 **HOGE Power Available Check**

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

17 **Areas to Avoid**

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

21 **Wind Direction**

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

24 **Reduction of Power**

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

26 **Pre-Exit Briefing**

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

29 **Single-Skid, Toe-In, Hover Exit/Entry**

30 Except in a life-threatening emergency, these types of landings are prohibited unless specifically
31 authorized. If single-skid, step-out, or toe-in landings are to be performed, Single-skid Toe-in Exit Procedures
32 (STEP) training is required as well as an approved exemption granted by the appropriate agency.

1 **Tundra or Boggy Areas**

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

3 **Snow Landings**

4 Snow landings may require agency approval. If the snow is suspected to be deeper than 18 inches, check
5 the Interagency Helicopter Pilot Qualification Card for deep snow operations and ensure that the
6 helicopter is equipped appropriately. See [Chapter 06](#) – “Helicopter Operating in Snow-Covered Areas”
7 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 – Helicopter Management Forms and Checklists for instructions on completing this form.

Personal Protective Equipment (PPE) Requirements

Refer to the *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: Flight gloves (type GS/FRP-2) constructed of a soft leather palm and stretchable Nomex® fabric for the back are preferred. These gloves have a long cuff extending several inches above the wrist providing total coverage when the flight suit sleeve is properly worn. Gloves should fit snugly to provide maximum finger dexterity for the wearer. All-leather gloves (without synthetic liners) are acceptable if they provide the wearer with wrist coverage and finger dexterity. Gloves that meet the flame-resistant Nomex® and leather design (conforms to Military Specification MIL-DTL-81188C) are available that are compatible with modern touchscreen devices. These are preferred when touchscreen devices are mission essential.
- 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, Qualified Non-Crewmember, or passenger refuses to adhere to PPE requirements, the HMGB must terminate the flight and report the non-compliance to the Unit Aviation Manager and complete a SAFECOM.

Exceptions or Additional PPE Requirements

Exceptions 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.

- 1 • Reconnaissance over water-extended: PFD, anti-exposure garment, raft & kit required. Refer to
2 *ALSE Handbook* for exceptions. Fire resistant clothing and leather boots not required.
- 3 • Individual not restrained by installed aircraft restraint system, e.g., spotter, cargo letdown, cargo
4 freefall, ACETA: approved auxiliary restraint harness/tether required.
- 5 • Extreme environmental conditions, e.g., wet, boggy, extreme cold: specific agency waiver to
6 policy is required and may allow the use of rubber or synthetic footwear and climate-appropriate
7 clothing.
- 8 • Rappel, short-haul, cargo letdown, aerial ignition: refer to agency policy and applicable guide,
9 handbook, or standard for specific PPE requirements.
- 10 • Firefighter: may wear a hardhat with chinstrap, eye protection, and hearing protection in lieu of
11 an aviator flight helmet ONLY when being transported as a passenger during fire operations
12 from an established, managed helispot or helibase to another established, managed helispot or
13 helibase.
- 14 • A managed helibase/helispot is established when there is a Helicopter Crewmember or a HEBM
15 on the ground at the helibase/helispot before passengers are transported to these locations.

16 **PPE Requirements for Helicopter Ground Operations**

17 Government personnel are required to wear PPE while in proximity to an operating helicopter. This PPE
18 consists of fire resistant clothing, e.g., long-sleeved shirt and pants; hardhat with chinstrap or approved
19 aviator flight helmet; fire resistant or leather gloves; all-leather boots; and hearing and eye protection.

20 It is at the discretion of the HEBM, DECK or HMGB to establish the appropriate level of PPE to be
21 worn by ground personnel when no helicopter operations are being conducted or for positions not
22 assigned to the deck.

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

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

- 26 • Longline hookup personnel and Parking Tenders: aviator helmet with handheld radio adaptor is
27 recommended. Radio contact with pilot is required.
- 28 • Helitorch Mixmaster and crewmembers: refer to the *NWCG Standards for Aerial Ignition*, PMS
29 501, for PPE requirements.
- 30 • Government fuelers: non-static clothing is required; may use rubber gloves in lieu of leather
31 gloves; eye and hearing protection required only when in the vicinity of operating helicopters.

32 **Survival Equipment**

33 It is the responsibility of the HMGB or project flight manager to ensure that proper and adequate
34 survival equipment for the planned mission is aboard and available for all crewmembers and passengers.
35 Requirements for survival equipment for overwater missions, survival kits for special use overland
36 missions, and first aid kits for all missions are found in the *ALSE Handbook*,
37 <https://www.doi.gov/aviation/library/guides>.

1 **Aircraft Equipment**

2 Personnel Restraints, Seat Belts, and Harnesses

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

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

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

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

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

22 Some missions where doors are open or removed may benefit from the use of a secondary restraint. If
23 qualified non-crewmembers will be leaning into the shoulder restraint, then a secondary restraint
24 provides additional protection in the event that the seat belt release mechanism is accidentally opened.

25 For additional information on restraint harnesses, refer to the appropriate special use mission standards
26 or the *ALSE Handbook*.

1 **Exhibit 9.1 – Example of Restraint Harness Configuration.**



2 **Emergency Locator Transmitter (ELT)**

3 An ELT must be installed in the helicopter.

4 **Emergency Position Indicator Radio Beacon (EPIRB)**

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

7 **Personal Locator Beacon (PLB) or Personal Trackers**

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

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

14 **Fire Extinguisher**

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

1 **Crash Rescue Equipment for Helicopter Landing Sites**

2 See Chapter 12 – Fire Protection and Crash Rescue Procedures for additional crash rescue information.

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

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

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

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

10 See Chapter 8 – Helicopter Landing Areas for helispot requirements. There is no extinguisher
11 requirement for an unimproved landing site.

12 **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

13 **Crash Rescue Kit, NFES 001040**

- 14 • 1 bolt cutter, 24"
- 15 • 1 crash axe, serrated edge
- 16 • 1 hacksaw frame w/blade
- 17 • 5 hacksaw blades
- 18 • 1 pliers, 12", adjustable joint, angle nose, multi-tongue
- 19 • 1 carrying case and sleeve
- 20 • 1 crash axe, smooth edge
- 21 • 1 rescue knife, seatbelt type
- 22 • 1 door opener w/claw tool
- 23 • 1 canvas case, rescue kit

1 **Evacuation Kit, NFES 000650**

- 2 • 24 AA batteries
- 3 • 2 boxes chemical light sticks, 12-hour, yellow
- 4 • 4 cold compress
- 5 • 1 first aid kit, type III, 24-person
- 6 • 1 litter, SKED®
- 7 • 1 pliers, 6," slip joint
- 8 • 1 screwdriver, 6," flat-tip
- 9 • 1 splint, spine
- 10 • 3 blankets, disposable, paper, 60" X 90"
- 11 • 1 carton, fiberboard, 42" X 13 1/2" X 14"
- 12 • 1 cord, cotton braided, 1/8" X 100'
- 13 • 2 headlamps, single cell, cordless (added)
- 14 • 3 markers, ground, 9" X 10'
- 15 • 2 ropes, nylon, 1/4" X 100' each
- 16 • 1 splint, inflatable, all limbs, 6 pieces

17 **Standard Equipment for External Loads**

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

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

24 **Cargo Basket and Rack**

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

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

30 **Cargo Hook**

31 The cargo hook is attached to the belly of the helicopter. It must be FAA-approved. The release must be
32 equipped with a primary and secondary release operated by the pilot from the cockpit. See Exhibit 9-3.

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

4 When testing a cargo hook that functions using a mechanical and electrical release it is important to first
5 test the mechanical release, followed by the electrical release to ensure that both function properly. This
6 sequence is important because the mechanical release may be susceptible to not properly resetting.

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

10 See Safety Alert SA 09-04 Cargo Hook.

11 https://www.doi.gov/sites/doi.gov/files/migrated/aviation/safety/upload/IASA_2009-04.pdf

12 See IATB 2014-03

13 https://www.doi.gov/sites/doi.gov/files/migrated/aviation/tech/upload/IATB_2014-03.pdf

14 **Exhibit 9.3 – Typical Cargo Hook.**



1 **Swivel**

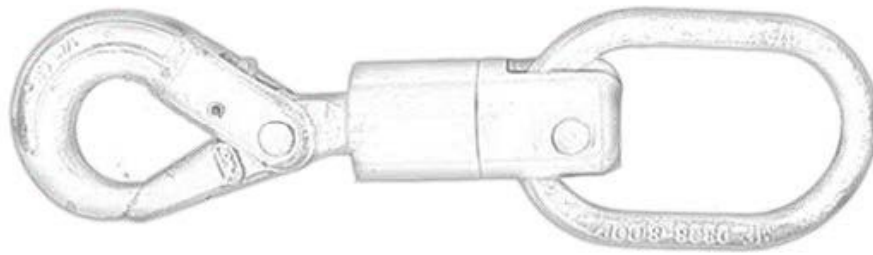
2 A cargo swivel consists of a ring or link on the upper end, a hook on the lower end, and a swivel section
3 in between. The ring or link and hook may be integral with, or detachable from, the swivel body. If
4 detachable, components should be replaceable and attached by bolts secured with self-locking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

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

8 Reference IASA 12-01

9 https://www.doi.gov/sites/doi.gov/files/migrated/aviation/safety/upload/IASA_2012-01.pdf

10 **Exhibit 9.4 – Typical Swivel.**



11 **Capacity of Swivels**

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

15 **Swivels without a capacity stamp must not be used.**

16 **Inspection and Maintenance of Swivels**

17 When inspecting swivels, check:

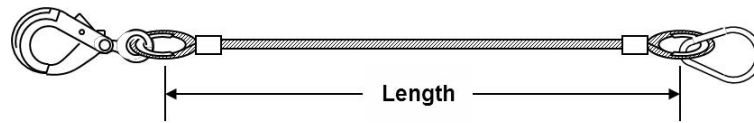
- 18 • Spinning action of the swivel.
- 19 • Condition of the integrated latch system.
- 20 • Bolts on the detachable type of swivel.
- 21 • All serviceable parts.

22 **Leadline**

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

26 **Leadlines are not designed to be used as chokers.**

1 **Exhibit 9.5 – Typical Leadline (12ft.)**



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

7 **Capacity and Length of Leadlines**

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

10 **Inspection and Maintenance of Leadlines**

11 For guidance on the inspection of leadlines please refer to the Interagency Aviation Safety Alert
12 (IASA 12-01), https://www.doi.gov/sites/doi.gov/files/migrated/aviation/safety/upload/IASA_2012-01.pdf.
13 When inspecting leadlines, check:

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

22 Leadlines with aluminum swages must not be used.

23 **Longline with Remote Electric Hook**

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

27 **Remote Hook**

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

1 **Remote Hook Guard**

2 The remote hook guard provides:

- 3 • A way to attach the remote hook to the longline.
- 4 • Protection of the remote hook when the hook is placed on the ground.
- 5 • A handle for ground personnel to use when moving the hook.
- 6 • Adequate weight to ensure good flying qualities of the remote hook and longline.

7 **Cable or Synthetic Line Section**

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

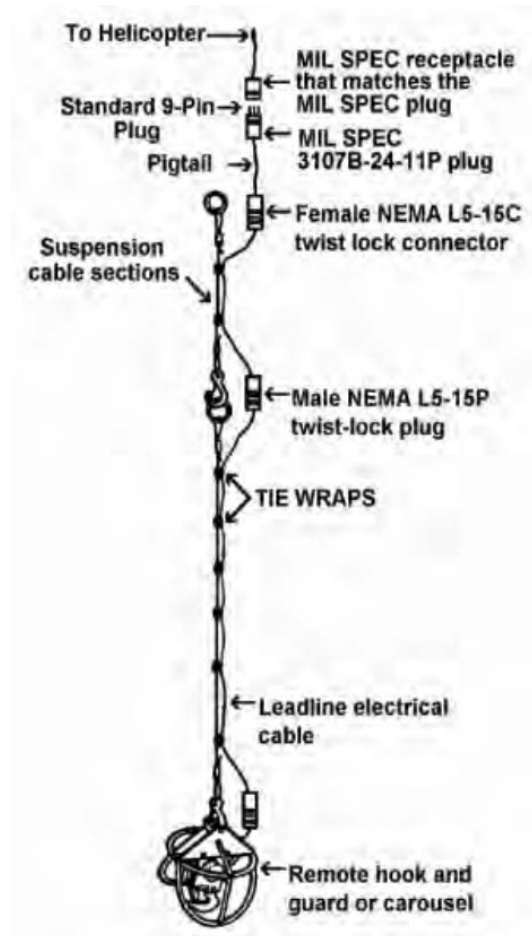
- 9 • Sections are in lengths of 50' feet and greater.
- 10 • Longline may be constructed of anti-twist, counter-wound cable, or synthetic rope.
- 11 • Longline attaches to the helicopter cargo hook on one end by means of a steel ring. On the other
- 12 end, it attaches to the remote hook by means of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

13 **Inspection and Maintenance of Longline with Remote Electric Hook**

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

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

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



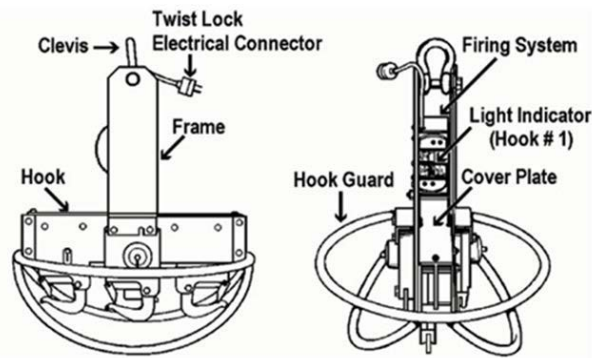
2 **Multiple Remote Cargo Hook System (Carousel Hook)**

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

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

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

1 **Exhibit 9.7 – Typical Four-Hook Carousel System.**



2 **Heavy Cargo Net**

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

5 Cargo nets come in both round and square configurations.

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

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

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

13 Capacity and Size of Cargo Nets

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

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

17 Inspection and Maintenance of Cargo Nets

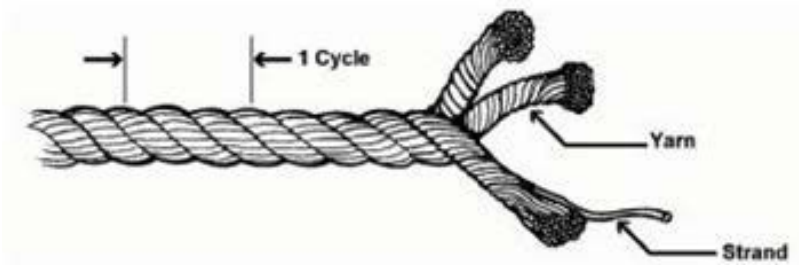
18 Rope embrittlement is caused by exposure to the sun's ultraviolet rays and is a cause of net failure. If the
19 net is free of brittleness, has no more than 10 percent broken strands in any two adjacent cycles, and
20 there is no chalking or other visible damage, then the net is probably safe for use. If in doubt, remove
21 from service.

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

1 When inspecting cargo nets, check:

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

16 **Exhibit 9.8 – Cargo Net Rope.**



17 **Lightweight Cargo Net**

18 An inexpensive, lightweight cargo net constructed of synthetic cord is desirable for certain operations.
19 Lightweight nets come in round or square configurations and have a minimum 10 foot and a maximum
20 12 foot diameter or side dimension. These nets usually weigh approximately 1.5 pounds.

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

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

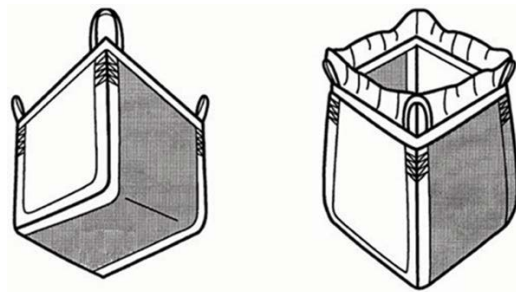
27 **Lightweight cargo nets are rated at 300 pounds only. Do not overload nets.**

1 **Cargo Lift Bag**

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

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

10 **Exhibit 9.9 – Typical Cargo Lift Bag.**

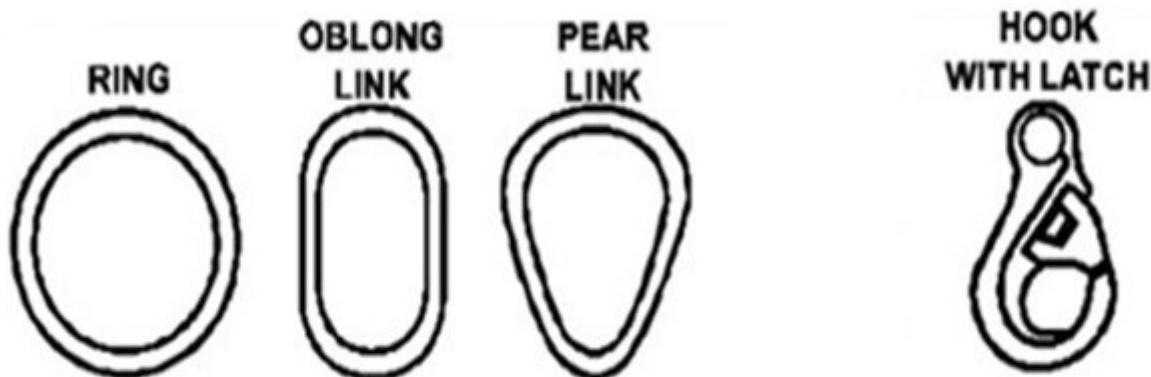


11 **Rings, Links, and Hooks**

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

16 See Chapter 11 – Cargo Transport for more information on the cargo hook/ring interface.

17 **Exhibit 9.10 – Rings, Links, and Hooks.**



1 **Buckets**

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

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

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

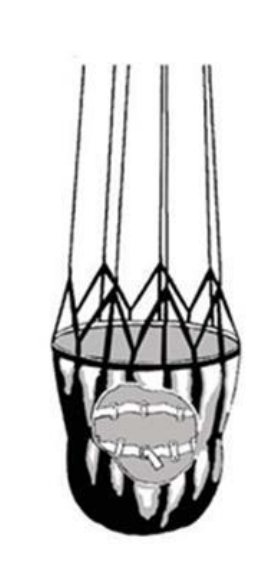
12 The weight of the bucket and capacity at each position or adjustment level must be marked on the
13 bucket.

14 For other than tandem rotor helicopters, while conducting water bucket operations, airspeed must be
15 limited to 80 Knots Indicated Airspeed (KIAS) or the airspeed limitation established by the rotorcraft
16 flight manual, whichever is less. Each operator, pilot and HMGB should review the manufacturer's
17 bucket operator manual and limitations for the applicable bucket prior to use.

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

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

27 **Exhibit 9.11 – Collapsible, Foldable Bucket**



1 **Helicopter Fixed Tank**

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

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

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

9 **Do not use lignin sulfonate in fixed tanks. Dust abatement chemicals may damage the tank.**

10 **Specialized External Load Equipment**

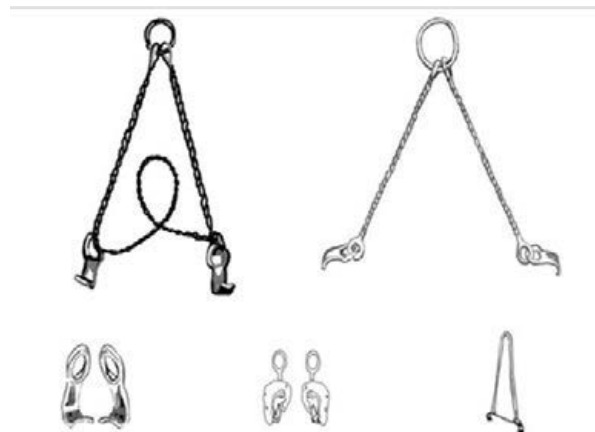
11 Specialized external load equipment is used to transport items whose dimensions or other characteristics
12 preclude use of cargo nets. These include, but are not limited to:

13 **Barrel Hooks/Clamps**

14 Barrel hooks are made of chain or cable. Two sets are usually used together. A bungee cord with a clip
15 on one end allows the pilot to hook up loads without ground assistance. Not attaching the bungee allows
16 the hooks to drop off the barrel once on the ground at an unattended site.

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

19 **Exhibit 9.12 – Barrel Hooks/Clamps.**

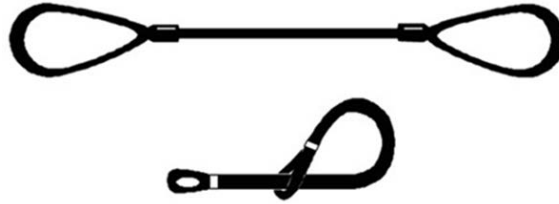


20 **Chokers**

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

27 Chokers are not to be used as leadlines.

1 **Exhibit 9.13 – Typical Chokers.**



2 **Seed and Fertilizer Spreaders**

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

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

8 **Exhibit 9.14 – Typical Seeder Configuration.**



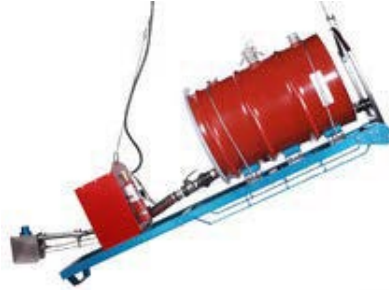
9 **Helitorch**

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

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

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

1 **Exhibit 9.15 – Typical Helitorch.**



2 **Plastic Sphere Dispenser (PSD)**

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

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

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

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

13 **Exhibit 9.16 – Typical Plastic Sphere Dispenser.**

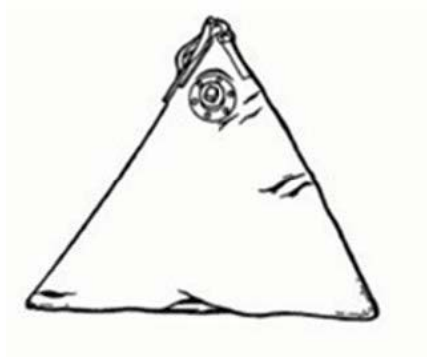


14 **Slingable Water Bags**

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

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

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



2 **Exhibit 9.18 – Typical Slingable Water Bag, 300 Gallons.**



3 **Ground-Based Tank Systems for Helicopter Dipping and Filling**

4 **Portable Auxiliary Rigid Water Tanks**

5 Flying an empty portable auxiliary rigid water tank can be a challenge. Any time you fly a large flat
6 surface through the air it will want to act like a wing and want to fly.

7 Portable auxiliary (rigid) water tanks are designed for water storage during fire suppression or other
8 operations requiring a reserve water supply. Water may be mixed with retardant in the tank using a
9 portable retardant blender.

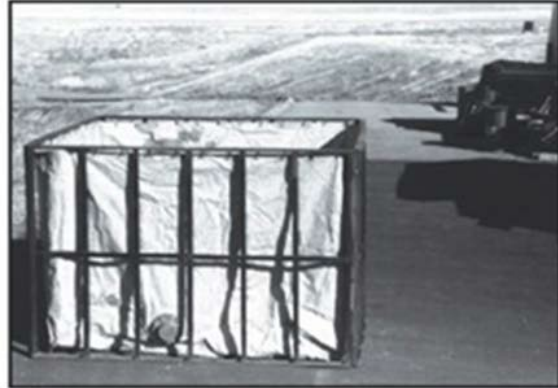
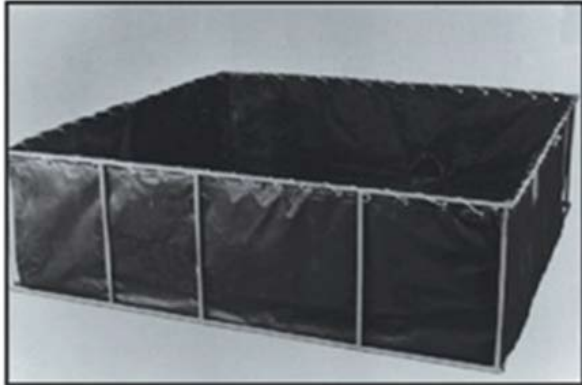
10 Tanks must be tethered to the ground and rocks placed in the bottom of the tank to prevent them from
11 being displaced by rotor wash.

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

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

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

1 **Exhibit 9.19 – Typical Portable Rigid Water Tank.**



2 **Self-Supporting, Open-Top Water Tanks**

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

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

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

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

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



1 Chapter 10 – Personnel Transport

2 Introduction

3 The safe transport of personnel in helicopters is of the highest priority. Using standard procedures for
4 personnel transport outlined in this chapter will ensure, transporting personnel safely and efficiently.

5 In order for personnel to be transported legally in a government aircraft, each passenger must meet the
6 definition of authorized/official passenger.

7 Refer to the *NWCG Glossary of Wildland Fire*, PMS 205 for definitions of flight crew member,
8 Qualified Non-Crewmembers, and passenger. Qualified Non-Crewmembers are an individual, other than
9 a member of the crew, aboard an aircraft whose presence is required to perform, or is associated with the
10 performance of, a governmental function.

11 Authorized/Official Passengers

12 Passengers are any persons aboard an aircraft who does not perform the function of a flight crew/pilot or
13 Qualified Non-Crewmember. Passengers may be transported in government aircraft only if they meet
14 the definition of an official passenger.

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

22 Unauthorized Passengers

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

28 Government employees may not be passengers or qualified non-crewmembers aboard helicopters
29 operated as restricted category aircraft, unless specifically authorized by agency policy.

30 OMB Circular A-126 Requirements

31 OMB Circular A-126, https://www.doi.gov/aviation/library/ses_travel, establishes approval and
32 reporting requirements for both point-to-point administrative travel cost-comparisons and mission flights
33 involving senior federal officials. Refer to agency-specific directives for guidance. The local Unit
34 Aviation Manager is usually responsible for meeting these requirements. State and local agencies may
35 have similar direction.

1 News Media as Passengers

2 Flights on government aircraft with news media aboard must be in the interest of the government. No
3 flight release waiver is required. This general guidance may be further restricted by agency local unit
4 policy. The air operations staff should check with the local area to ascertain any additional restrictions or
5 necessary approvals.

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

- 8 • A qualified HMGB or Flight Manager must be assigned to the mission. All requirements
9 regarding use of PPE, flight following, load calculations, and hazard analysis must be followed.
- 10 • If the mission is special use, a PASP is required and approved by line management prior to the
11 flight. It must show that the carriage of news media aboard the aircraft is of an official nature and
12 is advantageous to the agency. Since news media are thereby designated official passengers, no
13 flight release waiver is necessary.
- 14 • The IC on Type I or Type II Incident Management Teams (IMT), or a Complex Incident
15 Management Team (CIM), may authorize flights with media on board. On local unit fires, the
16 line manager, or their designee is the approving authority.

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

19 Personnel Transport Using Military Helicopters

20 Incident Operations

21 For aviation operations using Active Duty/Reserve Military helicopters, and National Guard units
22 officially “federalized” by DoD, refer to Chapter 70 of the *National Interagency Fire Center, Military*
23 *Use Handbook*, <https://www.nifc.gov/nicc/logistics/references.htm>, for specific policy and procedural
24 information.

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

28 Project Operations

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

31 Special Law Enforcement Operations

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

35 Special Search and Rescue Operations

36 See Chapter 17 – Search and Rescue Operations for differences in passenger transport procedures on
37 search and rescue missions. Unless specifically authorized in Chapter 17, search and rescue missions
38 must adhere to the procedures outlined in this chapter.

1 **Load Calculations and Manifests**

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

4 During passenger transport operations, load calculations must be performed prior to any flight activity,
5 in accordance with procedures outlined in Chapter 7 – Helicopter Load Calculations and Manifests.
6 Personnel manifesting procedures are addressed later in this chapter.

7 **Arrival of Personnel at the Helibase or Helispot**

- 8 • The person in charge of a group of people needing helicopter transportation (for example, Crew
9 Supervisor, Strike Team Leader, Chief-of-Party) must report to the person in charge of the
10 helibase or helispot and provide a passenger manifest.
- 11 • The person in charge should maintain control of personnel at all times.
- 12 • The person in charge should give the HMGB, Flight Manager, or Loadmaster a list of the people
13 to be transported so that a manifest can be completed.
- 14 • Passengers should be appropriately clothed (PPE) and ready for transportation.

15 **Manifesting Personnel**

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

18 **Other Considerations**

19 The pilot's knowledge of helispot location, hazards, etc. On helibases, the use of Aviation Locations
20 Summary, HBM-2, to provide a briefing is required by the helibase and HMGB.

21 The method of handling and transporting tools, equipment, and supplies (external or internal, hazardous
22 materials requirements, etc.).

23 Emergency procedures to be followed.

24 Stops to be made en route.

25 Procedures for unloading personnel and/or cargo at destination, with the assurance that:

- 26 • The destination is staffed by trained personnel or,
- 27 • A Qualified Non-Crewmember or flight crew member is assigned to the flight to assist or,
- 28 • One of the passengers is briefed to assist.

29 **Passenger Safety Briefing**

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

32 OAS-84 Passenger Briefing Card, <https://www.iat.gov/library.asp>.

1 The safety briefing may be given by the pilot or (as delegated by the pilot) authorized and qualified
2 personnel such as a HMGB, flight manager, HECM, or Loadmaster. The person giving the briefing
3 must:

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

6 **Loading Procedures**

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

- 8 • Helicopter crewmembers or other authorized, trained personnel must assist in the loading
9 operations.
- 10 • Personal items carried on board must be adequately secured.
- 11 • Wait for pilot, Helicopter Crewmember, or other authorized personnel to give a clear signal for
12 loading before approaching the helicopter.
- 13 • Doors should be opened only by helicopter crewmembers, other authorized personnel, or at the
14 direction of the pilot when no one is available at the landing site.
- 15 • Prior to approaching the helicopter, remove canteen belts, vests with full pouches, fire shelters,
16 and other items which might impede proper fastening of seat belts/shoulder harnesses. These
17 items must be placed and secured in an appropriate area.
- 18 • Stay in safe area prescribed by helicopter crew or other authorized personnel until given the
19 direction to load.
- 20 • Wear appropriate head protection. See *ALSE Handbook* located at
21 <https://www.doi.gov/aviation/library/guides>.
- 22 • First person into the helicopter passenger compartment should move to center seat, or seat
23 assigned by pilot, Helicopter Crewmember, or other authorized personnel.
- 24 • Find seat belt and fasten; if unable, advise the Helicopter Crewmember who will assist.
- 25 • Ensure that PPE is properly worn (that is, sleeves rolled down and collars up). See *ALSE*
26 *Handbook* for PPE requirements.
- 27 • Large gear such as fire tools should be handled by Helicopter Crewmember or other authorized
28 personnel.
- 29 • Ensure that all personnel understand the instructions given by pilot, Helicopter Crewmember, or
30 other authorized personnel.

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

1 **In-Flight Precautions**

- 2
- 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.
- 7

8 **Unloading Procedures**

- 9
- 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.
- 13

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

- 16
- 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.
- 20

21 When exiting the aircraft, do not walk toward the tail rotor or uphill. If in doubt, ask the pilot or
22 helicopter personnel what the approved exit route is.

- 23
- 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.
- 26

1 **Exhibit 10.1 – Standard Helicopter Safety Briefing Checklist.**

2 **MANAGER BRIEFING WITH PILOT**

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

4 **Aircraft Card:** Aircraft Approved for mission?

5 **Flight Plan/Resource Tracking:** FAA or Agency Flight plan filed; resource tracking procedures
6 identified.

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

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

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

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

14 **Hazardous Materials:** Identify any hazardous materials that will be transported and notify the pilot.
15 Take appropriate actions.

OAS-84 (12/21)

HELICOPTER PASSENGER BRIEFING

Pilot or designated Helitack must brief all passengers prior to flight

1. **Personal Protective Equipment:** (See IALSE CH 2 for requirements)
 - Nomex Clothing (long-sleeved shirt & pants, or flight suit)
 - Approved Helicopter Flight Helmet, or (for fire crew transport only, per IALSE CH 1.5) hardhat
 - All-Leather Boots
 - Hearing and Eye Protection
 - Flame Resistant or Leather Gloves - gloves should fit snugly, with adequate dexterity, to enhance operation of seat belts and emergency exits
 - Seatbelts - proper operation of buckle and lap/shoulder strap adjustments for all passengers
 - 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 and Emergency Exits:** Know location and how to operate

HELICOPTER PASSENGER BRIEFING (Continued)

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 any object 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 (Emergency Locator Transmitter) fuel and battery shut-off switch location and operation, radio operation

7. In-Flight Emergency Procedures

- Follow Instructions of Pilot/Helitack personnel
- Snug seatbelt and shoulder harness; secure gear
- **Emergency Seating Positions:**
 - **Forward Facing Seat:**
 - Press lower torso firmly against the seatback
 - Lower chin to chest
 - Grip the seat edge with hands or place hands under thighs
 - **Rear Facing Seat:**
 - Same as forward facing seat except, place head back against the head rest or bulkhead
 - **Side Facing Seat:**
 - Lean toward the front of the aircraft and brace upper torso and head against whatever might be contacted, or move head in the direction of impact to reduce flailing
- Move clear of the aircraft only after rotor blades stop or when instructed to 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

1 Chapter 11 – Cargo Transport

2 Introduction

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

4 Risk is the first thing to consider prior to any mission. Completion of a risk analysis is a must prior to
5 deciding how a mission is to be accomplished, what equipment is to be used, and if the pilot and
6 helicopter are correct for the job.

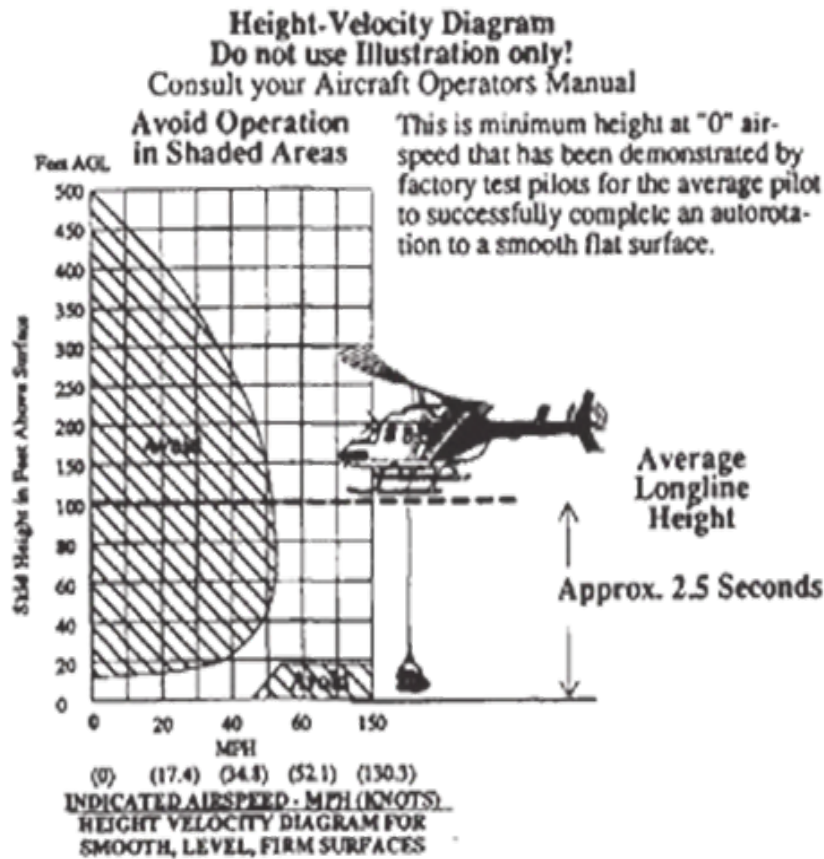
7 When cargo is transported incorrectly, there is the potential for dropped external loads, hazardous
8 materials spillage in the helicopter, over-grossed aircraft, cargo interference with the rotor systems, or
9 other serious safety hazards. Incorrect methods of rigging and transporting cargo have resulted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

11 Longline Operations

12 Height-Velocity Curve: What it means to the pilot, ground crew, and management.

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

16 Exhibit 11.1 – Height-Velocity Diagram.



1 **Qualified Personnel**

2 **Ground Personnel**

3 Helicopter and helibase management personnel must be trained and qualified to supervise and
4 coordinate cargo transport activities on incidents or projects per the requirements found in
5 Chapter 02 – Personnel.

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

8 **Pilot Qualification**

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

11 **Qualified Non-Crewmember on Board During External Load Missions**

12 A Qualified Non- member (for example, the HMGB) is allowed on board during external load
13 operations, provided certain conditions exist or are met.

14 Only the pilot should be aboard helicopters when conducting external load operations.

15 FAR 133, https://www.faa.gov/hazmat/air_carriers/operations/part_133, authorizes a Qualified Non-
16 Crewmember to be aboard the aircraft when conducting external load operations when:

- 17 • The safety of a mission can be substantially enhanced.
- 18 • The capability of the helicopter is not significantly reduced.
- 19 • The helicopter is not in the restricted category.
- 20 • Missions where safety and/or effectiveness may be enhanced by a Qualified Non-Crewmember
21 being on board during the conduct of external load missions include, but are not limited to:
- 22 • Conditions of visibility (smoke, smog) and/or terrain where the pilot requests an observer aboard
23 to optimize detection of obstacles and other aircraft.
- 24 • Complexity of the incident or project and the cockpit workload, to include large numbers of
25 aircraft operating in the vicinity, close and frequent coordination needed with ground personnel,
26 overloaded radio frequencies, etc.
- 27 • Areas of airspace complexity (military training areas such as SUA or MTR; high density civil
28 operations) where the observer could enhance the ability to avoid collisions with other aircraft.
- 29 • The pilot has the final authority regarding carrying a Qualified Non-Crewmember during
30 external load operations. Air operations staff should conduct an on-site risk analysis which
31 weighs the benefits of increased safety and efficiency versus the added exposure. The mission(s)
32 must also be adequately planned.
- 33 • Individual agency FAA exemptions to the FAR 91.119 Minimum Safe Altitudes,
34 <https://drs.faa.gov/browse/excelExternalWindow/91693C93525DE33E862576C100763E31.000>
35 1 may also require an observer on board during specific situations. Consult *NWCG Standards for*
36 *Airspace Coordination*, PMS 520, <https://www.nwcg.gov/publications/520>.

1 **Hazardous Materials Transport and Handling**

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

5 **HazMat Special Permit, DOT-SP 9198**

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

9 If an agency does not have an exemption from DOT, then all materials must be transported in
10 accordance with [49 CFR Parts 171-175](#).

11 **Requirements**

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

15 Per the OAS Tech Bulletin TB 2018-02, https://www.doi.gov/aviation/tech/tech_bulletins, a copy of
16 PMS 513, *NWCG Standards for Aviation Transport of Hazardous Materials*, the *Emergency Response*
17 *Guidebook* <http://www.phmsa.dot.gov/hazmat/outreach-training/erg>, and DOT-SP 9198 must be carried
18 aboard each aircraft transporting hazardous materials.

19 **Cargo Transport with Military Aircraft**

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

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

25 If military helicopters are tasked to perform external cargo transport, use military sling equipment and
26 qualified military personnel. Military personnel engaged in external load operations must be furnished
27 with and wear PPE according to the requirements found in Chapter 9 – Equipment Requirements and
28 Maintenance.

29 For aviation operations using Active Duty or Reserve Military helicopters, and National Guard units
30 officially “federalized,” refer to Chapter 70 of the *National Interagency Fire Center, Military Use*
31 *Handbook*, <https://www.nifc.gov/nicc/logistics/references.htm>, for specific policy and procedural
32 information.

33 **Cargo Preparation**

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

1 **Pilot Approval**

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

- 4 • Hazardous material(s) being transported.
- 5 • Hazardous material must be correctly packaged, should be marked and the pilot made aware of
6 the items being transported; and loaded, unloaded, flown and stored incidental to transport in
7 conformance with *NWCG Standards for Aviation Transport of Hazardous Materials*, PMS 513.

8 **Weighing and Helispots**

9 Weigh cargo and inform the pilot of actual weights. **DO NOT EXCEED ALLOWABLE PAYLOAD.** If
10 possible, have the cargo weighed, packaged, and marked for destination prior to the arrival.

11 **Methods of Identifying Cargo Destinations**

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

14 The following are suggested methods:

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

19 **Equipment Inspection**

20 Prior to the operation, the HMGB, Loadmaster, or Helicopter Crewmember should inspect all equipment
21 (e.g., leadlines, swivels, nets, cargo racks, tie-down straps) in accordance with the procedures found in
22 Chapter 9 – Equipment Requirements and Maintenance.

23 **Cargo Inspection**

24 Prior to the operation, the HMGB, Loadmaster, or Helicopter Crewmember should inspect all cargo.
25 Inspection should include, as applicable, the following:

- 26 • Liquid containers should be boxed or secured in an upright position.
- 27 • Boxes should be taped shut and all items tied down or secured, including Sigg™ and other fuel-
28 holding containers.
- 29 • All backhaul garbage should be double bagged in plastic garbage bags to prevent leaks inside the
30 aircraft. Garbage may be hauled externally in cargo lift bags or in a net with protective covers
31 such as a burlap sack.
- 32 • Cargo should be secured by restraining straps or nets constructed of synthetic webbing; straps or
33 nets should be attached to cargo rings or attachments points specifically designed for restraining
34 purposes.
- 35 • Avoid transporting liquid hazardous materials, such as gasoline, with food, or personal gear.

- 1 • Consider putting personal gear and packs in plastic bags if transporting with other non-hazardous
2 liquid containers and tape the neck of the plastic bags to prevent the plastic from ripping in
3 transit.
- 4 • Ensure that sharp tool edges are covered by tool guards or tape to protect the cargo net or other
5 container.
- 6 • If using the carousel hook system, make sure the pilot is aware of the destination sequence.

7 **Loading and Rigging Procedures**

8 **Internal Cargo**

9 All internal cargo must be properly stored and secured, regardless of whether passengers are being
10 transported with the cargo.

11 All packs must be secured if carried in the passenger compartment. Packs must not be carried unsecured
12 in a passenger's lap or on the floor. Packs can be stored separately in the cargo compartment, in external
13 cargo racks or transported in an external sling.

14 Do not exceed the weight limit of the cargo compartment or racks. This weight should be placarded
15 within or outside the compartment, usually on the door. If in doubt, ask the pilot.

