



HELICOPTER OPERATIONS

STANDARD OPERATING PROCEDURES



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PROTOCOLS USED TO DEVELOP STANDARD OPERATING PROCEDURES FOR ISLAND CONSERVATION

The following protocols and guidelines have been used to develop these Standard Operating Procedures for Island Conservation. The U.S. Federal Department of the Interior (DOI) and Aviation Management (AM) Directorate guidelines have been referenced due to the need for AM compliance on some projects. However, the Interagency Helicopter Operations Guide (IHOG) has also been used extensively, particularly in Sections VI and VII (selection of helicopter landing areas, and external load cargo transport) which provides more user-friendly information than is available on AM and DOI public-access websites. The information in Sections VI and VII, in particular, is provided so that personnel can retain some degree of oversight of vendor helicopter contractor activities, and understand best practices for helicopter operations in remote areas. These additional guidelines should be referenced.

The information presented below can be accessed via the following websites:

National Business Center's Aviation Management (AM) Directorate (NBC AM)
<http://amd.nbc.gov/>

National Interagency Fire Center, Interagency Helicopter Operations Guide (IHOG)
<http://www.nifc.gov/ihog/>

U.S. Fish & Wildlife Service, Aviation Center
<http://www.fws.gov/aviation/>

Protocols Referenced in this Document

Department of the Interior (DOI) / Aviation Management (AM) Directorate

- Field Reference Guide for Aviation Users: May 2006

National Interagency Fire Center

- Interagency Helicopter Operations Guide (IHOG) (NFES 1885): March 2006

U.S. Fish & Wildlife Service

- FWS Aviation Management Policy, Parts 330-339

Other Helicopter Operating and Safety Protocols for Reference

The following additional aviation user guides and safety manuals are referred to in this document and should be consulted where indicated.

DOI / AM

- Basic Aviation Safety: April 1997 (NFES 2097)
- Interagency Aviation User Pocketguide: April 1998 (NFES 1373)
- Five steps to a safe flight: April 1997 (NFES 1399)
<http://amd.nbc.gov/safety/library/orangec.htm>
- Aviation Life Support Equipment Handbook: September 2006
- Interagency Aviation Mishap Response Guide & Checklist: January 2006
- Aviation Fuel Handling Handbook: January 1994
- Interagency Aviation Transport of Hazardous Materials: January 2005 (NFES 1068)
- DOI Departmental Manual, Aviation Management: December 1997

AM Interagency Aviation Training (IAT)

- Interagency Aviation Training Guide: January 2006

The AM IAT website can be accessed through the IAT site:

<https://www.iat.gov/>

More AM Aviation User Training information can be found on the AM site:

<http://amd.nbc.gov/hqtrain/index.htm>

AM Safety Library & Handbooks:

<http://amd.nbc.gov/safety/library.htm>

I. OPERATIONAL STRUCTURE, FLIGHT PLANNING & TRAINING

Who's Who Glossary

A. Aircraft Pilot

An aircraft pilot is someone required to perform the following duties:

- (1) Pilot or co-pilot an aircraft to carry out a program or various tasks.
- (2) Provide ground and flight instruction and in-flight evaluation when piloting aircraft.
- (3) Test developmental and modified aircraft and components.
- (4) Inspect and evaluate air navigation facilities and the environmental conditions affecting flight procedures.
- (5) Perform work related to planning, analyzing, or administering aviation duties, where the work requires pilot knowledge and skills.

B. Pilot-in-command (PIC)

The PIC is the Pilot responsible for all phases of the flight.

C. Crew Members

There are four types of crew members:

- (1) *Air Crew Member*: A person assigned to specialized duties not involving flying the aircraft, e.g. an onboard observer, camera operator, or hand-held GPS operator.
- (2) *Flight Crew Member*: A pilot, flight engineer, or flight navigator assigned to duty in an aircraft. The flight crew member must hold a valid FAA Airman's Certificate and have passed a flight physical.
- (3) *Flight Passenger*: a person being transported via helicopter between two locations, as required by the mission.
- (4) *Ground Crew Member*: a person assisting flight operations from the ground, e.g. external loading, managing the helicopter landing zone, pilot-to-ground communications.

D: Helicopter Manager / Operations Manager

A person required to manage the helicopters, and to oversee all aspects of the helicopter operations on the project site. This may one job assigned to the vendor contractor, or two jobs assigned to both the vendor contractor and a participant(s) of the project (e.g. Project Leader).

E: Site Controller

A person managing the Helicopter Landing Area including site safety and security, and management of cargo and personnel transport.

F: Aviation Safety Manager

An Aviation Safety Manager is assigned to oversee the safety of helicopter operations, ensure that safety protocols and procedures are adhered to, and to address any helicopter safety issues of concern.

G. Loadmaster

A person assigned responsibility for, and supervision of, cargo loading (internal and external).

Operational Responsibilities

A. Helicopter Contractor:

- Ensures that all aviation support functions are managed safely and efficiently to accomplish goals.
- If the project is an AM operation, ensures compliance with AM guidelines.
- Manages helicopter emergency situations, e.g. helicopter crash.

B. Project Leader:

- Makes sure that flight operations he/she oversees follow requirements, including flight following plans, hazard evaluation and emergency response plans.
- Reviews mission profiles to ensure that pilots are adequately trained to accomplish proposed missions safely and efficiently.
- If an AM operation, reviews appropriate carding.
- Ensures all crew have the appropriate training

C. Pilot in Command

- Responsible for the safety of the aircraft and people on board the flight.
- Is the final authority for flight-related operations and decisions.
- If more than one pilot is on board an aircraft, the pilots must determine which one of them is the PIC for that flight before flight preparations begin.
- The PIC may deviate from any rule or policy to assure flight safety and to preserve life and equipment during an in-flight emergency.
- PICs must notify the Federal Aviation Administration (FAA), when appropriate, immediately after completing a flight where they had to deviate from rules or policies because of an in-flight emergency.

D. Aviation Safety Manager

- Ensures safety of the crew, the helicopter landing areas and cargo operations.

Training

- (1) All crew must receive helicopter training appropriate to their job responsibility.
- (2) If the project is an AM operation, the helicopter contractor must ensure that all contract pilots and support crew are appropriately AM certified.
- (3) If the project is an AM operation, all project crew must undertake AM training and receive their certification.
 - (a) The AM training required can be found on the Interagency Aviation Training website <https://www.iat.gov/> where you can create a profile and search the appropriate training modules required.
 - (b) All crew must have B3 Combination Helicopter/Airplane Safety certification (modules A101, A105, A106, A108, A113).
 - (c) All crew responsible for cargo hook-up must be certified in the SM1 Transportation of Cargo module, and SM2 Sling Loads & Hover Hook-up module. This is a classroom course only with practical.
 - (d) In addition, crew responsible for transporting hazardous cargo materials are recommended to take module A110 Aviation Transportation of Hazardous Materials. This is an online course.

II. PRE-FLIGHT PLANNING

The Pilot-in-Command (PIC) must follow all FAA, AM and IC procedures where appropriate.

A. Pre-flight Planning

PICs are responsible for pre-flight planning, which includes determining:

- (1) Risk. Pilots must use risk management techniques as a routine part of their flight planning and operations. Pilots should take steps to reduce risks they identify and make sure the Project Leader is aware of the risks involved.
- (2) The route of flight, including the airspace being flown in and out of, and the distance of travel.
- (3) Fuel requirements.
- (4) Weather reports and forecasts at the points of origin and destination.
- (5) Helicopter Landing Areas for expected takeoffs and landings, considering gross weights, winds, and temperatures. Review aircraft performance charts.
- (6) Helicopter performance data for expected hovering in and out of ground effect at landing sites.

B. Weight and Balance, and Helicopter Load Calculations

- (1) The PIC must complete a weight and balance calculation prior to each helicopter flight. The PIC may use a pre-calculated mission weight and balance if the information is current and the PIC reviews it prior to departure.
- (2) A helicopter PIC must complete a load calculation on the first flight of each day. The load calculation is valid for flights between similar points of elevation, temperature, and fuel loads.
- (3) The PIC must complete a new load calculation when there is:
 - (a) A change in outside air temperature of 41 degrees Fahrenheit/5 degrees Celsius,
 - (b) A change in landing site or low level operations of 1,000 feet/305 meters, or
 - (c) An increase of cargo or fuel load by 50 pounds/23 kilograms or more.