16 **External Cargo Racks**

17 Do not exceed the weight limit for a cargo rack or basket. This weight should be placarded on the rack.
18 With certain makes and models of helicopters with racks on either side, the weight limitation for one
19 may differ from that on the opposite side.

20 Cargo should be loaded within the CG of the aircraft as computed by the pilot.

21 Inspect tie-down devices for rips, tears, or cracks.

22 When securing cargo in the racks, start at the front of the rack and lace the tie-down strap or bungee
23 cord through pack straps or handles on containers or equipment toward the rear. This will eliminate the
24 possibility of items coming loose from the rack and potentially interfering with the tail or main rotor.

25 **Proper Rigging Methods for External Cargo**

26 The pilot always has the final say regarding whether or not to conduct the mission. Do not pressure the
27 pilot, either implicitly or explicitly, into flying a load with which they do not feel comfortable.

28 The importance of inspecting equipment prior to rigging cannot be over-emphasized.

29 Chapter 9 – Equipment Requirements and Maintenance contains information on both commonly used
30 and specialized external load equipment.

31 Ground personnel and pilots should be thoroughly trained and briefed on rigging and hand signals.

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

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

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

1 With loads comprised of multiple nets consult the pilot regarding rigging preferences.

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

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

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

7 A single-point sling (choker strap) is not normally the best method to carry a load, except for items such
8 as logs. The Rutter technique is useful to transport portable (rigid) water tanks. See *Ruiz-Rutter (Rutter)*
9 *Method For Flying Fold-a-Tanks via Long Line*, https://www.iat.gov/a-219_docs.asp.

10 A two-point sling with less than a 45 degree angle to the hook or longline is a method for most loads
11 that will not fit into a cargo net. See Exhibit 11.2.

12 Use a four-point sling for box-like loads. See Exhibit 11.2.

13 A spreader bar is useful for stabilizing a load, or where the sling may catch or damage the load if
14 attached conventionally. See Exhibit 11.2.

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

19 Certain loads such as vehicles, crashed aircraft, and other irregular loads, require special rigging
20 including the use of drogue chutes or spoilers. Drogue chute equipment utilizes drag to assist a load with
21 some directional control when in flight. Spoiler equipment should be applied to loads to defeat inherent
22 aerodynamic lifting forces (like covering the leading edge of an airplane wing).

23 If special rigging equipment is to be considered when building these types of irregular loads, the
24 following will be addressed prior to the mission.

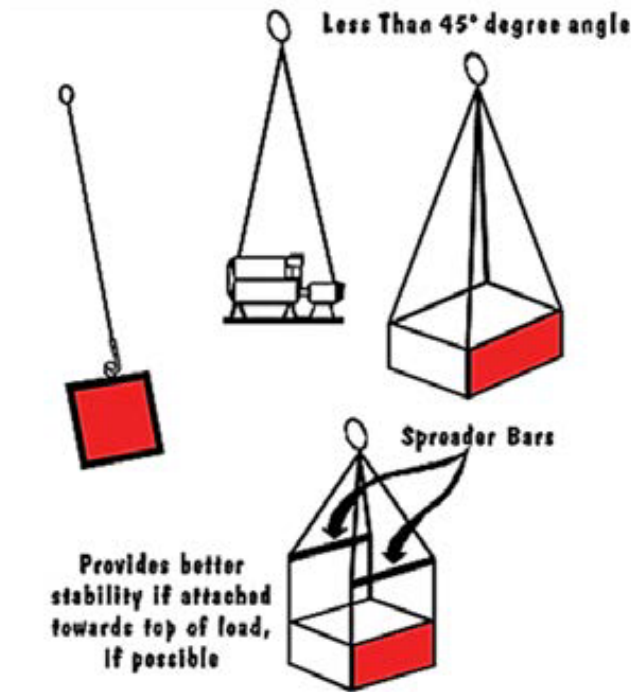
- 25 • Equipment attachment and locations that ensures adequate separation between the specialized
26 rigging equipment and the lifting helicopter in all lift phases of the project.
- 27 • Inspection of all rigging equipment is performed.
- 28 • Drogue chutes will be attached via swivel.
- 29 • A plan describing personnel roles when performing the lift.
- 30 • Adherence to any manufacturer's recommendations if utilizing commercially available
31 equipment.
- 32 • Pilot consultation and final approval of any load flown.

33 Drogue chutes will only be used on longline loads.

34 The aerodynamic configuration of a load may cause it to spin and oscillate, which in turn may cause the
35 pilot to experience control problems with the helicopter. Such difficulties may cause the pilot to return
36 with the load for re-rigging, or, in extreme cases, to release the load, either intentionally or
37 inadvertently.

- 1 There is no way to predict how each load will fly. This is especially true of non-standard loads such as
- 2 large water guzzlers, cement mixers, or pipe. Consult with the helicopter vendor or pilot, who may be
- 3 able to supply the necessary expertise and/or equipment.
- 4 If a load does not fly well, rig the next load differently and try again, provided there are no safety issues.
- 5 If safety will be compromised, other means of transportation should be found, such as ground vehicle,
- 6 pack train, or paracargo.

1 **Exhibit 11.2 – Single-, Two- and Four-Point Loads.**



2 **Cargo Net**

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

5 Some considerations when working with cargo nets:

- 6 • Center the weight and make the load as symmetrical as possible. Place heavy items in the center
7 of the net first, with light items on top.
- 8 • When using a purse net, do not weave purse strings through the net. The net will not cinch
9 properly and will be exposed to excessive wear.
- 10 • Pull tension on the purse string(s). If the net has two encircling lines, both should be made even
11 in length before attaching the leadline or swivel.
- 12 • The use of fiber tape to gather the purse strings of a net is discouraged.
- 13 • After the net is secured, look for holes or openings where items could slip through.
- 14 • If a leadline is necessary, attach a swivel between the leadline and the cargo hook. See Exhibit
15 11.12.
- 16 • A swiveling cargo hook may be used in place of a separate swivel on some missions such as bale
17 bombing.
- 18 • Multiple nets on one longline may be attached to the cargo hook by a leadline (and swivel!) so
19 that it rides below the other. See Exhibit 11.12.
- 20 • Tag each load with destination and total weight of load (net, swivel, and other accessories).

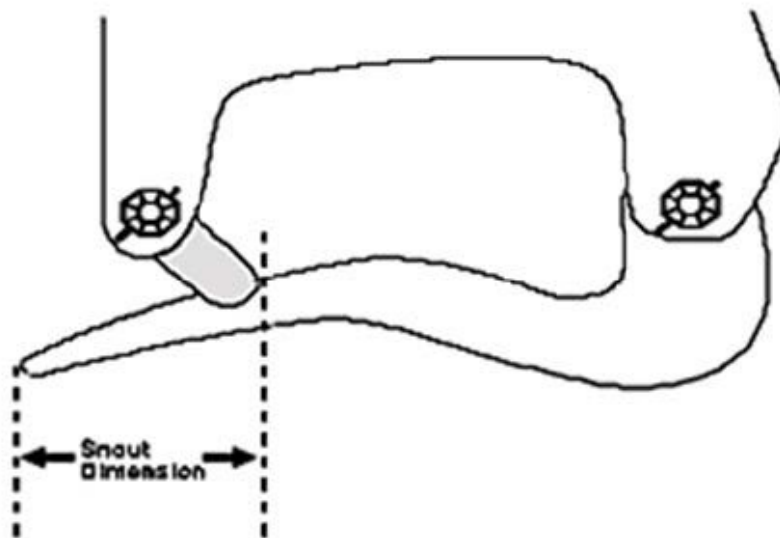
1 **Cargo Hook/Ring Interface**

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

4 The size or shape of the ring is a significant factor in inadvertently released loads.

- 5 • When the ring maximum inside diameter is greater than the “snout” dimension on the cargo hook,
6 there exists a small potential for the ring to ride over the load beam and inadvertently
7 release from the cargo hook. See Exhibit 11.3.
- 8 • Ring shapes other than a circle (e.g., oval- or pear-shape) pose the greatest chance of inadvertent
9 release. However, such release is rare for any rings when properly placed on cargo hooks.
- 10 • Use of a swivel reduces the chance of a hung load by limiting the torsional load that can be
11 applied to the ring.
- 12 • See cargo hook manufacturer specifications for acceptable ring size dimensions.

13 **Exhibit 11.3 – Snout Dimension on a Cargo Hook.**



1 **Box-like Loads**

2 Box-like loads usually fly poorly, as they tend to spin. Use a “tail,” e.g., tree branch. Ensure the tail is
3 well-secured to the bottom of the load. See Exhibit 11.4 for diagram of rope tied to load and branch. The
4 branch is used as the tail of the load.

5 **Exhibit 11.4 – Rigging a Box-like Load with a Tree Branch as a Tail.**



6 **Pipe**

7 Pipe shackles or hooks allow a number of pipes to be carried.

8 Use of chains as the connecting lines will work for loads of a weight that Type 3 helicopters can carry.

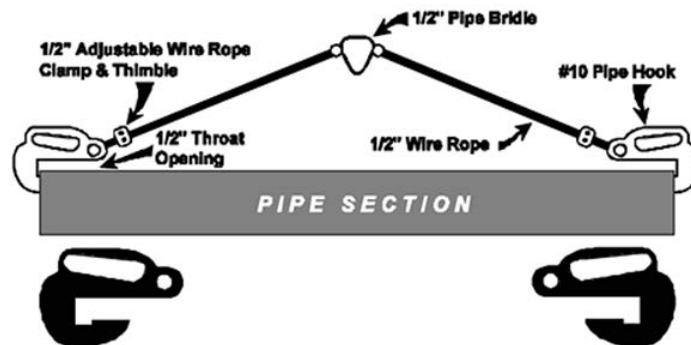
9 Chains are easier to store than cables.

10 For loads over 1,000 pounds, chains can bind where they cross and fail to tighten, allowing pipes to slip
11 out. This is especially true if the load spins. Cables are better, although they have to be replaced when
12 they become kinked.

13 Using a leader will require replacement of only a short length rather than the entire cable.

14 Ensure the shackles are hooked on opposite ends of the same pipe.

15 **Exhibit 11.5 – Rigging Loads of Pipe**



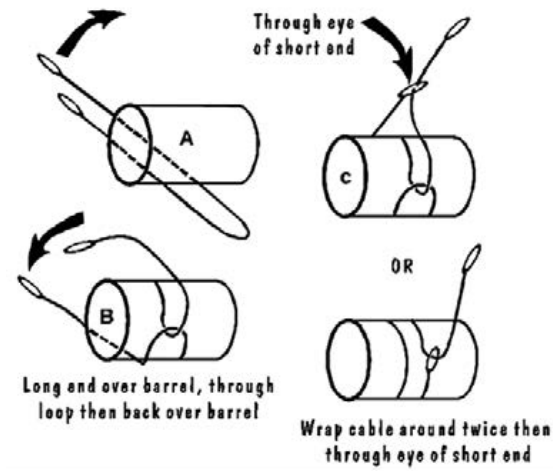
1 **Barrels**

2 Barrels may be rigged by using a choker or by using barrel hooks or clamps designed specifically for
3 that purpose.

4 Use the method shown below if barrel hooks are not available or are not preferred.

5 Barrel hooks are made of chain or cable. Two sets are usually used together. A bungee cord with a clip
6 on one end allows the hooks to be dropped off the barrels on touchdown at an unattended landing site.

7 **Exhibit 11.6 – Rigging Barrels without Barrel Hooks.**



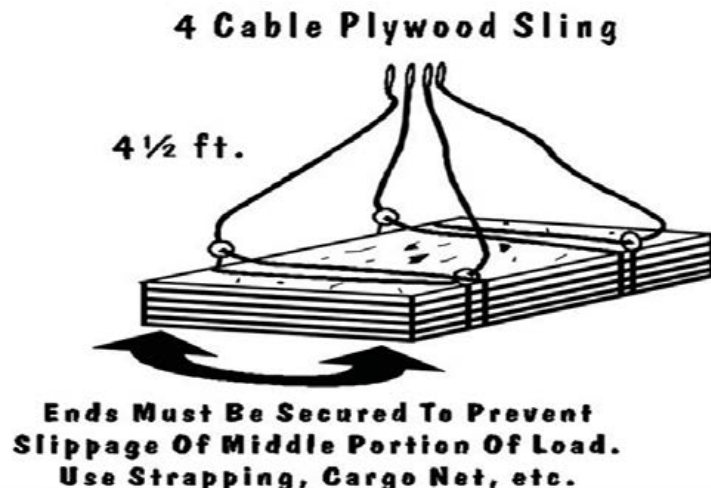
8 **Plywood or Lumber**

9 Plywood and lumber are one of the hardest loads to transport because the load's wing-like shape often
10 causes the load to fly, unfortunately often in a direction independent of the helicopter's intended flight.

11 As shown in the diagram below, ends must be secured to prevent slippage of middle portion of the load.
12 Use strapping, cargo net, etc., to secure the middle items.

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

15 **Exhibit 11.7 – Four Cable Plywood Sling.**



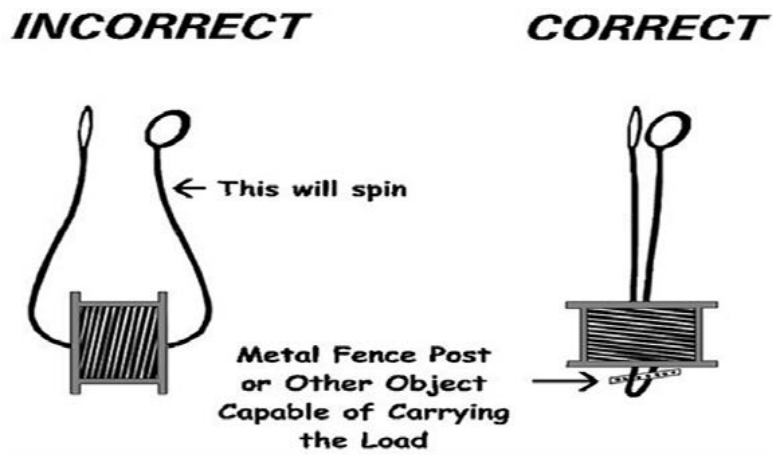
1 **Wire Spools**

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

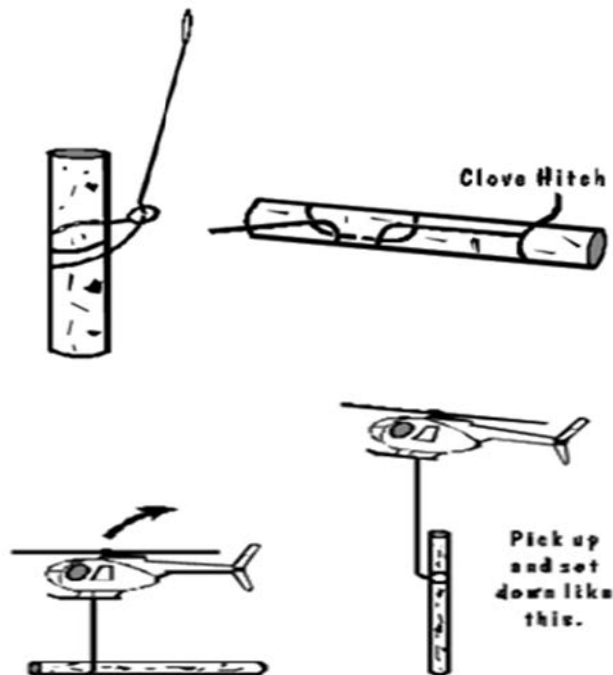
5 **Poles and Logs**

6 Logging operations use a cable choker where a ball on the end clips into a sliding catch further up the
7 cable. The cable then “chokes” down on the log when it is under tension. If this equipment is available,
8 use it. See Exhibits 11.8 and 11.9.

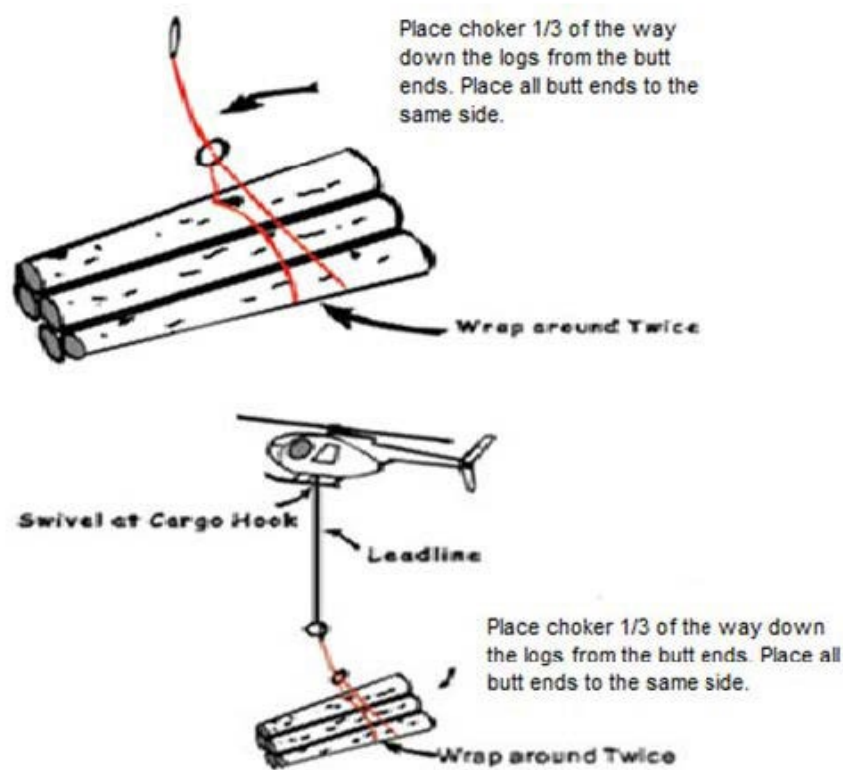
9 **Exhibit 11.8 – Rigging Wire Spools.**



10 **Exhibit 11.9 – Rigging a Single Pole or Log for Flight.**



- 1 Use of a single choker vertically in a straight line (that is, without one end being looped through the
- 2 other end), or in a “basket,” U-shaped configuration, is not approved.
- 3 For pole setting, a clove hitch can be used (two half-hitches back-to-back) at the bottom of the pole. Run
- 4 the rope up to the top and make a half-hitch.
- 5 When the load is placed on the ground, the sling will loosen and can be easily removed by ground crew.
- 6 A remote hook can be useful for releasing chokers, or when you want to retain the lead or longline.
- 7 To keep the load from slipping out, wrap the rope or chain twice around the end of the pole when
- 8 carrying a single pole or log.
- 9 Multiple poles or logs can be wrapped with heavy wire. Attach the wire to each log with fencing staple
- 10 and use a choker 1/3 of the way from the end of the logs.
- 11 With multiple-log loads, use an end stop to prevent interior logs from slipping out. Ensure the material
- 12 used is well-secured to the stack itself.
- 13 **Exhibit 11.10 – Rigging Multiple Poles or Logs for Flight.**



1 **Hookup Methods**

2 **Preparation for the Hookup**

3 Basic tasks should be performed prior to performing any external load operation.

- 4 • Prepare by removing any items from the helicopter that are not essential.
- 5 • If requested, assist the pilot with the removal of all or any doors and store in a safe location at the
6 pilot direction.
- 7 • Check both the rigging of the load and the external load equipment according to the requirements
8 and guidelines discussed in Chapter 9 – Equipment Requirements and Maintenance.
- 9 • Attach the load to a swivel. Use of a swivel is required in most cases. Attach the swivel to the
10 cargo hook or leadline. If using a longline with remote hook, attach the swivel to the remote
11 hook.

12 **Hookup with Helicopter on the Ground**

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

- 15 • Pilot checks mechanical release to the cargo hook
- 16 • Pilot checks the electrical release to the cargo hook.

17 Check the electrical function of the mission equipment (for example, water bucket release, remote
18 electric hook release, helitorch pump, etc.).

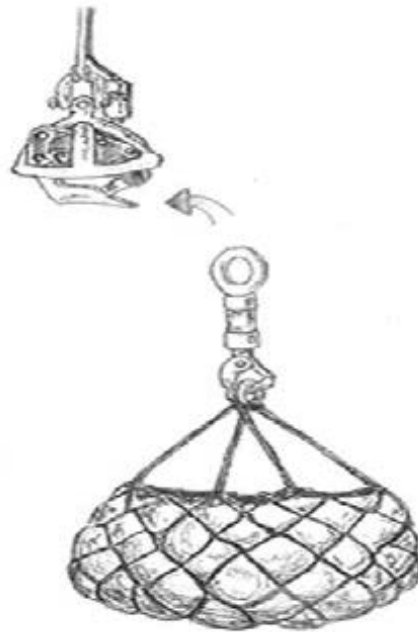
19 Run the leadline from the load swivel to the cargo hook, ensuring that the line is not near or looped over
20 any skid.

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

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

25 After all checks have been performed, visually inspect the cargo hook to ensure the release arm or knob
26 is fully reset.

1 **Exhibit 11.11 – Attaching Swivel to Hook.**



2 **Hover Hookup with No Leadline**

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

4 The method has disadvantages. There may not be enough slack in the net's perimeter lines to allow the
5 hookup person to attach the load on the cargo hook easily. The helicopter will have to descend to just
6 above the top of the load itself.

7 **Hover Hookup with Leadline**

8 Hover hookups with leadline are effective:

- 9 • When multiple loads need to be transported in a short time frame.
- 10 • When the load destination involves terrain on which the helicopter is unable to land.
- 11 • To determine when and how to use a leadline, consider:
 - 12 ○ Pilot preference on length of leadline.
 - 13 ○ Cargo to be transported.
 - 14 ○ Terrain and surrounding vegetation at the destination or takeoff point.
- 15 • Additional leadline lengths may be necessary for bulky loads, when doing special projects, or
16 when the hookup person underneath the helicopter may need additional length to perform the
17 hookup. If the pilot is not carded for vertical reference, the bottom of the load must not be more
18 than 50' below the cargo hook.

1 **Exhibit 11.12 – Performing a Hover Hookup.**



2 **Hookup with Longline and Remote Electric Hook**

3 Use of a longline with remote electric hook carousel allows the pilot to place loads at different locations
4 during the same mission.

5 Hookups with longline and remote electric hook are effective:

- 6 • When multiple loads need to be transported within short time frames.
- 7 • When the load is on terrain on which the helicopter is unable to land or take off.
- 8 • When the surrounding vegetation and/or terrain is such that the helicopter is unable to perform a
9 hover hookup with a standard length of leadline.
- 10 • When ground personnel are not at the receiving site.

11 **Exhibit 11.13 – Daisy Chain Configuration.**



1 **General Requirements for External Load Missions**

2 **Required Personnel**

3 Hookup With Helicopter on the Ground

4 Only one person is necessary for this type of operation, since the Parking Tender can accomplish the
5 hookup, then exit, and perform marshalling duties.

6 Hover Hookup

7 Only trained and qualified personnel must perform hover hookup operations. It is recommended that two
8 individuals perform the operation, a Parking Tender, and a hookup person.

9 Longline With Remote Electric Hook

10 Two people are recommended, a Parking Tender and a hookup person. If circumstances dictate, one
11 person may perform the operation, provided there is positive air-to-ground radio communication
12 between the pilot and the individual performing the hookup.

13 **Radio Communications**

14 For operations where radio communication is recommended or required, a secure or discrete operating
15 frequency should be established, radios checked during the briefing, and ground contacts identified.

16 Pilot must receive radio communications from only one person.

17 Hover Hookup With or Without Leadline

18 It is recommended that the Parking Tender be equipped with a radio. Use of the flight helmet adapter to
19 a handheld radio is optimal, though a headset worn beneath a hard hat, with adapter to a handheld, will
20 work.

21 Hookup with Longline and Remote Electric Hook.

22 Radio communications between the pilot and Parking Tender or hookup person is required.

23 **Briefings**

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

26 Standard helicopter hand signals should be used.

- 27 • The pilot should normally receive hand signals from one person.
- 28 • There may be instances where terrain dictates the need for two people to give hand signals.

29 Ensure that the ground crew and pilot are thoroughly familiar with standard helicopter hand signals. For
30 hover hookups, these should include:

- 31 • Use the “Move Downward” signal to indicate the helicopter’s height above the hookup person.
- 32 • Use the “Hold Hover” signal to indicate that the helicopter should hold while the hookup person
33 leaves the area.
- 34 • Use the “Move Upward” signal to indicate load clearance.

- 1 • Use the “Clear to Takeoff” to indicate that it is clear to take off.
- 2 Emergency Procedures must be established between the pilot and ground crew prior to external load
- 3 operations.
- 4 • The emergency briefing is usually presented by the pilot and addresses procedures in the event of
- 5 a mechanical failure.
- 6 • The pilot should indicate that the intent will be to move the helicopter away from the hookup
- 7 person underneath the aircraft. Generally, this will be to the pilot’s side of the helicopter, but
- 8 confirm this with each pilot.
- 9 • The hookup person should move in the opposite direction from that of the helicopter, or fall flat
- 10 next to the load and attempt to gain as much protection as possible.

11 **Exhibit 11.14 – Standard Helicopter Hand Signals.**



1 **External Load Operations**

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

4 The selection of dip/snorkel sites may require concurrence of agency personnel such as Resource
5 Advisors. While it may not be feasible to approve every dip site, check first.

6 In areas of sloping terrain or with obstacles rising to one or more sides of the cargo pickup/delivery area
7 or dip site, the pilot must maintain rotor clearance from all obstacles equivalent to the landing area
8 safety circle requirements stated in Chapter 8 – Helicopter Landing Areas.

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

12 If the helicopter rotor circle is within ½-rotor diameter of the highest obstacle, the pilot should consider
13 increasing the longline length to increase the distance between the rotor and obstacle.

14 **Personal Protective Equipment**

15 See Chapter 9 – Equipment Requirements and maintenance.

16 **Equipment**

17 Check equipment according to procedures in Chapter 9 – Equipment Requirements and Maintenance.

18 Check serviceability or general condition of equipment.

19 Check the load-carrying capacities of nets, leadlines, swivels, etc.

20 **Grounding**

21 Static electricity may present a problem to the hookup person when attaching loads to hovering
22 helicopters. Unfortunately, there is no method that ensures that the hookup person will not receive some
23 amount of electrical shock when the swivel touches the hook.

24 Ways to reduce static shock:

- 25 • Allow the remote hook to touch the ground.
- 26 • Use rubber gloves.
- 27 • Ground the load to the helicopter skid prior to attaching to the cargo hook. Never touch the skids
28 or any other part of the helicopter without the pilot's permission.
- 29 • Pilot key the radio prior to the hookup person attaching the load.

30 **Procedures for Hover Hookups**

31 **General**

32 These are standard procedures for any hover hookup, regardless of whether a leadline is used
33 (see Exhibit 11.12):

- 34 • The load should be placed in front of the helicopter skids, with no potential for lines to become
35 snagged over the skids.

- 1 • The cargo net’s perimeter lines should be drawn over the top of the load and laid so that the lines
2 and leadline are prevented from becoming entangled in the net during liftoff.
- 3 • The Parking Tender should direct the pilot by radio or standard helicopter hand signals.
4 Placement of loads carried by longline and remote electric hook may be done independently by
5 the pilot if no ground personnel are available.
- 6 • The Parking Tender should be far enough back of the load to remain visible to the pilot at all
7 times.
- 8 • The Parking Tender should be slightly to the side of the load so that they can maintain visual
9 contact with the pilot. For helicopters that are flown from the right seat, the Parking Tender
10 should be approximately at the pilot’s “2 o’clock” position. For aircraft that are flown the left
11 seat, the Parking Tender should be approximately at the pilots “10 o’clock” position.
- 12 • The Parking Tender should wear a non-flammable, high-visibility vest to distinguish him or her
13 from other personnel on the deck.
- 14 • Measures to prevent static electrical shock may be taken by the hookup person and the pilot,
15 once agreed upon.
- 16 • After the hookup is completed, the hookup person should exit from underneath the helicopter to
17 the front and in full view of the pilot and proceed to a position that is not in the departure path of
18 the helicopter. Always keep the load between you and the helicopter.
- 19 • When exiting, the hookup person should take care not to become entangled in either the line or
20 the load. WALK, DO NOT RUN.
- 21 • When the hookup person is clear, the Parking Tender may signal the pilot to begin moving the
22 load. The Parking Tender must pay close attention as the helicopter lifts and tension is applied to
23 the line. An improperly rigged or placed load can become snagged at any time. If the load
24 becomes snagged or is improperly rigged or hooked, the Parking Tender must communicate this
25 to the pilot using the radio or hand signals.
- 26 • The hookup person should remain ready to take direction from the Parking Tender should the
27 load or line become snagged.
- 28 • The hookup person should never re-enter the load area beneath the hovering helicopter unless the
29 Parking Tender directs the hookup person to do so, and the pilot is aware of the person’s
30 movement.
- 31 • The hookup person should never attempt to re-rig a load when tension is still applied to the load
32 by the helicopter. Hands, arms, or other parts of the body could become snagged in the load,
33 causing serious injury.
- 34 • Water buckets and longlines should be attached to the helicopter while it is on the ground and
35 not hover hooked or plugged.
- 36 • Appropriate risk management should be applied if the remote electrical hook becomes
37 inoperative during the mission. This may include ground personnel manually releasing the load
38 from the dysfunctional electrical remote hook.
- 39 • Hover hookups to connect electrical power accessories should not be performed. If an electrical
40 connection is loose or not functioning, the pilot should land and rectify the problem.

1 **Longline With or Without Remote Electric Hook Procedures**

2 Considerations and requirements for longline with or without remote electric hook operations include:

- 3 • The sling load should be placed on the ground in the center of the loading area.
- 4 • On approach, the signal person should advise the pilot on load clearance from trees, load height
5 above the ground, and any problems that might arise in the pickup or drop zones.
- 6 • For safety purposes, the remote hook should be placed next to the load. The hookup person
7 should not be next to the load at the time the pilot is placing the remote hook.
- 8 • Once the remote hook is placed on the ground, the pilot should then move the helicopter to the
9 side so the hookup person is not directly beneath the hovering helicopter.
- 10 • When attaching a load to the remote hook, the hookup person should allow the hook to contact
11 the ground before touching it. This grounds the hook and eliminates the possibility of shock from
12 static electricity.
- 13 • When attaching a load to a remote hook, take the remote hook to the swivel rather than taking
14 the swivel to the remote hook. This ensures positive control of the remote hook.
- 15 • The hookup person hooks the load to the remote hook and leaves the area. On approach or
16 departure to the remote hook, the hookup person must not step over the longline when attaching
17 the load.
- 18 • Helicopter is then positioned above the load and the load is lifted from the ground and flown out.
- 19 • When receiving a load, stay clear of the landing area. Let the pilot set the load on the ground and
20 release it before entering the area. On approach or departure, the hookup person must not step
21 over the longline when detaching the load.

22 **Cargo Letdown**

23 Cargo letdown is a system that allows the controlled descent of lighter cargo loads (water containers,
24 chainsaws, backpack pumps, etc.) from a hovering helicopter into areas that preclude landing. Refer to
25 agency policy.

26 **Cargo Freefall**

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

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

32 **Required Personnel**

33 Minimum crew will consist of pilot and spotter (spotter will conduct dropping operations). The spotter
34 should be a qualified HMGB for freefall cargo operations. Some missions may require additional
35 personnel.

1 **Cargo Freefall Use Criteria and Situations**

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

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

13 **Planning for the Drop**

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

- 15 • **Compliance with Aircraft Flight Manual**
16 All procedures will comply with the aircraft manual (for example, door removal).
- 17 • **Line of Authority**
18 The pilot and spotter must establish a contact at the drop zone. The person at the drop zone must
19 be aware of the mission and have established a drop zone.
- 20 • **Selection and Packing of Cargo**
21 Packing will depend largely on what materials are available. Cargo must be selected and packed
22 to prevent undue damage.
- 23 • **Little or No Packing Required**
24 Items that require little or no packing include:
 - 25 ○ Fire hose and sleeping bags. These must be banded with rubber bands, straps, or filament
26 tape. Ends of the hose should be coupled to prevent damage.
 - 27 ○ Hand tools. These should be taped together with heads protected and appropriately packaged
28 (for example, padded with several layers of cardboard).
 - 29 ○ Rations.
- 30 • **Packing of Fragile Items**
31 Without access to large quantities of packing material, the only fragile items that are practical to
32 drop are water, batteries, and other inexpensive items. Fragile items will have to be appropriately
33 packaged to prevent damage. It is suggested that bases intending to use cargo freefall stock
34 packing material and boxes both at the base and in the helicopter chase truck.
- 35 • **Equipment Required**
36 An approved restraint harness fastened to a hard point must be worn by any individual (spotter
37 and/or dropper) who will not be normally restrained by a seatbelt. The tether must be adjusted so
38 that the individual cannot break the plane of the doorway.

1 • **Selecting the Drop Site**

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

- 5 ○ Fragile and breakable items such as radios and power saws require special consideration.
6 Look for areas where a lower drop can be accomplished. If available, a patch of brush serves
7 as a good cushion.

8 **Drop Procedure**

9 The following procedures must be followed.

- 10 • Air-to-ground communications must be established before drop zone is selected.
- 11 • The drop zone must be identified on the ground (marker, ribbon, flagging).
- 12 • Two reconnaissance runs, one high-level, and one low-level, must be made over the drop zone.
- 13 • A high-level reconnaissance of the drop zone must be made to determine:
- 14 ○ If the drop is feasible at the selected site.
- 15 ○ That ground personnel have moved a safe distance out of the drop zone. Wind conditions,
16 including direction and speed.
- 17 ○ Location and nature of ground and aerial hazards.
- 18 • A low-level reconnaissance of the drop zone must be made. At this time, the pilot and dropper
19 must:
- 20 ○ Reconfirm hazards in the drop zone.
- 21 ○ Determine approach and departure routes.
- 22 ○ Check for personnel too near the drop zone and/or approach-departure path.
- 23 ○ Confirm with the ground contact that the area is clear. Make final check of cargo to be
24 delivered.
- 25 ○ Both agree to proceed.
- 26 • On the drop pass, the cargo will be delivered if there are no changes in conditions.
- 27 • Remember to anticipate the forward speed of the helicopter.
- 28 • 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

It is not recommended that agency personnel in an AFFF equipped engine be assigned helibase crash rescue duties unless they have received advanced aircraft firefighting training and are equipped [turnouts and self-contained breathing apparatus (SCBA)] to respond safely.

The purpose and objectives of this chapter are to provide safe, cost-efficient, and effective fire protection and crash rescue procedures for incident and project helibase operations. It prescribes minimum firefighting and crash rescue operating requirements. The guidance and requirements in this chapter are not intended to cover every contingency, nor does it detail every rule of crash rescue safety and practice. Specialized, basic aircraft firefighting training should be sought to supplement the information contained herein.

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 these standards 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.

Emergency Response Preparedness Plan

Local Unit Responsibility

Each local dispatch or other flight following office will complete the *NWCG Aviation Mishap Response Guide and Checklist*, PMS 503. This plan will be reviewed and updated annually or more often if needed.

Helibase Manager Responsibility

Upon arrival at an incident or prior to commencement of a project, the HEBM 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 EMERGENCY MEDEVAC/MEDICAL TRANSPORT REQUEST (HJA-1), Medical Incident Report

1 (ICS 206 WF) – 8-Line Form from *Incident Response Pocket Guide (IRPG)*, PMS 461 – should be
2 completed during the helibase emergency response preparedness so a timely, safe, and effective
3 response can be achieved.

4 **On-Site Accident Preparedness Planning**

5 Preparedness must go beyond merely having a plan. Preparedness planning must be supplemented with
6 briefings and drills to reduce the confusion that exists during crash rescue operations.

7 Some of the information required for site-specific accident preparedness planning at helibases is
8 available in the local unit *NWCG Aviation Mishap Response Guide and Checklist*, PMS 503,
9 Information commonly available in the local unit plan includes:

- 10 • Name and location of hospitals and burn units within or near the unit’s administrative
11 boundaries.
- 12 • Name, location, and method of contact for helicopter ambulance services.

13 The effectiveness of crash rescue operations depends on:

- 14 • How well the planning for various known and unknown factors in the accident has been
15 performed.
- 16 • How well those involved understand the plan.
- 17 • How well it is executed.

18 As a minimum, the helibase preparedness plan should address:

- 19 • Who will respond, by assignment.
- 20 • What equipment and other facilities are available.
- 21 • When the plan will be implemented.
- 22 • Where equipment and medical facilities are located.
- 23 • How the plan will be implemented (notification).

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

- 27 • Emergency Rescue Information, HBM-15.
- 28 • Emergency Medevac/Medical Transport Request, HJA-1.
- 29 • Helibase Diagram, HBM-10.
- 30 • Aviation Locations Summary, HBM-2.
- 31 • Daily Helicopter Operations Briefing, HBM-00.
- 32 • Helibase Manager’s Reminders List, HJA-2.

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

35 The Crash Rescue Plan Checklist shown below guides the user through specific questions regarding the
36 readiness of helibase and other personnel to respond to a crash rescue situation. It may be used by the

1 HEBM, pilots, and other personnel, in conjunction with the other job aids mentioned, as a means of
2 ensuring crash rescue preparedness.

3 **Crash Rescue Plan Checklist.**

- 4 • Are the crash rescue equipment, fire extinguishers, and tool kits adequate?
- 5 • Has the responsibility for the supervision of crash rescue activities been clearly defined?
- 6 • Are crash rescue personnel assigned specific duties?
- 7 • Can crash rescue equipment readily reach all portions of the helibase area?
- 8 • Are helibase personnel familiar with procedures pertaining to crash rescue activities?
- 9 • Have contacts and plans been made with cooperators for crash rescue assistance if needed?
- 10 • Are crash rescue personnel instructed on the importance of not unnecessarily disturbing the
11 aircraft wreckage for accident investigation purposes?
- 12 • Are crash rescue personnel trained in first aid?
- 13 • Have provisions been made to dispatch a second helicopter to the crash rescue scene for possible
14 air evacuation?
- 15 • Are fire suppression crews instructed to stand by while crash rescue helicopter is landing or
16 taking off?
- 17 • Do helibase personnel understand their specific duties?
- 18 • Are minimum levels of crash rescue training completed for assigned crews? Have the pilots been
19 informed of the crash rescue plan?
- 20 • Are all helibase personnel briefed on the plan?

21 **Medical Incident Report, part of the Medical Plan (ICS-206 WF)**

22 **Purpose**

23 This form is part of the ICS-206 WF. Use items one through eight to communicate situation to
24 communications/dispatch.

25 **Applicability**

26 The form is optional but should be used for all requests for helicopter EMS, including “life flight”
27 helicopters and incident helicopters assigned to medevac missions. Completion is not required for
28 medevac transport from established helispots or the helibase.

29 **Responsibility and Instructions for Completion**

30 The HEBM is responsible for ensuring the form is completed when requests for such services are
31 received. This responsibility is usually delegated to the ABRO.

32 Ensure that as much information is completed as is possible or available. Particular attention should be
33 paid to radio frequencies, particular with “life flight” helicopters, and to the availability of fuel either
34 en route to the scene or to the medical facility.

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

3 **Types of Emergencies**

4 Consideration must be given to the type of aircraft emergencies that might occur and where they might
5 happen. Experience shows that few helicopter accidents occur on the helibase itself.

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

8 Types of aviation emergencies might include, but are not limited to, the following.

9 **In-Flight Emergency**

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

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

- 13 • Are passengers being regularly briefed on in-flight emergencies?
- 14 • Have emergency landing areas near the helibase and on the incident or project area been
15 identified and made known before every mission?
- 16 • Are these areas accessible by ground or by the identified medevac aircraft?
- 17 • Are there limitations to ground access (bridges, gates) that will require that the entire response be
18 by air?
- 19 • Has an emergency response team and aircraft been identified?
- 20 • Have helibase personnel been briefed in the event the helicopter makes an emergency landing at
21 the helibase?
- 22 • Have helispot personnel been briefed in the event the helicopter makes an emergency landing at
23 the helispot?

24 **Emergency Seating Positions**

25 Forward Facing Seat:

- 26 • Press your lower torso firmly against the seat back.
- 27 • Lower your chin to chest. Grip the seat edge with your hands or place them under your legs.
- 28 • Do not grasp the restraint harness.

29 Rear Facing Seat:

- 30 • Same as Forward Facing Seat except place your head back against the head rest or bulkhead.

1 Side Facing Seat:

- 2 • Lean toward the front of the aircraft and brace your upper torso and head against whatever
3 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
5 helicopter crew.
- 6 ○ Assist injured personnel.
- 7 ○ Assess situation, remove first aid kit, survival kit, radio, ELT, and fire extinguisher.
8 Render first aid. Attempt to establish contact.

9 See *Interagency Aviation Safety Alert 13-01 Helicopter Brace for Impact Positions*.

10 https://www.doi.gov/sites/doi.gov/files/migrated/aviation/safety/upload/IASA_2013-01.pdf

11 **Fueling Area Emergency**

12 Fuel spills, have the potential hazard of ignition. Prevention measures are discussed in detail in
13 Chapter 13 – Fueling Operations.

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

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

21 **Helicopter Start-Up Emergency**

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

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

- 25 • Are Parking Tenders positioned at a safe distance during helicopter start-up?
- 26 • Have Parking Tenders been briefed on start-up emergencies and responses?

27 **Approach-Departure or External Load Operations Emergency**

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

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

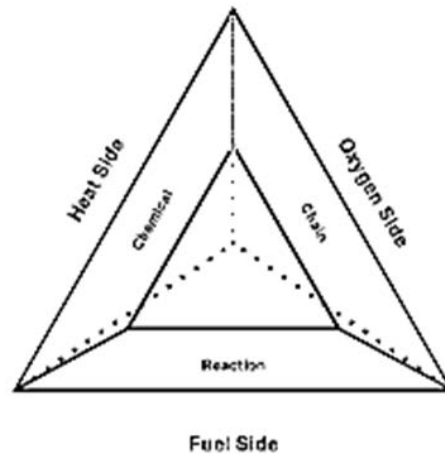
- 32 • Have adequate safeguards been provided to control vehicle and personnel movement on the
33 landing area?
- 34 • Are there warning signs posted?
- 35 • Are Parking Tenders and other deck personnel alert to vehicle and/or personnel movement?

- Are flight routes and hazards posted on the Helibase Facilities, Hazard, and Flight Route Map?