C. Pre-flight Inspections

PICs must perform a thorough pre-flight inspection on the first flight of the day. The PIC determines what items to check prior to flights on that day, but the inspection must include safety items.

D. Flight Plans

Always file a Flight Plan with an approved agency. PICs usually complete and file flight plans for all flights. Flight Plans should also be received by off-island individual(s) providing additional operations and logistical project support. The Helicopter Operations Manager should have a copy for reference during the operation.

- (1) The flight plan must contain:
 - (a) The intended route of flight
 - (b) Estimated time of arrival
 - (c) How the aircraft will be tracked during the flight
 - (d) The planned response procedures if the aircraft experiences a mishap or fails to report.

- (2) The flight plan must be filed with one of the following agencies:
 - (a) FAA
 - (b) International Civil Aviation Organization
 - (c) DOI or other Federal bureau-approved flight plan program
 - (d) An NBC AM-approved vendor flight plan program

E. Flight Following

Flight following is an aviation term that means the Pilot reports his/her position throughout the flight.

Flight following requirements should be clearly identified, including check-in procedures, time and locations, flight following offices involved, individuals responsible for flight following including contact numbers, radio frequencies to be used, and any special circumstances requiring check-ins (for example to military facilities within Special Use airspace).

The flight following program must describe the actions to be taken if the aircraft is overdue or missing. The flight following agent must document position reports to assist in locating an overdue or missing aircraft. Interval times for flight following *en route* must be pre-arranged between the PIC and flight following agency.

PICs must ensure that they or their air crew members:

- (1) Provide the flight following agency position reports at regular intervals, under normal circumstances. Check-ins must be documented.
- (2) Flight follow with at least one of the following on every flight:
 - (a) FAA
 - (b) International Civil Aviation Organization
 - (c) DOI or other Federal bureau-approved flight plan program
 - (d) NBC AM-approved vendor flight following program.

F. Manifests

A passenger and crew member manifest must be completed and a copy left at the point of departure. The PIC, Project Leader or designated personnel can complete the manifest, and should leave a copy of the manifest at subsequent points of departure when practical.

G. Briefings

(1) Mission Briefing.

The PIC, Project Leader, or qualified person the Project Leader designates must brief all crew members about the mission prior to the flight. The mission briefing must include at least the following topics:

- (a) Specific mission goals or objectives
- (b) Crew responsibilities in normal and emergency situations
- (c) Weather considerations
- (d) Communications procedures
- (e) Altitudes, maneuvers, and speeds
- (f) Fuel endurance
- (g) Known or potential flight hazards

(2) Passenger and Crew Safety Briefing.

The PIC or another qualified person must brief passengers and crew members about safety prior to each flight. The briefing does not need to be repeated when the same passengers and crew are onboard during multiple short flights for one operation, unless new passengers or crew board the aircraft. The safety briefing must include at least the following information:

- (a) Smoking is **not** allowed on board the aircraft at any time.

- (b) Safety belts must be fastened while on board the aircraft. Passengers must be briefed on how to use the safety belts.
- (c) How to operate the doors (emergency exits).
- (d) Location of survival equipment and the emergency locator transmitter.
- (e) Fuel and electrical shut-off switches or handles.
- (f) Location of oxygen masks and how to use them, if applicable.
- (g) Location of personal protective equipment (PPE), first aid kits, and life support equipment and how and when to use them.

(3) Special Use Activities Crew Members Briefing.

The PIC must brief all crew members on special activity missions (see Section III).

The briefing must include:

- (a) The overall objective of the flight
- (b) Any limitations involved (for example, areas where you cannot fly, a boundary you cannot fly past, etc.)
- (c) Anticipated hazards
- (d) What PPE must be worn and carried on the aircraft

(4) Passenger Briefing Card.

The PIC or Aviation Safety Officer must ensure that the aircraft has a passenger briefing card on board. The card provides information on survival equipment, location and operation of the emergency locator transmitter, and other items of information specific to the type of aircraft.

III. SPECIAL USE ACTIVITIES

Definition: Operations involving helicopters which are not point-to-point flight activities and which require species control measures due to their inherently higher risk. This may require deviation from normal operating practices where authorized by AMD. Special pilot qualifications and techniques, special equipment, and PPE are required to minimize risk to personnel and property. DOI include the following as special use activities:

- External loads, Class B or C (slingloads, longline, water buckets etc:)
- Low level flight (within 500' of the ground)
- Mountain flying
- Toe-in, single skid, and step-out landing
- External load shortline (< 50') and longline (>50') cargo operations
- Offshore navigation (vessel or platform landings)
- Animal darting

- Animal tagging and eradication
- Animal herding and capture
- Air-frame mounted net gun
- Hand-held net gun

A. Low level flights

Pilots must comply with the low level flight requirements in 14 CFR Part 91 unless exemption has been received from the FAA for the State where the pilot is flying. There is no DOI or FWS exemption for low level flights. Permits and protocols allowing low level flights in wildlife refuges or protected areas must be obtained where necessary. Pilots and everyone else on board must wear PPE.

B. Over-water flights

For extended over-water operations, aircraft must comply with Federal and State regulations, and the Aviation Life Support Equipment Handbook. For extended over-water operations:

- (a) The aircraft must be float-equipped.
- (b) Flight crew members and passengers must wear personal flotation devices.

IV. AIRCRAFT SECURITY

The helicopter contractor and/or PIC is responsible for the following security requirements for his/her aircraft:

- (1) Assist vendor aircraft pilots with their aircraft security responsibilities whenever possible.
- (2) When operating away from home base, put the aircraft in a hanger overnight, if possible.
- (3) If a hanger is not available, tie down the aircraft with permanent-type tie downs. Use screw-in type tie downs if permanent-type tie downs are not available. Screw-in type tie downs should be sufficient to keep the aircraft in place in up to a 30-knot wind. Screw-in type tie downs should be carried in the aircraft if they might be needed.
- (4) Park the aircraft in a secure area whenever possible.

V. PERSONAL PROTECTIVE EQUIPMENT (PPE) & SAFETY EQUIPMENT

1. PPE

Flight crew and passengers engaged in Special Use activities are required to wear the following, unless exempted:

General Requirements	
Anyone working in and around helicopters	Nomex or approved Fire Resistant clothing (long-sleeved shirt & pants) or flight suit. Leather boots (extending above the ankles) Nomex and/or leather gloves Safety goggles for eye protection Ear protection Natural fiber clothing (cotton, wool, silk) under Nomex
Exceptions or Additional Requirements	
Flying in a helicopter	Flight helmet
Hover hook-up personnel	Flight helmet or hard-hat with chin-strap. Hard had can be equipped with avionics. Radio communication with Pilot and PM is needed.
Fuelers	May wear rubber gloves in place of Nomex Non-static clothing recommended Eye and ear protection only required when in the vicinity of operating helicopters Adhere to protocols of contractors
Extreme cold weather operations	Snow boots
Over water operations	Waders or top-siders

Table 1. PPE required for Special Use Activity flying

The **Aviation Life Support Equipment Handbook** should be referenced for information about PPE required.

- The preferred fire-resistant material is known as “Nomex”. The actual material may be Nomex, polyamide, aramide, polybenzimidazole, Kevlar or blends thereof. Cotton materials chemically altered into “fire resistant (FR) cotton” are acceptable. Materials treated with fire retardant chemicals which launder out, and materials with low temperature melting characteristics such as synthetics (nylon, Dacron, polyester) and synthetic blends are not approved.

- Garments worn over the Nomex clothing such as coats, bibs pants etc: should also be made of Nomex. Outerwear garments made from natural fibres such as leather, cotton, wool, or wool/cotton blend, as well as from fire resistant cotton are acceptable substitutes.
- Nomex clothing is designed to be worn loosely, to provide an airspace between fabric and skin which acts as insulation from heat sources.
- Launder Nomex garments only with other Nomex to avoid entrapment of flammable lint. Only use liquid detergent to prevent insoluble flammable powder remaining in pockets in the garment.

2. Survival Equipment Onboard

- A.** Pilots must ensure that a fire extinguisher, Emergency Locator Transmitter (ELT) or EPIRB and a first-aid kit are onboard. The Pilot must ensure that passengers know the location and use of each item.
- B.** Survival equipment is recommended for Special Use Activity flights over land, over water and for extended flights in Alaska and Canada. The Aviation Safety Manager or Project Manager should ensure that there is adequate survival equipment on board the aircraft that is appropriate for the route, environmental conditions, and number of crew members and passengers.