2 **Classes of Fire**

3 Fire is a result of a chemical chain reaction between fuel, heat, and oxygen. This relationship is known
4 as the fire tetrahedron. Exhibit 12.1 depicts the tetrahedron with the heat side, oxygen side, and fuel side.
5 This combination results in a chemical chain reaction to produce fire.

6 **Exhibit 12.1 – Fire Tetrahedron**



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

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

12 **Class A Fire**

13 Class A fires involve wood, cloth, paper, rubber, and/or plastics. Water is often used to cool the fuels
14 and extinguish the fire. Extinguishers suitable for Class A fires are identified by a green triangle
15 containing the letter "A."

16 **Class B Fire**

17 Class B fires involve flammable or combustible liquids such as Jet fuel, gasoline, oil, hydraulic fluids,
18 solvents, or similar materials. These fires require extinguishers like carbon dioxide (CO₂), foam, dry
19 chemicals, or halon. These extinguishing agents act to deprive the fire of oxygen or interfere with the
20 chemical chain reaction. Extinguishers suitable for Class B fires are identified by a red square containing
21 the letter "B."

22 **Class C Fire**

23 Class C fires involve energized electrical equipment that may present a shock hazard. These fires require
24 de-energizing the electrical equipment and applying CO₂ or halon. Extinguishers suitable for Class C
25 fires are identified by a blue circle containing the letter "C."

1 **Class D Fire**

2 Class D fires involve combustible metals such as magnesium or lithium. These fires require a dry
3 powder, which smothers the fire and doesn't react with the burning metal. Extinguishers suitable for
4 Class D fires are identified by a yellow five-point star containing the letter "D."

5 **A dry chemical extinguisher is not the same as a dry powder extinguisher.**

6 Exhibit 12.2 provides a summary that lists the class of fire based on what type of material is burning and
7 the type of fire extinguisher needed to quench the fire. The last column gives the corresponding symbol
8 that would be on the appropriate fire extinguisher.

9 **Exhibit 12.2 – 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

10 **Extinguishing Capacity**

11 Fire extinguishers are rated in accordance with American National Standards Institute (ANSI)/UL 711:
12 Rating and Fire Testing of Fire Extinguishers. The ratings are described using numbers preceding the
13 class letter, such as 1A-10B:C. The number preceding the "A" multiplied by 1.25 gives the equivalent
14 extinguishing capability in gallons of water. The number preceding the "B" indicates the size of fire in
15 square feet that an ordinary user should be able to extinguish. There is no additional rating for class "C,"
16 as it only indicates that the extinguishing agent will not conduct electricity, and an extinguisher will
17 never have a rating of just "C."

18 **Extinguishing Agents**

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

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

25 Portable fire extinguishers come in a variety of weights and sizes. However, the effectiveness of an
26 extinguisher is not solely determined by its weight or size. It is also determined by the training and
27 knowledge of the person using it. A critical element in firefighting is response time. This means the

1 person closest to the accident must know what to do and do it immediately. Portable fire extinguishers
2 are considered the first line of defense when a fire occurs and are effective firefighting tools if used
3 properly and on the fires for which they have been designed.

4 **Extinguisher Types Most Commonly Used**

5 **Water**

6 Water is effective on Class A fires involving ordinary combustible materials. It may be applied from
7 engines, portable hand pumps, or stored pressure extinguishers.

8 Water must not be used on Class C fires as water applied to energized electrical equipment presents a
9 hazard from electric shock.

10 **Foam or Aqueous Film Forming Foam (AFFF)**

11 AFFF, commonly referred to as “A-Triple F,” should not be confused with Class A wildland fire foams.
12 AFFF is designed to extinguish Class B flammable liquid fires but can also be effective on Class A fires.
13 The foam creates a blanket which smothers the fire. An aqueous solution from the foam bubbles creates
14 a vapor barrier over the fuel surface, preventing reignition of the fuel.

15 Foam must not be used on Class C fires as foam applied to energized electrical equipment presents a
16 hazard from electric shock.

17 **Carbon Dioxide (CO₂)**

18 Carbon dioxide (CO₂) is a gas 12-times heavier than air. It is non-poisonous and will not support
19 combustion nor sustain life. Carbon dioxide extinguishers are suitable for Class B and C fires. It is
20 discharged in a gaseous form and is easily affected by drafts or wind. It is non-corrosive, non-damaging,
21 and leaves no residue.

22 The danger from CO₂ is the possibility of losing consciousness or being suffocated in an enclosed space
23 or low-lying place.

24 **Dry Chemical**

25 Dry chemical extinguishers are normally rated for Class B and C fires, but some are rated A, B, and C.

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

30 Danger from the dry chemical extinguisher lies in discharging it into an occupied crew or passenger
31 compartment, or directing the stream into the escape path of occupants, causing a visual impairment.

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

34 **Halon**

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

1 **Dry Powder**

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

- 3 • G-1 Powder. G-1 Powder is a screened graphitized foundry coke with various phosphates added.
4 The material acts as a heat conductor to lower the temperature of the burning metal. It forms a
5 coating to smother the fire by excluding air, and may be used in magnesium and magnesium
6 alloy fires.
- 7 • Met-L-X Powder. Met-L-X Powder has a sodium chloride base with additives. The additive
8 fuses at high temperatures to aid in forming an air-tight coating. It may be used on magnesium,
9 sodium, potassium, and sodium-potassium alloy fires.

10 **Requirements**

11 **Extinguishing Agent for Helicopter Landing Areas**

12 The required extinguisher for helicopter landing areas is a 20A-120B:C rated extinguisher.

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

16 **Personal Protective Equipment**

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

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

22 Additionally, smoke from aircraft fires may contain toxic gases and/or minute particulates of
23 combustion. Exposure without a SCBA must be avoided.

24 Given the limitations and hazards outlined above, personnel must be trained to respond appropriately.

25 **Emergency Tools and Equipment**

26 Emergency tools and equipment should be prominently positioned adjacent to the landing area(s). All
27 helibase ground support and flight crews should be made aware of these locations. Crash rescue
28 equipment is required at helibases and at helispots which will see continued use over the course of an
29 incident or project. Chapter 8 – Helicopter Landing Areas outlines the minimum requirements for fire
30 extinguishers, evacuation kits, and crash rescue kits at helicopter landing areas.

31 **Fire Extinguisher**

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

33 **Crash Rescue Kit**

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

1 **Evacuation Kit**

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

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

6 **Additional Crash Rescue Resources at Helibases**

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

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

14 **Strategy and Tactics**

15 **Strategy**

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

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

- 22 • Training received.
- 23 • The response time of crash rescue personnel and equipment.
- 24 • The effectiveness of crash rescue and extrication equipment.
- 25 • All actions taken must be aimed at providing care to survivors as quickly as possible.

26 **Tactics**

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

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

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

1 **Helicopter Makes and Models**

2 Crash rescue diagrams of many frequently used helicopters are provided in Appendix I of these
3 standards. These diagrams provide general features of a model of helicopter. Some of the diagrams have
4 emergency procedures information, including the location of fuel and battery shutoffs, attached.

5 **Briefings**

6 Since the diagrams provide only information generic to a model, they must be supplemented with a pilot
7 aircraft briefing which addresses the specific features of each helicopter assigned. Briefing material
8 should include, but is not limited to:

- 9 • Door operation.
- 10 • Location of battery and fuel cell.
- 11 • Location of emergency shut offs.
- 12 • Location and operation of emergency exits.
- 13 • Location and operation of the ELT.
- 14 • Location of the first aid kit and fire extinguisher(s).
- 15 • Operation of crew/passenger restraint devices.

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

19 **Factors Influencing Tactics**

20 Tactics employed at the accident scene are dependent on many factors, including but not limited to:

- 21 • Terrain and obstacles.
- 22 • Wind direction.
- 23 • Type of helicopter(s) involved.
- 24 • Crew stations and passenger locations within the helicopter.
- 25 • If a fire results, its location and the degree of fire involvement.
- 26 • Other mission-specific equipment attached (for example, helitorch, PSD, external cargo,
27 hazardous materials, etc.).

28 **Sequence of Actions**

29 Recognizing that accidents are all different, there is a general sequence of actions to follow.

30 **Approach**

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

- 34 • Approach from the front or side.

- 1 • Approach from ground that is lower than that on which the helicopter is resting.
- 2 • Do not approach until the rotors and other moving components are at rest.

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

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

- 8 • Will moving components soon come to rest?
- 9 • Is the pilot or other occupant attempting to shut the helicopter down?
- 10 • Is it a survivable accident?
- 11 • Is a fire or the potential for fire, present?
- 12 • Can the helicopter be approached?

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

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

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

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

24 **Entry**

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

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

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

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

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

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

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

7 **Rescue of Occupants**

8 After entrance to the flight and/or passenger compartments is achieved, crash rescue personnel should
9 perform the following, in order:

- 10 • Secure the area.
- 11 • Locate and then determine the condition of the occupants.
- 12 • Evacuate uninjured occupants first, if possible.
- 13 • Evacuate injured occupants.
- 14 • Document and/or photograph the location of any debris that must be disturbed in order to carry
15 out rescue and/or fire suppression activities.

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

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

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

26 Release configurations vary among make and model of helicopter and may even vary among seats in the
27 same helicopter. If the belt or harness cannot be released normally, use the seat belt cutter included in
28 the crash rescue kit. See Exhibit 12.3.

29 **Exhibit 12.3 – Seat Belt Cutter.**



1 **Fatalities**

2 In an emergency triage situation, common sense dictates that personnel who have been fatally injured
3 receive lower priority for extrication than those still living.

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

- 6 • Contact the local Coroner to make the legal determination of death.
- 7 • Do not release the name(s) of the victims.
- 8 • The local agency or IMT Public Information Officer (PIO) should be informed as soon as
9 possible to deal with media inquiries. Follow Mishap Response Plan.

10 When bodies are either interfering with operations or are mentally affecting first responders, it is
11 appropriate to move the bodies.

12 Critical Incident Stress Management (CISM)/Peer Support may be needed after accident.

13 Fatalities are also discussed at the end of this chapter.

14 **Extrication and Evacuation**

15 Site safety precautions that should be considered: Aircraft wreckage sites can be hazardous for many
16 reasons other than adverse terrain or climatic conditions. Personnel involved in the recovery,
17 examination, and documentation of wreckage may be exposed to physical hazards such as hazardous
18 cargo, flammable, and toxic fluids, sharp or heavy objects, and disease.

19 After all occupants have been accounted for, medical injuries should be treated to the extent possible
20 and only within the skill level of those present. Injured personnel should be prepared for transport to the
21 appropriate medical facility.

22 While crash rescue personnel are performing the extrication, it is critical that the helibase ABRO or
23 other individual assigned be making the contacts identified in the Medical Plan (ICS 206) and/or Crash
24 Rescue/Medevac/Evacuation Plan, HJA-4.

25 Note that for project operations, initial contact is usually made with the local dispatch office, who will
26 implement the unit accident preparedness plan.

27 If the accident is not at a location with known conditions, the ABRO should use EMS – Helicopter
28 Ambulance Request Information, EMERGENCY MEDEVAC/MEDICAL TRANSPORT REQUEST
29 (HJA-1), to obtain and relay information. See Appendix B – Helibase Management Forms and
30 Checklists for further information. In order to avoid delays in what may be a life-threatening situation, it
31 is essential that the ABRO obtain as much information on this form as possible.

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

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

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

3 **Preservation of the Accident Scene**

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

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

10 The HEBM or other official in charge should ensure that crash rescue and other helibase personnel
11 immediately document the following:

- 12 • Condition and position of the aircraft prior to any significant cutting or alteration, including its
13 initial position before the accident, position when it came to rest, and position after evacuation
14 and extrication was performed. Use written statements, sketches, and photos or video. Personnel
15 should document sounds heard, their actions, actions of others, etc.

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

- 18 • Preserve and secure all helibase documentation for that operational period, including Helibase
19 Mission Request Logs, Flight Following Logs, load calculations, manifests, Unit Logs, Helibase
20 Organization Chart, Daily Helicopter Operations Briefing/Debriefing Checklist, and other
21 relevant material.
- 22 • Removal of the bodies of fatally injured occupants from the wreckage should be accomplished
23 only by, or under the direction of, the responsible medical examiner (coroner). Premature
24 removal can interfere with identification and/or destroy required pathological evidence. If body
25 removal is necessary to prevent further incineration, the original location of the body and the
26 body itself should be tagged or otherwise identified, and the facts reported to the investigation
27 team.

28 **BE AWARE AND BE PREPARED.**

29 **SOMEONE'S LIFE MAY DEPEND ON YOUR ACTIONS.**

1 **Chapter 13 – Fueling Operations**

2 **Introduction**

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

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

9 Remote Fuel Site Reminders List, HJA-3, is a job aid that can be used by HEBM’s and Fueling
10 Specialists.

11 **Responsibilities**

12 **Management**

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

18 **Employees**

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

24 **Fuel Vendors**

25 Vendors conducting business for the transportation, storage or dispensing of aviation fuels, including
26 into-aircraft operations, must adhere to the procurement document provisions and specifications. These
27 operations must be in accordance with the standards and procedures specified in applicable ANSI or
28 National Fire Protection Association (NFPA) publications.

29 **Pilots**

30 The pilot is personally responsible for ensuring that the proper type and grade of clean, dry, clear, and
31 bright (uncontaminated) fuel is pumped into the aircraft.

32 **Fuel and Oil Pollution Prevention**

33 Agencies must be informed of the Environmental Protection Agency (EPA) regulations found in
34 40 CFR 112, <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-112>.

35 Regardless of the size or location of an operation, it is necessary that an assessment be made to
36 determine whether or not provisions of the regulations are applicable.

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

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

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

9 **Fuel Spill Prevention Guidelines and Requirements in Environmentally Sensitive Areas**

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

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

14 Restrictions may include, but are not limited to:

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

21 **Types of Fuel**

22 There are currently two categories of aviation fuel in use. These are aviation gasoline, commonly called
23 Aviation Gasoline (AVGAS), and turbine, or Jet fuel.

24 **Aviation Gasoline (AVGAS)**

25 AVGAS is used in reciprocating aircraft engines. There are currently three grades of AVGAS in use:

- 26 • 80/87
- 27 • 100 Low Lead (100 LL)
- 28 • 100/130

29 **Turbine (Jet) Fuel**

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

- 32 • Kerosene based (Jet A, Jet A-50, JP-8, and Jet A-1)
- 33 • Blends of gasoline and kerosene (Jet B and JP-4)

34 Most commercial operators use Jet A or Jet A-50. The military normally uses JP-4 and JP-8. The
35 specifications for JP-8 are similar to Jet A except that JP-8 has required additives for anti-icing, anti-
36 corrosion, and anti-static.

1 Identifying Types of Fuel

2 Fuel Color

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

5 Exhibit 13.1 – AVGAS Color

Grade	Color
AVGAS 80/87	red
AVGAS 100 LL	blue
AVGAS 100/130	green

6 The EPA and Internal Revenue Service (IRS) require that certain types of high and low sulfur diesel be
7 colored blue and red. Aviation grade 100 LL and 80/87 fuels are also colored blue and red, respectively.
8 The potential exists for a supplier to furnish diesel fuel instead of 100 LL. The FAA will issue a
9 NOTAM and a special alert bulletin to pilots warning of the color conflict.

10 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

11 Fuel Equipment Markings of Fuel Type and Grade

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

15 Fuel Servicing Vehicles

16 Each aircraft fuel servicing vehicle must be conspicuously and legibly marked with an identification
17 decal to indicate the product contained in the vehicle. The markings must be on each side and the rear of
18 the vehicle in letters at least 3” high. Decals on vehicles must be marked as follows:

19 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

20 Valves and Piping at Permanent Storage Facilities

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

1 Hose Lines

2 Hose lines must be marked by decals or labeled adjacent to the nozzle to indicate the type of fuel
3 dispensed.

4 Portable Storage Facilities

5 Containers

- 6 • Bulk Collapsible Tanks (Bladders and Rollagons). Large fixed collapsible tanking facilities, as
7 well as their accessory fueling lines and equipment, must be marked, or decal attached in
8 accordance with the requirements for vehicles in Section V.
- 9 • 250 and 500 Gallon Collapsible Rollagons. Each end of a rollagon must be marked in letters at
10 least 4” high with the type and/or grade of fuel in the container.
- 11 • 55-Gallon Barrels. The top head or sides of a 55-gallon barrel must be marked in letters no
12 smaller than 3/4” with the type and/or grade of fuel, filling date, vendor, and any other pertinent
13 information.

14 Agency authorization is required for use of 55-gallon fuel barrels.

- 15 • 5-Gallon and Smaller Containers.
- 16 • All containers must be marked with the type and/or grade of fuel contained. In many cases the 5-
17 gallon containers are marked by the fuel manufacturer.

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

22 Aircraft

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

26 **Contamination Testing**

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

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

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

- 4 • If water is detected in the tank sample, sump, and continue to test until no more water is detected
5 in sample jar. Do not allow helicopter fueling until the sample is free of visible contamination.
- 6 • If water is detected in the nozzle sample, suspend the operation immediately.
- 7 • Particles in the sample can also be visually identified. If particles appear in the tank sample,
8 sump tank until sample is clean.
- 9 • Do not use fuel if any nozzle sample indicates:
 - 10 ○ Wrong color, not clear or bright.
 - 11 ○ Particulates are present.
 - 12 ○ Water is present.

13 **Fueling Hazard**

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

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

19 While fueling aircraft be aware of the potential problems caused by fuel vapors in the presence of
20 ignition sources such as static electricity, certain weather conditions, electromagnetic energy, and open
21 flames.

22 Be aware of conditions that introduce additional sources of ignition and/or increase the likelihood of fuel
23 or fuel vapors escaping.

24 **Fuel Vapors**

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

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

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

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

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

1 **Ignition Sources**

2 In any area aircraft are parked or operating, there are numerous ignition sources that may ignite fuel
3 vapors. These sources include static electricity such as that caused by low-conductivity liquids, refueling
4 vehicles, and clothing; adverse weather conditions (lightning); electromagnetic energy (radar); and open
5 flames.

6 Static Electricity

7 Static electricity is more difficult to control than any other ignition source. The mechanism responsible
8 for this phenomenon is complex, and there are many variables that may increase and decrease the
9 amount of energy generated. Static charges may exceed 50,000 volts and may produce sufficient energy
10 to cause an explosion above the surface of liquid fuel.

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

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

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

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

23 Electromagnetic Energy

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

27 Open Flames

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

- 30 • Lighted smoking materials of any type

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

- 33 • Exposed-flame heaters whether liquid, solid, or gas-fired devices, including portable and
34 wheeled gasoline or kerosene heaters and open-element electric heaters.
- 35 • Welding and cutting torches and blowtorches.
- 36 • Grinding equipment, either portable or stationary.
- 37 • Flare pots or other open-flame lights.

1 Other Conditions

2 There are other normal and accepted fueling operations that are hazardous and may require additional
3 safety precautions. Some of these operations are:

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

12 **Safety Precautions**

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

16 **Grounding Requirements**

17 The NFPA no longer recommends grounding aircraft during refueling operations. Due to the particular
18 difficulty involved in grounding helicopters at off-airport sites, the NFPA recommendation not to
19 require grounding should be followed by participating agencies.

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

22 **Bonding Requirements**

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

27 **Pre-Bonding Inspection**

28 Check condition of the bonding cable and plug. Procurement document language will usually state
29 required bonding equipment condition.

30 **Connecting the Bond**

31 Bonding must be performed as follows, in order (omit grounding steps if not required):

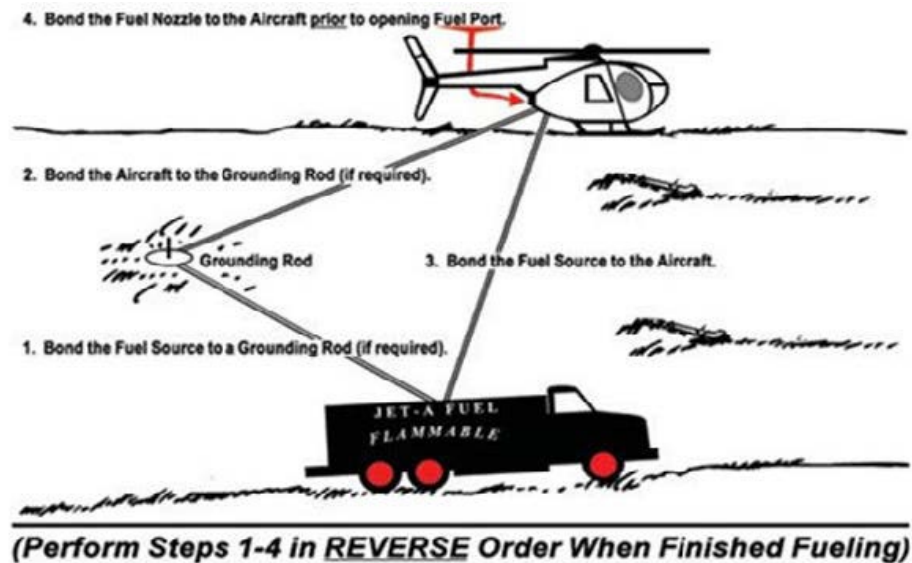
- 32 • Bond the fuel source to a grounding rod (if available and required).
- 33 • Bond the helicopter to the grounding rod (if available and required).
- 34 • Bond the fuel source to the helicopter.
- 35 • Bond the fuel nozzle to the helicopter prior to opening the fuel port.

1 **Disconnecting the Bond**

2 Disconnect the bond in reverse order (omit grounding steps if not required):

- 3 • Disconnect the fuel nozzle bond from the helicopter after closing the fuel port.
- 4 • Disconnect the fuel source bond from the helicopter.
- 5 • Disconnect the helicopter from the grounding rod (if used).
- 6 • Disconnect the fuel source from the grounding rod (if used).

7 **Exhibit 13.4 – Correct Bonding Procedure**



8 **Rapid Refueling**

9 Hot refueling of helicopters is permitted if requested by the government representative. Equipment used
10 for hot refueling operations must meet all NFPA 407, Standard for Aircraft Fuel Servicing requirements
11 which is available at [https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-
12 and-standards/detail?code=407](https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=407).

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

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

17 **Vendor Fueling Operations**

18 **Vendor Responsibility**

19 Vendors are responsible for maintaining equipment and conducting refueling operations in accordance
20 with the procurement document and, when appropriate and when not in conflict with the procurement
21 document, in accordance with the safety procedures stated in these standards.

1 **Government Responsibility**

2 The government representative (for example, HEBM, HMGB) is responsible for ensuring that:

- 3 • Vendor equipment meets specifications and is correctly maintained in accordance with the
4 procurement document; and
- 5 • Fueling operations are conducted in accordance with the procurement document and, when
6 appropriate and when not in conflict with the procurement document, in accordance with the
7 safety procedures stated in these standards.

8 **Government Participation**

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

12 **Vendor Service Truck Requirements and Specifications**

13 It is essential that the government representative ensures that all fueling operations involving a service
14 truck are conducted in accordance with the procurement document. For specific requirements, each
15 individual procurement document must be consulted. Procurement documents usually contain the
16 following requirements:

- 17 • An approved service truck is provided with each helicopter.
- 18 • The service truck is suitable for and capable of handling the terrain encountered (e.g.,
19 mountainous roads).
- 20 • The service truck meets the licensing criteria of each individual state in which they travel. This
21 requirement can result in delays in arrival of the service truck if not anticipated in advance.
- 22 • For fire, the service truck tank capacity is usually required to be able to sustain 8 hours of flight
23 (14 hours when a two or more pilot crew is required). For projects, this requirement may be
24 adjusted according to local need.
- 25 • The service truck is properly maintained, clean, and reliable. Tanks, plumbing, filters, and other
26 required equipment should be free of rust, scale, dirt, and other contaminants. A trailer used for
27 storage and transport of fuel is usually required to have an effective wheel braking system.
- 28 • Spare filters, seals, and other components of the service truck filtering system are stored in a
29 clean, dry area. (A minimum of one set is usually required.)
- 30 • All tanks are securely fastened to the truck bed. Tanks must have a sump or sediment settling
31 area to allow water and particulate accumulation and subsequent removal.
- 32 • A 10-gallon-per-minute filter and pump is usually the minimum size acceptable. Filter and pump
33 system sizes should be compatible with the helicopter being serviced.
- 34 • The filter manufacturer’s operating, installation and service manual is available with the service
35 truck.
- 36 • Gasoline engine driven pumps must be UL listed for flammable liquid transfer. Physical
37 indicators of UL listed pumps are shielded ignition systems and spark arrestors.

- 1 • Tanks erected for above-ground storage and tanks mounted on trucks are equipped with a sump
2 drain valve at the lowest point.
- 3 • Only hoses meeting procurement document specifications must be used for dispensing aviation
4 fuel. Hoses should be kept in good repair.
- 5 • The fuel nozzle should include a 100-micron or finer screen, a dust protection device and a
6 bonding clip or plug. Except for Wiggin closed-circuit nozzles, no hold-open devices are
7 permitted.
- 8 • An accurate fuel metering device for registering quantities in U.S. gallons of fuel pumped is
9 provided. The meter must be positioned in full view of the fuel handler while fueling the
10 helicopter.
- 11 • The service truck has bonding cables, and, when required, grounding cables.
- 12 • Fire extinguisher is mounted in a manner to make it readily available at all times.
- 13 • Fire extinguishers should be provided as specified in the procurement document and in
14 accordance with NFPA 10, Standards for Portable Fire Extinguishers.
- 15 • Each fuel servicing vehicle should have “NO SMOKING” signs with 3-inch minimum letters
16 visible from both sides and rear of truck.
- 17 • Each vehicle be conspicuously and legibly placarded and marked according to the requirements
18 in procurement document specifications to indicate the nature of the fuel.
- 19 • The first and third stage elements of a three-stage system and the elements of a single-stage
20 system should be new and installed by the contract start or during the annual inspection; the
21 separator element (teflon screen) of the three-stage system should be inspected and tested as
22 prescribed by the manufacturer during the inspection; and the filter assembly must be placarded
23 with that data.
- 24 • The bottom of the filter assembly should be mounted to allow room for at least a quart size jar to
25 be inserted under the drain for taking fuel samples. Piping for draining and pressure flushing of
26 the unit must be clear of truck wheels and exhaust systems. Water sight gauge must be visible in
27 filter vessels using them.
- 28 • Depending on whether it is a single or three-stage (coalescer, water separator, and monitor)
29 system, specific pumps, and monitor systems are usually specified. Filters must meet
30 specifications of the procurement document.

31 **Fuel Servicing Vehicle Driver Qualifications**

32 Fuel servicing vehicle drivers must comply with DOT Safety Regulation Part 390-399, and any duty
33 limitations imposed by the helicopter procurement document. Refer to the appropriate procurement
34 document for specific requirements.

35 **Government Fueling Operations**

36 There are situations, especially in Alaska, where the government is responsible for supplying fuel and a
37 government-operated fueling operation must be set up to accommodate refueling needs. There may be
38 other situations where the government, though not responsible for supplying fuel, must do so. An

1 example would be an incident so remote, or where helibases have no road access, that the government is
2 supplying fuel via aerial delivery.

3 **General Guidance and Requirements**

4 Prior to the start of operations, the refueling site manager (for example, FUEL) may use the Remote
5 Fuel Site Reminders List, HJA-3, to ensure that operations are set up and conducted correctly. Parts of
6 the Fuel Site Reminders List HJA-3 may also be used by HEBM's to correctly locate fueling pads and to
7 monitor vendor refueling operations.

8 Limit the time which exposure both the helicopter and the service truck are in close proximity to other
9 helicopters operating in the refueling area or on the helibase.

10 Refer to the OAS Aviation Fuel Handling Handbook located at
11 <https://www.doi.gov/aviation/library/guides> for additional information.

12 **Personnel Requirements at a Government-Operated Fueling Site**

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

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

19 **Personal Protective Equipment**

20 Government fuelers must wear protective clothing as required in Chapter 9 – Equipment Requirements
21 and Maintenance. Vendor fuelers must wear protective clothing as required in the procurement
22 document.

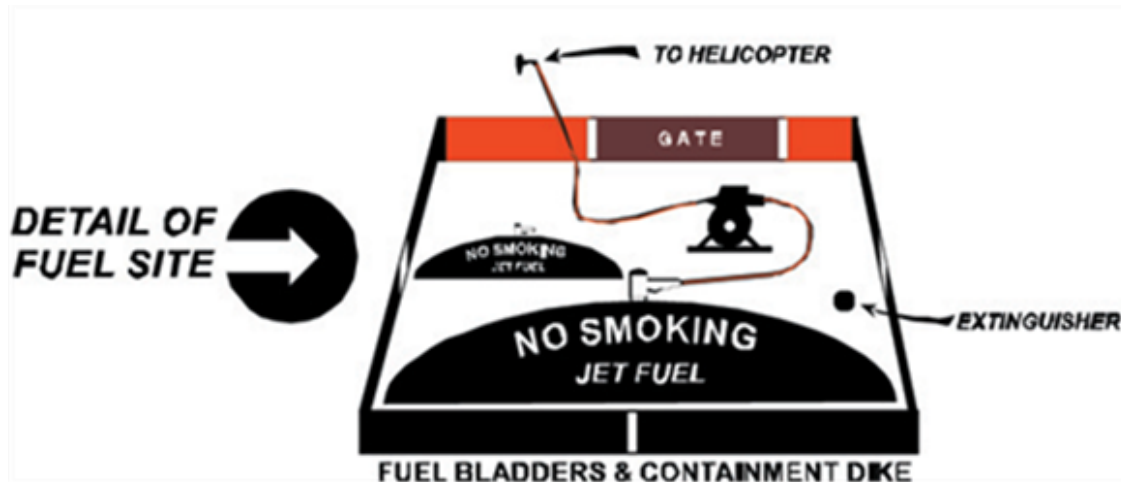
23 **Fueling Site Layout**

24 Fueling sites should be laid out according to the following general guidelines. Refer to the OAS
25 Aviation Fuel Handling Handbook located at <https://www.doi.gov/aviation/library/guides> for additional
26 information.

27 The fueling site should be separate from the main area of helicopter operations.

- 28 • There should be a minimum of 185 feet pad-to-pad separation between Type 1 helicopters.
- 29 • There should be a minimum of 140 feet pad-to-pad separation between Type 2 helicopters.
- 30 • There should be a minimum of 110 feet pad-to-pad separation between Type 3 helicopters.
- 31 • The fueling equipment at a fixed fueling site (pump, fuel source) must be at least 20 feet outside
32 the rotor disk of the nearest helicopter.
- 33 • Wind direction must be considered when setting up refueling points. Landing and takeoff paths
34 must be selected to provide a direct or quartering headwind.
- 35 • Fueling activities generate a considerable amount of vapor. Because the vapor is an explosive
36 hazard, the fueling activity should be situated to allow vapors to be dispersed by the prevailing
37 wind.

1 Exhibit 13.5 – Government Fueling Site Layout



2 Equipment Required

3 Equipment at the typical fueling site consists of the following:

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

18 Equipment Setup

19 Distances

- 20 • As stated above, the fueling equipment (pump, fuel source) at a fixed fueling site should be at
21 least 20 feet outside the rotor disk of the nearest helicopter.
- 22 • The fuel source should be downwind of the aircraft exhaust to reduce the fire hazard.

1 Pump Assembly

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

9 **Equipment Checks**

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

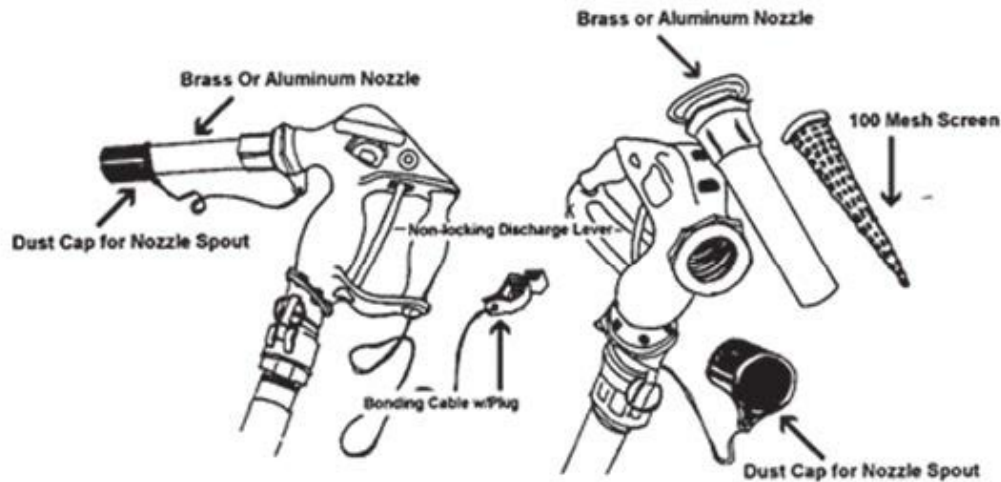
12 Aviation Fuel Nozzle Requirements

13 If all of these items are not present and in good condition, discontinue the operation until corrected:

- 14 • Non-locking discharge lever.
- 15 • Bonding cable with plug.
- 16 • Brass or aluminum nozzle.
- 17 • 100-micron screen in nozzle.
- 18 • Serviceable dust cap for nozzle spout.
- 19 • For government-operated fueling operations, it is advantageous if each nozzle has all fittings
20 needed to conduct both closed-circuit and open port fueling.
- 21 • Each nozzle has two ground wires (not a procurement document requirement). One wire has an
22 alligator clip on the end of it and the other wire should have a plug. These wires are used to bond
23 the aircraft to a grounded five-foot grounding rod (if available; not mandatory). The nozzle can
24 be kept off the ground by hanging it on the grounding rod.

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

1 Exhibit 13.6 – Fuel Nozzle Requirements



2 Nozzle Spout Screen

3 Check for cleanliness by:

- 4 • Unscrewing nozzle spout and removing screen.
- 5 • Tapping screen and collecting contents (if any) for indication of filter by-pass debris or hose
- 6 deterioration.

7 Portable Fueling Equipment Pressure Differential Gauge(s)

8 When this gauge is installed, check the pressure difference between the inlet side of filter [high pounds

9 per square inch (PSI)] and the outlet side (low PSI). Perform the following test:

- 10 • Re-circulate fuel through the nozzle into the tank at maximum flow rate and note the difference.
- 11 Some use two gauges, which require that the operator perform mathematical calculations. Others
- 12 use a single gauge, allowing a direct differential reading.
- 13 • When pressure differentials are at or exceed the manufacturer's recommendations, there is cause
- 14 for concern. It is a good indication the filter is holding back water and/or particles. The following
- 15 should be performed:
 - 16 ○ Sample fuel in tank.
 - 17 ○ Replace the element.
 - 18 ○ Re-check the pressure differential with new element in place.

19 Flow Rate

20 Per specification on pump rating, determine flow rate in gallons per minute (GPM):

- 21 • Re-circulate fuel through the nozzle into the tank and timing the GPM.
- 22 • Substantially reduced flow rates from the minimum specified may be a good indication of a
- 23 restriction in the element caused by particulate or water contamination. Consider:
 - 24 ○ That the pump may not meet specifications or,

- 1 ○ The filter may need to be changed.
- 2 ● Remove the filter element in the single cartridge Velcon or the monitor from a three-stage
- 3 system (inside the Teflon screen) and replace with new element.
- 4 ● Use clean gloves when changing elements; do not touch elements with dirty hands or gloves.
- 5 Leave new element in package until the last step of placing element in canister.
- 6 ● Re-check the GPM flow.
- 7 ● While re-circulating, check total system for leaks.

8 **Inspections and Quality Control**

9 Every precaution must be taken to maintain quality assurance for fuel.

10 Items which must be checked and maintained on a daily, weekly, monthly, annual, or as needed basis
11 are covered in the Aircraft Fuel Facility Inspection Log, HCM-3. Inspections must be performed on the
12 required basis, unless this is not feasible due to the remote location and infrequent use of a fueling site.
13 In that case, a combination daily, weekly, and monthly inspection must be performed prior to each use
14 of the fueling site.

15 **Daily Inspections**

16 Fuel site and equipment must be visually checked daily for leaks. If found, follow local procedures for
17 hazardous materials spills. In addition, check for water or particulate contamination in the fuel source
18 by:

- 19 ● Checking the bottom of storage facility tanks for water, using water draw off connections
20 (sumps) and a visual test on a water-finding paste (allow the paste to remain in contact with the
21 fuel for 30 seconds). Look for paste to change colors.
- 22 ● Checking for and removing any water from fuel vehicle tanks. A water check should also be
23 performed after every reloading of the fuel container, washing of equipment, and after a heavy
24 rain or snowstorm. Use the “clear and bright” test explained earlier in this chapter.
- 25 ● Visually checking for particulates.
- 26 ● Checking all three-stage and Velcon filter/separator manual water drains for water and other
27 contaminants after each receipt of fuel, as well as on a daily basis. Draw off any accumulation of
28 water.
- 29 ● Checking and recording all fixed filter and filter/separator differential pressures while under full
30 flow conditions. A graph-type log may be used in plotting differential pressure daily. Any
31 sudden change or decrease in pressure differential may indicate a ruptured filter.
- 32 ● Visually inspecting fuel vehicle and storage facilities, pumps, valves, and pipelines for leaks.
- 33 ● Checking and cleaning hose nozzle screens, and if breaks are found, replacing the screens.
- 34 ● Inspecting all hoses for abrasions, separations, or soft spots. Weak hoses should be replaced.
- 35 ● Drawing off a sample daily from the downstream side of the filter. Sample should be collected in
36 a clean, clear glass container, and examined visually. Any visible water, dirt, or filter fibers is
37 unacceptable.
- 38 ● Checking that dust caps are in place.

1 **Weekly Inspections**

2 All of the daily inspections plus:

- 3 • Inspect all fire extinguishers for broken seals, proper pressure, and recharge date. Recharge as
- 4 necessary.
- 5 • Check fuel flow rate GPM to nearest 1/10 gallon.

6 **Monthly Inspections**

7 All of the daily and weekly inspections plus:

- 8 • Check the condition of bonding and grounding wires, grounding clips, jacks, and bonds.
- 9 • Check condition of pumps, motors, and valves.
- 10 • Check fuel source and fueling facilities for general condition, safety, and appearance.

11 **Record Keeping**

12 The HCM-3 must be used for required record keeping. The individual responsible for fueling and/or the
13 fuel source will keep a record containing the following information:

- 14 1. Condition (clean, clear, bright, etc.) of the tank sump sample, filter sump sample, and nozzle
15 sample.
- 16 2. Flow rate in GPM to the nearest 1/10 gallon.
- 17 3. Filter change, reason, and date.

18 **Fuel Spills**

19 The information in this section is consistent with all NFPA 407 Standard for Aircraft Fuel Servicing
20 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
21 government-operated fueling operations.
22

23 Fuel spills are often the result of improper or careless operation of fueling equipment and lack of
24 preventative maintenance of the fueling equipment. Close attention on the part of every person
25 responsible for fueling is required to prevent fuel spillage. Personnel must follow the guidelines listed
26 below.

27 Refer to Chapter 12 – Fire Protection and Crash Rescue Procedures for crash rescue and firefighting
28 procedures regarding fuel spills.

29 All fuel spills, regardless of size, should be considered a fire hazard.

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

32 Report all spills immediately; do not attempt to hide the fact that a spill occurred. There are severe civil
33 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:

- 1 • Size of the spill.
- 2 • Terrain on which the spill occurred.
- 3 • Equipment.
- 4 • Weather conditions.
- 5 • Type of fuel and its flammability.
- 6 • Proximity to aircraft or personnel.
- 7 • Aircraft accident involved.
- 8 • Emergency equipment and personnel available.

9 **Spill Prevention**

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

- 11 • Devote full attention to the fueling operation.
- 12 • Never leave any fuel nozzle unattended.
- 13 • Never tie or wedge the nozzle trigger in an open position.
- 14 • Frequently check the amount of fuel in the tank to prevent overfilling.
- 15 • Pumps, hand-, or power-operated, must be used when aircraft are fueled from drums.
- 16 • Pouring or gravity flow must not be permitted.
- 17 • Kinks and short loops in fueling hose should be avoided.
- 18 • 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.
- 19
- 20 • 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.
- 21

22 **Spill Mitigation Procedures**

23 Extreme caution must be exercised to avoid actions that could provide ignition sources to the fuel
24 vapors.

25 See Chapter 12 – Fire Protection and Crash Rescue Procedures for procedures to follow to avoid ignition
26 of a fuel spill resulting from a crashed aircraft.

- 27 • Develop, keep current, and post a spill contingency plan. The procedures outlined below, with
28 the addition of specific local material, should suffice.
- 29 • In addition to the plan, absorbent material should be available at the helibase or fueling location.
- 30 • If a fuel leak develops or a fuel spill occurs during aircraft servicing, follow emergency
31 procedures without delay.

- 1 • If the leak continues, or the spill is a large one, all non-essential personnel should leave the area
2 immediately until the hazard is neutralized, repairs are made, and the area is safe. Follow these
3 steps:
 - 4 ○ Alert the airport fire crews or follow established emergency procedures applicable to a
5 remote fueling operation, as outlined below.
 - 6 ○ Stop the flow of fuel and the fueling operation immediately upon discovering leakage or
7 spillage.
 - 8 ▪ If fuel is leaking or spilling from a fuel servicing hose or equipment, the emergency fuel
9 shutoff valve must be actuated immediately.
 - 10 ▪ If the fuel is leaking or spilling from the helicopter at the filler opening, vent line, or tank
11 seam, fuel delivery must be stopped immediately.
- 12 • If the spill occurs during open port (hot) refueling operations, the pilot will make the decision on
13 moving or keeping the helicopter in place. If the latter, then all electrical power must be shut
14 down and the helicopter evacuated.
- 15 • Before the helicopter is put back into service, it must be thoroughly checked for damage and for
16 flammable vapors that may have entered fuselage areas.
- 17 • Small spills involving an area of less than 18” normally pose little danger. However, personnel
18 staffing fire extinguishers during start-up procedures should stand by until the helicopter departs
19 the area of the spill because engine exhaust could ignite the spill. These spills contain such a
20 small amount of fuel that they may be absorbed and placed in an approved hazardous materials
21 container to await disposal.