Refer to IHOG Manual (Chapter 9) and ALSE (2006) for a list of appropriate survival equipment.

3. Crash-Rescue Kits, Fire Extinguishers and Evacuation Kits Required at Helicopter Landing Sites.

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

A. Crash-Rescue Kit.

A crash-rescue kit should be available at each helicopter landing area, with the exception of unimproved landing sites (Table 2).

QUANTITY	ITEM
1 Ea	20-pound 40-B:C fire extinguisher (for 1-4 helicopters)
1 Ea	Axe, Crash, Serrated Edge
1 Ea	Axe, Crash, Smooth Edge
10 Ea	Blade, Hacksaw
1 Ea	Case, Cloth, Carrying, 2-piece Set
1 Ea	Cutter, Bolt, 24"
1 Ea	Frame, Hacksaw
1 Ea	Knife, Rescue, Seat-belt Type
1 Ea	Opener, Door, w/ Claw Tool
1 Ea	Pliers, 12", adjustable joint, angle nose

Table 2. Crash-Rescue Kit Components

C. Evacuation Kit.

One Evacuation Kit should be available per operation (Table 3).

QUANTITY	ITEM
1 Pg	Battery, size AA
3 Ea	Blanket, survival, disposable, 60" x 90"
1 Ea	Carton, fiberboard, 42" x 13.5 " x 14"
4 Ea	Compress, cold
1 Hk (Hank)	Cord, cotton braided, 1/8" x 100'
2 Ea	Head lamp, single cell, cordless
1 Kt	Kit, first aid, 24 person
2 Bx	Lightstick, Yellow
1 Ea	Litter, S.K.E.D.
3 Ea	Marker, Ground
1 Ea	First Aid Manual
1 Ea	Pliers, slip joint, 6"
2 Hk	Rope, nylon. 1/4" X 100'
1 Ea	Screwdriver, flat tip, 6"
1 Se	Splints, inflatable, all limbs, 6 piece
1 Ea	Stretcher, basket, 2 piece

Table 3. Evacuation Kit components

VI. HELICOPTER LANDING AREAS

Terminology and definitions to describe the helicopter landing areas have been adopted from IHOG Manual (Chapter 8). See Section VII.1.5 for facilities and equipment required for each.

Temporary Helibase: a base for helicopter operations established to serve a temporary or intermittent project need.

Helispot: a natural or improved take off and landing area intended for temporary or occasional helicopter use. It may or may not have road access.

Helipad/Touchdown pad: a designated area, usually with a prepared or improved surface on a take-off/landing area.

Unimproved Landing Site or Area: a landing spot used for the first time at the discretion of the Pilot and to which no improvements have been made. If it is to be used on a recurring basis, approval is necessary and improvements should be made.

Safety Circle: a safety zone that provides an obstruction-free area on all sides of the touchdown pad. For temporary helibases and helispots, the only items that should be within the safety circle are the crash kit, a pad marker and, if applicable, the external or internal loads awaiting transport. The Site Controller may also be within the safety circle.

The following issues should be addressed during the planning stage for a temporary helibase.

1. Initial planning actions for a project-specific Temporary Helibase.

A temporary helibase should be adequately planned in advance of the project start. The Helicopter Operations Manager/Project Leader and the Pilot should gather appropriate information required to establish the helibase, including (but not limited to):

- Impact of clearance, aerial and ground activity on the terrain, especially if wilderness or protected area.
- Hazardous materials handling (e.g. fuel)
- Flight path (approach and departure), prevailing wind conditions
- Aerial and ground hazards (e.g. bird colony, trees, rocks)
- Geographical features, e.g. slope, ground stability, size of landing pad, rotor clearances

A temporary helibase construction, especially in a wilderness or sensitive area, can cause impact to the natural environment by creating an opening in a vegetated area, cut stumps

and boles of trees or shrubs, and damage to the site through trampling and helicopter activities.

An area should not be considered as a landing site if it cannot be built to safe standards or if negative environmental impacts cannot be mitigated.

Appendix I should be referenced for factors to consider.

2. Selection of and specifications for Temporary Helibases, Helispots and Unimproved Landing Sites

A. Landings at an Unimproved Landing Site

The Pilot is responsible for making the decision to utilize an unimproved landing site. The Project Manager must defer to the pilot's decision, even if the preferred site is at a distance from that desired. Conversely, the Project Manager has the option to advise the pilot that he/she is uncomfortable landing at the site selected by the pilot, and may decline to land at the site.

B. Construction & Improvement

Construction of approach-departure paths for temporary helibases and helispots should conform as closely as possible to the specifications in Fig. 1 and Fig. 2. Safety circles and touchdown pads should conform to the requirements in Table 4 (Section VI.3(b)). The best landing sites are obviously those that require no construction of landing pads and safety circles, or removal of ground or aerial hazards.

C. General Locations for Temporary Helispots and Unimproved Land Sites

(a) Ridge tops

An exposed knob on a ridge offers the best location, especially if approach/departure is available from all or several directions (see Fig. 1). Consider the following:

- Minimum approach/departure path should be no less than the required safety circle.
- Clear brush and trees below the level of the landing area. Jumbled brush and limbs tend to dissipate the ground-effect cushion, resulting in an abrupt transition to out-of-ground-effect flight.

(b) Lakes or Rivers

Bodies of water, with their less-than-solid surfaces, may seriously reduce the benefits of ground effect. A Helibase or helispot should offer a take-off and landing profile that will not place an aircraft loaded for “In-Ground-Effect” over water before sufficient airspeed and lift is achieved. Depth perception can also be a problem for overwater portions of approach or departure routes.

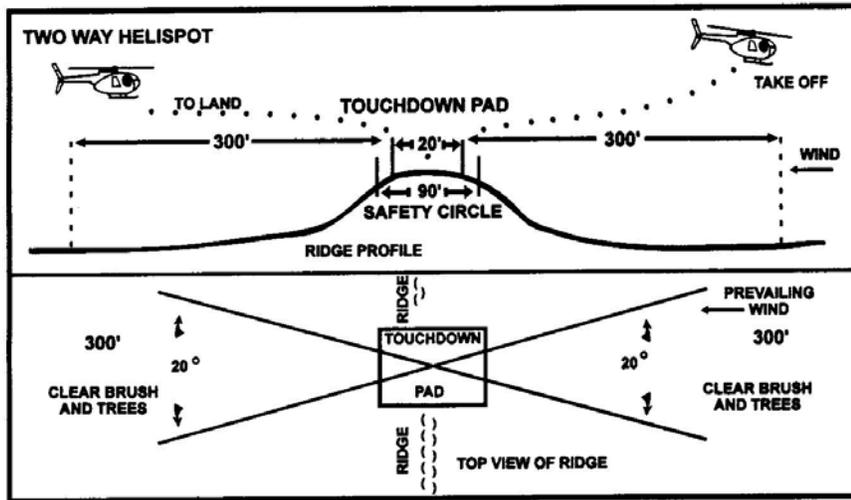


Figure 1. Example of a two-way helispot (IHOG Manual, Chapter 8, 8-6)

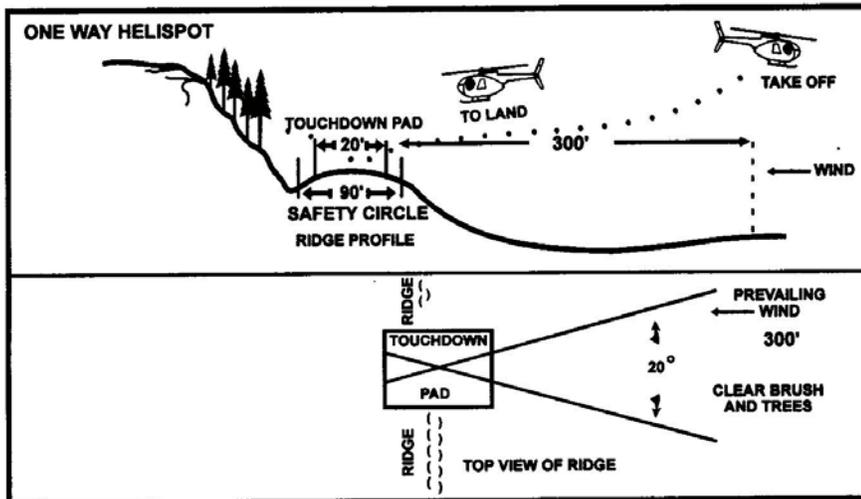


Figure 2. Example of a one-way helispot (IHOG, Chapter 8)

(c) Meadows

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

(d) Snow Areas

Depth perception on snow and glacial ice is often poor. It is important to clearly mark the landing site with objects of contrasting color. To reduce blowing snow, tramp the area thoroughly inside the safety circle.