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

- 24 • A fire guard should be posted for other small or medium static spills: a spill not over 10 feet on
25 any side nor over 50 square feet in area. The fire guard should have one or more fire
26 extinguishers with at least a 20 B rating. Local regulations and procedures must be followed, but
27 in most cases absorbent materials or emulsion compounds should be used to absorb the spilled
28 fuel, especially if AVGAS or low flash point fuels are involved. The contaminated absorbent
29 should be placed in an approved container to await disposal.
- 30 • Large spills – over 10 feet on any side or over 50 square feet in area – or smaller spills
31 continuing to enlarge (non-static) should be handled by the fire department or, if in a remote
32 location, by a ground engine. Anyone in the area of a large spill should move upwind of the spill
33 at once.

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

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

38 Wildland fire foams are not adequate suppressants for fuel spills. Foams must be approved for
39 hydrocarbon fuels.

1 **Fuel Spillage on Personnel**

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

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

10 Entering a warm room wearing fuel-soaked clothing can be dangerous. Chances of a fire starting
11 because of static electricity are increased.

1 Chapter 14 – Helicopter Maintenance

2 Introduction

3 Requirements for contract aircraft maintenance are found in the procurement document.

4 If questions arise concerning helicopter maintenance, consult with a DOI/USFS approved Maintenance
5 Inspector as soon as possible. Consult the *NWCG Aviation Technical Assistance Directory*, PMS 504,
6 <https://www.nwcg.gov/publications/504>.

7 Inspection

8 Upon aircraft arrival, the HMGB will determine that the following has been accomplished. See
9 Chapter 5 – Vendor personnel and equipment for additional information.

10 All Contract Aircraft

11 The aircraft has been inspected by DOI/USFS approved Maintenance Inspectors according to agency
12 inspection criteria. Inspected aircraft will be issued a Helicopter Data Card that lists the authorized uses
13 of the aircraft.

14 Military Aircraft

15 Military aircraft are not issued qualification cards.

16 Military aircraft are used under a Letter of Agreement (LOA) or MOU,
17 <https://www.doi.gov/aviation/library/mou>, and are maintained in accordance with the terms of the
18 agreement (usually military or National Guard standards).

19 Cooperator Aircraft

20 Cooperator aircraft are approved via Letter of Approval and issued by the USFS Regional Aviation
21 Officer and/or DOI-Office of Aviation Services Regional Director.

22 Pilot Functioning as a Mechanic

23 A pilot may function as a mechanic when they hold a valid Airframe and Powerplant (A&P) mechanic
24 certificate, meet experience requirements as specified in the procurement document, and the terms of the
25 procurement document do not prohibit this activity. Additionally, some agencies require that mechanics
26 are carded for specific aircraft.

27 When a pilot functions as a mechanic, duty day, and/or flight time limitations may be affected, per the
28 procurement document or agency directive.

1 **Pilot Performing Preventative Maintenance**

2 Note that servicing an aircraft with fuel and oil is not considered to be maintenance.

3 Pilots who are not certificated mechanics may perform preventative maintenance if they have completed
4 an approved training program and are authorized in writing by the vendor (certificate holder) to perform
5 said maintenance. Each item a pilot is authorized to perform must be specified in writing. Examples of
6 preventative maintenance which may be authorized include:

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

9 **Mechanic Approval**

10 Generally, if the contract requires an on-site mechanic, the contract will require the mechanic meet
11 certain interagency experience standards and possess a current qualification card.

12 Chapter 5 – Vendor personnel and [equipment](#) for additional information provides additional information
13 regarding mechanic approval.

14 **Maintenance Ferry Flight**

15 Ferry flights may be necessary to relocate an aircraft to a suitable maintenance location for scheduled or
16 unscheduled maintenance purposes. If the airworthiness of the aircraft is questionable, the vendor must
17 seek authorization from the FAA prior to ferrying the aircraft to a site where repairs may be performed
18 and no government passengers may be on board.

19 Managers should remember that if maintenance time requirements have been or will be exceeded during
20 flight, government passengers are not allowed on board the helicopter, nor may the vendor perform any
21 government-ordered missions.

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

24 **EXAMPLE:** A 100-hour inspection is due in 0.5 hours, but it will take 0.8 hours to fly to the vendor's
25 maintenance facility. The flight may be performed only for the purpose of ferrying the helicopter to a
26 maintenance facility.

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

30 **Scheduled Maintenance**

31 Helicopters will be maintained in accordance with the vendor's FAA-approved Operation
32 Specifications, applicable FARs, and the manufacturer's recommendations. Under normal
33 circumstances, scheduled inspections are not to be overflowed. The manufacturer and/or the FAA may
34 allow flight up to 10 hours over the scheduled maintenance timeframe (that is, may fly up to 110 hours
35 since the last 100-hour inspection). Scheduled maintenance performed within that allowance is still
36 considered "on time." Scheduled maintenance should be performed before or after daily standby or as
37 approved by the contracting officer or designated representative.

1 The following inspections are to be performed by authorized personnel and may require a logbook entry:

2 **Maintenance Specific Duties Performed by the Pilot**

3 Daily Preflight Check

4 The pilot will perform a daily preflight check prior to the first flight of each day. The pilot may make an
5 entry in the helicopter's logbook or record that such an inspection has been performed.

6 The preflight inspection is included in the pilot's 14-hour duty day.

7 Helicopter Turbine Engine Power Assurance Check

8 A Helicopter Turbine Engine Power Assurance Check will be accomplished on the first day of operation
9 and thereafter within each 10-hour interval of contracted flight operation unless prohibited by
10 environmental factors (e.g. weather, smoke). The Helicopter Turbine Engine Power Assurance Check
11 will be accomplished by the vendor in accordance with the rotorcraft flight manual. The results will be
12 recorded and either kept in the helicopter or at the assigned work location. A record of the Helicopter
13 Turbine Engine Power Check will be kept with the aircraft.

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

17 Helicopter turbine engine power assurance checks for some aircraft cannot be trended. The reading may
18 be correct or incorrect, or above or below specification, instead of having a numeric value.

19 See procurement document and Appendix A – Helicopter Management Forms and Checklists for more
20 specific information on Helicopter Turbine Engine Power Assurance Checks.

21 Test Flight

22 Test flights do not have a specified minimum flight time requirement. Test flights will normally be of
23 sufficient duration to determine that the item repaired, replaced, or adjusted operates correctly. The pilot
24 is required to make an entry in the helicopter's logbook or record to indicate all required
25 functional/operation checks have been satisfactorily completed. Passengers are not permitted to be
26 aboard the aircraft during test flights. Consult agency Maintenance Inspector for specific test flight
27 requirements.

28 **Inspections or Maintenance Performed by the Mechanic**

29 50/100-Hour Inspections

30 The vendor will usually provide the necessary maintenance personnel and equipment to inspect and
31 service the aircraft in the field. In order to minimize time out-of-service and under normal
32 circumstances, 50/100-hour inspections should be performed before or after daily standby or as
33 approved by the contracting officer or designated representative.

34 Annual Inspection

35 An annual inspection is required once every 12 calendar months. This inspection is similar to the 100-
36 hour inspection in scope and detail, and must be performed by a qualified A&P mechanic with
37 Inspection Authorization (IA). This inspection will not be overflowed. Information on the scope and

1 detail of items to be inspected during the annual or 100 hour inspection can be found in 14 CFR 43,
2 <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-43?toc=1>.

3 Approved Aircraft Inspection Program (AAIP).

4 In lieu of 100-hour/annual inspections, phase inspections may be authorized by the vendor's
5 maintenance program. Phase inspections can normally be accomplished in a very short period of time,
6 since only a portion of the aircraft is inspected at each phase.

7 Time/Calendar Life Inspections

8 Various engine, rotor, drivetrain, and airframe components require hourly or calendar inspections or
9 replacement. These inspections will normally be performed in conjunction with other inspections. These
10 inspections will not be overflowed unless the vendor has an FAA-approved extension from the
11 manufacturer.

12 Airworthiness Directives and Service Bulletin Compliance

13 Special inspections may be required by the FAA or by the manufacturer. These inspections must be
14 accomplished within the timeframes indicated in the directive or bulletin. The vendor is required to
15 provide a current compliance list at the designated base.

16 **Unscheduled Maintenance**

17 A SAFECOM is used to report any condition, observation, act, maintenance problem, or circumstance
18 with personnel or the aircraft that has the potential to cause an aviation-related mishap. Consultation
19 with a DOI/USFS approved Maintenance Inspector prior to submission is encouraged.

20 <https://www.safecom.gov>

21 **USFS**

22 Do not return aircraft having mechanical or equipment deficiencies to service until the aircraft has been
23 approved by an authorized Aviation Maintenance Inspector.

24 When any unscheduled maintenance or repairs are performed for mechanical or equipment deficiencies,
25 a DOI/USFS approved Maintenance Inspector and the contracting officer will be notified for "return to
26 contract availability," before the aircraft may again be allowed to fly under the contract. Depending on
27 the complexity of the maintenance or repair, "return to contract availability" may be given by electronic
28 or verbal means.

29 **DOI**

30 The vendor must immediately notify the COR and Contracting Officer Technical Representative
31 (COTR) (DOI/USFS approved Aviation Safety Inspector) of any change to any engine, power train,
32 flight control or major airframe component or of any major repair following an incident or accident and
33 must describe the circumstances involved.

34 Most DOI contracts require an aircraft to be returned to contract availability after unscheduled
35 maintenance. The vendor returns the aircraft to "service" after maintenance is completed with a logbook
36 entry by the mechanic and by the pilot if a test flight was required. A DOI/USFS approved Aviation
37 Safety Inspector returns it to "contract availability" when notified by the vendor that they are back in
38 service.

1 The contractor may be required to demonstrate their availability by providing documented evidence to
2 the COR and COTR that the deficiency has been corrected. Evidence may be in the form of pictures
3 and/or aircraft record/logbook entries documenting the corrective action, including the date, signature,
4 and certificate number of the person clearing the deficiency. Depending on the magnitude of the
5 deficiency, the COR and/or COTR may also require a physical inspection by an OAS inspector.

6 DOI vendor aircraft operate under FARs and are maintained by trained and qualified maintenance
7 professionals. DOI/USFS approved Aviation Safety Inspectors are available to help the on-site aircraft
8 manager assess the efficacy and appropriateness of corrective actions documented by the vendor
9 mechanic.

10 Examples where technical assistance from a DOI/USFS approved Maintenance Inspector may prove
11 beneficial are:

- 12 • Any unscheduled maintenance action requiring a post maintenance test flight for the purpose of
13 ensuring discrepancy correction.
- 14 • Anytime the manufacturer requires a Conditional Inspection be performed, e.g., hard landing,
15 blade or prop strike, sudden stoppage, engine or rotor over-speed, engine or transmission over-
16 temp, over-torque, engine compressor stall, or surge.
- 17 • Any condition affecting flight control maneuverability or responsiveness.
- 18 • Any un-commanded jettison of external loads.
- 19 • Malfunctioning of vendor provided equipment such as buckets, seeders, torch equipment, etc.
- 20 • Any repair following an incident or accident.

21 **State and Local Agencies**

22 Consult agency directives.

Chapter 15 – Helibase and Helispot Management and Operations

Introduction

For incident helibases hosting two (2) or more helicopters past one day, a HEBM is required.

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 02 – Personnel.

HEBM's 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 HEBM 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 AOB

Coordination, communication, and cooperation with the Project Aviation Manager, ASGS, and AOB 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 HEBM 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 HEBM in planning and monitoring all operations are the:

- Helibase Manager's Reminders List (HJA-2).
- Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00.

These are the primary management tools and job aids of the HEBM. 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.

1 **Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00**

2 The use of the Daily Helicopter Operations Briefing/Debriefing Checklist, HBM-00, is mandatory at all
3 multiple-helicopter bases by the start of the second operational period. It will be completed on a daily
4 basis thereafter.

5 Anyone who cannot attend briefings or debriefings must be individually briefed or debriefed by the
6 HEBM or designee, using the Daily Helicopter Operations Briefing/Debriefing Checklist and other
7 helibase forms (for example, HBM-10, Helispot Information Summary, etc.).

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

10 The Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00) is designed to enable the
11 HEBM to conduct comprehensive briefings and debriefings. Major areas covered are organization and
12 personnel, communications, landing areas, safety, operations, and administration. One checklist may be
13 used for a seven-day period, after which a new one must be initiated.

14 If any item on the checklist has not been accomplished, approval is required from the IC, Project
15 Aviation Manager, or designee (for example, the AOBDD). Detail the deviation on the checklist, General
16 Message (ICS 213) or other format. A signature from the official approving the deviation is required.
17 This documentation must be attached to the checklist.

18 Pilots are required to sign the Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00)
19 daily.

20 If the Helibase Manager arrives at an incident where operations are already proceeding, it is advisable,
21 unless life or property is being threatened, to conduct a short briefing to review the Daily Helicopter
22 Operations Briefing/Debriefing Checklist (HBM-00). The Helibase Manager should make it clear to the
23 air operations staff that there will be a slight operational delay while the initial briefing is accomplished.
24 The time spent accomplishing the initial briefing will result in a smooth transition from initial/extended
25 attack to incident management helibase operations and should increase safety awareness and efficiency
26 significantly.

27 **Helibase Manager's Reminders List, HJA-2**

28 The use of the Helibase Manager's Reminders List, HJA-2 is optional. It is recommended that the
29 HEBM review it upon arrival, with additional review at convenient times throughout each day and after
30 nightly debriefings. It is organized in a sequential and logical manner to lead the HEBM and subordinate
31 personnel through all phases of helibase operations:

- 32 • Helibase and Helispot Site Selection.
- 33 • Personnel and Organization Communications.
- 34 • General Planning Information and Organization Needs.
- 35 • Operations.
- 36 • Demobilization and Rehabilitation.

37 **Briefing/Debriefing Schedule**

38 Briefing and debriefing schedules vary according to incident or project requirements.

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

10 Briefing Time Frames

- 11 • Depending upon complexity of operations and pilot duty day requirements, provide for adequate
12 time prior to the “aircraft start” time shown on the Air Operations Summary (ICS-220).
- 13 • Remember, part of this period must be provided for helicopter preflight prior to the “aircraft
14 start” time.
- 15 • Adjust times as necessary but be prepared to meet “aircraft start” times identified.
- 16 • The HEBM and primary staff should be preparing for the briefing at least 15-30 minutes prior to
17 the scheduled start.
- 18 • All operational and safety problems identified during the previous nightly debriefing should be
19 corrected. Remember to review the Helibase Manager’s Reminders List (HJA-2).

20 Debriefing Time Frames

- 21 • The debriefing should be accomplished as soon as practical after the completion of helibase
22 operations.
- 23 • Remember for next day planning purposes that vendor personnel are “On Duty” until the
24 debriefing is completed. Notify the AOBD or Project Aviation Manager if completion time
25 affects the next day’s plan.
- 26 • At this time, the next day’s plan (if available) should be reviewed.
- 27 • Ensure that feedback is obtained from everyone, including contractor personnel, concerning the
28 day’s activities. Operational and safety problems should be either immediately corrected or
29 brought to the attention of the ASGS/AOBD or Project Aviation Manager.

30 **Helibase Personnel and Organization**

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

34 The assignment of trained and qualified personnel to each helibase function is critical to the safety and
35 effectiveness of operations. Refer to The Daily Helicopter Operations Briefing/Debriefing Checklist
36 (HBM-00) Section I for personnel and organizational items that must be checked prior to the start of
37 operations. Refer also to Helibase Manager’s Reminders List (HJA-2) Section III for similar
38 considerations.

1 The position of the HEBM is common to all helibase organizations. This individual is responsible for
2 the safety and efficiency of all helibase and helispot operations.

3 If an operation is not functioning smoothly, the ASGS and/or AOBD should consider:

- 4 • Assigning a Deputy HEBM (fully qualified HEBM).
- 5 • Splitting the operation into two or more helibases at different locations to reduce single-location
6 complexity. There are negative aspects of this which may outweigh the advantages.
- 7 • Replacing the HEBM. This option should only be considered if it is determined that the HEBM
8 is unable to manage the helibase effectively. Supervisory personnel should also consider that
9 failures at the helibase may be the result of failures in other parts of the project or IMT.

10 **Helibase Setup and Layout**

11 See Exhibit 15.1 for a typical helibase layout. Helibase Manager's Reminders List (HJA-2) Section I,
12 Helibase Site Selection, and Layout should be reviewed during initial site selection.

13 **Time Frames**

14 A HEBM who can manage and delegate responsibilities effectively should have accomplished all of the
15 items discussed in this chapter, plus those specified on the Helibase Manager's Reminders List, HJA-2,
16 by mid-day of the second operational period on incidents. With more lead time available on a project, all
17 items should be implemented or operational prior to commencement of the project.

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

22 **Obtaining Necessary Equipment**

23 The HEBM should work with incident supply unit leaders or local aviation managers to obtain required
24 equipment for large incidents or project work.

25 Commonly needed items include, but are not limited to:

- 26 • Radios and radio kits.
- 27 • Ground vehicles.
- 28 • Crash rescue and evacuation kits.
- 29 • Helicopter support kits, plus additional fire extinguishers, wind socks, pad markers, signs, lead
30 lines, swivels, and cargo nets.
- 31 • PPE.
- 32 • Portable tanks and water bags.
- 33 • Tents.
- 34 • Aerial ignition equipment.
- 35 • Miscellaneous administrative and office supplies.

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

4 **Facilities and Layout Consideration**

5 Operations and Communications Area

6 Refer to Exhibit 15.1 for an example. One of the first priorities is the establishment of a helibase
7 operations and communications area. See Chapter – 04 Communications, Flight Following and Resource
8 Tracking for additional information.

9 Location

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

11 Setup

12 Set up communications equipment in an area in which the ABRO can function effectively and
13 communicate readily with the HEBM and DECK. The following set-ups are usually acceptable:

- 14 • Outside a helicopter crew chase truck equipped with side compartments to handle
15 communications needs.
- 16 • Inside a tent, with a full view of the helibase.
- 17 • In a communications trailer designed for air operations use.

18 Communications Equipment

19 The use of radio headsets to counter helibase noise is strongly encouraged. See Chapter 4 for more
20 information.

21 The Helibase Manager should ensure that assigned radio equipment and frequencies meet the needs for
22 ground-to-ground, air- to-ground, and air-to-air functions.

23 Wind Indicators

24 Set up wind indicator(s) in location(s) visible to all helicopters. Indicators should be placed on both the
25 approach and departure paths.

26 Indicators should be located at sufficient height to give a true indication of wind direction that is not
27 affected by adjacent vegetation or terrain.

28 They should be placed in location(s) that are unaffected by rotor wash.

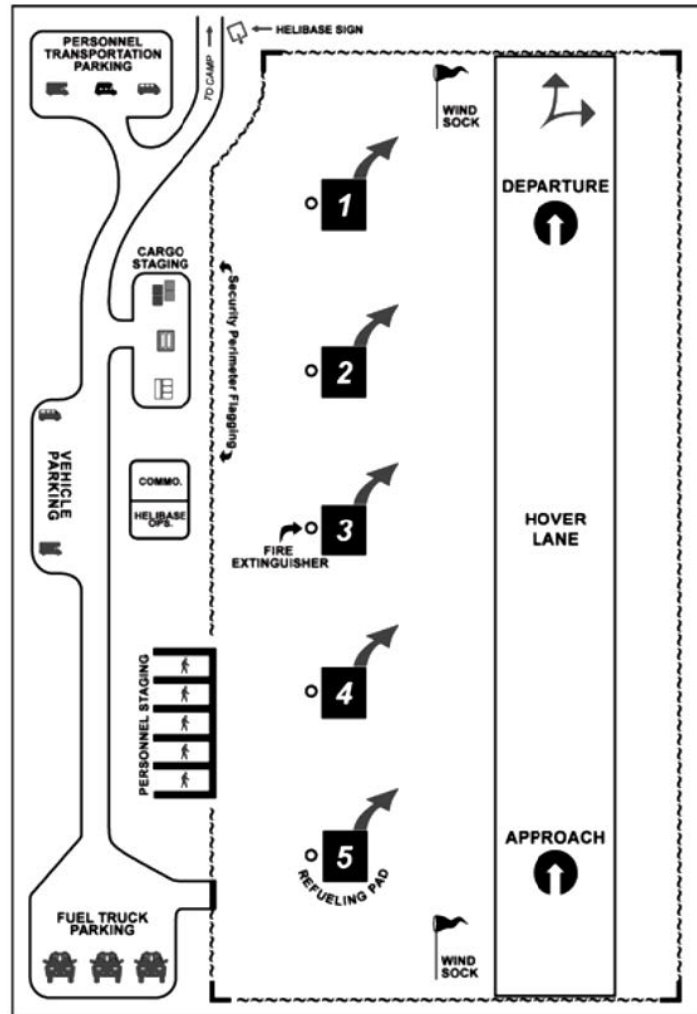
29 Approach and Departure Paths

30 Establish approach and departure paths with pilot input and in conformance with requirements in
31 Chapter 8 – Helicopter Landing Areas.

32 Establish hover lanes for access to various areas on the helibase.

33 Enter information on the Helibase Facilities, Hazard, and Flight Route Map, HBM-10. See Exhibit 15.1

1 Exhibit 15.1 – Example of the Helibase Facilities, Hazard, and Flight Route Map, HBM-10, Filled Out



2 Touchdown Pads and Safety Circles

3 Establish touchdown pads and safety circles in conformance with requirements in
4 Chapter 8 – Helicopter Landing Areas.

5 Group pads by helicopter types. Also separate pads, or groups of pads, by type of flight mission (for
6 example, external cargo transport pads separate from personnel transport pads).

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

8 Establish special pads as necessary for fueling, maintenance, retardant mixing, or aerial ignition. Refer
9 to Chapter – 13 Fueling Operations for fueling separation requirements.

10 Enter information on the Helibase Facilities, Hazard, and Flight Route Map (HBM-10).

11 Vehicle Parking and Movement

12 Establish vehicle parking area for crash rescue vehicle (if assigned), fuel, cargo, personnel transports,
13 visitors, etc.

1 Establish procedures for vehicle movement: access to helibase, refueling, delivery of cargo, etc.

2 Enter information on the Helibase Facilities, Hazard, and Flight Route Map (HBM-10).

3 Helibase Security

4 Cordon off the helibase to control vehicle and foot traffic.

5 Request security as needed.

6 Personnel and cargo staging areas.

7 Establish staging areas for personnel and cargo.

8 Use pennant flagging for crew “holding areas,” as well as for entry-egress routes to pads.

9 Establish the cargo loading and external load area(s) so that other helicopters are not overflown, and so
10 that upon either approach or departure with a load, the helicopter does not fly over inhabited areas.

11 If moderately or heavily traveled roads will be overflown on approach or departure, a road guard may
12 need to be posted. Consult with local law enforcement officials on the posting of road guards. If county,
13 state, or federal highways are involved, the appropriate law enforcement agency is responsible for traffic
14 control.

15 Enter information on the Helibase Facilities, Hazard, and Flight Route Map (HBM-10).

16 Weighing

17 Set up scales for weighing personnel and cargo.

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

22 Signing

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

25 Sanitation

26 Provide an adequate number of portable toilet facilities to meet the needs of helibase personnel and
27 crews in transit through the helibase.

28 Order enough trash barrels or dumpsters to handle both the helibase waste needs and the backhaul from
29 helispots.

30 Establish a separate disposal area for used batteries and other hazardous materials such as saw gas, oil,
31 and grease from helicopter maintenance, etc.

32 Display Board

33 A display board is an essential part of any helibase operation to facilitate information posting, exchange,
34 and briefing requirements. Refer to Exhibit 15.2.

- 35 • The display board should be located near the helibase operations and communications area for
36 ease of posting and referring to information, conducting briefings and debriefings, etc.

- 1 • 4' by 8' sheet(s) of plywood work well. Ensure that the board has adequate support to withstand
2 high winds and rotor wash.
- 3 • Cover with plastic to protect information from adverse weather.
- 4 • For incidents, required information should be completed and posted on the display board no later
5 than mid-day of the second operational period. For projects, it should be posted prior to the
6 commencement of operations. Unless noted as optional, the following should be posted on the
7 display board.
- 8 • Incident Action Plan [Incident Objectives (ICS 202), Organization Assignment List (ICS 203),
9 Assignment List (ICS 204), and Incident Radio Communications Plan (ICS 205) minimum] or
10 Project Aviation Plan.
- 11 • Incident or Project Map.
- 12 • Air Operations Summary (ICS 220).
- 13 • Helibase Facilities, Hazard, and Flight Route Map, HBM-10.
- 14 • Helibase Organization Chart, HBM-1.
- 15 • Aviation Locations Summary, HBM-2.
- 16 • Helibase Aircraft Information Summary, HBM-3, optional.
- 17 • Helibase Flight Time Tracking Record, HBM-5A, optional.
- 18 • Daily Helicopter Operations Briefing Checklist, HBM-00.
- 19 • Load calculations for representative elevations and temperatures for all helicopters assigned, or
20 Helicopter Load Capability Summary – Multiple Helispots and Fuel Loads, HCM-10.
- 21 • Allowable Payload Chart, HBM-4.
- 22 • Crash Rescue/ Medevac/Evacuation Plan, HJA-4.
- 23 • Standard Aircraft Safety Briefing.

24 Helibase Eating Area and Arrangements

25 An area for eating meals should be established and posted on the Helibase Facilities, Hazard, and Flight
26 Route Map (HBM-10).

27 The HEBM should coordinate immediately with the Project Aviation Manager or the ASGS regarding
28 meal arrangements.

29 Helibase and Vendor Personnel Sleeping Area

30 One or two general sleeping areas for personnel should be immediately designated and posted on the
31 Helibase Facilities, Hazard, and Flight Route Map (HBM-10). Sleeping areas should be well away from
32 the helibase operational area, hover lanes, and flight paths to avoid the effects of rotor wash.

33 The HEBM should make his/her contact information known to the ASGS or Project Aviation Manager
34 in case an emergency arises during the night.

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

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

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

7 If motels are not ground accessible within a reasonable time, reduce the effect on duty days by flying all
8 pilots to the rest location in one or two aircraft, instead of allowing each pilot to fly in.

9 In Alaska, helicopter vendors are advised in the procurement document to provide tents for their
10 personnel. Sleeping bags, plastic sheeting, and bug nets are provided at remote helibases. Housing may
11 be available in villages.

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

13 Exhibit 15.2 – Example of a Helibase Display Board, Part 1 of 2

DAILY OPERATIONS BRIEFING

HELIBASE ORGANIZATION

FACILITIES, HAZARD AND FLIGHT ROUTE MAP

HELISPOT SUMMARY

HELIBASE ORGANIZATION

EMERGENCY RESCUE PLAN

CRASH / RESCUE OPERATIONS

BE AWARE AND BE PREPARED
SOMEONE'S LIFE MAY DEPEND ON YOUR ACTIONS!

14 NFES 2866 S-371 Helibase Manager, Helibase Display Board Part 1 (2007)

1 **Establishing Helispots**

2 All helispots must be approved regarding hazards and capability (HIGE or HOGE) by the appropriate
3 incident or resource project authority. Pilots are a good source of input.

4 The AOBD is responsible for the establishment of all helispots. In the absence of an AOBD, the ASGS
5 is responsible. In the absence of the ASGS, the HEBM is responsible. On resource projects without a
6 full aviation staff, the HEBM, or HMGB is responsible. In any case, close coordination with, and
7 authorization by the local READ to construct helispots is required.

8 Refer to Chapter 8 – Helicopter Landing Areas for additional landing area information.

9 The Aviation Locations Summary, HBM-2, should be initiated and updated as new helispots are
10 established. Its primary use is for pilot safety briefings.

11 **Necessary Equipment**

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

- 14 • One (1) 20A-120B:C rated fire extinguisher (Required).
- 15 • Pad marker with nails (initial establishment of spot) (Required).
- 16 • Radio with extra batteries (Required).
- 17 • Wind indicator(s) (Required).
- 18 • Crash rescue kit.
- 19 • Scales.
- 20 • Fiber tape.
- 21 • Manifest book(s).
- 22 • Pocket calculator.
- 23 • Passenger Aircraft Safety Briefing cards.
- 24 • A list of allowable payloads for each helicopter assigned to the helibase (HIGE and HOGE) for
25 all helispots, since they may be assigned to another spot during the course of the day. The Single
26 Helicopter Load Capability Planning Summary – Multiple Helispots and Fuel Loads, HCM-10,
27 for each helicopter works well for this purpose.
- 28 • Food and water.
- 29 • Initial attack gear.
- 30 • Overnight gear (even if the plan is to return the crew to the helibase).

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

1 **Facilities and Layout Considerations**

2 Helispot personnel are usually the first personnel to be flown to a helispot, both for initial construction
3 and improvement and on a daily basis thereafter in preparation for personnel and cargo transport. The
4 helispot will not be declared operational (that is, ready to receive personnel or cargo) until the helicopter
5 crewmembers assigned to that helispot have informed the helibase that the spot is ready. Final approval
6 for helispot use rests with appropriate agency authority or delegate.

7 Some of the considerations regarding facilities and layout of helibases also apply to helispots. Refer to
8 Helibase Manager’s Reminders List (HJA-2) Section II, Helispot Site Selection and Layout, for items
9 which should be checked during the establishment of any helispot. Also refer to Chapter 8 – Helicopter
10 Landing Areas for requirements. Items to consider include, but are not limited to:

11 **Wind Indicators**

12 Considerations are the same as with helibases

13 **Approach and Departure Paths**

14 Establish approach and departure paths with pilot input in conformance with requirements in
15 Chapter 8 – Helicopter Landing Areas.

16 **Touchdown Pads and Safety Circles**

17 Establish touchdown pads and safety circles in conformance with requirements in
18 Chapter 8 – Helicopter Landing Areas.

19 **Vehicle Parking and Movement**

20 Though road access to a helispot is the exception rather than the rule, the helispot may have road access.
21 If so, consult guidelines for helibases.

22 **Security**

23 The helispot may have need for security. If so, consult guidelines for helibases. For special security
24 requirements during law enforcement operations, see Chapter 16 – Law Enforcement.

25 **Personnel and Cargo Staging Areas**

26 Although helispot staging areas do not need to be as elaborate as those for the helibase, establish areas
27 for personnel and cargo well away from the landing pad. If necessary, use pennant flagging for crew
28 “holding areas,” as well as for ingress-egress routes to the helispot landing pad.

29 **Weighing**

30 If scales are available, use them for the accurate weighing of personnel and cargo.

31 **Signing**

32 Post warning and informational signs (helispot, no smoking, etc.) as appropriate.

1 **Dipsite Considerations**

2 **Personnel and Organization**

3 Dipsite management may enhance safe and efficient operations. A dipsite is staffed at the discretion of
4 the HEBM based on expected dipsite activity, accessibility, and risks involved. The HEBM is
5 responsible for ensuring appropriate personnel are assigned and briefed.

- 6 • Personnel managing dipsites should maintain communications with the HEBM and Division
7 Supervisor.
- 8 • Communicate and coordinate with the public, law enforcement and/or public safety official(s) to
9 assure that the public are clear of dipsite operations and not exposed to hazards, when applicable.
- 10 • Include all dipsite personnel in a post operational debrief.

11 **Establishing Dipsites**

12 The dipsite should be located as close to the incident area as practical that allows for quick turnaround,
13 easy access, and lots of water. The dipsite will be identified by name and mapped and placed on the
14 Aviation Locations Summary, HBM-2. Other considerations when establishing dipsites should include:

- 15 • Permission should be obtained for both water usage, landowner(s) and other affected entities
16 prior to use.
- 17 • Attention will be given to hazards associated with the spread of non-native aquatic species and
18 will be addressed.
- 19 • Flight paths of aircrafts to incident and overflight risks to the public.

20 **Necessary Equipment**

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

- 23 • Incident Action Plan or Project Aviation Safety Plan, Air Operations Summary (ICS-220),
24 Communications Plan (ICS-205), and local Mishap Response Plan/Crash Rescue Plan,
25 commensurate with incident complexity.
- 26 • One (1) dry chemical, 20A-120B:C rated fire extinguisher.
- 27 • One (1) crash rescue kit.
- 28 • VHF-FM Radio(s) and VHF-AM Radio(s).
- 29 • GPS device.
- 30 • Mobile phone.
- 31 • Fiber/Electrical tape.
- 32 • Necessary pump/hose kits, fuel, and pump parts (if applicable).
- 33 • Food and water.
- 34 • Extra Batteries.
- 35 • Wind indicator(s).

1 **Layout Considerations**

2 The proper selection and improvement of dipsites is essential to both the safety and efficiency of
3 helicopter operations. Dipsites that are poorly located or without improvements may lead to a mishap.
4 At a minimum, inadequate dipsites heighten risk, increase pilot workload, and may result in inefficient
5 operations. The layout should allow visibility, assure rotor clearance from hazards and minimize public
6 and firefighter exposure to hazards. Other considerations include:

- 7 • Dipsite selection should provide for approaches and departures in several directions.
8 Approach/departure paths should be aligned with the prevailing wind. Avoid one-way and
9 “hover-hole” dipsites.
- 10 • Dipsites should be free of hazards i.e. dust, trees, power lines, structures, and located in areas
11 with clear flightpaths.
- 12 • Perform any necessary hazard reduction and safety improvements to the dipsite using
13 recommendations from pilots, aerial supervision, and landowner or land management direction.
- 14 • Dipsites can be difficult to monitor as they may not have road access, in these cases, air attack
15 may be the best tool for monitoring hard to reach dipsites.
- 16 • Identify nearby landing area(s) that may be used for helicopter equipment troubleshooting and/or
17 emergency landing.
- 18 • Place wind indicators as needed.
- 19 • Post warning and informational signs as appropriate.
- 20 • Make crash rescue equipment such as fire extinguishers and crash rescue kits available, visible,
21 and accessible as appropriate for the site.
- 22 • Identify staging areas for water tenders, routes of ingress and egress, and coordinate movement
23 with the Dipsite Manager and dipsite activity. Personnel/vehicle staging areas should not be
24 under approach/departure or near the emergency landing site.
- 25 • Coordinate with PIO and/or law enforcement/public safety official(s) to assure that the public are
26 clear of dipsite operations.
- 27 • Dipsites located in rivers or large bodies of water may require a boat to appropriately manage
28 dipsite operations.

29 **Communications**

30 Communications is certainly within the “top five” on the list of most important aspects of helibase
31 operations.

32 Communications problems must be solved immediately. Close coordination with the AOBD or Project
33 Aviation Manager is essential. See Chapter 04 – Communications, Flight Following, and Resource
34 Tracking for more information.

35 Helibase Manager’s Reminders List (HJA-2) Section IV, Communications, should be reviewed as
36 needed by the HEBM.

1 **Safety**

2 The HEBM should maintain constant awareness of other safety items not on the Daily Helicopter
3 Operations Briefing/Debriefing Checklist (HBM-00).

4 **General Planning, Information and Organization Needs**

5 Appendix B – Helibase Management Forms and Checklists contains guidance and direction concerning
6 both required and optional planning tools available to the HEBM.

7 The HEBM should review Helibase Manager’s Reminders List (HJA-2) Section V.

8 **Operations**

9 The Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00) Section V, Operations, must
10 be completed on a daily basis prior to the start of operations.

11 The HEBM should review Helibase Manager’s Reminders List (HJA-2) Section VI, Operations.

12 **Demobilization of Aircraft and Personnel**

13 The HEBM should review Helibase Manager’s Reminders List (HJA-2) Section VII, Demobilization,
14 when it is anticipated a helicopter will be demobilized. Although use of Helicopter Demobilization
15 Information Sheet, HBM-09, is optional, it facilitates the orderly demobilization of air and associated
16 ground resources.

17 **Rehabilitation**

18 The HEBM should review Helibase Manager’s Reminders List (HJA-2) Section VIII, Rehabilitation,
19 whenever a helispot or helibase will be placed in inactive status or will be permanently demobilized.
20 Consult the local READ for specific rehabilitation standards.

21 **Demobilization and Deactivation of the Helibase**

22 Aside from the physical cleanup considerations of demobilization addressed in Helibase Manager’s
23 Reminders List (HJA-2) Section VIII, Rehabilitation, the HEBM is responsible for ensuring that a
24 complete helibase file is left with the Documentation Unit Leader on incidents or the project manager on
25 projects. This file should consist of the items specified in Helibase Manager’s Reminders List (HJA-2)
26 Section V.

27 **Additional Considerations**

28 **Operations Involving Military Helicopters**

29 Operations involving use of military helicopters can increase the complexity of a helibase operation. For
30 aviation operations using Active Duty/Reserve Military helicopters or National Guard units officially
31 “federalized” by DoD, refer to Chapter 70 of the *National Interagency Fire Center, Military Use*
32 *Handbook* for specific policy and procedural information,
33 <https://www.nifc.gov/nicc/logistics/references.htm>.

1 **Pilot Informational Needs**

2 Most pilot informational needs are provided through use of the Daily Helicopter Operations
3 Briefing/Debriefing Checklist (HBM-00) at the start of the operational period and by consulting
4 information posted on the helibase display board.

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

- 8 • Incident or Project Map marked with hazards, helispots, drop points, dip sites, etc.
- 9 • Air Operations Summary (ICS 220).
- 10 • Incident Radio Communications Plan (ICS 205).

11 It is the HEBM's responsibility to communicate hard-copy needs of the above to the ASGS, AOBD, or
12 Project Aviation Manager.

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

14 A geographic area (state, area, or region) may request that the IC accommodate the visit of an Aviation
15 Safety Assistance Team, or the IC or Project Aviation Manager may request one.

16 Teams are usually made up of Helicopter Operations Specialists and Maintenance and Avionics
17 Inspectors.

18 Teams have been instructed not to interfere with operations unless an immediate safety hazard is
19 observed. The ASAT/STAT should closeout with both the HEBM, supervisory air operations staff
20 (ASGS/AOBD), and the IC or Operations Section Chief, or Project Aviation Manager.

21 The evaluation team completes the following:

- 22 • Reviews the Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00) items,
23 checking for compliance.
- 24 • Reviews the Helibase Manager's Reminders List (HJA-2) items, checking for compliance.
- 25 • Evaluates management relationships to determine if coordination and communication are
26 occurring.
- 27 • Determines if training opportunities are being offered.
- 28 • Reviews maintenance and avionics inspectors' findings.

1 Chapter 16 – Law Enforcement

2 Introduction

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

7 Provisions in the procurement document may prohibit use of vendor helicopters for high-risk law
8 enforcement missions. Vendors and pilots must be informed of any potential hazard to the aircraft or its
9 occupants. This may also apply to the MOU or LOA being used. The HMGB must be familiar with
10 these documents to ensure that the aircraft are being used appropriately.

11 Agency-specific policy may exempt law enforcement from some standard helicopter operating
12 procedures. An exemption in one area does not automatically exempt law enforcement users from
13 following other standard operating practices and procedures. All activities not covered in this chapter or
14 in agency-specific policy must follow the procedures outlined in previous chapters.

15 The leader of each law enforcement mission will complete a rapid risk assessment.

16 Personnel Duties and Responsibilities, Qualifications, Certification, and Training

17 All law enforcement aviation operations should be conducted by qualified HMGBs and crew members
18 in accordance with agency requirements for Helicopter Manager Resource and Aircrew member, see
19 the current IAT guide for more information, https://www.iat.gov/docs/IAT_Guide.pdf.

20 Operational Planning

21 Law enforcement aviation missions may be accomplished using agency-owned, contracted, rented,
22 other-government agency, or military helicopters. There are numerous agreements between agencies and
23 the military for using the latter's aircraft and pilots.

24 Types of Missions

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

- 27 • Counter-narcotics operations.
- 28 • Surveillance of suspects or locations.
- 29 • Warrant service.
- 30 • Reconnaissance.
- 31 • Fire Investigation.
- 32 • Seizure and removal of evidence, contraband, and other property.

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

1 When planning law enforcement aviation missions, an aviation manager must be consulted to ensure
2 compliance with guidelines and procedures and to assist in planning safe, effective operations.

3 Rappel and Short-Haul Operations

4 All rappel and short-haul missions conducted by agency law enforcement personnel must conform to the
5 procedures as outlined in their agency requirements.

6 Use of the Incident Command System Aviation Structure

7 The use of the Incident Command System is recommended for all law enforcement aviation operations,
8 including incidents-within-incidents.

9 Aerial Supervision/Airspace Coordination

10 For operations involving multiple-aircraft, it is recommended that an aerial supervisor be assigned
11 (ATGS, HLCO) to perform aerial supervision and airspace coordination duties. This individual may
12 operate from either a fixed-wing aircraft or helicopter.

13 The requirements of FAR – 14 CFR 91.119, [http://www.gpo.gov/fdsys/granule/CFR-2012-title14-
14 vol2/CFR-2012-title14-vol2-sec91-119](http://www.gpo.gov/fdsys/granule/CFR-2012-title14-vol2/CFR-2012-title14-vol2-sec91-119), regarding maintaining minimum safe altitudes from persons or
15 property on the ground apply.

16 Also see *NWCG Standards for Airspace Coordination*, PMS 520,
17 <https://www.nwcg.gov/publications/520>, for specific criteria regarding air space.

18 **Flight Following, Resource Tracking and Communications**

19 Flight following procedures as described in Chapter 04 – Communications, Flight Following, and
20 Resource Tracking must be followed, except for covert operations where the need for secure
21 communications is essential. In those cases, one of the following procedure(s) must be used.

22 **Grid Map Reference**

23 The area where flights will occur is gridded on a map and each grid area is given a code. The flight plan
24 and grid map are placed in a sealed envelope to be opened by the flight following dispatcher only in the
25 event of an aircraft emergency or failure to check-in within specified time frames. Flight check-in is
26 performed using coded grid references rather than geographical location descriptors.

27 **Flight Following Through Another Agency**

28 Flight following may be performed by another agency (for example, DoD, National Guard, or sheriff's
29 office). Check-in frequency must meet the requirements outlined in Chapter 04 – Communications,
30 Flight Following, and Resource Tracking.

31 **Satellite Flight Following**

32 Flight following via an automated reporting satellite system is highly recommended, since no voice
33 communication is necessary. The military often has this option available. The HMGB can ask for a
34 contact number for the facility that is tracking the aircraft in the event that radio communications with
35 the aircraft are lost.

1 **Personnel and Equipment Approval and Carding**

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

5 **Non-Emergency Operations**

6 All rented, chartered, contracted or agency-owned aircraft must be flown by pilots who meet agency
7 standards and possess a current Interagency Helicopter Pilot Qualification Card.