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

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

(e) Tundra and Boggy Areas

Tundra and boggy areas are unstable surfaces. Helicopters that operate in tundra areas are usually equipped with tundra pads that function essentially the same as snow pads. A log-deck pad may also be used (see Fig 3). Cut and limb at least 10 poles, 20 feet long and approximately 6" to 8" in diameter. These are used to build a square touchdown pad. Place at right angles to the helicopter skids. The poles must support largest helicopter to be used. Secure outer logs to prevent rolling or separation from the pad.

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

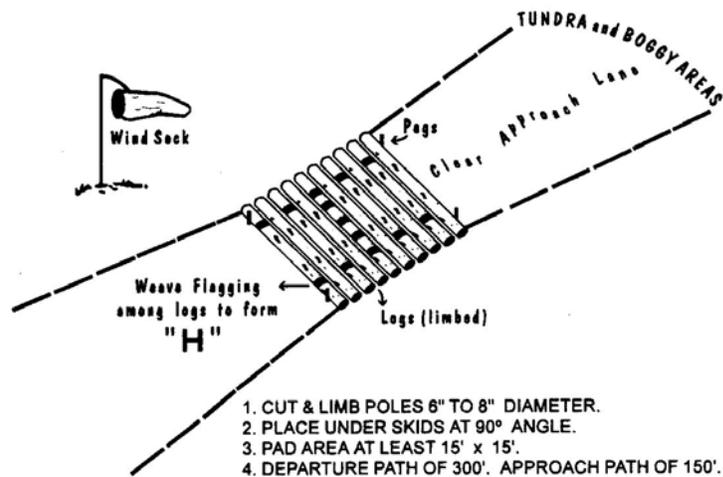


Figure 3. Log-deck landing pad for use in tundra or boggy areas (IHOG, Chapter 8)

3. Slope and Safety Circles

Level or bottom land locations are best. The ground should be as level or as close to the terrain surface as possible without disturbing the small brush and grass cover. The ideal approach-departure path should be 300ft long minimum and slightly downhill. Avoid slopes over 5° or 11% (9:1).

EXAMPLE: Approximately 9' elevation rise x 100' length = 9:1

(a) Specifications for a Safety Circle

The requirements specified in Table 4 and illustrated in Fig. 1 and Fig. 2 are recommended minimums for construction. Safety circles should be as level as possible with trees and large brush removed. Avoid damage to small bushes and grass cover that will help to reduce the dust problem.

(b) Specifications for a Touchdown Pad

The requirements in Table 4 and in Fig. 1 and Fig. 2 are recommended minimums for construction.

- (i) **Fuselage clearance.** Ensure that the pad is free of brush or other obstructions and large enough to accommodate both skids. There must be adequate clearance under the fuselage to clear antennas, cargo hook, or externally supported accessories.

- (ii) **Avoid sloped or unstable pads.** Pads must be as level as possible and firm enough to support the type of helicopter being used. These specifications apply to both temporary helibases and helispots.

Helicopter Type	1	2	3
Touchdown Pad Dimension	30' x 30'	20' x 20'	15' x 15'
Safety Circle Diameter	110'	90'	75'

Table 4. Specifications for planning a helibase or helispot (IHOG, Chapter 8). IC will normally use a Type 3 helicopter (4-8 passenger seats, maximum payload at sea-level 1200 lbs)

4. Approach-Departure Path.

Site selection should provide for approaches and departures in several directions. If the site is not located on a ridge top, an approach-departure path aligned with the prevailing wind should be constructed. If possible, avoid one-way helispots.