8 Use of other law enforcement agency, DoD, National Guard, or Coast Guard aircraft flown by that
9 agency's pilots requires acceptance of that agency's pilot qualifications requirements in an MOU or
10 LOA. In these instances, it is acceptable for agency law enforcement personnel to fly with non-carded
11 pilots who have been approved under the MOU or LOA.

12 **Emergency Operations**

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

- 18 • Authorization must be given on a case-by-case basis by the LEO in charge or IC. Verbal
19 approval is acceptable, but should be followed up with written documentation.
- 20 • A written justification statement must be prepared by the LEO in charge or the IC and submitted
21 to the appropriate aviation manager within 24 hours of the completion of the mission. A
22 SAFECOM should be submitted as soon as practical.

23 **Helicopter Capabilities and Limitations**

24 Refer to Chapter 6 – Helicopter Capabilities and Limitations, for guidance regarding flying at night
25 during emergency operations.

26 **Helicopter Load Calculations and Manifests**

27 See Chapter 7 – Helicopter Load Calculations and Manifests and Appendix A – Helicopter Management
28 Forms and Checklists for requirements and procedures.

29 When using aircraft other than military, load calculations and manifests are required; except, subject to
30 policy exemption, when flying undercover in a suspect's helicopter.

31 When using military aircraft, use of a PPC is acceptable.

32 **Helicopter Landing Areas**

33 Standards outlined in Chapter 8 – Helicopter Landing Areas must be followed.

34 It is recognized that landing areas may not always be optimal. Nevertheless, particular care should be
35 exercised in selecting landing sites for law enforcement operations.

36 **Equipment Requirements and Maintenance**

1 Refer to Chapter 9 – Equipment Requirements and Maintenance for standard requirements and
2 procedures.

3 Exemptions from aviation PPE requirements are agency-specific and must be used only in emergency
4 situations when the hazards on the ground (for example, from gunfire) are greater than those requiring
5 the use of aviation PPE.

6 Law enforcement operations may require the use of specialized equipment. In these situations, consult
7 with the local Unit Aviation Manager.

8 **Personnel Transport**

9 See Chapter 10 – Personnel Transport for standard requirements and procedures.

10 The following specifically applies to law enforcement and should be conducted by law enforcement
11 personnel only.

12 **Transport of Injured Officers**

13 Prior to transporting an officer with serious injuries, all weapons being carried by the injured officer
14 must be secured by another LEO.

15 **Transport of Canines**

16 All canines should be either muzzled and restrained or contained in a secured portable carrier with
17 pilot's concurrence. Canines must be transported in the rear of the helicopter and accompanied by a
18 handler.

19 **Transport of Prisoners**

20 When prisoners are transported by aircraft, the following guidelines must be used. These guidelines are
21 not applicable to inmate fire crews.

- 22 • Brief the pilot on the prisoner, the nature of the crimes and the extent of safety precautions used
23 while transporting a prisoner.
- 24 • Brief the prisoner on aircraft safety using the standard briefing format for all passengers.
- 25 • Search the prisoner for weapons even if the prisoner has been previously searched.
- 26 • Handcuff the prisoner using standard law enforcement policy and procedures. If the prisoner is to
27 be handcuffed in front, ensure that a belly chain or other suitable device is used.
- 28 • Seat and restrain prisoners in the rear of the aircraft opposite the pilot with the LEO sitting next
29 to the prisoner. It is not advisable to seat a prisoner where the prisoner has access to the pilot or
30 controls.
- 31 • LEOs at the receiving landing area should be briefed and available for pickup and transportation
32 of the prisoner.

33 **Cargo Transport**

34 Refer to Chapter 11 – Cargo Transport for standard requirements and procedures.

35 The following specifically applies to law enforcement operations.

36 **Transport of Evidence**

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

3 **Transport of Hazardous Materials**

4 With the exception of defensive equipment, all transportation of hazardous materials during law
5 enforcement operations must follow the procedures of *NWCG Standards for Aviation Transport of*
6 *Hazardous Materials*, PMS 513. Weapon control, readiness for use, and method of transport is the
7 responsibility of the LEO.

8 **Transport of Weapons**

9 Transportation Security Administration TSA – 49 CFR 1544.219, [http://www.tsa.gov/about-tsa/law-](http://www.tsa.gov/about-tsa/law-enforcement-officers-flying-armed)
10 [enforcement-officers-flying-armed](http://www.tsa.gov/about-tsa/law-enforcement-officers-flying-armed), governs LEOs in the transportation of ammunition and compressed
11 gas cylinders contained in weapons, magazines, and belt holders.

12 When LEOs transport weapons in aircraft, the following safety precautions must be taken.

- 13 • Brief pilots on weapons type(s) and safety policy.
- 14 • Long guns (shotguns, rifles, etc.) must not have a round in the chamber unless the tactical
15 situation as determined by the LEO dictates, the pilot has been briefed, and all agency guidelines
16 and requirements are followed.
- 17 • Handguns may be loaded and must be holstered.
- 18 • Fully automatic weapons must have an empty chamber and the bolt locked in safe position.
- 19 • Keep all weapons pointed in a s direction as determined by the pilot during the preflight briefing.

20 **Transport of Hazardous Chemicals**

21 When carrying hazardous chemicals in the aircraft, the following safety precautions must be taken.

- 22 • Brief pilots on material and safety policy.
- 23 • All clandestine laboratory paraphernalia must be transported under the direction of a designated
24 hazardous materials response team.

25 **Fire Protection and Crash Rescue**

26 See Chapter 12 – Fire Protection and Crash Rescue Procedures for standard requirements and
27 procedures.

28 **Fueling Operations**

29 See Chapter 13 – Fueling Operations for standard requirements and procedures.

30 **Helicopter Maintenance**

31 See Chapter 14 – Helicopter Maintenance for standard requirements and procedures.

32 Maintenance requirements for cooperator or military aircraft should be established by MOU or LOA.

33 It is essential that a thorough preflight check of the aircraft be made to detect sabotage.

34 **Helibase and Helispot Management and Operations**

1 See Chapter 15 – Helibase and Helispot Management and Operations for standard requirements and
2 procedures.

3 **Law Enforcement Helibase**

4 Law enforcement personnel must be at the helibase at all times. If a HMGB or HEBM is a qualified
5 LEO, they may act in this capacity.

6 **Law Enforcement Helispots**

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

9 **Overnight Security**

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

13 **Fuel Truck**

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

1 Chapter 17 – Search and Rescue Operations

2 Introduction

3 The use of aviation assets in search and rescue operations can be highly effective. All direction in this
4 chapter is provided for the purpose of promoting safety and efficiency in search and rescue (SAR)
5 aviation operations.

6 All activities not covered in this chapter must follow the procedures outlined in other parts of these
7 standards, as well as other appropriate agency manuals and handbooks. Due to the high-risk nature of
8 SAR missions, it is critical that SAR personnel possess thorough knowledge of all aspects of helicopter
9 operations.

10 The leader of each helicopter SAR mission must implement rapid risk assessment and management
11 techniques.

12 It is easy to become caught up in the urgency of a mission, especially those involving life-threatening
13 situations. Regardless of the emergency, never forget to follow basic helicopter procedures.

14 Personnel Duties and Responsibilities, Qualifications, Certification, and Training

15 All SAR aviation operations should be conducted by qualified HMGB's and crew members in
16 accordance with agency requirements for Helicopter Manager Resource and Aircrew member.
17 https://www.iat.gov/docs/IAT_Guide.pdf%20%20

18 Operational Planning

19 Types of Missions:

- 20 • Reconnaissance.
- 21 • Low-level flight.
- 22 • Short-Haul.
- 23 • STEP.
- 24 • Rappel.
- 25 • Cargo Letdown.
- 26 • Support to other agencies.

27 These types of operations must emphasize safety requirements and considerations. When planning
28 aviation missions, an aviation manager must be consulted to ensure compliance with guidelines and
29 procedures and to assist in safe, effective operations.

30 Rappel, Cargo Letdown, STEP, and Short-Haul Operations

31 The use of rappel, cargo letdown, STEP or short-haul requires approval, training, and qualifications in
32 accordance with agency policy.

33 Use of the Incident Command System Aviation Structure

34 Use of the Incident Command System (ICS) is recommended for all SAR operations, including
35 incidents-within-incidents.

1 **Aerial Supervision and Airspace Coordination**

2 For operations involving multiple-aircraft, it is recommended that an aerial supervisor (ATGS, HLCO)
3 be assigned to perform aerial supervision and airspace coordination duties. This individual may operate
4 from either a fixed-wing aircraft or helicopter.

5 The requirements of FAR – 14 CFR 91.119, [https://www.govinfo.gov/app/details/CFR-2022-title14-](https://www.govinfo.gov/app/details/CFR-2022-title14-vol2/CFR-2022-title14-vol2-sec91-119)
6 [vol2/CFR-2022-title14-vol2-sec91-119](https://www.govinfo.gov/app/details/CFR-2022-title14-vol2/CFR-2022-title14-vol2-sec91-119), regarding maintaining minimum safe altitudes from persons or
7 property on the ground apply.

8 Additional information is referenced in *NWCG Standards for Airspace Coordination*, PMS 520,
9 <https://www.nwcg.gov/publications/520>, for specific criteria regarding airspace.

10 **Flight Following and Communications**

11 Flight following procedures as described in Chapter 04 – Communications, Flight Following, and
12 Resource Tracking must be followed.

13 **Personnel and Equipment Approval and Carding**

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

17 The agency managing the SAR operation may have a LOA or MOU that allows use of other agency or
18 military aircraft that contains standards for pilot and aircraft approval.

19 **Emergency Operations**

20 In certain life-threatening emergencies, it may be necessary for personnel to deviate from policy. This
21 may include seating configuration, PPE and riding in unapproved aircraft and/or with unapproved pilots.
22 A SAFECOM outlining the deviation from policy should be submitted as soon as practical.

23 Don't become part of the emergency! Choose an aircraft capable of meeting performance requirements
24 for the mission.

25 The following must govern emergency situations where deviation from policy occurs:

26 Authorization must be given on a case-by-case basis by the IC. Verbal approval is acceptable, but should
27 be followed up with written documentation.

28 A written justification statement must be prepared by the IC and submitted to the appropriate aviation
29 manager within 24 hours of the completion of the mission. A SAFECOM should be completed as soon
30 as practical.

31 **Non-Emergency Operations**

32 All rental, charter, contracted or agency-owned aircraft must be flown by pilots who meet agency
33 standards and possess a current Interagency Helicopter Pilot Qualifications Card.

34 **Helicopter Capabilities and Limitations.**

35 Refer to Chapter 6 – Helicopter Capabilities and Limitations, for guidance regarding flying at night
36 during emergency operations.

1 **Helicopter Load Calculations and Manifests**

2 See Chapter 7 – Helicopter Load Calculations and Manifests and Appendix A – Helicopter Management
3 Forms and Checklists for requirements and procedures.

4 When using aircraft other than military, load calculations, and manifests are required.

5 When using military aircraft, use of a PPC is acceptable.

6 **Helicopter Landing Areas**

7 Standards outlined in Chapter 8 – Helicopter Landing Areas must be followed.

8 It is recognized that landing areas may not always be optimal. Nevertheless, particular care should be
9 exercised in selecting landing sites for SAR operations.

10 **Equipment Requirements and Maintenance**

11 Refer to Chapter 9 – Equipment Requirements and Maintenance for standard requirements and
12 procedures.

13 Exemptions from aviation PPE requirements are agency-specific. These generally apply to the use of
14 alternative PPE for extreme environmental conditions. The IC has the authority to invoke the waiver,
15 and this should be documented as specified in the waiver document.

16 SAR operations may require the use of specialized equipment. In these situations, consult with the local
17 Unit Aviation Manager.

18 High-visibility flight suits for SAR personnel are highly recommended to allow pilots to more readily
19 locate personnel on the ground.

20 **Personnel Transport**

21 See Chapter 10 – Personnel Transport for general requirements and procedures.

22 During emergency operations, some requirements for PPE for personnel transport may not be met. Care
23 must be exercised to prevent additional injury and/or loss of life. If possible, the HMGB should be on
24 board the helicopter to assist with mission management.

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

26 **Transport of Medical Patients**

- 27 • Secure oxygen tanks.
- 28 • Carry medical gloves for protection from patient body fluids and blood-borne pathogens. Proper
29 body substance precautions should be used in transport of the deceased.
- 30 • Secure the patient to the litter and then secure the litter to the helicopter.
- 31 • The use of PPE for patients is case dependent. Factors to consider include the nature of the
32 injury/illness, urgency of the injury/illness, and the ability to monitor the patient's condition.

1 **Transport of Canines**

2 All canines should be either muzzled and restrained or contained in a secured portable carrier with
3 pilot's concurrence. Canines must be transported in the rear of the helicopter and accompanied by a
4 handler.

5 **Cargo Transport**

6 Refer to Chapter 11 – Cargo Transport for standard requirements and procedures.

7 **Fire Protection and Crash Rescue**

8 See Chapter 12 – Fire Protection and Crash Rescue Procedures for standard requirements and
9 procedures.

10 **Fueling Operations**

11 See Chapter 13 – Fueling Operations for standard requirements and procedures.

12 **Helicopter Maintenance**

13 See Chapter 14 – Helicopter Maintenance for standard requirements and procedures.

14 Maintenance requirements for cooperator or military aircraft should be established by MOU or LOA.

15 **Helibase and Helispot Management and Operations**

16 See Chapter 15 – Helibase and Helispot Management and Operations for standard requirements and
17 procedures.

1 **Appendix A – Helicopter Management Forms and Checklists**

2 **Introduction**

3 This appendix provides standardized forms for the management and operation of a single helicopter.
4 Such standardization helps to implement common procedures among participating agencies to meet
5 mutual safety, efficiency, fiscal management, and contract administration objectives. The forms also
6 provide a basis for training development and presentation.

7 The Helicopter Management Forms and Checklists are found at <https://www.nwcg.gov/publications/510>.

8 **Applicability**

9 The forms in this appendix are used by HMGB's, whereas those in Appendix B – Helibase Management
10 Forms and Checklists are to be used in the management of helibases.

11 However, several of the Helicopter Management (HCM-series) forms contribute to the informational
12 requirements of the Helibase Management (HBM-series) forms. It is therefore essential that HMGB's
13 use these forms as appropriate or required when operating as part of a helibase organization.

14 Some of the forms are required for all helicopter operations; some are required only for incident
15 operations. Others are optional and may be used at the discretion of the HMGB or local aviation
16 management staff as part of the unit's helicopter operation. Certain optional forms may be required by
17 the air operations staff at an incident or project due to a specific management informational need.

18 The use and applicability of other contracting forms such as Contract Instruction, Notice-to-Proceed,
19 etc., are discussed in agency contract administration guides.

20 Exhibit A.1, Helicopter Management Forms Summary, on the following pages is a summary listing of
21 the HCM-series forms, including information concerning the purpose of the form, the HCM form
22 number, whether a form is optional or required for all or only certain situations, responsibility for
23 completion, and frequency of completion. The HMGB may use this chart as a quick-reference guide to
24 form requirements. The pages following the chart contain a comprehensive discussion of each form.

25 HMGB's for Exclusive-Use and CWN contracts should obtain copies of all forms so that they may
26 respond to different management requirements encountered.

27 **Electronic HCM Forms**

28 The electronic load calculation is available as a training tool or may be used in lieu of the booklet form.
29 The form is an Excel worksheet and makes automatic computations as data is entered by the pilot or
30 government representative. Equipped Weight, Computed Gross Weight, and Gross Weight Limitations
31 must be derived by flight manual reference and entered by the pilot.

1 Please be aware of the following important notes:

2 • Save to hard drive prior to using.

3 • Worksheets can be completed, named, and saved individually.

4 • As the cursor is moved over a field, a Comment Box will appear offering explanation or
5 instruction for that field.

6 • Information is entered into the yellow fields by the user.

7 • The blue cells are locked and data cannot be entered by the user. They perform automatic
8 functions.

9 • If the electronic format is used for actual helicopter operations, the form may be printed out in
10 color or in black & white, signed by the pilot and HMGB and retained.

11 • Full-size, fillable HCM forms are available at <http://www.nwcg.gov/publications/510>.

1 Exhibit A.1 – Helicopter Management Forms Summary.

Title	Purpose	Applicability	Responsibility of Completion	Completion Frequency	Remarks
Aircraft Contract Daily Diary 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 Aircraft Rental Agreement (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	Applicability	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, HCM 8 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	Applicability	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.
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.

1 **Aircraft Contract Daily Diary, HCM-1**

2 **Purpose**

3 The purpose is to provide daily documentation of contract activities.

4 **Applicability**

5 The form is required for all Exclusive-Use contract helicopters, fire, and project, as well as fire CWN.
6 Its use is also encouraged for rental helicopters utilized for more than one day.

7 **Responsibility and Instructions for Completion**

8 It is the responsibility of the HMGB to complete the form on a daily basis. The HMGB should document
9 significant occurrences, deficiencies, actions by the contractor or government, etc.
10 If nothing of significance occurred, an entry indicating such should be made. Higher levels in the
11 contract administration structure (for example, the COR) are encouraged to utilize a continuous
12 documentation log rather than the single-sheet format shown here.

13 **Routing and Filing**

14 Copies should be routed to appropriate personnel concurrently with copies of agency flight payment
15 documents.

16 **Posting**

17 None

18 **Related Forms**

19 HCM-2, Call-When-Needed Pre-Use Checklist, is the start of contract documentation for CWN
20 helicopters.

21 Certain occurrences that are documented on the Aircraft Contract Daily Diary may require submission
22 of an agency incident/hazard report.

1 **CWN Pre-Use Checklist, HCM-2**

2 **Purpose**

3 The purpose is to ensure fire CWN, or fire rental helicopters meet requirements and specifications as
4 contained in the procurement document.

5 **Applicability**

6 The form is required to be completed for all fire CWN or fire rental helicopters prior to use. It may also
7 be utilized for project rental helicopters as a checklist to document the condition of the helicopter.
8 However, not all of the items indicated as required for fire are required for projects.

9 **Responsibility and Instructions for Completion**

10 Pre-use inspections should be accomplished prior to arrival of the helicopter at the incident by the
11 HMGB, an agency aircraft inspector, or other authorized aviation management personnel.

12 The HMGB is responsible for either ensuring the inspection has been completed (ask for signed copy
13 from vendor) or completing the checklist prior to the utilization of the helicopter.

14 Discrepancies must be reported immediately to the aircraft contracting organization, as well as to the
15 state, area, or regional aviation officer or his/her representative. Do not use the aircraft until
16 discrepancies have been rectified and/or permission is given to utilize the aircraft.

17 **Routing and Filing**

18 The HMGB should keep the completed form unless requested to route it differently.

19 **Posting**

20 None.

21 **Related Forms**

22 Aircraft Contract Daily Diary, HCM-1, should be initiated simultaneously with the CWN Pre-Use
23 Checklist, HCM-2. Discrepancies should be noted on the HCM-1.

1 **Aircraft Fuel Facility Inspection Log, HCM-3**

2 **Purpose**

3 The purpose is to provide an inspection format for aircraft fuel facilities to ensure that fuel quality is
4 maintained and fuel spills do not occur.

5 **Applicability**

6 The information on this form is required for:

- 7 • all fixed or mobile helicopter fueling facilities operated by the government, or
- 8 • vendor-owned facilities on government land that is operated by a vendor.

9 **Responsibility and Instructions for Completion**

10 The vendor is responsible for inspecting vendor-owned facilities located on government land, or
11 government-owned facilities for which the vendor is contractually responsible. For example, the vendor
12 is required to maintain and fill a remote fuel cache.

13 The government will ensure that inspections are performed with the frequency indicated.

14 A government representative (for example, the HMGB or local Unit Aviation Manager) is responsible
15 for inspecting government-owned facilities.

16 Items are checked according to the frequency indicated. Refer to Chapter 13 – Fueling Operations, for
17 further information.

18 Remote facilities for which the required frequency of inspection (for example, daily or weekly checklist
19 items) is not feasible must be fully inspected prior to the use of fuel in the facility.

20 **Routing and Filing**

21 For facilities for which the vendor is responsible, the vendor will provide the government representative
22 (for example, the HMGB or PI) with a copy of each monthly inspection. A copy will be furnished to the
23 COR in federal agencies, and to an appropriate individual as identified by state and local agencies.

24 For facilities for which the government is responsible, the contract PI will furnish a copy of each
25 monthly inspection to aviation management personnel as identified by the agency.

26 **Posting**

27 None.

28 **Related Forms**

29 Any discrepancies regarding facilities for which the vendor is responsible should be noted on HCM-1.
30 The HMGB should file an agency incident/hazard report concerning any fuel cache discrepancies,
31 regardless of who has the responsibility for maintaining the site. For fuel spills at the site, other local,
32 state, and federal reporting regulations apply.

1 **Helicopter Turbine Engine Power Assurance Check, HCM-4**

2 **Purpose**

3 The purpose is to gather engine performance data which, when graphed with subsequent power checks,
4 may indicate power fluctuations that potentially could lead to engine failure.

5 **Applicability**

6 This form is optional. The vendor or agency pilot is required to complete the power assurance check
7 every 10 hours of flight for all fire Exclusive-Use and fire CWN helicopters and for project Exclusive-
8 Use contracts. A Helicopter Turbine Engine Power Assurance Check will be accomplished on the first
9 day of operation, and thereafter within each 10-hour interval of contracted flight operation unless
10 prohibited by environmental conditions, i.e., weather, smoke.

11 The power assurance check will be accomplished by the contractor in accordance with the rotorcraft
12 flight manual or approved company performance monitoring program. The results are recorded and kept
13 in the helicopter or at the assigned work location. A current record of the power assurance checks will
14 be maintained with the aircraft. Helicopters with power output below the minimum published
15 performance charts will be removed from service. The below-minimum power condition will be
16 corrected before return to service and contract availability.

17 **Responsibility and Instructions for Completion**

18 The pilot is responsible for completing the form and furnishing a copy to the HMGB.

19 Since Helicopter Turbine Engine Power Assurance Check procedures differ according to make and
20 model of aircraft, refer to the flight manual and record appropriate readings according to procedures
21 specified.

22 Chart definitions are as follows:

- 23 • PA = Pressure Altitude.
- 24 • OAT = Outside Air Temperature.
- 25 • N1 = Gas Producer Speed.
- 26 • N2 = Engine RPM.
- 27 • TOT = Turbine Outlet Temperature.
- 28 • TPT = Tail Pipe Temperature.
- 29 • ITT = Inter Turbine Temperature.
- 30 • Type of Check = Hover.
- 31 • Performance Reading = TOT/ITT values and/or % of RPM from aircraft instruments.
- 32 • Chart Reading = TOT/ITT values and/or % of RPM from performance chart.
- 33 • Margin Difference = Difference between the aircraft performance and chart values.

1 **Routing and Filing**

2 The pilot furnishes the HMGB with a copy of the Power Trend Analysis; it becomes part of the contract
3 file.

4 **Posting**

5 None.

6 **Related Forms**

7 Information may be transferred to Helicopter Turbine Engine Performance Analysis Chart, HCM-5.

1 **Turbine Engine Performance Trend Analysis, HCM-5**

2 **Purpose**

3 The purpose is to graph the data collected every 10 hours from the HCM-4. When graphed with
4 subsequent Helicopter Turbine Engine Power Assurance Check, power fluctuations that might lead to
5 engine failure may be indicated.

6 **Applicability**

7 This form is optional. The information on this form is required to be maintained in accordance with the
8 procurement document.

9 **Responsibility and Instructions for Completion**

10 The pilot is responsible for graphing the data.

11 **Routing and Filing**

12 None.

13 **Posting**

14 The graph should be posted at the permanent helibase and taken with the service truck (not the
15 helicopter) on off-unit incidents or projects.

16 **Related Forms**

17 HCM-4 is utilized to record values for input to the HCM-5.

18 The HMGB should document discrepancies on the agency incident/ hazard report and note them on
19 HCM-1.

20 Turbine Engine Performance Trend Analysis, HCM-5.

1 **Helicopter Information Sheet, HCM-6**

2 **Purpose**

3 The purpose is to provide the HEBM and other operations branch personnel with information
4 concerning the helicopter, the pilot, and the vendor's ground crew (driver/mechanic) assigned to
5 multiple-aircraft helibases.

6 It summarizes most, if not all information relating to each individual helicopter operation at a helibase,
7 thus relieving the HEBM from having to obtain this information at various times over the course of the
8 incident or project.

9 **Applicability**

10 The information on this form is required for large fire operations and projects.

11 **Responsibility and Instructions for Completion**

12 The HMGB for both Exclusive-Use contracts and CWN is responsible for completing the form prior to
13 or immediately after arrival at an incident or project helibase.

14 The HEBM is responsible for obtaining the HCM-6 immediately upon arrival of a helicopter at an
15 incident or project.

16 Exclusive-Use Helicopters. All information available at the start of the season should be entered, and
17 multiple copies made for distribution upon arrival at an incident or project. Information concerning
18 incident/project order number, aircraft request number, and maintenance and vendor crew information
19 should be completed upon arrival at an incident or project.

20 CWN helicopters. All information should be completed when the CWN crew assembles and joins up
21 with the helicopter.

22 **Routing and Filing**

23 The form is submitted to the HEBM upon arrival at an incident or project. The ASGS or AOBD is
24 responsible for routing an informational copy to the Resources Unit Leader.

25 **Posting**

26 None.

27 **Related Forms**

28 Helicopter Crew Information Sheet, HCM-7, should be submitted concurrently. Information from the
29 HCM-6 is used to complete Helibase Aircraft Information Summary, HBM-3.

1 **Helicopter Crew Information Sheet, HCM-7**

2 **Purpose**

3 The purpose is to provide the HEBM and other air operations branch personnel with information
4 concerning helicopter crews assigned to helicopters at incident or project helibases. It identifies order
5 numbers for CWN crews, qualifications, training needs, days off, etc.

6 It relieves the HEBM from having to obtain this information at various times over the course of the
7 incident or project. It is especially valuable for filling helibase positions and training assignments.

8 **Applicability**

9 The information on this form is required for large fire operations and projects.

10 **Responsibility and Instructions for Completion**

11 The HMGB for both Exclusive-Use contracts and CWN is responsible for completing the form prior to
12 or immediately after arrival at an incident or project.

13 The HEBM is responsible for obtaining the HCM-7 Information Sheet immediately upon arrival of a
14 helicopter at an incident or project.

15 Exclusive-Use Helicopters. All information available at the start of the season should be entered, and
16 multiple copies made for distribution upon arrival at an incident or project. Information concerning
17 incident/project order number, aircraft request number, and last day(s) off is to be completed upon
18 arrival at an incident or project.

19 CWN Helicopters. All information should be completed when the CWN crew assembles and joins up
20 with the helicopter.

21 **Routing and Filing**

22 The form is submitted to the HEBM upon arrival at an incident or project. The ASGS or AOBD is
23 responsible for routing an informational copy to the Resources Unit Leader.

24 **Posting**

25 None.

26 **Related Forms**

27 HCM-6 should be submitted concurrently with HCM-7. Information from HCM-7 is used to complete
28 Helibase Organization Chart, HBM-1, ensuring that only qualified individuals fill helibase positions.

1 **Interagency Helicopter Load Calculation, HCM – 8, OAS-67/FS 5700-17**

2 **Purpose**

3 The purpose is to ensure that the aircraft is capable of carrying a specified load to an identified elevation
4 at a given density altitude.

5 **Applicability**

6 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

7 **Responsibility and Instructions for Completion**

8 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

9 **Routing and Filing**

10 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

11 **Posting**

12 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

13 **Related Forms**

14 *NWCG Passenger/Crew and Cargo Manifest*, PMS 245, is used to document manifest information under
15 one “umbrella” load calculation.

16 Helicopter Load Capability Summary Multiple Helispots and Fuel Loads, HCM-10, may be used to
17 summarize load calculation information and plan flights. However, data for altitudes, temperatures, and
18 fuel weights indicated must be supported by load calculations completed from the appropriate chart(s).
19 Allowable Payload Chart, HMB-4, is completed from individual load calculations. Load calculation,
20 manifest, and flight time information is summarized on Helicopter Daily Use and Cost Summary,
21 HCM-15, and is utilized to complete the agency flight payment document.

1 **Interagency Helicopter Passenger/Cargo Manifest, HCM-9**

2 **Purpose**

3 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

4 **Applicability**

5 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

6 **Responsibility and Instructions for Completion**

7 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

8 **Routing and Filing**

9 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

10 **Posting**

11 Refer to Chapter 7 – Helicopter Load Calculations and Manifests for further information.

12 **Related Forms**

13 OAS-67/FS 5700-17/HCM-8 is used to document manifest information under one “umbrella” load
14 calculation. Load calculation and manifest totals are collated on HCM-15. Manifests are utilized to
15 complete the agency flight payment.

1 Helicopter Load Capability Summary Multiple Helispots and Fuel Loads, HCM-10

2 Purpose

3 The purpose is to enable the HMGB to plan mission loads safely and efficiently to different elevations
4 or helispots at different temperatures with different fuel loads.

5 Applicability

6 The form is optional but should be used on incidents or projects where multiple helispots have been
7 established. It may be required by the incident air operations staff.

8 Responsibility and Instructions for Completion

9 The HMGB is responsible for ensuring the form is completed and updated as new helispots are
10 established.

- 11 • Block 1: Aircraft Information. Enter information as indicated.
- 12 • Block 2: Allowable Payloads. Complete the matrix by calculating allowable payloads, both
13 HIGE and HOGE, with full or working fuel load, to different helispots or elevations, for
14 temperatures appropriate to the area.
- 15 • It is essential that the load calculation form and appropriate flight manual performance charts be
16 used to determine allowable payloads. A load calculation form must be completed for every
17 temperature, elevation, and fuel load indicated on the form. However, once a load calculation is
18 completed, the information on HCM-10 may be utilized in conjunction with the *NWCG*
19 *Passenger/Crew and Cargo Manifest*, PMS 245.
- 20 • Block 3: Payload Adjustments. Depending on the size helicopter and fuel capacity, enter
21 increased payload capability in pounds as fuel weight is reduced.
22 Utilizing the load calculation form, HCM-10 should be updated as additional helispots are
23 established.

24 Routing and Filing

25 At multiple-aircraft helibases, the HMGB should submit the form to the HEBM.

26 Posting

27 The form should be posted on the helibase display board.

28 Related Forms

29 OAS-67/FS 5700-17/HCM-8 is used to calculate information.

30 Loads are documented on *NWCG Passenger/Crew and Cargo Manifest*, PMS 245.

31 Allowable Payload Chart, HBM-4, Flight Following Log HBM-5; and Resource Capability Planning
32 Chart, may be completed from information supplied on HCM-10.

1 **Aircraft Dispatch, HCM-11**

2 **Purpose**

3 Provide the HMGB and pilot with dispatch information critical to flight safety and efficiency (note that
4 block numbers correspond exactly to those on the dispatcher's Resource Order).

5 Provide accurate information concerning individual incidents during multiple-fire situations.

6 Provide information (for example, incident number and Hobbs Meter start/end readings) essential for
7 accurate completion of agency payment documents.

8 **Applicability**

9 This form is optional. If utilized, it should be completed for all fire helicopter initial attack missions,
10 both Exclusive-Use contract, and CWN. It is not intended to be used for mission dispatch, other than
11 initial attack, at incident helibases.

12 **Responsibility and Instructions for Completion**

13 The HMGB completes the form.

14 The dispatcher provides the information to the HMGB prior to or immediately after dispatch by phone
15 or by radio.

16 **Routing and Filing**

17 Copies are kept as part of the helicopter crew file.

18 **Posting**

19 None.

20 **Related Forms**

21 Agency flight payment document can be completed from information entered (for example, billing
22 numbers).

1 **Pilot Flight Time/Duty Day Cumulative Log, HCM-12**

2 Fuel Servicing Driver Duty Day Cumulative Log, HCM-13.

3 Mechanic Duty Day Cumulative Log, HCM-14.

4 **Purpose**

5 The purpose of these forms is to enable the HMGB to track contract or CWN pilot, driver, and mechanic
6 flight time or driving time (as applicable), as well as duty day, so that limitations are not exceeded.

7 **Applicability**

8 HCM-12 and HCM-14 are required for all contract aircraft. It is also mandatory for CWN and rental
9 aircraft used for more than four continuous days. It is advisable to initiate these forms immediately at the
10 start of any incident CWN or rental use.

11 **Responsibility and Instructions for Completion**

12 HMGB's are responsible for making entries to the form on a daily basis for the period of the contract, or
13 for CWN, for the period of use.

14 If completing the electronic version, <https://www.nwcg.gov/publications/510>, refer to electronic help
15 text for correct procedure on entering pilot day off to ensure cumulative flight time feature works.

16 It is the responsibility of HMGB to inform the HEBM of flight time, driving time, or duty day
17 limitations that may interfere with planned operations.

18 **Posting**

19 None at incident helibases. It may be posted at the permanent helibase for Exclusive-Use contract crews,
20 but must be taken on off-unit dispatches.

21 **Routing and Filing**

22 No routing is necessary. Completed logs become part of the contract file.

23 **Related Forms**

24 HCM-1.

25 An agency incident/hazard report is submitted if limitations are exceeded.

1 **Helicopter Daily Use and Cost Summary, HCM-15**

2 **Purpose**

3 The purpose is to enable the HMGB to summarize daily use and costs for the helicopter.

4 **Applicability**

5 The form is required on incidents to which an IMT Type 1, Type 2 or CIM is assigned. However, the air
6 operations staff on these IMTs will usually require that the HEBM(s) submit summaries from the day of
7 initial attack. Helicopter and Helibase Managers should therefore be prepared to furnish this information
8 once an IMT is assigned.

9 It may also be required on projects at the Project Aviation Manager's option.

10 **Responsibility and Instructions for Completion**

11 Each HMGB is responsible for completing the HCM-15 at the end of each day's operational period. The
12 HMGB submits it to the HEBM.

13 Use totals are gathered from load calculations and manifest forms. The HMGB should ensure:

- 14 • If daily flight guarantees are not met for CWN or rental helicopters, that these costs are included
15 on the summary.
- 16 • If daily/hourly availability or guarantee costs on Exclusive-Use contract helicopters are already
17 paid from pre-suppression funding, that these costs are not included on the summary.
- 18 • Mobilization costs (for example, ferry time to the incident, service truck miles, etc.) must be
19 included on the first summary submitted.
- 20 • Demobilization costs should be estimated, and a final summary submitted to the HEBM prior to
21 the departure of the helicopter from the incident or project.

22 **Posting**

23 None.

24 **Routing and Filing**

25 The HMGB gives the summary to the HEBM. A copy of each helicopter's cost summary should be
26 made part of the helibase file.

27 **Related Forms**

28 Helicopter load calculations and manifests forms are used to complete the summary. The HEBM
29 completes Helibase Daily Use and Cost Summary, HBM-11, from helicopter summaries.

1 **Contractor Performance Assessment Report System (CPARS)**

2 **Purpose**

3 The purpose of the form is to provide vendor performance information to the contracting official for
4 agencies that utilize it.

5 **Applicability**

6 CPARS are mandatory for DOI and Forest Service for CWN and Exclusive-Use contract agreements.

7 **Responsibility and Instructions for Completion**

8 Government representative is responsible for making entries to the form at the conclusion of any
9 assignment or mandatory availability period. It is the vendor's responsibility to provide the form to the
10 contracting official as identified by procurement document.

11 **Posting**

12 None at incident helibases.

13 **Routing and Filing**

14 Vendor responsibility to have form completed and submitted to the appropriate contracting official.

15 **Related Forms**

16 None

1 **Appendix B – Helibase Management Forms and Checklists**

2 **Introduction**

3 This appendix provides standardized forms for the management and operation of helibases. A discussion
4 of helibase related Incident Command System (ICS) forms, checklists, evaluations, and job aids, is also
5 included. The Helibase Management Forms and Checklists are found at,
6 <https://www.nwccg.gov/publications/510>.

7 Such standardization helps to implement common procedures among participating agencies to meet
8 mutual safety, efficiency, fiscal management, and contract administration objectives. The forms also
9 provide a basis for training development and presentation.

10 **Applicability**

11 The forms in this appendix are to be utilized by HEBM's, whereas those in Appendix A – Helicopter
12 Management Forms and Checklists are utilized by HMGB's in the management and operation of a
13 single helicopter.

14 However, several of the Helicopter Management (HCM-series) forms contribute to the informational
15 needs of the Helibase Management (HBM-series) forms.

16 It is therefore essential that HMGB's use these forms as appropriate or required when operating as part
17 of a helibase organization, and that HEBM's ensure that appropriate HCM forms are completed timely
18 and accurately.

19 Some of the forms are required for all helibase operations, and some are required only for incident
20 operations. Others are optional and may be used at the discretion of the HEBM. Certain optional forms
21 may be required by the air operations staff at an incident or project due to a specific management
22 informational need.

23 Chart B-1 on the following pages is a summary listing of the HBM-series and other checklists and job
24 aids. Included is information concerning the purpose of the form, the HBM form number, whether a
25 form is optional or required for all or only certain situations, responsibility for completion, and
26 frequency of completion. The HEBM may use this chart as a quick-reference guide to form
27 requirements. The pages following the chart contain a comprehensive discussion of each form.

28 All HEBM's should obtain sets of all forms so that they may respond to different management
29 requirements encountered. Recognizing that at most incidents, or prior to a project's start that copies
30 may be reproduced. Helibase Manager's Reminders List (HJA-2) provides recommendations concerning
31 the number of forms to carry in the HEBM's kit.

32 **Helibase Management (HBM) Forms**

33 NOTE: The Helibase Management (HBM) forms or checklists that are required must be completed or
34 implemented by the second operational period on incident helibases or helispots to which two or more
35 helicopters are assigned.

36 On project helibases with two or more helicopters assigned, the required forms must be completed or
37 implemented prior to the start of the first day's operations. The requirement for project helibases is
38 stricter than that for incidents due to the ability of the project's HEBM to plan in advance of the
39 operation.

1 **Exhibit B-1 – Helibase Management Forms Summary.**

2 **All required forms must be completed and implemented by the start of the second operational shift when two or more**
 3 **helicopters are assigned to an incident base. On project helibases where two or more helicopters are assigned, they must be**
 4 **completed or implemented at the start of the first operational shift.**

Title	Purpose	Applicability	Responsibility of Completion	Completion Frequency	Remarks
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	Applicability	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 ASGS and 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
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

Title	Purpose	Applicability	Responsibility of Completion	Completion Frequency	Remarks
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
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 Helibase Daily Use and Cost Summary (HBM-7)

Title	Purpose	Applicability	Responsibility of Completion	Completion Frequency	Remarks
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
Emergency Rescue Information HBM-15	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	Optional	Helibase Manager	As needed	The form becomes part of the Incident Crash Rescue Plan. Ensure updates are completed as changes occur

1 **Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00)**

2 **Purpose**

3 The purpose of the Daily Helicopter Operations Briefing/Debriefing Checklist is to provide the HEBM
4 with the means to brief all helibase personnel, including pilots. Space is provided on the form to
5 document feedback collected from all helibase personnel and pilots at the debriefing.

6 **Applicability**

7 The checklist is required and must be implemented by the second operational period on incident
8 helibases. On project helibases with two or more helicopters assigned, the form must be implemented
9 prior to the start of the first day's operations.

10 **Responsibility and Instructions for Completion**

11 The HEBM is responsible for completing the checklist daily. Pilots must initial the checklist daily to
12 indicate that they have received a briefing.

13 The Debriefing Section should be covered with all helibase personnel and pilots present.

14 The checklist may be used for a seven-day period, after which a new one must be initiated. Enter the
15 appropriate date(s) below each day on the new checklist.

16 The blank blocks below each day are for the HEBM to initial, to indicate the item has been completed
17 and/or discussed.

18 Refer to Appendix C – Helibase Manager's Reminders List (HJA-2), which addresses one-time 'start-
19 up' items (for example, helibase location considerations).

20 **Routing and Filing**

21 After a checklist has been completely used (that is, after seven days), it should be placed in the helibase
22 file for later inclusion in the incident or project file.

23 **Posting**

24 No posting requirement

25 **Related Forms**

26 Helibase Management (HBM) forms and HCM forms are not specifically discussed within the checklist.
27 However, many items may be initialed as complete through completion of these forms.

28 Helibase Manager's Reminders List (HJA-2) may be used by the HEBM as a job aid to ensure that daily
29 checklist items have been addressed. The HEBM may incorporate parts of the Reminders List in the
30 briefing or debriefing as appropriate.

31 The *NWCG Standards for Aerial Ignition*, PMS 501, <https://www.nwcg.gov/publications/501>, contains
32 Helitorch and PSD Operations Checklists. They should be used as a supplement, not in lieu of, the Daily
33 Helicopter Operations Briefing/Debriefing Checklist.

1 **Helibase Organization Chart (HBM-1)**

2 **Purpose**

3 The purpose is to establish, by name, those positions filled on a helibase, as well as provide other
4 information concerning aircraft and radio frequencies assigned.

5 **Applicability**

6 The form is required and must be initiated by the second operational period on incident helibases or
7 helispots to which two or more helicopters are assigned. On project helibases with two or more
8 helicopters assigned, the form must be completed prior to the start of the first day's operations.

9 **Responsibility and Instructions for Completion**

10 Refer to Exhibit B-1, Helibase Management Forms Summary. Refer also to Chapter 15 – Helibase and
11 Helispot Management and Operations for further information on making daily assignments. The HEBM
12 is responsible for completion. Names are entered at the start of helibase operations. Position assignments
13 are reviewed daily, and appropriate changes in the chart are made as needed. The HEBM must ensure
14 that personnel assigned to fulfill a function are qualified (see “Related Forms” below).

15 **Routing and Filing**

16 No routing is necessary. The form becomes part of the helibase file.

17 **Posting**

18 The form is posted on the helibase display board. Information may also be transferred to an organization
19 board carried by many helicopter crews.

20 **Related Forms**

21 Forms HCM-7, Helicopter Crew Information Sheet, should be consulted prior to making assignments in
22 order to ensure qualified personnel are filling positions. Frequencies are obtained from the day's Air
23 Operations Summary (ICS-220), and the Incident Radio Communications Plan (ICS-205).

1 **Helibase Complexity Analysis (HBM-1A)**

2 **Purpose**

3 The Helibase Management Complexity Analysis is intended to assist a HEBM/AOBD/Unit Aviation
4 Manager in assessing the complexities of operations at their Helibase(s). This is a risk analysis tool that
5 will help to quantify the complexity of a helibase operation and support a decision to request an
6 additional HEBM / HEBM (T) or limit current aviation flights until mitigations can be made to
7 conditions that threaten to exceed oversight capacity of a helibase operation.

8 **Applicability**

9 This analysis is applicable to all helibases.

10 **Responsibility and Instructions for Completion**

11 This complexity analysis would be completed by the helibase/aviation manager.

12 **Routing and Filing**

13 This complexity analysis would be routed through the helibase/aviation manager's supervisor. The form
14 becomes part of the helibase file.

15 **Posting**

16 This form is not required to be posted.

17 **Related Forms**

18 This analysis is related to Helibase Organizational Chart (HBM-1) since it will be used to determine the
19 management at a Helibase.

1 **Aviation Locations Summary (HBM-2)**

2 **Purpose**

3 The purpose is to provide information concerning helispots and other landing areas (for example, dip
4 sites) for load planning purposes, hazard identification and safety, and pilot briefings.

5 **Applicability**

6 The form is required and must be initiated by the second operational period on incident helibases or
7 helispots to which two or more helicopters are assigned. On project helibases with two or more
8 helicopters assigned, the form must be completed prior to the start of the first day's operations.

9 **Responsibility and Instructions for Completion**

10 Refer to Chapters 8 and 15 for further information. The initial reconnaissance of the incident for
11 purposes of helispot site selection provides a timely opportunity to initiate the form. The HEBM is
12 responsible for completion. Often the Helispot Managers and HEBM will jointly complete the summary.
13 Pilots should be consulted and briefed concerning the information on the summary. It should be updated
14 as necessary (additional helispots, helispot improvement to accommodate larger helicopters, etc.).

15 **Routing and Filing**

16 The summary becomes part of the helibase file.

17 **Posting**

18 The summary is posted on the helibase display board.

19 **Related Forms**

20 The summary is supplemented by a topographic map showing the locations of all helispots, dipsites,
21 hazards, etc.

1 **Helibase Aircraft Information Summary (HBM-3)**

2 **Purpose**

3 The purpose is to provide the HEBM and air operations staff with an informational summary on all
4 aircraft assigned to the helibase(s).

5 **Applicability**

6 The form is required for fires with a Type 1 or Type 2 IMT, or a CIM team assigned, and if requested by
7 project personnel.

8 **Responsibility and Instructions for Completion**

9 The HEBM is responsible for completion. Information is obtained from Forms HCM-6, Helicopter
10 Information Sheets, and Forms HCM-7, Helicopter Crew Information Sheets, submitted by HMGB's
11 upon arrival at the incident or project. The form should be updated as additional aircraft arrive.

12 **Routing and Filing**

13 A current copy of the form is routed to the ASGS and to the AOBD. The form becomes part of the
14 helibase file.

15 **Posting**

16 The summary is posted on the helibase display board.

17 **Related Forms**

18 Form HCM-6, Helicopter Information Sheet and Form, HCM-7 Helicopter Crew Information Sheet,
19 provide the necessary information.

1 **Allowable Payload Chart (HBM-4)**

2 **Purpose**

3 The purpose is to provide helibase management personnel with the means to plan mission loads safely
4 and efficiently. The completed forms can quickly provide the HEBM with information on which aircraft
5 are suitable for different loads to different helispots.

6 **Applicability**

7 Information on this form is optional. It may be required for by the HEBM to facilitate planning.

8 **Responsibility and Instructions for Completion**

9 The HEBM is responsible for ensuring forms are initially completed and updated as new aircraft arrive
10 on the incident or as new helibases/helispots are established. Actual completion is usually performed by
11 the Deck Coordinator or Loadmasters. Enter the allowable IGE/OGE loads for the range of temperatures
12 which may be encountered at the helispot during the day. These figures may be obtained from Form
13 HCM-11, Single Helicopter Load Capability Planning Summary – Multiple Helispots and Fuel Loads.
14 The form should be updated as additional aircraft arrive. A new form should be completed as additional
15 helispots are established.

16 **Routing and Filing**

17 No routing is necessary. The form becomes part of the helibase file.

18 **Posting**

19 The form is posted on the helibase display board.

20 **Related Forms**

21 Form HCM-8, Helicopter Load Calculation; Form HCM-10, Single Helicopter Load Capability
22 Planning Summary – Multiple Helispots and Fuel Loads; form HBM-4, Allowable Payload Chart.

1 **Helibase Flight Following Log (HBM-5)**

2 **Purpose**

3 The purpose is to enable the ABRO to perform helicopter flight following quickly and efficiently, with
4 knowledge of where any given helicopter is at any time.

5 **Applicability**

6 The form is optional and should be implemented by the second operational period on incident helibases
7 or helispots to which two or more helicopters are assigned. (It is recommended that the form be
8 implemented on any incident helibase where flight following is being performed on-site, that is, not
9 through the unit dispatch office.) On project helibases with two or more helicopters assigned, the form
10 must be implemented prior to the start of the first day's operations

11 **Responsibility and Instructions for Completion**

12 The HEBM is responsible for flight following at a helibase. The HEBM usually delegates this
13 responsibility to the ABRO, who becomes responsible for implementing and making entries on the form.
14 The ABRO should inform the HEBM immediately if a helicopter fails to meet a required check-in.

15 **Routing and Filing**

16 No routing is necessary. The form becomes part of the helibase file.

17 **Posting**

18 None. The ABRO usually keeps the form at the helibase communications area.

19 **Related Forms**

20 The form should be used in conjunction with HBM-5 (Flight Following Log) and HBM-6 (Helibase
21 Mission Request Log).

1 **Flight Hour Tracking (Multiple Helicopters) (HBM-5A)**

2 **Purpose**

3 The purpose is to enable the HEBM to track cumulative flight hours over the course of a day on
4 multiple-aircraft projects or incidents. It ensures that there will be sufficient flight time for tasks
5 assigned prior to the end of the operational period. The intent is not to track pilot flight time/duty day,
6 even though this information can be entered at the top of the form.

7 **Applicability**

8 The form is optional. It may be required by the HEBM or air operations staff to plan. It is recommended
9 that it be used on helibases with a large number of helicopters where tracking of flight time is more
10 difficult.

11 **Responsibility and Instructions for Completion**

12 The HEBM is responsible for ensuring completion. Actual completion is usually performed by the
13 Aircraft Timekeeper. The HEBM and HMGB's should make entries with whatever frequency (hourly,
14 every four hours, etc.) that is deemed necessary.

15 **Routing and Filing**

16 None.

17 **Posting**

18 None, although it may be posted on the display board. (The ABRO usually keeps the form in the
19 helibase communications area).

20 **Related Forms**

21 Form HCM-12, Pilot Flight Time/Duty Day Cumulative Log.

22

1 **Helibase Mission Request Log (HBM-6)**

2 **Purpose**

3 The purpose is to establish an orderly and documented mission request process for use by the HEBM in
4 tracking, prioritizing, and assigning helicopter missions.

5 **Applicability**

6 The form is required to be implemented by the second operational period on incident helibases. On
7 project helibases with two or more helicopters assigned, the form must be implemented prior to the start
8 of the first day's operations.

9 **Responsibility and Instructions for Completion**

10 The HEBM is responsible for entering mission requests as received from personnel authorized to request
11 them.

12 This responsibility is usually delegated to the ABRO.

13 Personnel receiving mission requests should ensure that personnel are authorized to request them, and
14 that the proper chain-of-command is followed.

15 Initial entries should be made at the morning's briefing from the Air Operations Summary (ICS-220) or
16 project plan. If the number or scope of missions conflict with available aircraft, obtain priorities from
17 ASGS or AOBD and enter priority in far left-hand column.

18 **Routing and Filing**

19 No routing is necessary. The form becomes part of the helibase file.

20 **Posting**

21 None.

22 **Related Forms**

23 Form ICS-220, Air Operations Summary.

1 **Helibase Daily Use and Cost Summary (HBM-7)**

2 **Purpose**

3 The purpose is to enable the HEBM to meet cost/use reporting requirements of the air operations staff
4 on an incident and of the Project Aviation Manager on a project.

5 **Applicability**

6 The form is required.

7 **Responsibility and Instructions for Completion**

8 The HEBM is responsible for completing this form. This responsibility is usually delegated to the
9 ABRO.

10 Entries are made from information provided by HMGB's on Form HCM-15, Helicopter Daily Use and
11 Cost Summary. The HEBM should ensure:

- 12 • If daily flight guarantees are not met on ARA helicopters, that these costs are included on the
13 summary.
- 14 • If daily/hourly availability or guarantee costs on Exclusive-Use contract helicopters are already
15 paid from pre-suppression funding, that these costs are not included on the summary.

16 **Routing and Filing**

17 The form is routed to the air operations staff on incidents or to the Project Aviation Manager on projects
18 at the end of shift. It becomes part of the helibase file.

19 **Posting**

20 None.

21 **Related Forms**

22 Forms HCM-15, Helicopter Daily Use and Cost Summary, submitted by each HMGB to provide
23 information on individual helicopter costs.

1 **Helibase Communications Plan (HBM-8)**

2 **Purpose**

3 The purpose is to provide radio frequency information to pilots and helicopter crews.

4 **Applicability**

5 The form is optional in both incidents and projects.

6 **Responsibility and Instructions for Completion**

7 The HEBM is responsible for completing the form. The AOBD or ASGS must communicate and
8 coordinate with the Communications Unit Leader (COML) concerning frequency needs and
9 assignments. The frequencies on the ICS-205 must match those identified on the Air Operations
10 Summary (ICS-220) and on Helibase Organization Chart (HBM-1).

11 **Routing and Filing**

12 The AOBD should ensure that sufficient copies of the ICS-205 are made available for use by the
13 HEBM, Takeoff and Landing Coordinator, ABRO, and pilots.

14 **Posting**

15 A copy should be posted on the helibase display board.

16 **Related Forms**

17 Air Operations Summary (ICS-220), and on form HBM-1, Helibase Organization Chart.

1 **Helicopter Demobilization Information Sheet (HBM-9)**

2 **Purpose**

3 The purpose is to enable the HEBM to provide demobilization information on air and associated ground
4 resources to the Planning Section so it may be relayed timely and accurately.

5 **Applicability**

6 The form is optional. It may be required by the HEBM or air operations staff to facilitate timely
7 transmittal of helicopter demobilization information.

8 **Responsibility and Instructions for Completion**

9 The HEBM and HMGB, along with the pilot, are responsible for completing the form when a decision
10 to demobilize the resource has been made.

11 Update if travel routes and times change, or decision to hold the resource is made.

12 **Routing and Filing**

13 Route the form to the ASGS or AOBD, who is responsible for ensuring the information is relayed to the
14 Planning Section and applicable dispatch center.

15 **Posting**

16 None.

17 **Related Forms**

18 None.

1 **Helicopter Flight Schedule (HBM-9A)**

2 **Purpose**

3 The purpose is to enable the HEBM to provide demobilization information on air and associated ground
4 resources to the Planning Section so it may be relayed timely and accurately.

5 **Applicability**

6 The form is optional. It may be required by the HEBM or air operations staff to facilitate timely
7 transmittal of helicopter demobilization information.

8 **Responsibility and Instructions for Completion**

9 The HEBM and HMGB, along with the pilot, are responsible for completing the form when a decision
10 to demobilize the resource has been made.

11 Update if travel routes and times change, or decision to hold the resource is made.

12 **Routing and Filing**

13 Route the form to the ASGS or AOBD, who is responsible for ensuring the information is relayed to the
14 Planning Section and applicable dispatch center.

15 **Posting**

16 None.

17 **Related Forms**

18 HBM-9A Helicopter Flight Schedule.

1 **Facilities, Hazard, and Flight Route Map (HBM-10)**

2 **Purpose**

3 The purpose is to enable the HEBM to brief pilots and other personnel on the location of Helibase
4 Facilities, touchdown pads, and flight routes inbound to and outbound from the helibase.

5 **Applicability**

6 The form is optional. but the information is required and should be completed by the second operational
7 period on incident helibases s to which two or more helicopters are assigned. On project helibases with
8 two or more helicopters assigned, the form should be completed prior to the start of the first day's
9 operations.

10 **Responsibility and Instructions for Completion**

11 Also refer to Chapters 8 and 15 for further information. The HEBM is responsible for completion. The
12 HEBM may delegate this responsibility to the Deck Coordinator, who in turn may delegate to the best
13 artist available. Pilots should be consulted regarding flight route, location of facilities, landing pads, etc.

14 The map should include, but is not limited to, the following:

- 15 • Inbound/Outbound Flight routes.
- 16 • Location of all landing pads, i.e., personnel, cargo, and fueling.
- 17 • Location of hazards on and around the helibase.
- 18 • Vehicle parking (fuel, helibase personnel, crews, cargo).
- 19 • Location of helibase operations and communications area.

20 The map should be updated as necessary (realignment of helibase, addition of landing pads, whenever
21 locations change, and facilities are added, etc.). A date/time should be indicated on the map.

22 **Routing and Filing**

23 Pilots should be briefed utilizing the latest map. No additional routing is necessary. The map becomes
24 part of the helibase file.

25 **Posting**

26 The map is posted on the helibase display board.

27 **Related Forms**

28 The Incident Map showing helispot locations and incident area hazards is a separate map.

1 **Helibase Cumulative Cost Summary (HBM-11)**

2 **Purpose**

3 The purpose is to ensure accurate cost tracking over the course of an incident or project.

4 **Applicability**

5 The form is optional for fire and project use. Air operations staff will request completion when required.

6 **Responsibility and Instructions for Completion**

7 The HEBM is responsible for completing this form, but may be delegated to other helibase staff. Entries
8 are made from the individual Helibase Daily Use and Cost Summary (HBM-7).

9 **Routing and Filing**

10 If used, the form becomes part of the helibase documentation file.

11 **Posting**

12 None.

13 **Related Forms**

14 Forms HBM-7 Helibase Daily Use and Cost Summary.

1 **Helitack Crew Performance Rating (HBM-12) and Helibase Personnel Performance**
2 **Rating (HBM-13)**

3 **Purpose**

4 Utilized to rate crews and single resources in performance of duties on the helibase.

5 **Applicability**

6 Optional.

7 **Responsibility and Instructions for Completion**

8 The forms will be completed by the appropriate helibase supervisor.

9 **Routing and Filing**

10 None.

11 **Posting**

12 None.

13 **Related Forms**

14 None.

1 **Two-for-One HMGB and/or Standard to Limited Request (HBM-14)**

2 **Purpose**

3 Document authorization from the appropriate State or Regional Aviation Manager, Regional Aviation
4 Officer to allow one manager to manage two (2) restricted category or Limited Use designated HMGB,
5 or to allow a standard category helicopter to be designated for Limited Use. Refer to Chapter 02 –
6 Personnel for more information.

7 **Applicability**

8 The form is optional, but authorization by the appropriate agency aviation manager must be
9 documented.

10 **Responsibility and Instructions for Completion**

11 The information is provided by the AOBD, ASGS, HEBM, HMGB, or Unit Aviation Manager.

12 **Posting**

13 None.

14 **Routing and Filing**

15 Routed to the Geographical Area Coordination Center and the local controlling dispatch office.
16 Completed logs become part of the contract file.

17 **Related Forms**

18 None.

1 **Emergency Rescue Information, HBM-15**

2 **Purpose**

3 The purpose is to identify primary and secondary medevac helicopters in the event of injuries to
4 personnel or in the event of an aircraft mishap and the locations of medical facilities.

5 **Applicability**

6 The form is optional and should be completed by the second operational period on incident helibases to
7 which two or more helicopters are assigned. On project helibases with two or more helicopters assigned,
8 the form should be implemented prior to the start of the first day's operations.

9 **Responsibility and Instructions for Completion**

10 The HEBM is responsible for completing and updating as necessary. Most information is available from
11 the local unit dispatch office.

12 **Routing and Filing**

13 The form becomes part of the Incident Crash Rescue Plan.

14 **Posting**

15 The form is posted on the helibase display board.

16 **Related Forms**

17 Form HJA-4, Crash Rescue/Medevac/Evacuation Plan, HJA-1, Emergency Medevac/ Medical Transport
18 Request, and Medical Plan (ICS 206 WF).

19 The purpose is to provide additional information which is not on a Resource Order or other dispatch
20 request but which is necessary to respond safely and efficiently to a request for helicopter EMS service.

Appendix C – Exclusive-Use Helitack Crew and Permanent 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 in Appendix E, located 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 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.

1 **Responsibility and Instructions for Completion**

2 Aviation management at the regional, state, or area level is responsible for facilitating the evaluation.
3 Conducting the evaluation can be delegated to the Unit Aviation Manager. Annual evaluations are
4 recommended. The crew and vendor should be allowed sufficient time (for example, 1-2 weeks)
5 between contract start and the evaluation.

6 The following is recommended:

- 7 • The Helitack Manager should use the evaluation as a checklist to prepare for the visit by the
8 team. It can also be used for self-evaluation throughout the season.
- 9 • In order to cover all functional areas in a reasonable amount of time, it is recommended that each
10 member of the evaluation team cover a separate functional area, with others on the team
11 concurrently completing their assigned area.
- 12 • A closeout with local fire and aviation management personnel, to review positive aspects of the
13 evaluation as well as deficiencies, is essential. The evaluation team should follow this up with
14 written documentation to the local Line Officer.
- 15 • A follow-up, either formal or informal, should be made to ensure corrective action has been
16 taken to rectify deficiencies.

17 **Routing and Filing**

18 Formal submission to the local Line Officer is recommended, with follow-up reply from the local unit as
19 to corrective actions planned or already taken. Regional, State or area aviation management should keep
20 past evaluations on file in order to ensure that items identified in previous visits have been addressed.

21 It is recommended that Section L, Helitack Crew, be addressed LAST in the evaluation. During the
22 course of the inspection, items addressed in other sections will provide much of the information needed
23 to make the evaluation of personnel.

1	Section	Page
2	GENERAL INFORMATION.....	E-3
3	HELIBASE LOCATION AND LANDING AREA.....	E-4
4	BASE FACILITIES AND COMMUNICATIONS	E-6
5	PLANNING AND ADMINISTRATION	E-8
6	SAFETY AND TRAINING	E-10
7	PREFLIGHT PLANNING	E-12
8	CRASH RESCUE.....	E-13
9	CACHE AND EQUIPMENT	E-14
10	HELICOPTER.....	E-15
11	FUEL SERVICING VEHICLE	E-17
12	HELICOPTER CREW CHASE TRUCK.....	E-18
13	HELITACK CREW	E-19
14	PROFICIENCY CHECKS	E-21
15	SUMMARY	E-23
16	RECOMMENDATIONS AND FOLLOW-UP REQUIREMENTS	E-25
17	The Following Additional Sheets Are Available on the Electronic Version of This Checklist:	
18	HELICOPTER (supplemental sheets for additional helicopters)	E-27
19	FUEL SERVICING VEHICLE (supplemental sheets for additional fuel trucks)	E-29
20	HELICOPTER CREW CHASE TRUCK (supplemental sheets for additional chase trucks).....	E-31

1 **Appendix D – NSHO Helibase Job Aids Package**

2 **Introduction**

3 The job aids included in this appendix are forms, checklists, or worksheets that have been developed to
4 assist aviation managers as they perform their duties. These job aids help to organize information,
5 thought processes, and workload and are a means for standardized documentation. The forms also
6 provide a basis for training development and presentation.

7 The Helibase Job Aids Forms and Checklists are found at <https://www.nwcg.gov/publications/510>.

8 **Applicability**

9 These job aids have been developed to assist aviation managers as they perform their duties. Each of the
10 job aids have a specific purpose to assist in four different general topic areas; Emergency Response,
11 Helibase Management, Management of Remote Fuel Sites and Risk Management. These forms are all
12 optional but the information that some of them contain is required to be documented.

13 Aviation Managers are encouraged to use these forms as appropriate to ensure all items are considered
14 and actions are documented.

15 Exhibit F-1 is a summary listing of the HJAs. Included is information concerning the purpose of the
16 form, the HJA form number, whether a form is optional or if information is required, responsibility for
17 completion, and frequency of completion. The pages following the chart contain a discussion of each
18 form. Aviation Managers should reproduce sets of these forms so they are available when or as needed.

1 Exhibit D-1. HJA Forms Summary

Title	Purpose	Applicability	Responsibility Completion	Completion Frequency	Remarks
Emergency Medevac/Medical Transport Request, HJA-1	To provide additional information for aircraft responding to a medevac or medical transport.	Optional	Aircraft Base Radio Operator	As medical incidents occur	See Chapter 12
Helibase Manager's Reminders List, HJA-2	Enables the Helibase Manager to review items, systems, and procedures applicable to helibase operations.	Optional	Helibase Manager	Daily or as needed	
Remote Fuel Site Reminder List, HJA-3	Enables the Helibase Manager to review items, systems, and procedures applicable to remote fuel site operations.	Optional	Helibase Manager	During initial establishment of helibase and updated as necessary	
Crash Rescue/ Medevac/ Evacuation Plan, HJA-4	Provides procedures and protocols for crash rescue, medevac, and helibase evacuation missions.	Information is Required, can be on another form	Helibase Manager	During initial establishment of helibase and updated as necessary	See also Chapter 12
Risk Assessment Worksheet HJA-5	See also <i>NWCG Standards for Aviation Risk Management</i> , PMS-530.				See also <i>NWCG Standards for Aviation Risk Management</i> , PMS-530.
Risk Assessment and Mitigation, HJA-6	See also <i>NWCG Standards for Aviation Risk Management</i> , PMS-530.				See also <i>NWCG Standards for Aviation Risk Management</i> , PMS-530.
GAR Model Risk Assessment Worksheet HJA-7	See also <i>NWCG Standards for Aviation Risk Management</i> , PMS-530.				See also <i>NWCG Standards for Aviation Risk Management</i> , PMS-530.

1 **Emergency Medevac/Medical Transport Request (HJA-1)**

2 **Purpose**

3 To have a form available for the ABRO so he/she can ensure all pertinent information is obtained and
4 relayed during emergencies that involve helicopters.

5 **Applicability**

6 The form is optional but should be used for all requests for helicopter EMS, including “life flight”
7 helicopters and incident helicopters assigned to medevac missions. Completion is not required for
8 medevac transport from established helispots or the helibase.

9 **Responsibility and Instructions for Completion**

10 The HEBM is responsible for ensuring the form is completed when requests for such services are
11 received. This responsibility is usually delegated to the ABRO.

12 The information on this form supplements information that is relayed to the helibase from the Medical
13 Incident Report (8-Line). Ensure that as much information is completed as is possible or available.
14 Particular attention should be paid to radio frequencies, particular with “life flight” helicopters, and to
15 the availability of fuel either en route to the scene or to the medical facility.

16 **Posting**

17 None.

18 **Routing and Filing**

19 The form becomes part of the Incident Crash Rescue Plan.

20 **Related Forms**

21 HJA-4 Crash Rescue/Medevac/Evacuation Plan, and Emergency Rescue Information (HBM-15).

1 **Helibase Manager’s Reminders List (HJA-2)**

2 **Purpose**

3 Provide the HEBM with a comprehensive list of items, procedures, and systems required for helibase
4 and helispot management and operations. If items on the Reminders List are adequately covered, then
5 the Daily Helicopter Operations Briefing/Debriefing Checklist should show few, if any, discrepancies.

6 **Applicability**

7 Use of the Helibase Manager’s Reminders List (HJA-2), available at
8 <https://www.nwcg.gov/publications/510>, is optional, but highly recommended on all multiple-aircraft
9 helibases prior to or immediately after the start of air operations. Review of the list at appropriate times
10 during the course of an incident or project is also recommended.

11 **Responsibility and Instructions for Completion**

12 The HEBM should review the Helibase Manager’s Reminders List (HJA-2) upon arrival at multiple-
13 aircraft operations and should review all or parts of the list daily.

14 One-time “start-up” items, such as helibase location considerations, should be re-evaluated at
15 appropriate times.

16 Further guidance can be found in the appropriate chapter of this guide.

17 **Posting**

18 None. The HEBM may post a copy on the helibase display board.

19 **Routing and Filing**

20 None.

21 **Related Forms**

22 All of the Helibase Management (HBM) forms and several of the HCM forms are discussed. The Daily
23 Helicopter Operations Briefing/Debriefing Checklist (HBM-00), covers some but not all of the items
24 contained in the Reminders List.

1 **Remote Fuel Site Reminders List (HJA-3)**

2 **Purpose**

3 To provide the HEBM and/or Fueling Specialist with a comprehensive list of items, procedures, and
4 systems pertaining to remote site fueling operations.

5 **Applicability**

6 Use of the Remote Fuel Site Reminders List is optional but highly recommended for government-
7 operated fueling operations.

8 **Responsibility and Instructions for Completion**

9 The HEBM should review the list upon arrival at remote site fueling operations and daily thereafter.

10 **Posting**

11 None. The HEBM may post a copy on the helibase display board.

12 **Routing and Filing**

13 None.

14 **Related Forms**

15 The Daily Helicopter Operations Briefing/Debriefing Checklist (HBM-00) requires that fueling
16 operations be conducted safely. Use of this appendix will help meet this objective.

1 **Crash Rescue/Medevac/Evacuation Plan (HJA-4)**

2 **Purpose**

3 Provides procedures and protocols for crash rescue, medevac, and helibase evacuation missions.

4 **Applicability**

5 A Crash Rescue plan is required for all helibases and should be completed by the second operational
6 period. Other versions of this plan may be used.

7 **Responsibility and Instructions for Completion**

8 The HEBM is responsible for completing an incident specific plan it should also include the local
9 crash rescue plan, crash rescue diagrams from Appendix M, HJA-4A, and HJA-B.

10 Helibase personnel should be informed of information contained in this plan, and a crash rescue drill
11 should be done as practical.

12 **Routing and Filing**

13 The helibase should retain a copy for the helibase files, and a copy should be given to incident Medical
14 Unit for familiarization.

15 **Posting**

16 Plan should be posted on helibase information board or other conspicuous location.

17 **Related Forms**

18 Emergency Rescue Information (HBM-15), Emergency Medevac/Medical Transport Request (HJA- 1),
19 and Medical Plan (ICS 206 WF).

- 1 **Risk Assessment/Risk Management Worksheets (HJA-5, HJA-6, HJA-7)**
- 2 These job aids have been moved and will be maintained by the Aviation Risk Management
- 3 Subcommittee, see also *NWCG Standards for Aviation Risk Management*, PMS-530
- 4 <https://www.nwcg.gov/committees/aviation-risk-management-subcommittee/publications>.

1 **Appendix E – Incident, Hazard and Accident Reporting**

2 **Introduction**

3 A significant portion of an effective aviation safety management program is to ensure hazardous
4 situations or unsafe actions are reported in a timely manner. Written reports are analyzed by aviation
5 program managers to determine if and what kind of corrective actions should be taken and to track
6 trends.

7 **Situations that Warrant a Written Report**

8 Some of the definitions below supplement those found in the *NWCG Glossary of Wildland Fire*,
9 PMS 205. They may vary slightly among agencies but are generally applicable to all agencies.

10 **Aviation Hazard**

11 An aviation hazard is any condition, act, or set of circumstances that compromise the safety of personnel
12 engaged in aviation activities. These hazards may address, but are not limited to, such areas as:

- 13 • Deviations from policies, procedures, regulations and instructions as contained in Manual and
14 Handbook Releases, Interim Directives, standard operating guides, etc.
- 15 • Hazardous materials handling and/or transport.
- 16 • Flight following.
- 17 • Deviation from planned operations, flight plan, type of use (for example, general to special use).
- 18 • Failure to utilize PPE or ALSE.
- 19 • Inadequate training, or failure to meet training requirements.
- 20 • Failure to utilize load calculations and/or manifests correctly.
- 21 • Weather conditions.
- 22 • Ground operations.
- 23 • Pilot procedures.
- 24 • Fuel contamination.
- 25 • Unsafe actions by pilot, aircrew, passengers, or support personnel.

26 **Maintenance Deficiency**

27 A Maintenance Deficiency is a defect or failure causing mechanical difficulties encountered in aircraft
28 operations, not specifically identified as an incident or aviation hazard.

1 **Aircraft Incident**

2 An aircraft incident is an unplanned event that results in damage which is less than serious aircraft
3 incident criteria, or injury not requiring medical attention. A situation involving an aircraft and/or
4 personnel which has the potential of resulting in an accident is also classified as an aircraft incident.
5 Note that the USFS also has a classification of “Incident with Potential” to cause an accident. Examples
6 of incidents are:

- 7 • Injury to Personnel. Injury requiring only first aid.
- 8 • Damage to Aircraft. Any damage less than significant (and less than accident criteria) when
9 engines/rotors are turning and there is an intent to fly. When in doubt, respond to the occurrence
10 as if it were an accident. The accident investigators will determine whether the occurrence is
11 classified as an incident or accident.
- 12 • Forced Landing. A landing necessitated by failure of engines, systems, or components which
13 makes continued flight impossible, and which may or may not result in damage or injury.
- 14 • Precautionary Landing. A landing necessitated by apparent impending failure of engines,
15 systems or components, or incapacitation of the flight crew, which makes continued flight
16 inadvisable.
- 17 • Aircraft Ground Mishap. A mishap in which there is no intent to fly; however, the power plants
18 and/or rotors are in operation and damage incurred requiring replacement or repair of rotors,
19 propellers, tires, wheels, wing tips, flaps, etc., or an injury is incurred requiring first aid.
- 20 • Ground Damage to Aircraft. A mishap not specifically addressed as an incident above, where the
21 aircraft or component incurs damage requiring repair or replacement before flight. Powerplants
22 and/or rotors may or may not be in operation.
- 23 • Near Mid-Air Collision. When airborne aircraft encroaches within 500 feet of another airborne
24 aircraft, or a pilot or crew member determines that a collision hazard existed between two or
25 more aircraft.

26 **Accident**

27 The accident definition is lengthy and fairly technical. If in doubt as to whether the occurrence was an
28 incident (“Damage to Aircraft”) or an accident, treat it as an accident. The investigation team will make
29 the final determination as to classification.

30 **Reports and Forms**

31 The agency with operational control of the aircraft at the time of the occurrence will complete a written
32 report SAFECOM (incident/hazard form) and submit it through agency channels.

33 **USFS or DOI Bureaus/Agencies**

34 The Aviation Safety Communiqué (SAFECOM), OAS-34 /FS 5700-14. The SAFECOM form,
35 instructions and database is available at <https://www.safecom.gov/>.

36 The SAFECOM is a confidential safety reporting and feedback system for accident prevention. It is a
37 tool used to encourage the reporting of any condition, observance, act, maintenance problem, or
38 circumstance that has the potential to cause an aviation or aviation-related mishap. Data obtained from
39 the system is monitored to identify emerging hazards, share critical safety information, document and

1 track safety issues, and identify training needs. It is also used for reporting positive safety actions and
2 mishap prevention measures.

3 The SAFECOM system is not intended for initiating punitive or disciplinary actions and is not to be
4 used for claims or contract evaluation /determination purposes. The goal of the SAFECOM system is to
5 create a reporting culture that encourages open and honest reporting that improves the safety of aviation
6 operations. SAFECOMs should be utilized in tailgate safety sessions, after action reviews, and briefings
7 only after they have been properly managed through the system.

8 Submitting a SAFECOM is not a substitute for “on-the-spot” correction(s) to a safety concern. It is
9 imperative that safety issues be addressed at the local level as well as being documented in a
10 SAFECOM. SAFECOM managers at all levels may have additional corrective actions and input.

11 SAFECOM managers at all levels are responsible for protecting personal data and sanitizing
12 SAFECOMs prior to any distribution and/or posting to the public. The SAFECOM system contains
13 Personal Identifiable Information (PII) which is to be protected and safeguarded. In the event of an
14 accident, dissemination of accident investigation information must be in accordance with National
15 Transportation Safety Board (NTSB) law.

16 A SAFECOM does not replace the requirement for initiating a mishap report. Mishaps will be reported
17 immediately by the most expeditious means available in accordance with the bureau or agency Mishap
18 Response Plan.

19 In order for SAFECOMs to be effective as an accident prevention tool, they should be reported as soon
20 as possible to the agency with operational control of the aircraft at the time of the event. SAFECOMs
21 can be submitted online at SAFECOM or via phone at 888-464-7427. Hard copies of the OAS-34/FS-
22 5700-14 form can be faxed to OAS at 208- 433-5007; USFS at 208-387-5735 or submitted through the
23 Unit/Forest Aviation Officer.

24 Do not waste time trying to figure out if an event is an accident. If you have an event with an aircraft
25 that results in damage or injury, no matter how slight, REPORT IT to DOI or USFS by calling 1-888-
26 4MISHAP (888-4MISHAP).

27 **State and Local Agency Reports**

28 Reference local formats. Federal personnel managing helibases or engaging in helicopter missions for
29 state or local agencies should complete the state or local format. If none exists, complete a SAFECOM
30 and submit it to the local unit.

1 **Appendix G – Crash Rescue Diagrams**

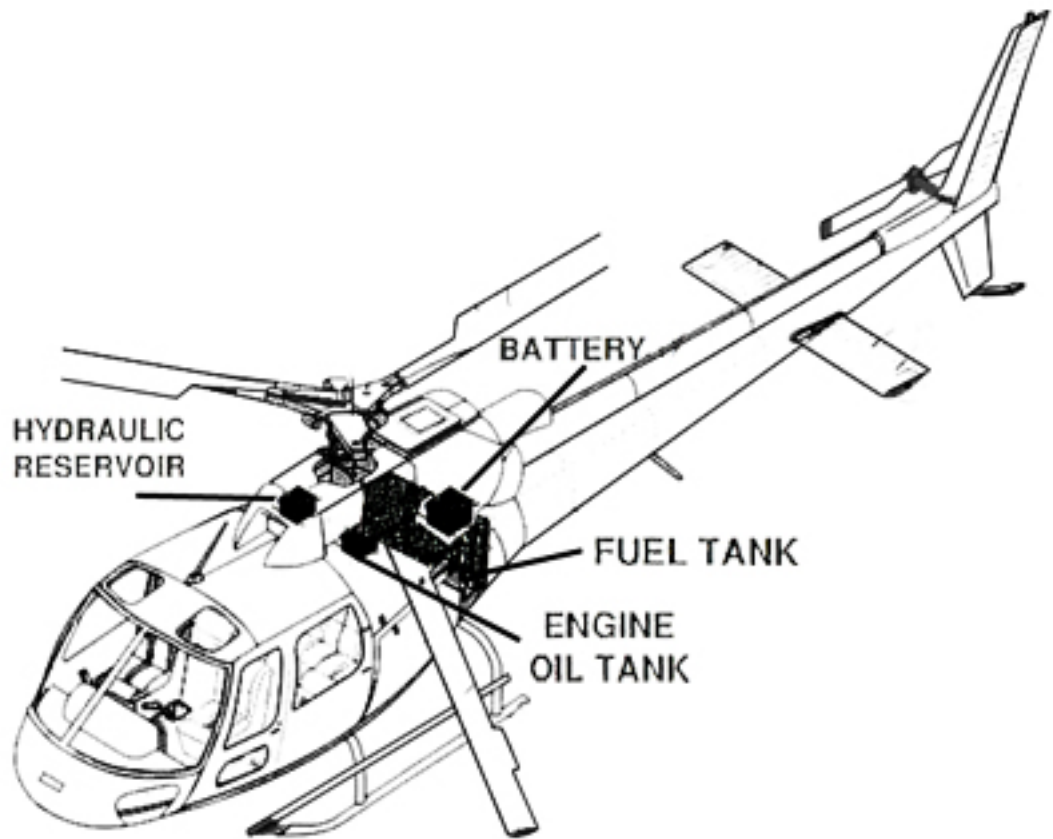
2 **Introduction**

3 This appendix provides typical diagrams of various makes and models of helicopters. The intent is to
4 provide crash rescue personnel on helibases or other locations with general information concerning
5 aircraft layout, emergency ingress and egress, and emergency procedures for fuel and electrical power
6 shutoff.

7 It is essential that helibase and other personnel with crash rescue responsibilities, or who may be
8 assigned such responsibilities, receive a briefing by the pilot on the specific characteristics of the
9 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.

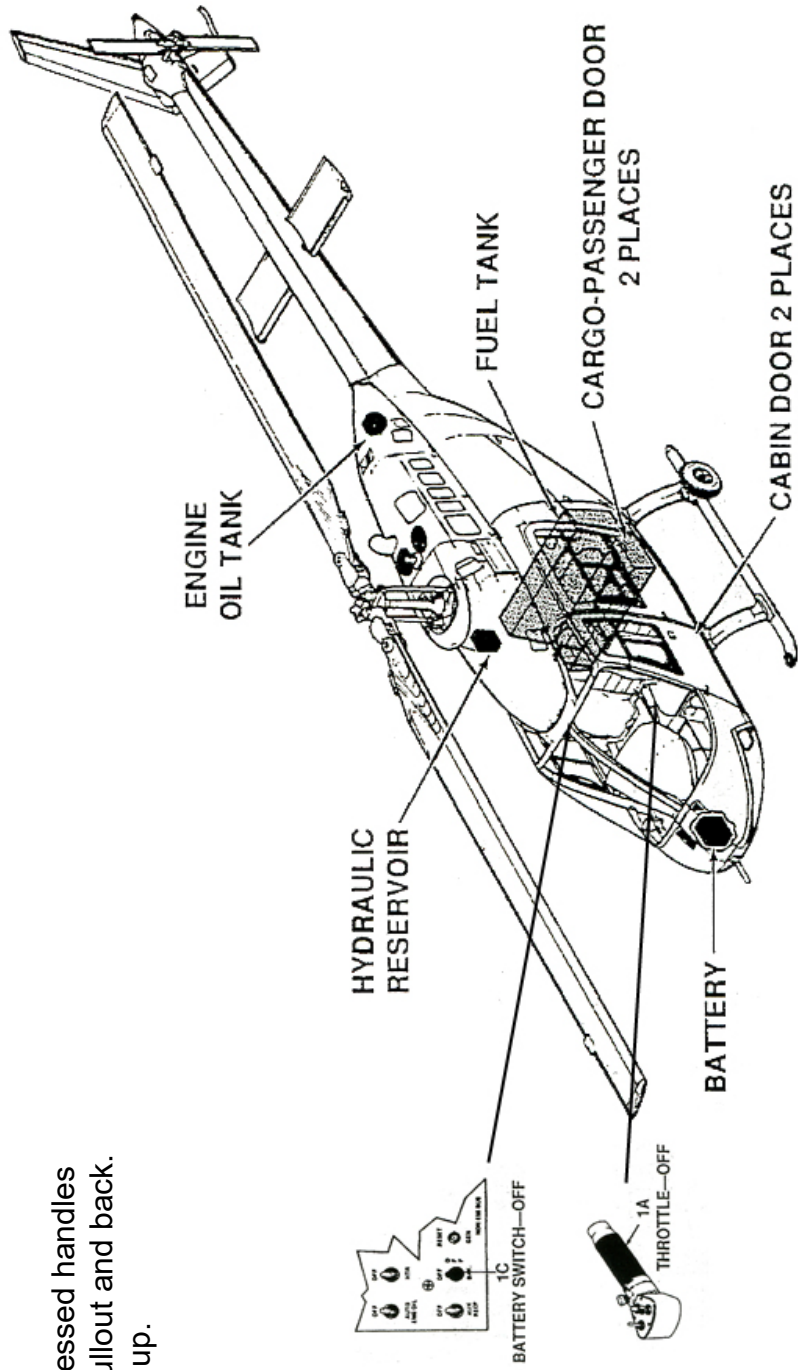


Bell 206B Crash Rescue

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.



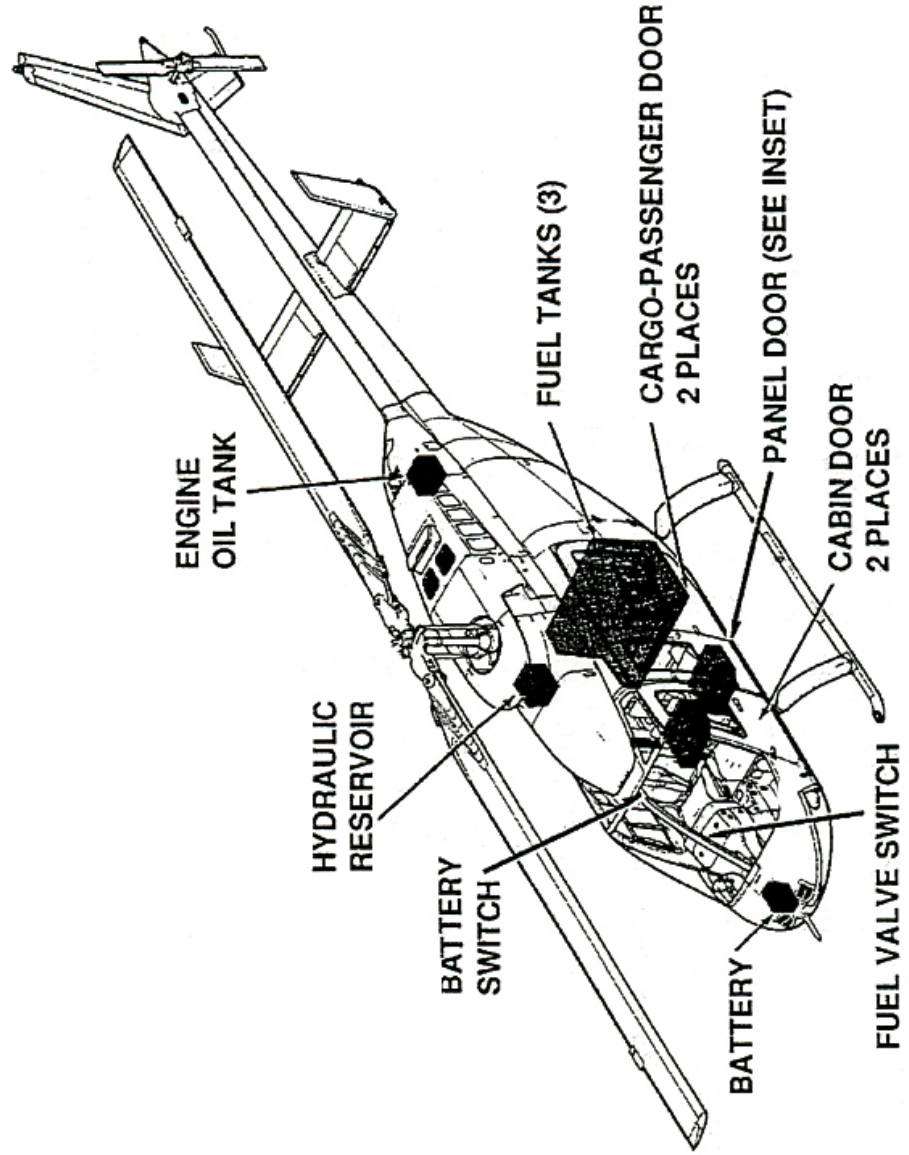
Bell 206L Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

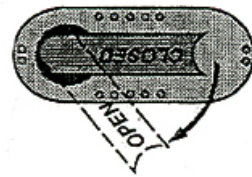
*To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.

* 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.



PANEL DOOR HANDLE



OPENING INSTRUCTIONS

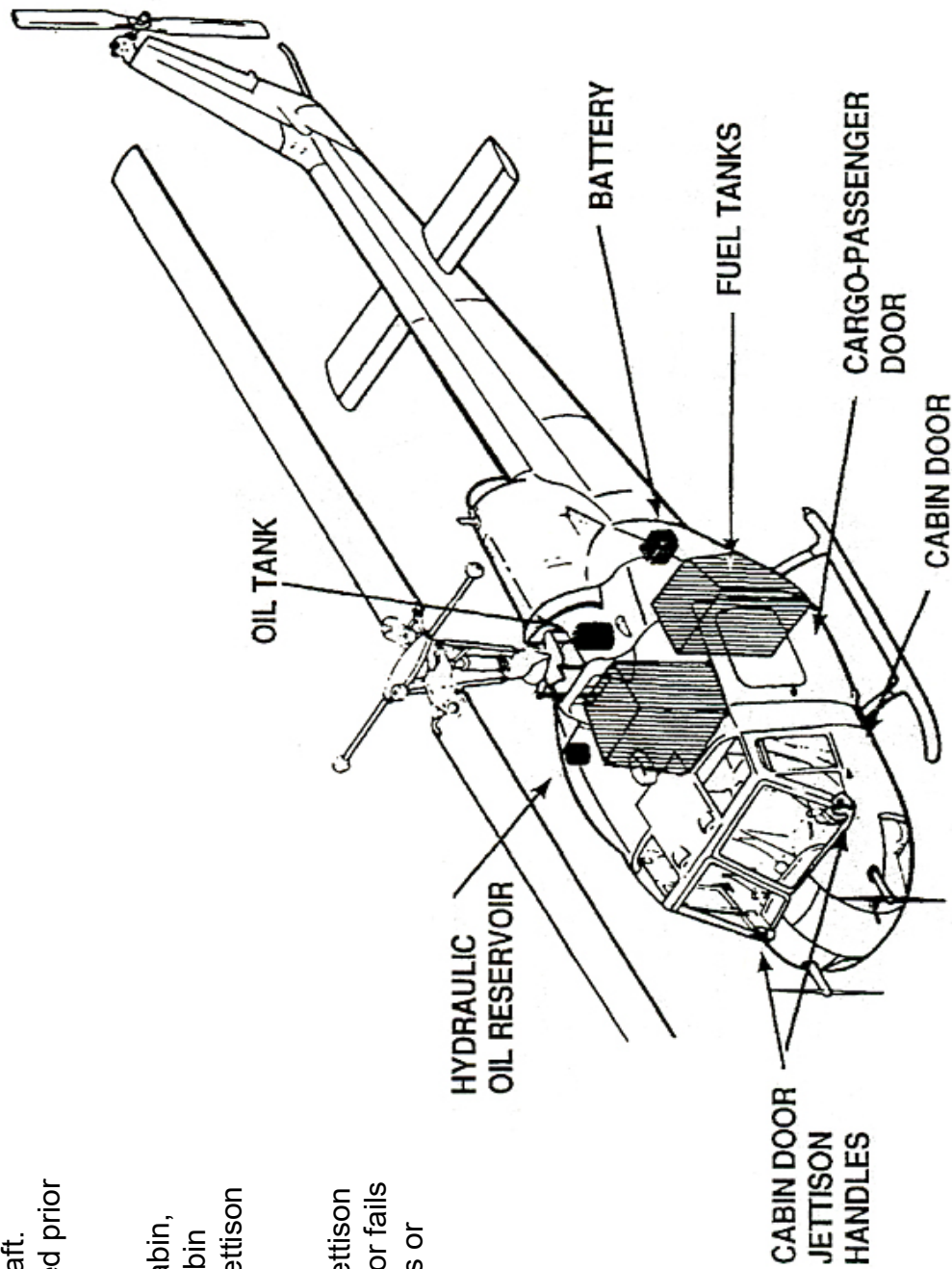
1. Open rear door
2. Lift panel door handle
3. Rotate as shown

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.

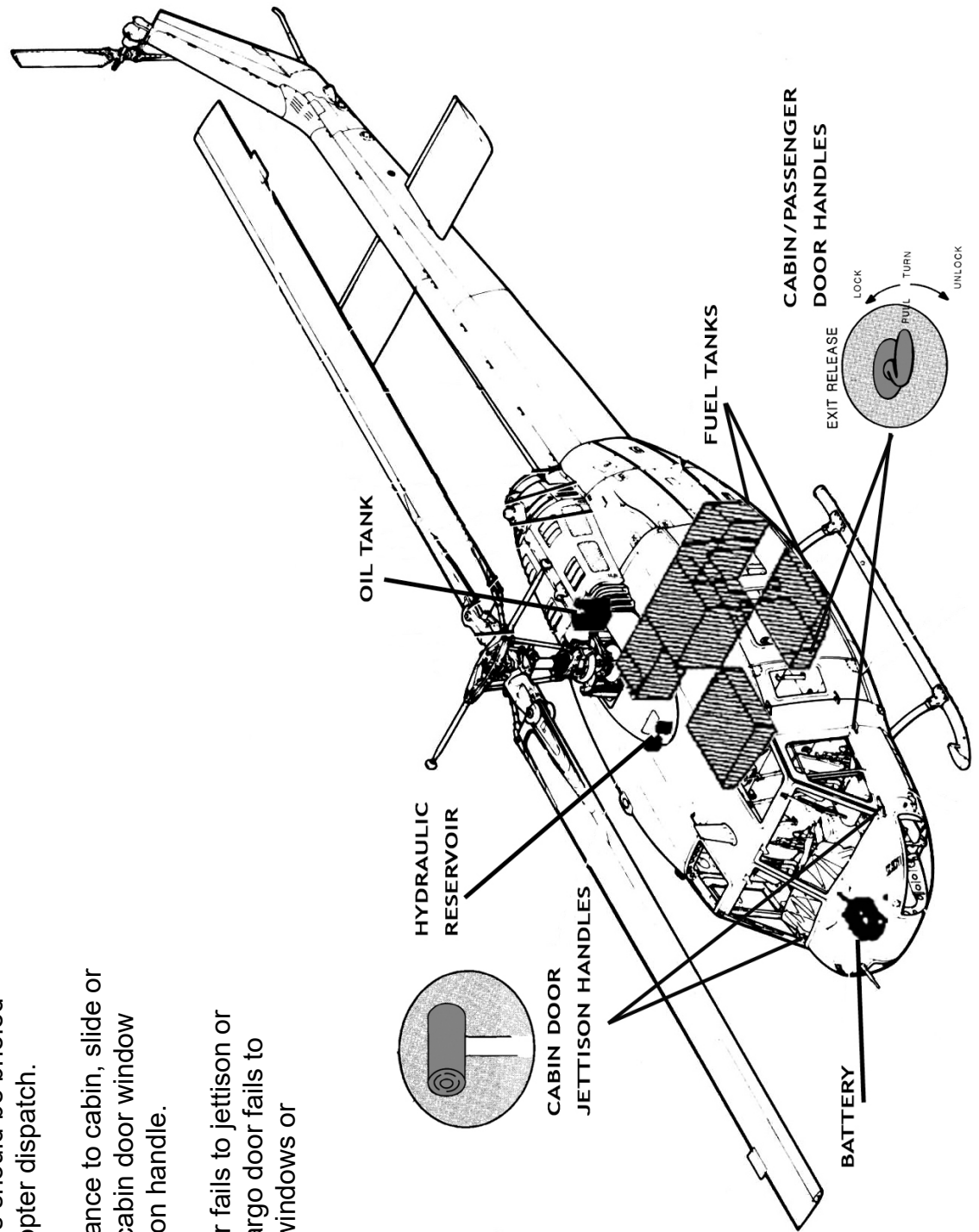
* If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



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.

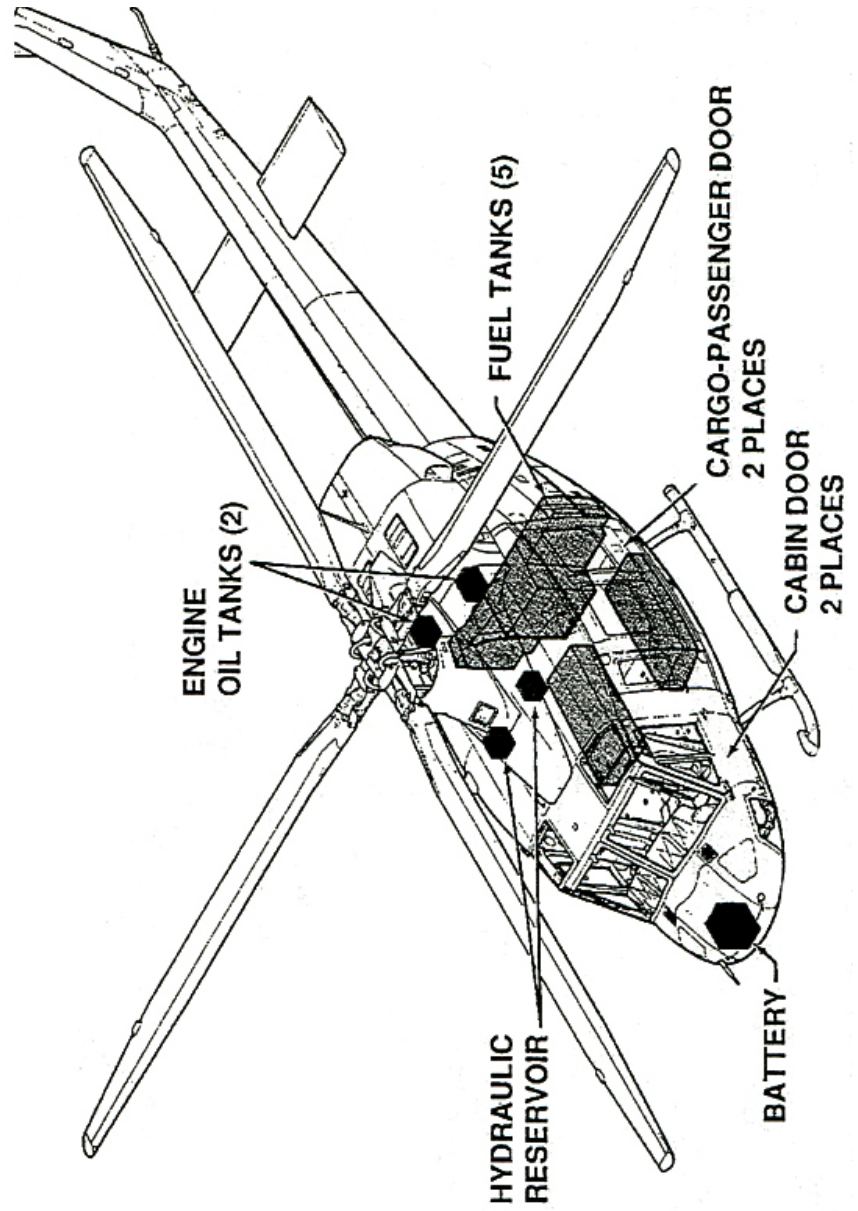
- *To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.
- * If cabin door fails to jettison or passenger-cargo door fails to open, break windows or windshield.



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.

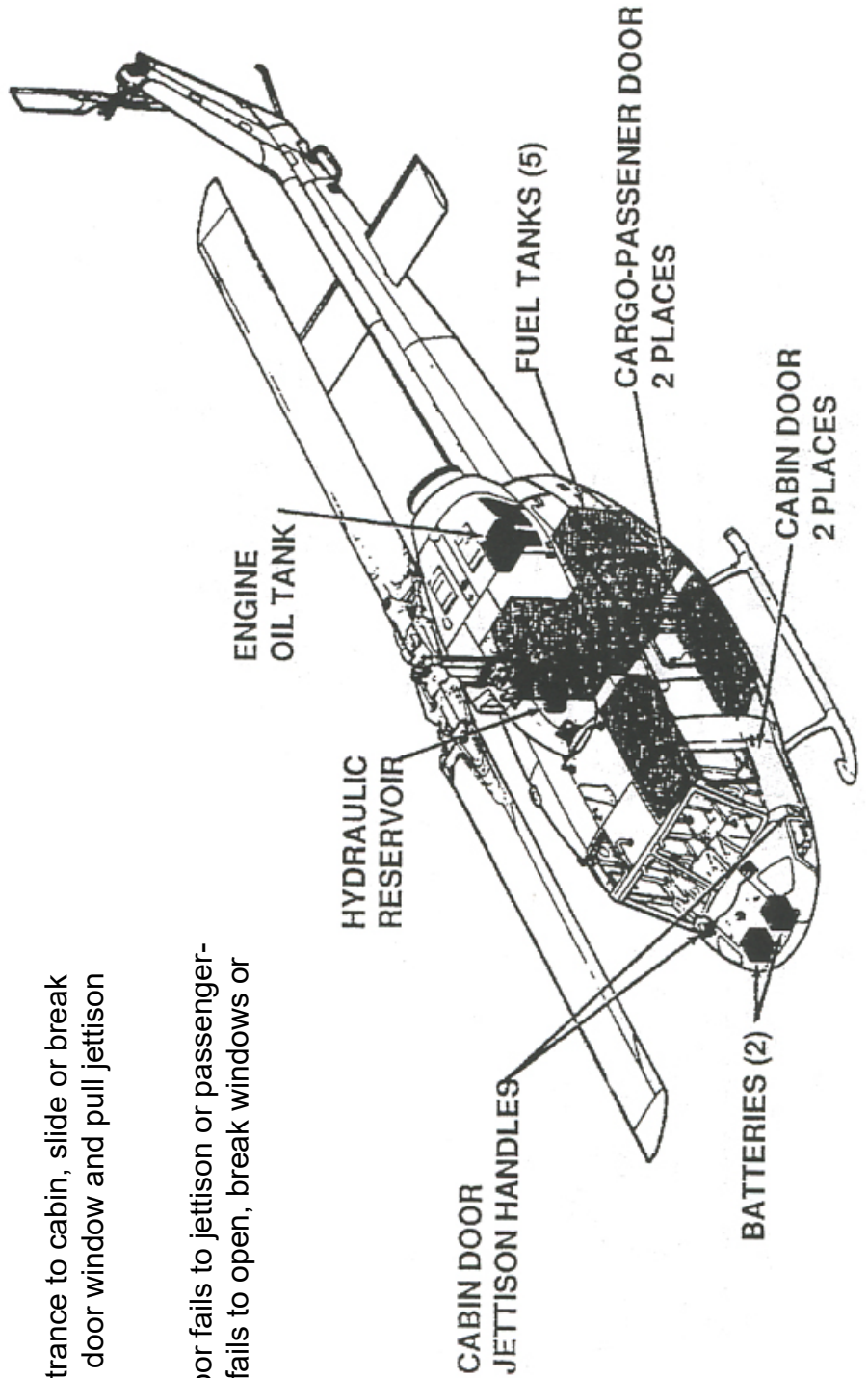
- * Pull both fire extinguisher "T" handles located on instrument panel, top center. "T" handles activates extinguishers and shuts off fuel valve.
- * To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.
- * If cabin door fails to jettison or passenger-cargo door 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.

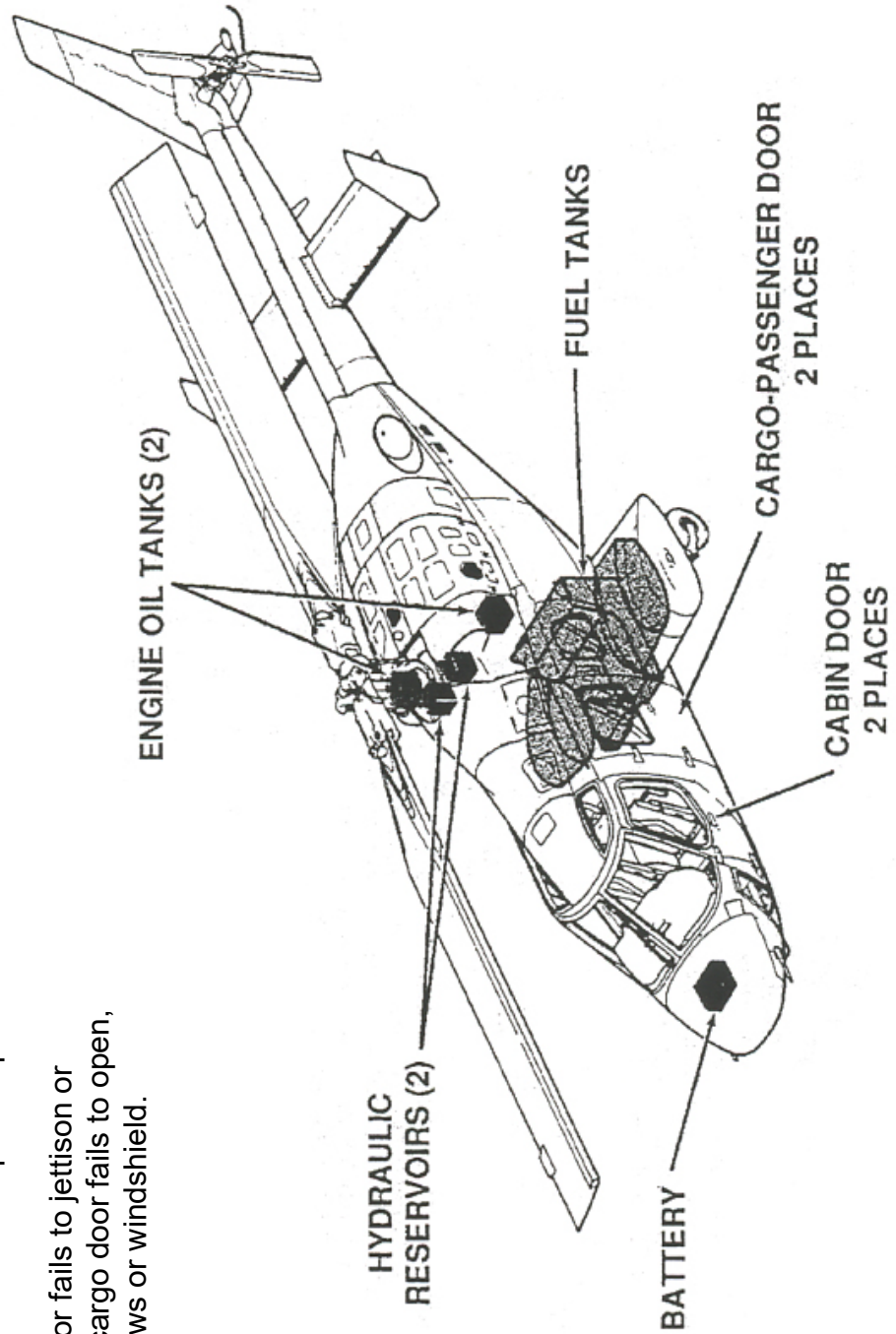
- * Pull both fire extinguisher "T" handles located on instrument panel, top center. "T" handles activates extinguishers and shuts off fuel valve.
- * To gain entrance to cabin, slide or break either cabin door window and pull jettison handle.
- * If cabin door fails to jettison or passenger-cargo door 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.



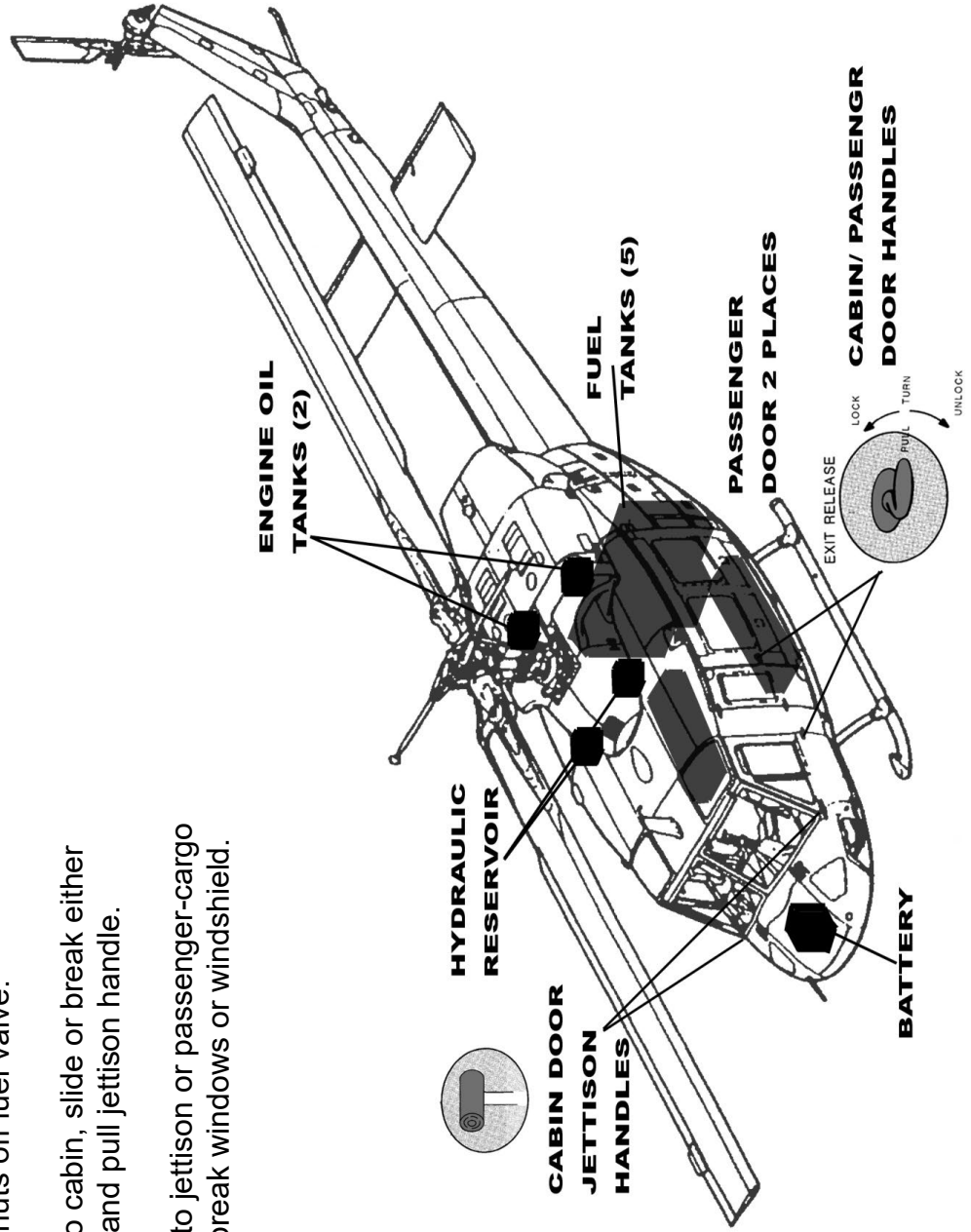
Bell 212 Crash Rescue

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

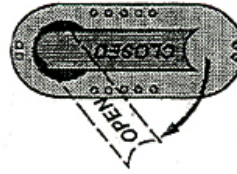
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

*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.

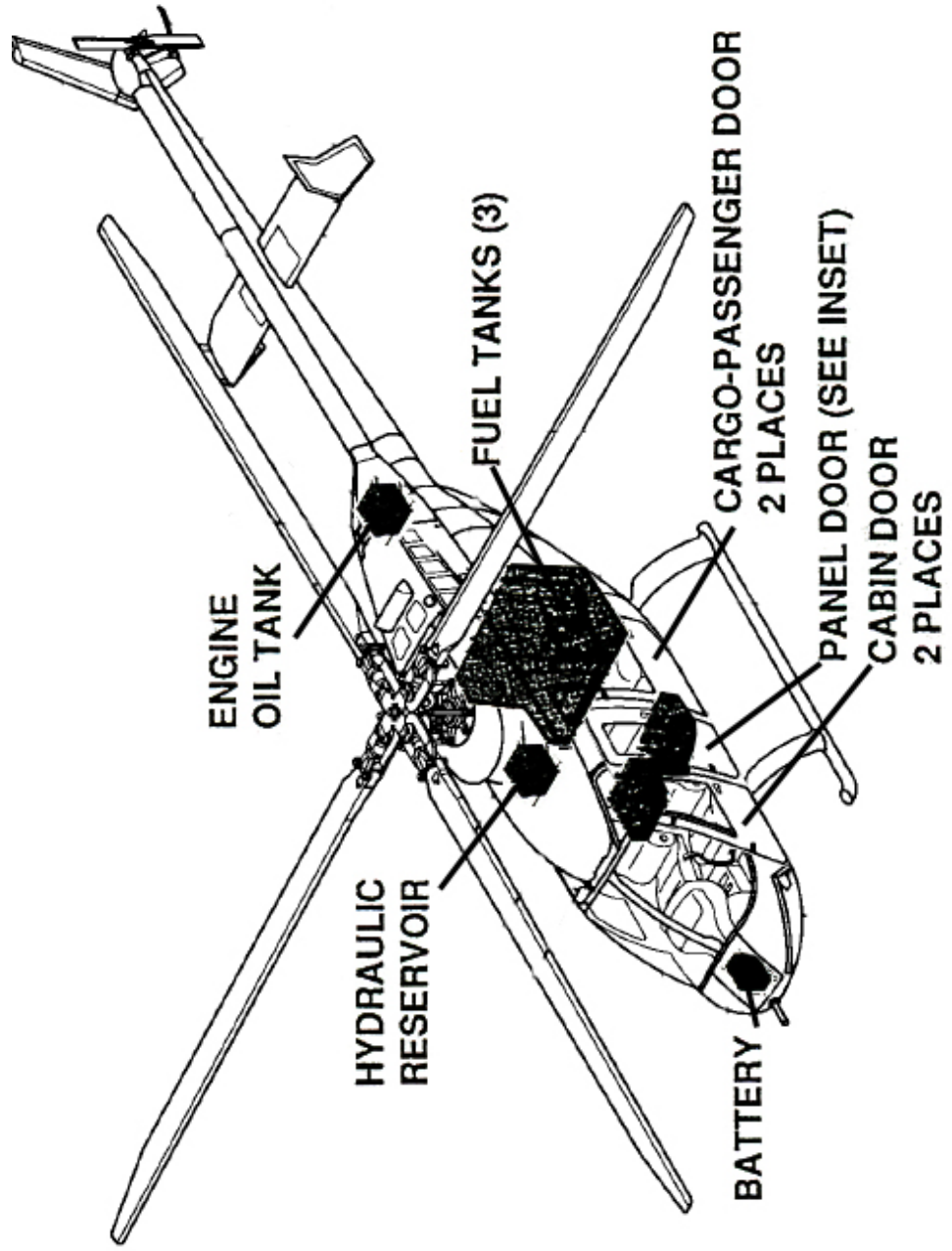
*Pilot and passenger doors have recessed handles. Outside-pull up. Inside-pull back.

PANEL DOOR HANDLE



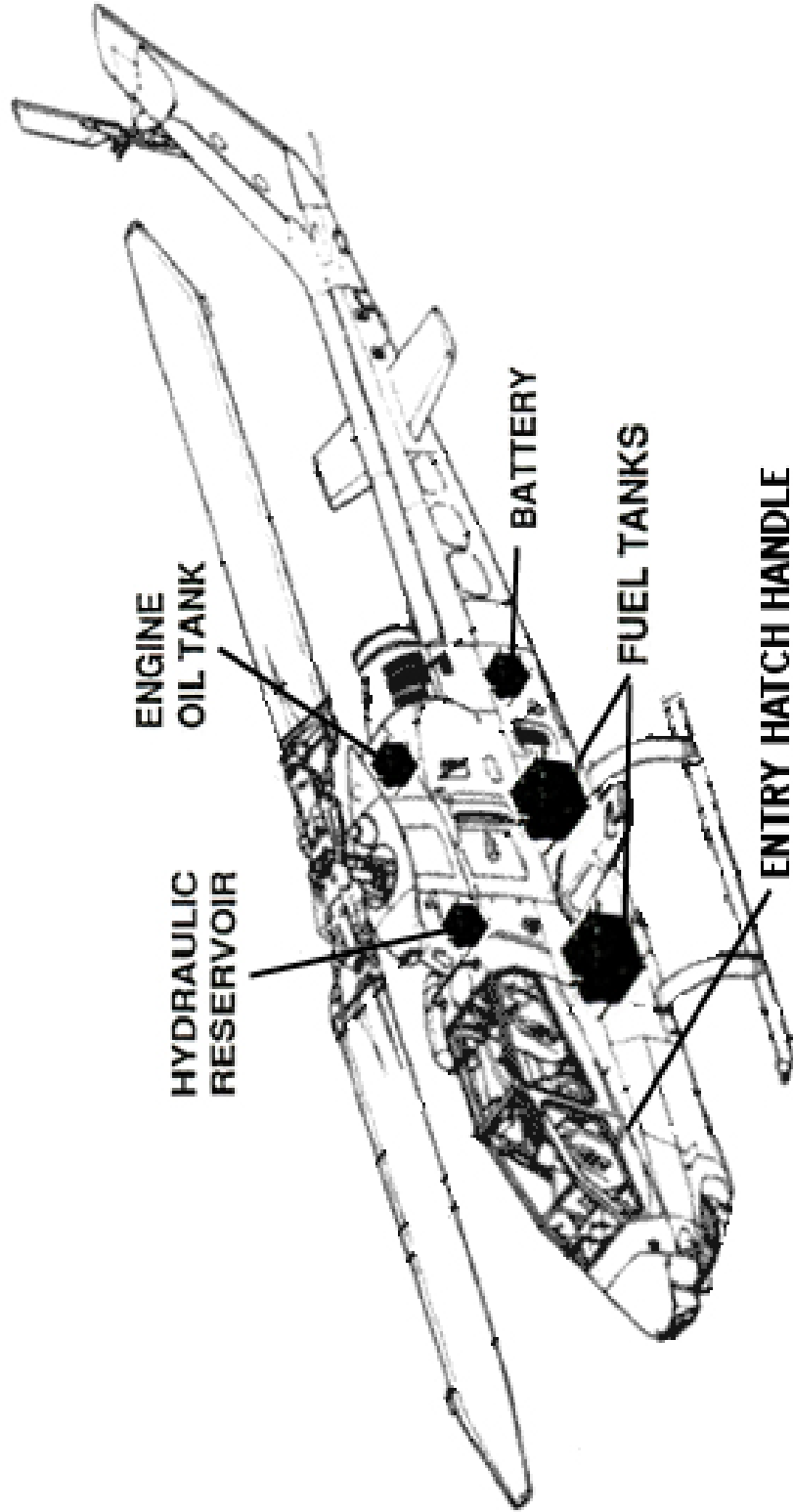
OPENING INSTRUCTIONS

1. Open rear door
2. Lift panel door handle
3. Rotate as shown



Bell 209 Crash Rescue

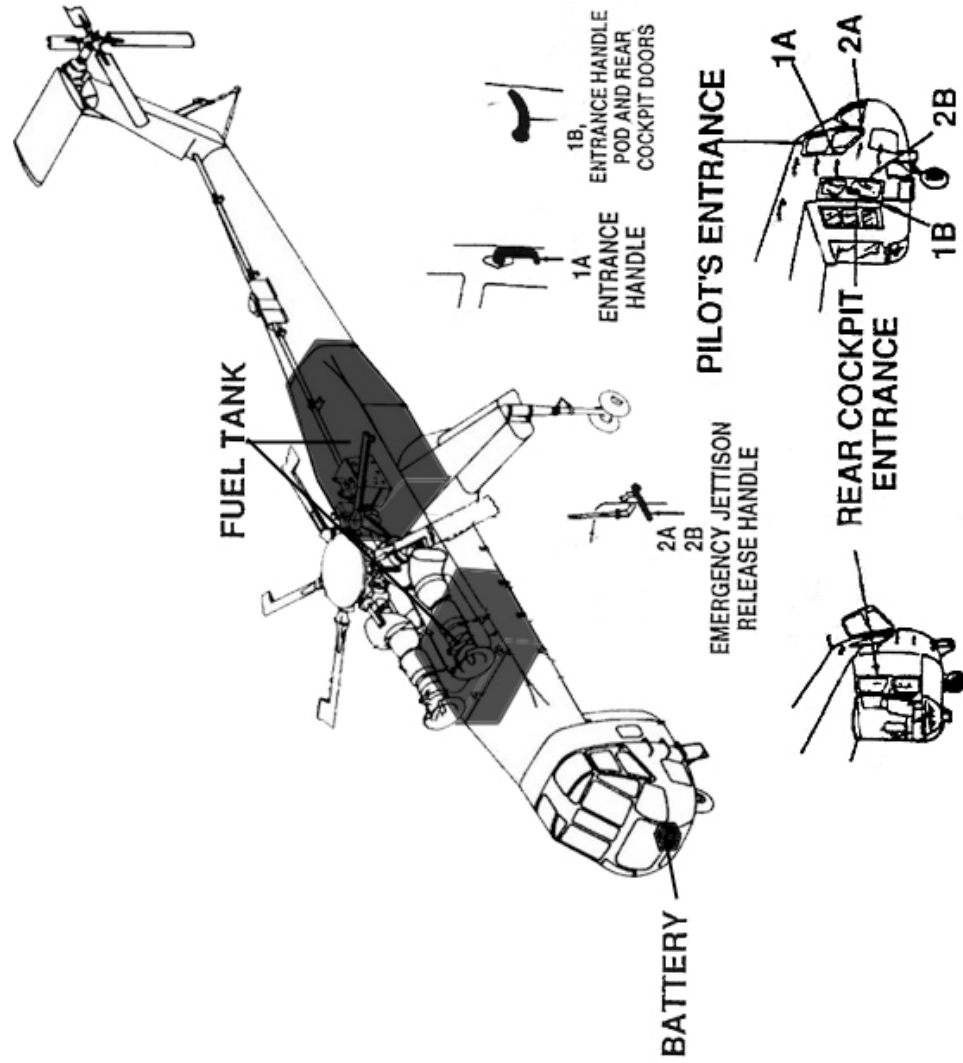
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.



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.

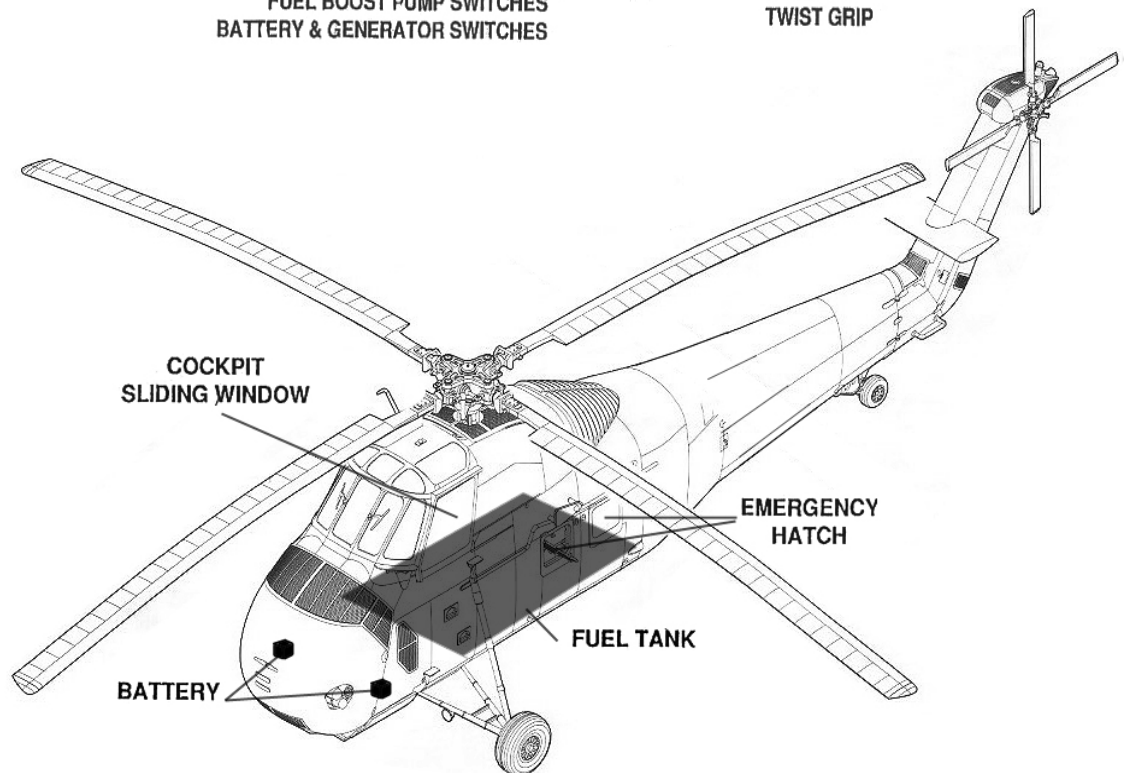
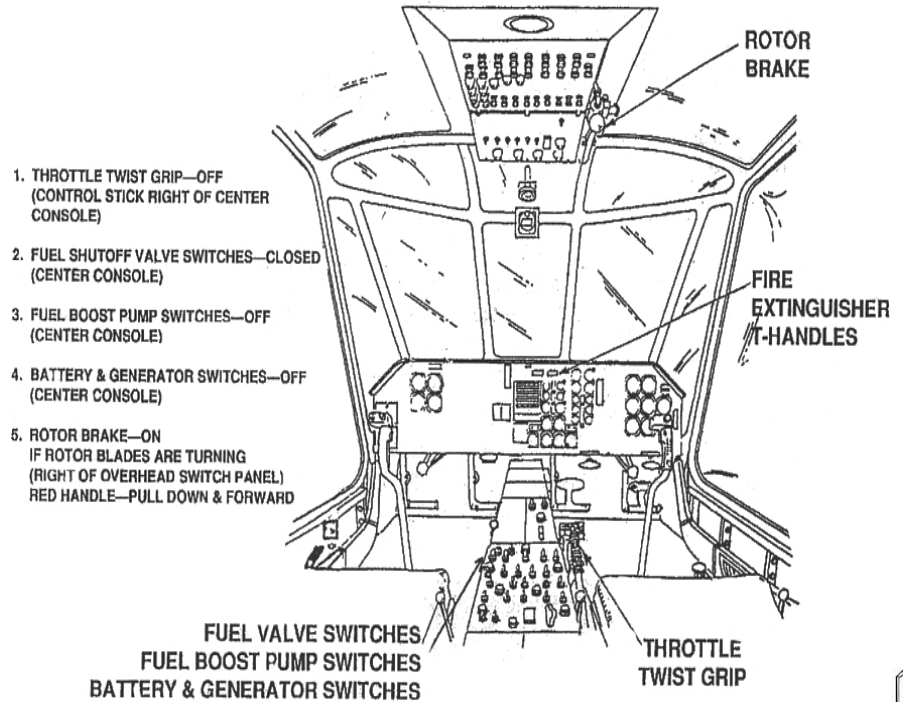
1. Normal Entry
 - A. Rotate entrance handle located on aft edge of pilots/co-pilots entrance door, swing door out.
 - B. Rotate entrance handle located on aft edge of rear cockpit entrance door on right side of crew compartment, swing door out.
2. Emergency entry
 - A. Rotate emergency jettison release handle, located at forward lower corner of pilot's/co-pilot's entrance door, pull door out.
 - B. Rotate emergency jettison release handle, located at forward lower corner of rear cockpit entrance door on right side of crew compartment, pull door out.



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.

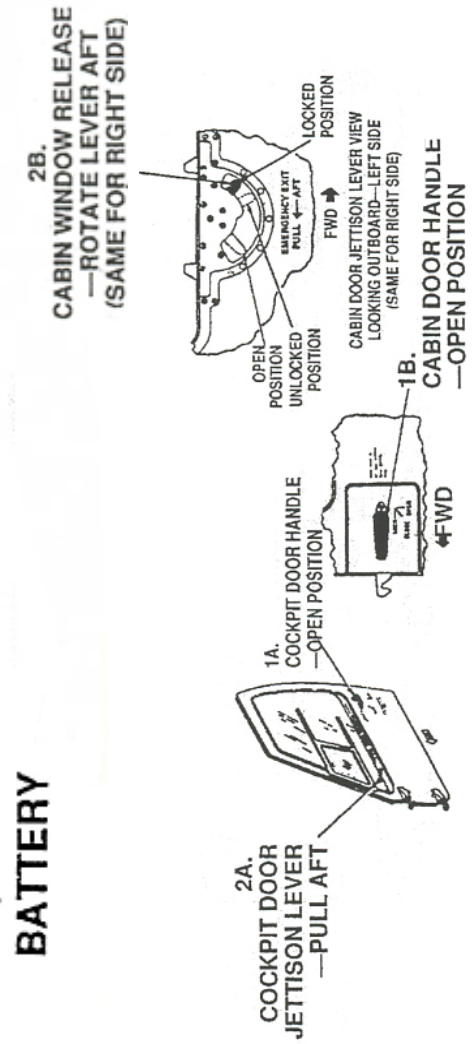
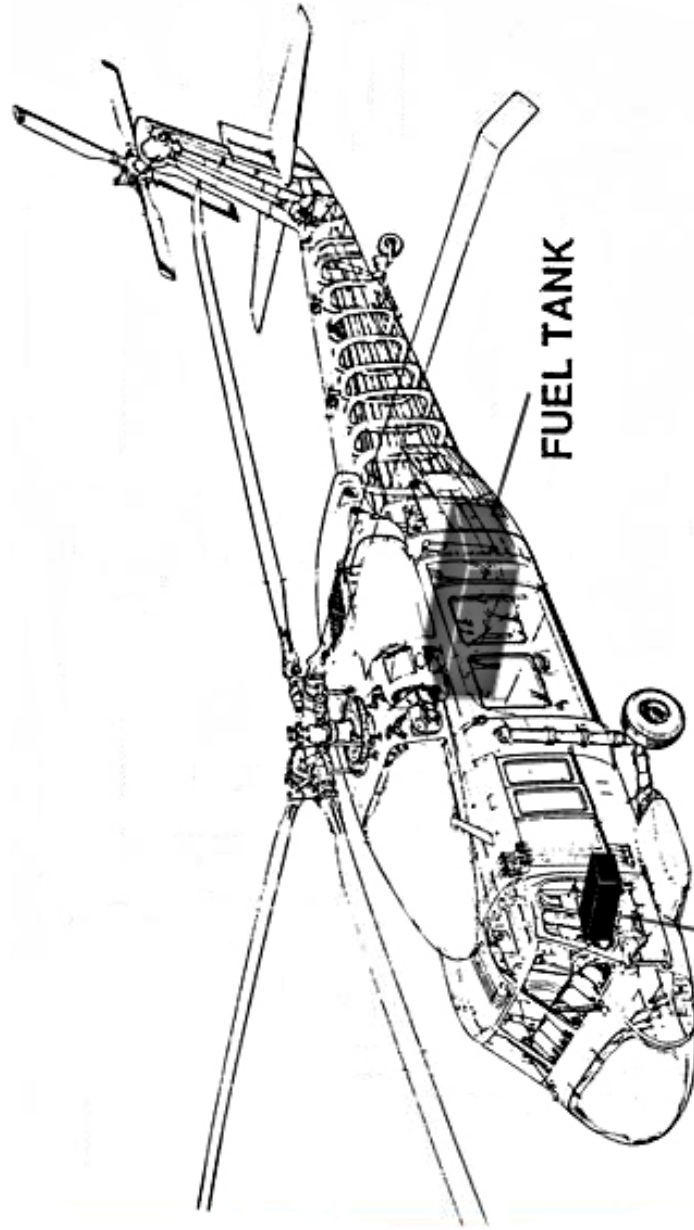
B. Turn cabin door handle counterclockwise to the open position and slide door aft.

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.

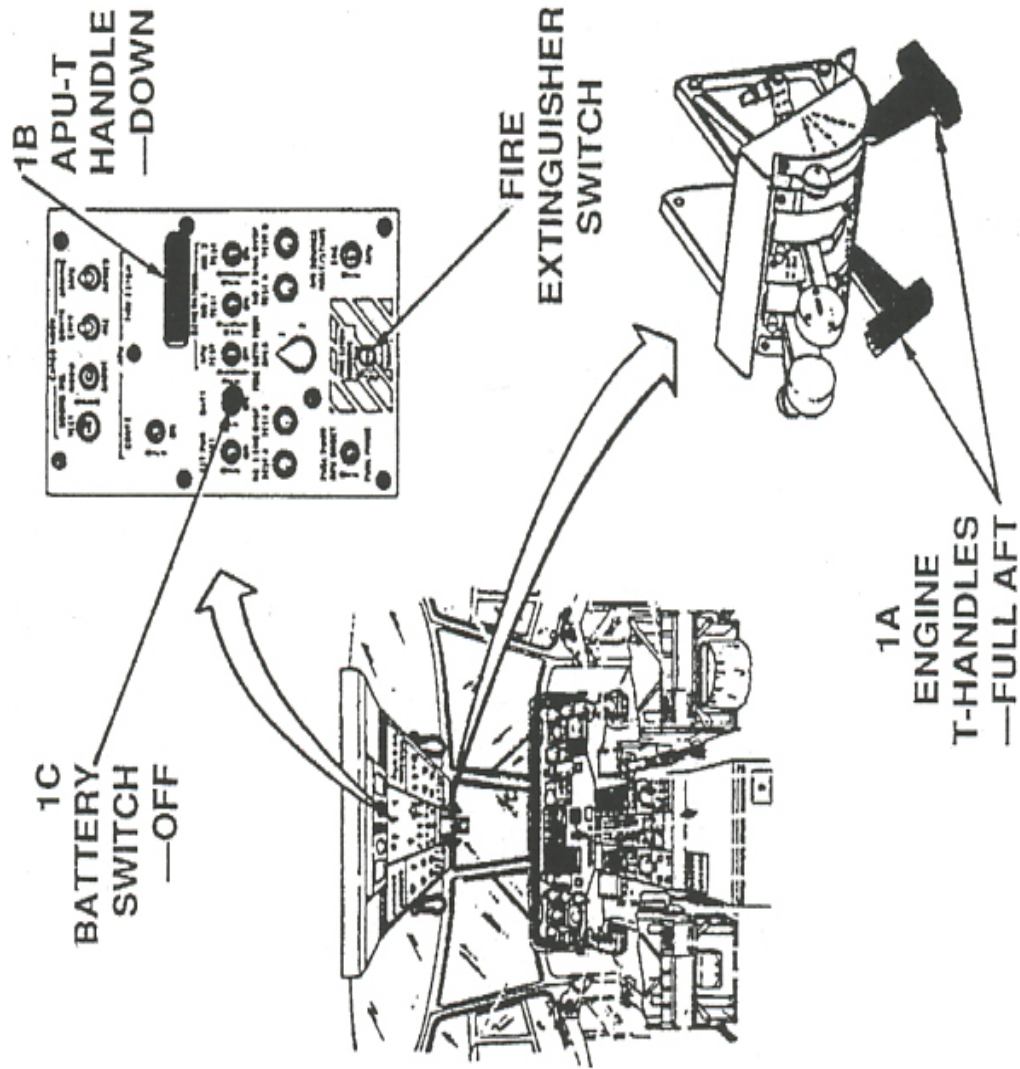
A. Pull engine emergency "T" handles located on control quadrant, full aft.

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.

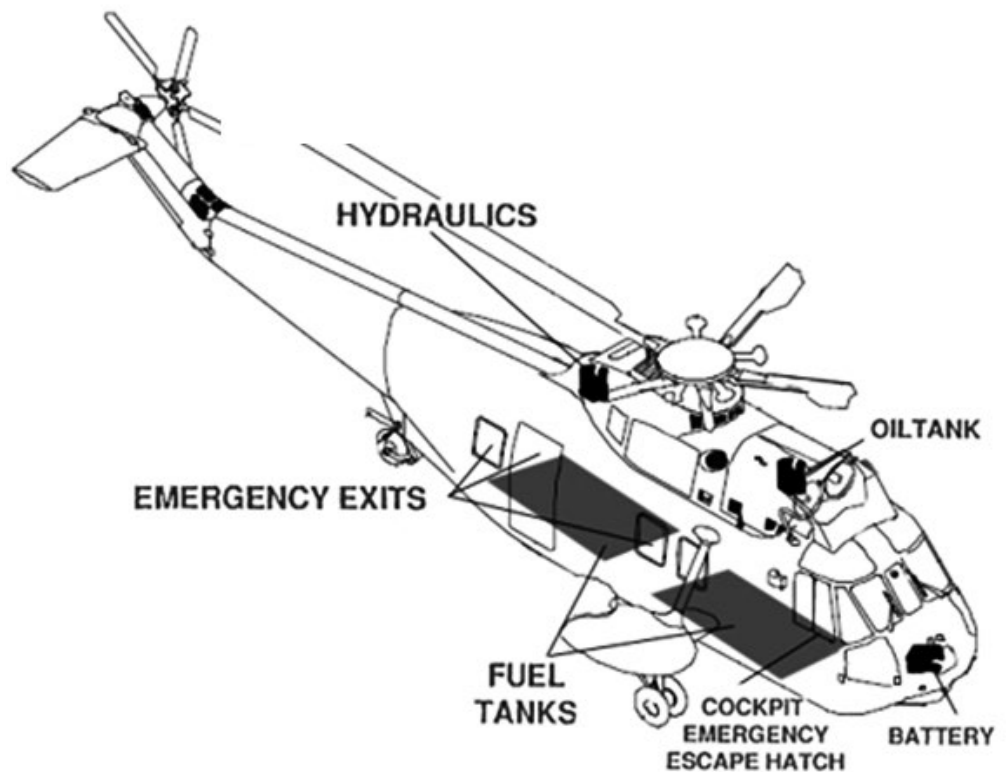
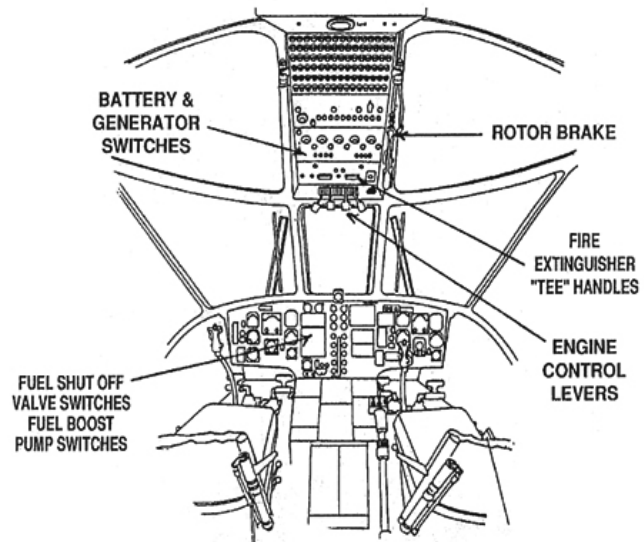


Sikorsky S-61 Crash Rescue

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.

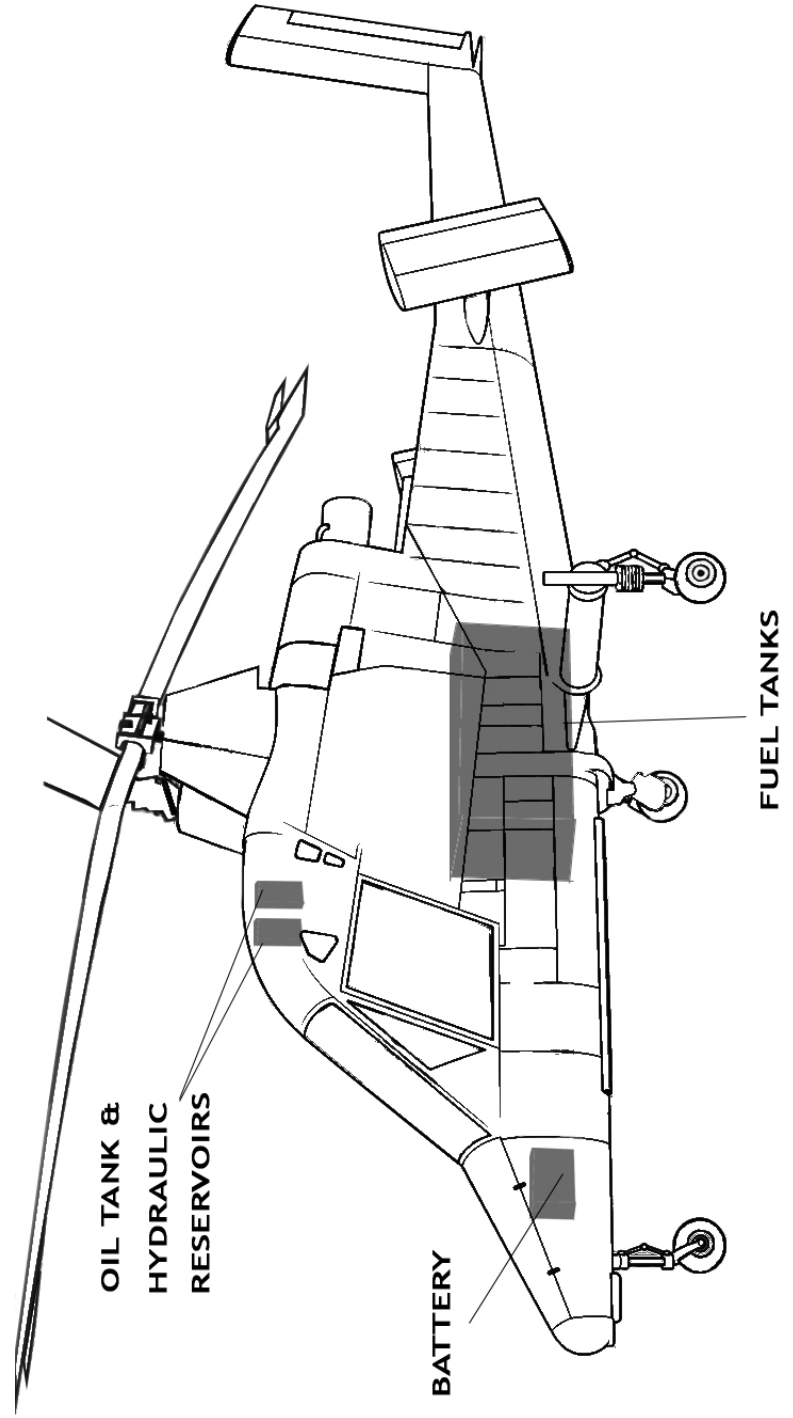


Kaman K-1200 K-MAX Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* WARNING: APPROACH FROM FRONT.

* If cabin door fails to jettison fails to open, break windows or windshield.



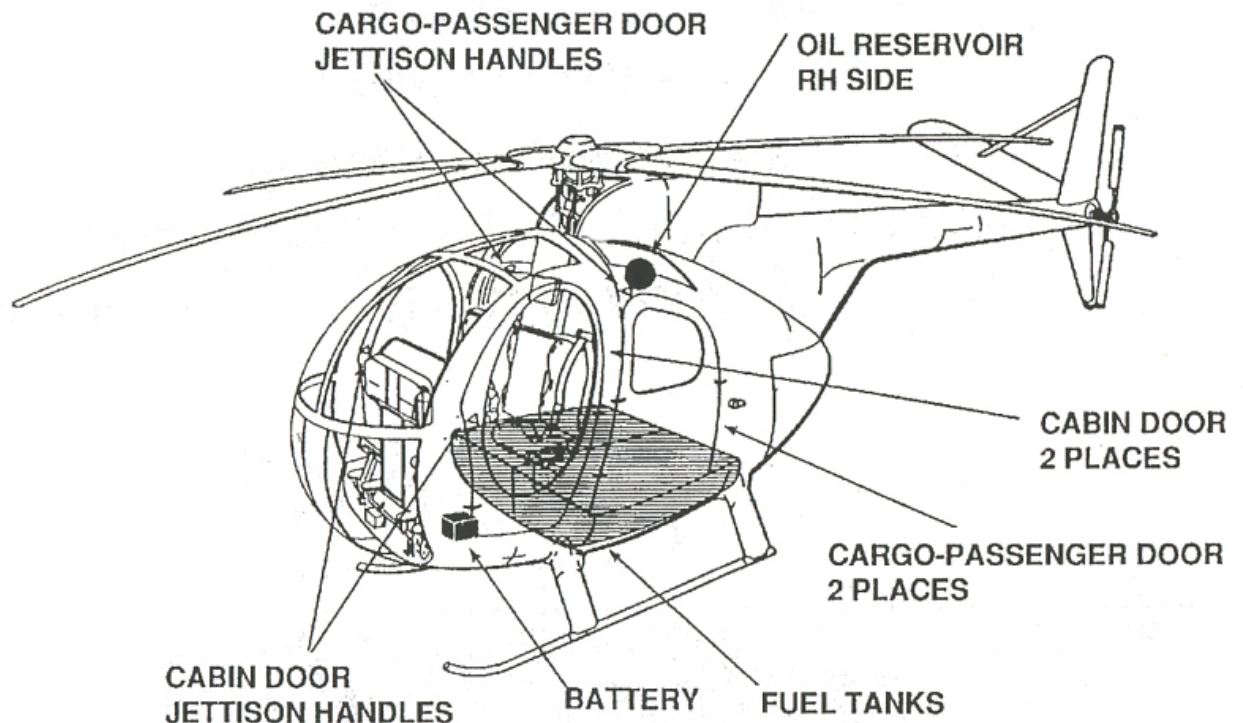
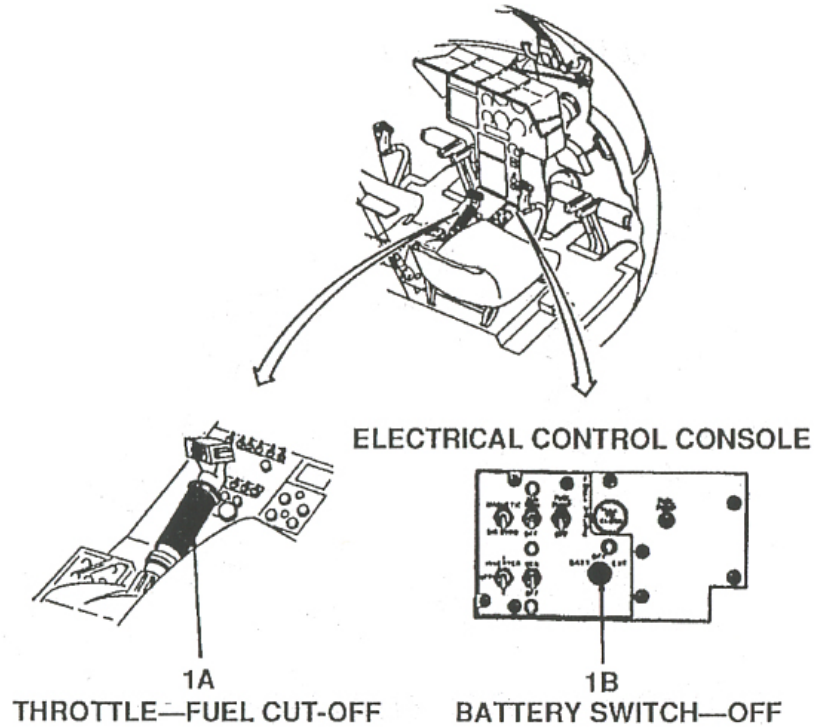
McDonnell Douglas (Hughes) 500 C Crash Rescue

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

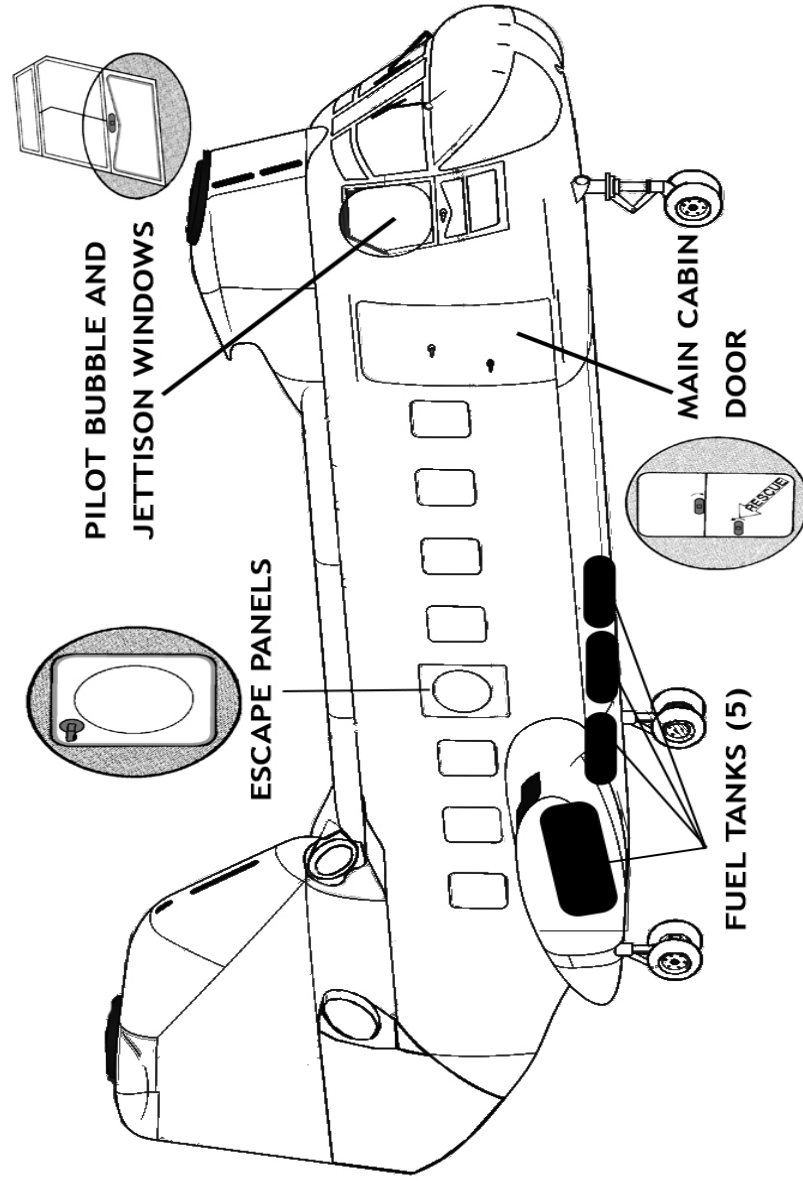
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

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

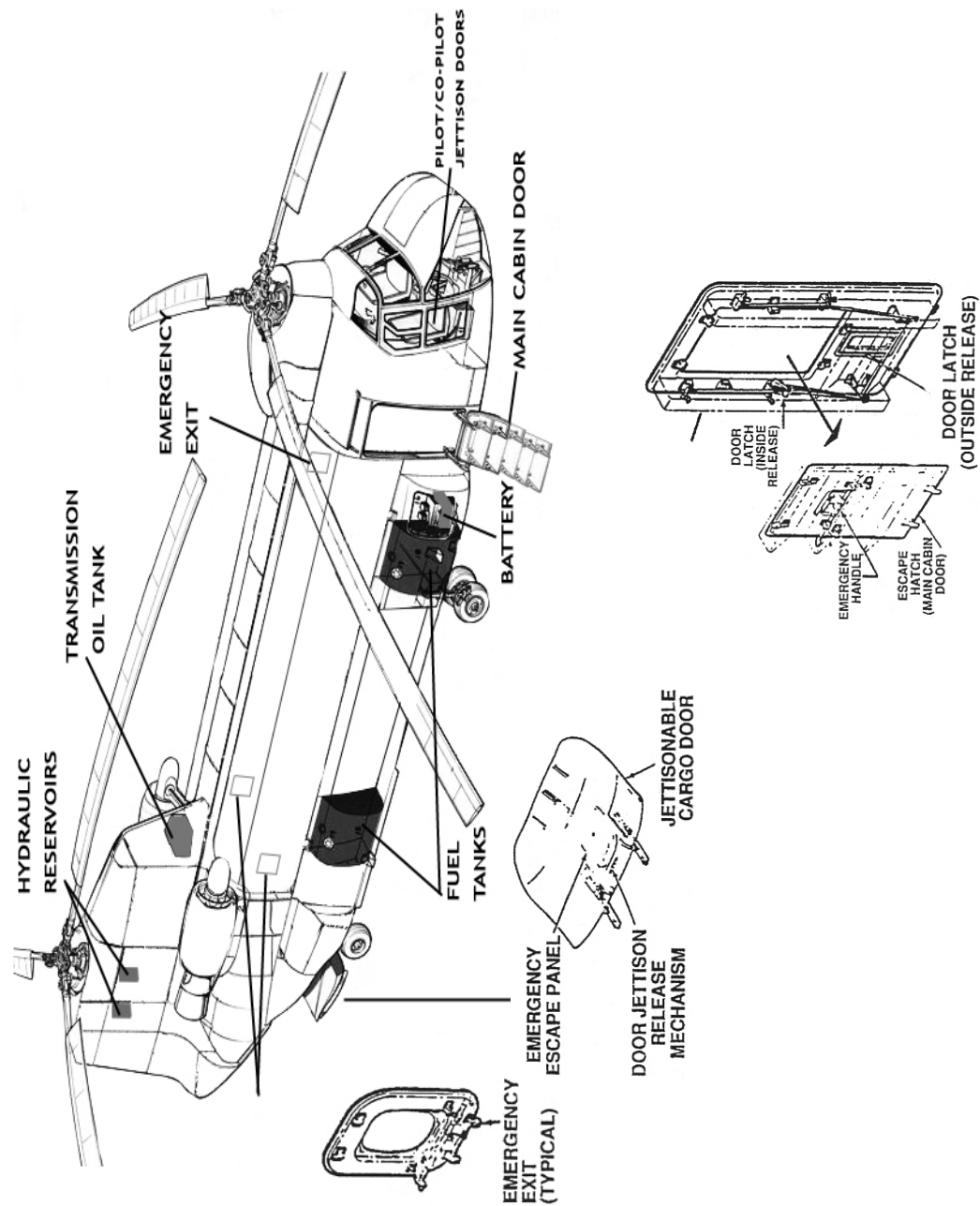
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

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

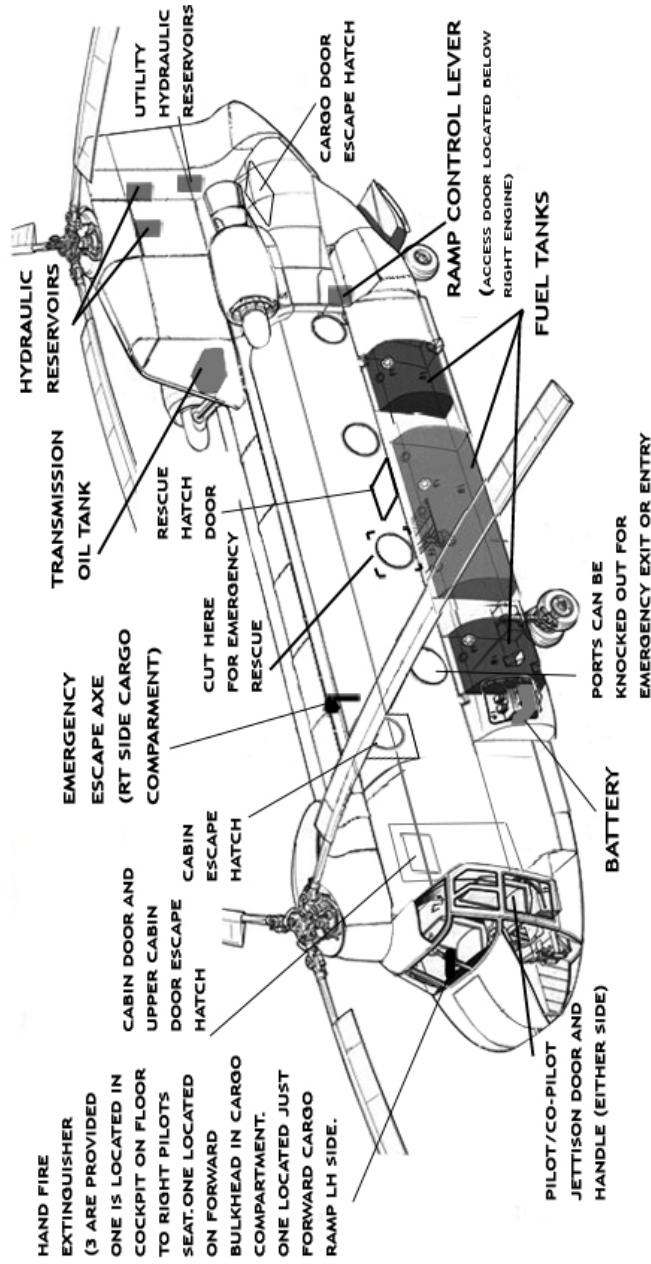
Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

* 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.

7 first aid kits are provided. 1 is located in passageway between cockpit and cargo compartment. 6 are located in cargo compartment, 3 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.**

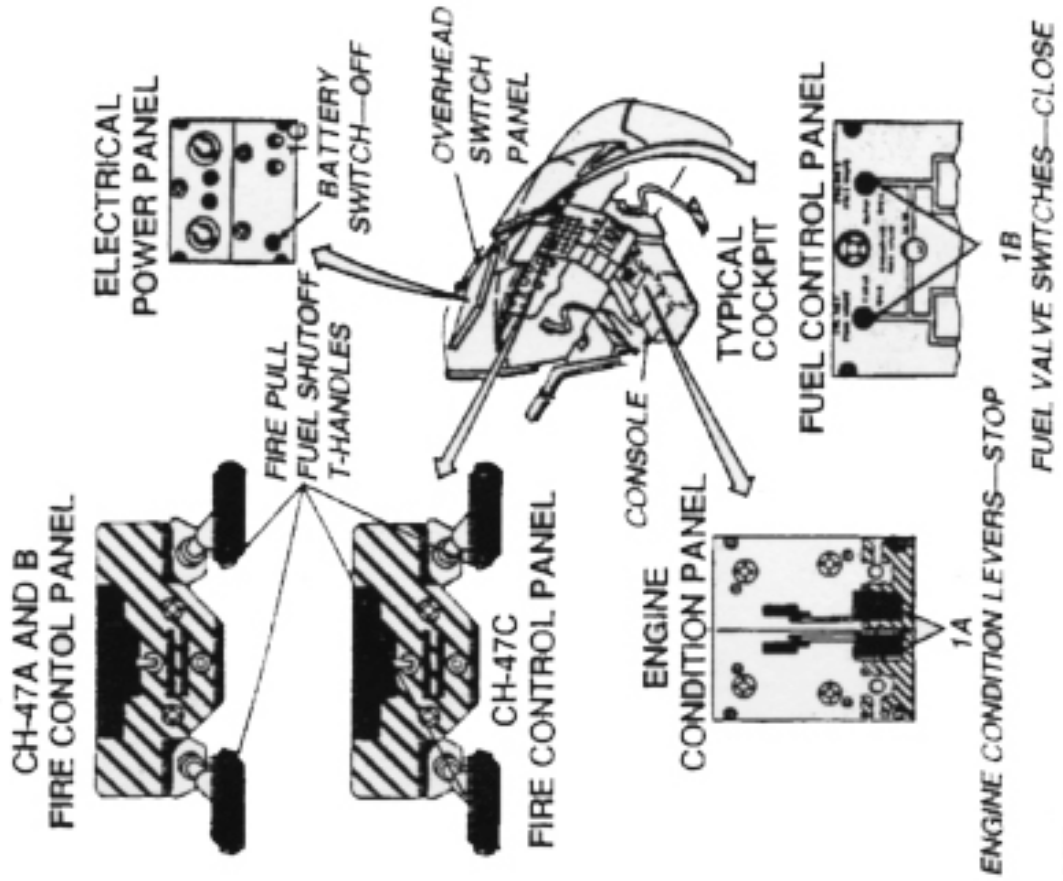
Boeing CH-47 Engine Shutdown

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 and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

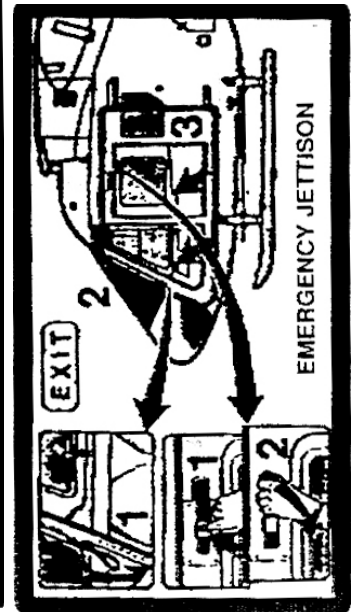
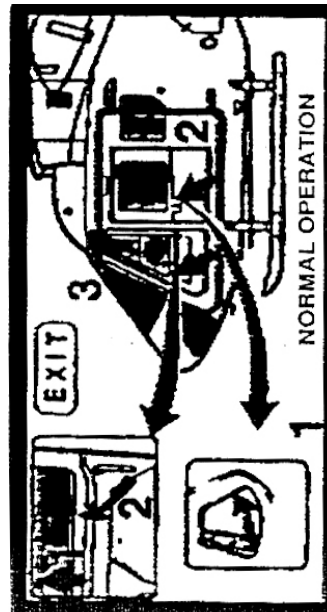
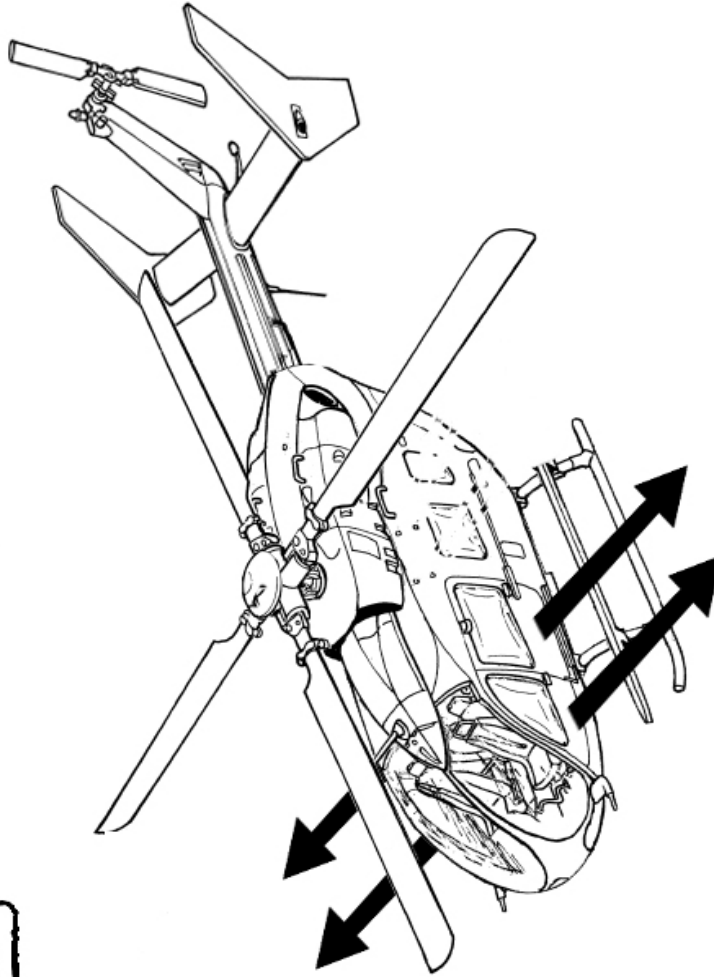


EXIT

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.



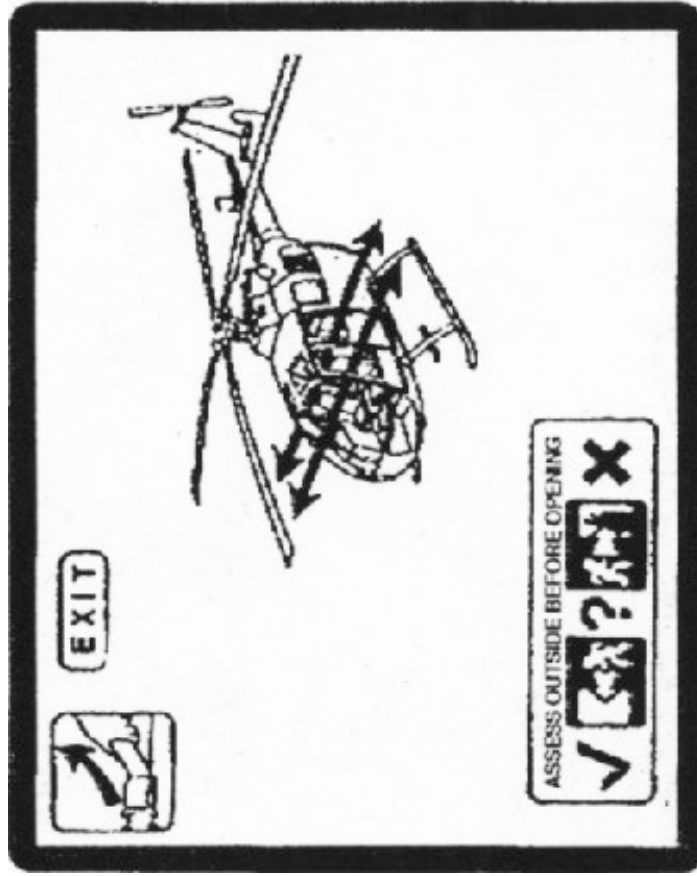
Eurocopter BO-105 Crash Rescue

Location of switches, equipment and emergency shutdown procedures may vary for individual aircraft. Crews should be briefed prior to helicopter dispatch.

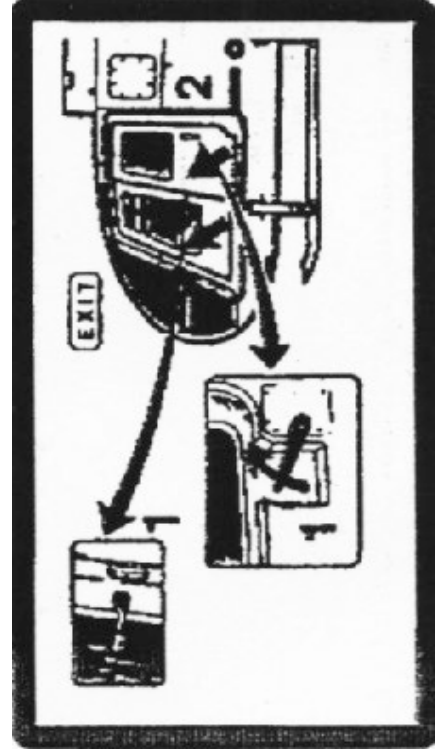
Emergency procedures

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

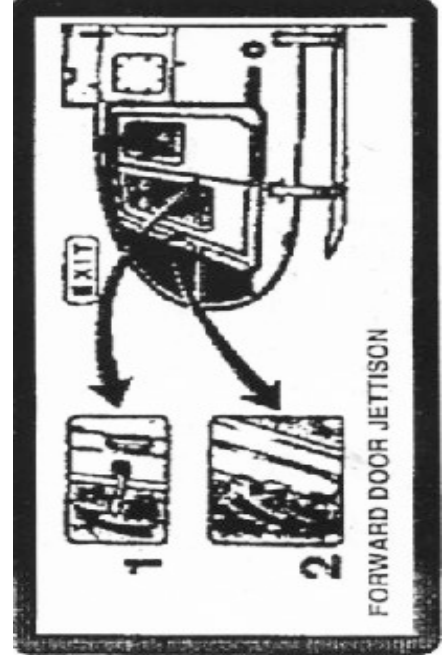
Extinguish fire with hand fire extinguishers.



Normal Operation

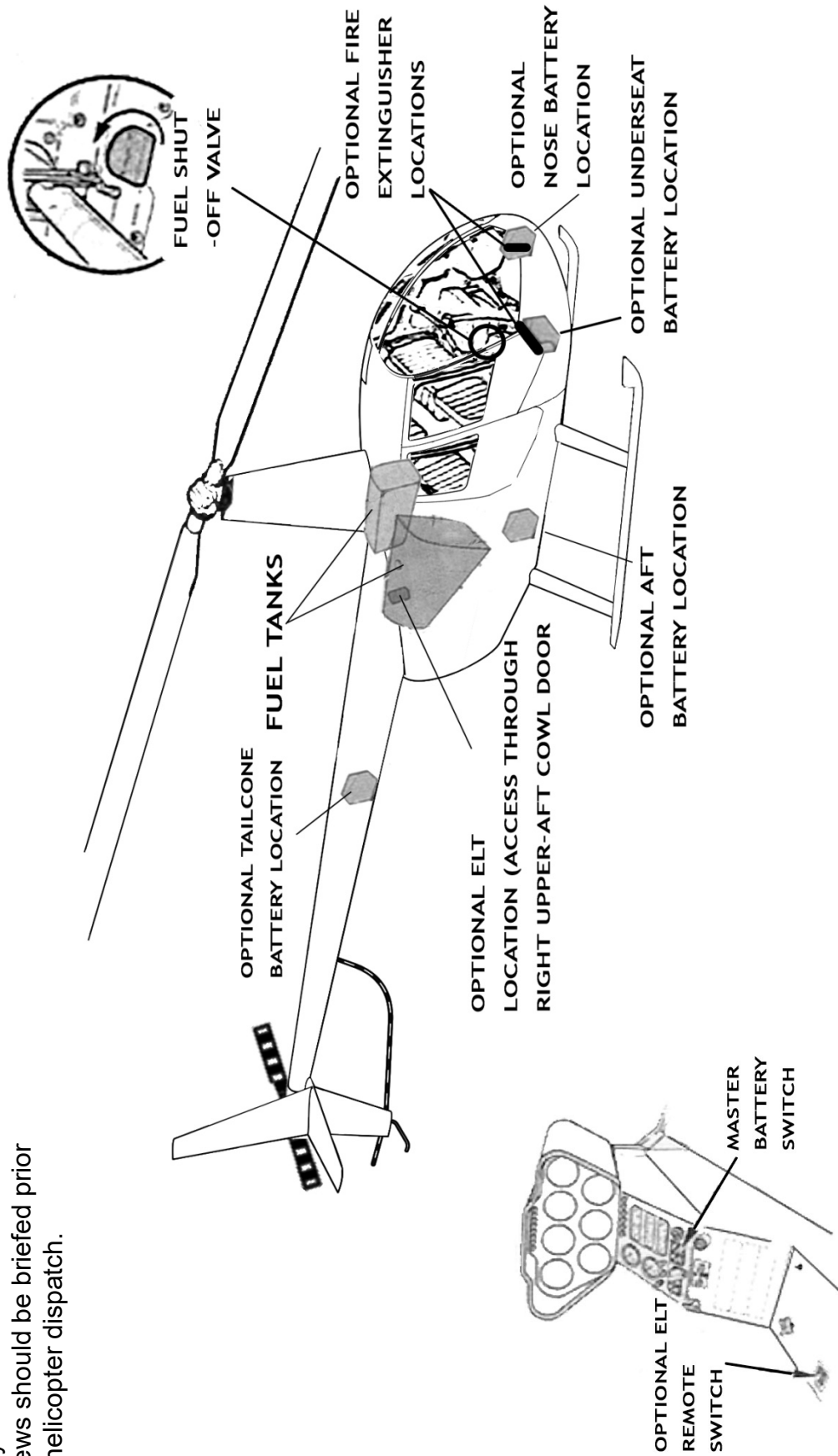


Emergency Operation



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 Standards for Helicopter Operations Unit (SHOU), 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: 2021 2019, 2016, 2014.

While they may still contain current or useful information, previous editions are obsolete. The user of this information is responsible for confirming that they have the most up-to-date version. NWCG is the sole source for the publication.

This publication is available electronically at <https://www.nwcg.gov/publications/510>.

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