- (a) **Wind Direction.** Always attempt to locate landing areas so that takeoffs and landings may be made into the prevailing winds.
- (b) **Almost-Vertical (Full Performance) Approaches and Takeoffs.** Almost-vertical approaches and departures should be avoided if possible, especially on an extended-use basis.
- (c) **Minimum Width.** An adequate minimum width for an approach-departure path is the diameter of the safety circle. Construction starts at the edge of the safety circle and extends in the take-off direction far enough to permit normal no-wind take-offs for the expected density altitudes. Safety is increased if the paths can be widened as they leave the circle.
- (d) **Approach.** The approach should be free of obstructions which would prevent a normal approach.
- (e) **Departure.** There should be enough level running space to permit normal acceleration from hover to translational lift and initial climb.
- (f) **Downdraft Areas.** Avoid downdraft areas on lee sides of ridges.

5. Required Equipment and Facilities.

Table 5 lists recommended equipment and facility requirements and standards for temporary helibases and helispots. Construction should take into account these needs and requirements.

Table 5. Required and Recommended Facilities for Temporary Helibases, and Helispots (IHOG)

REQUIREMENT	Temporary Helibase	Helispot
Operations office or area for communications/ administrative purposes	Required	NA
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 the site	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)	NA
Storage area for helicopter equipment and servicing supplies	Recommended	NA
Parking and staging areas for vehicles (for ground-accessible sites)	Required	NA
Water supply for drinking, utilities, and aircraft maintenance	Recommended	NA
"No Smoking" and other safety and warning signs	Required	Recommended
Evacuation and Crash-Rescue Kit	Required	Recommended
Fire extinguisher located at each pad *	Required	Required
Scales for weighing passengers/cargo	Required	Recommended
Wind indicators	Required	Required
Dust abatement, if necessary	Required	Required
Fueling capabilities	Required	NA
Identifiable, marked touchdown pads	Required	Required
Hazard map	Required	NA

* See Extinguisher, Crash Rescue, and Evacuation Kit Requirements for Temporary Helibase (Table 2 and Table 3).

6. Markings for Aerial Identification

(a) Temporary Helibases and Helispots

Project helispots used on a recurrent basis (for example, for more than one day) by more than one helicopter should be marked or identifiable from the air.

(b) Log-deck Touchdown Pad

Wind flagging or other colored cloth strip around the logs to form a letter “H”. Ensure cloth strip is secure and cannot unravel.

(c) Snow Areas

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

(d) Miscellaneous Markings

- Painted rocks or well-secured and weighted signal panels may be used to outline a touchdown pad or landing area.
- Color marking should provide sufficient contrast with the background area. Reflective material may be used. If paint is to be used, it must be environmentally acceptable (for example, a water-based paint).
- Known hazards outside the safety circle such as poles, pipes, and high vegetation should be marked with colored ribbon or other means. Known hazards should also be marked on a hazard map at the helibase.

7. Dust Abatement

The potential for dusty conditions usually exists when not operating from turf or pavement. Dust abatement measures should be accomplished at all helibases and helispots. The simplest measure is the application of water by ground equipment or from helicopter buckets or fixed tanks. Any application of chemicals should be approved by the appropriate land agencies.

8. Procedures for Landings.

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

A. Load Calculations

Prior to repetitive flights to and from the same helispot, the Helicopter Manager/ Operations Manager will consult with Pilot(s) and to plan and compute loads for those sites.

B. High-Level Reconnaissance

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

C. Areas to Avoid

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

D. Wind Direction

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

E. Reduction of Power

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

F. Pre-Exit Briefing

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

G. One-Skid, Toe-In, or Step-Out Landings

(See IHOG Glossary for definitions). Except in a life threatening emergency, these types of landings for DOI personnel are prohibited unless specifically authorized. Exemptions are agency-specific and should be carried by agency personnel or vendors engaging in these activities. Appropriate personnel training should be obtained.

H. Tundra or Boggy Areas

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

I. Snow Landings

Snow landings for DOI personnel may require agency special use approval. Check agency Pilot Qualification Card for snow operations and ensure that the helicopter is equipped with snow pads.

9. Temporary Helibase and Helispot Rehabilitation and Restoration.

Project staff are responsible for obtaining desired rehabilitation standards from the appropriate land agency. It is recommended that these be obtained in writing, or follow IHOG guidelines. Before starting the operation, walk through adjacent, untouched areas and record the appearance, arrangement, and color scheme of the vegetation. Attempt to restore the helibase or helispot as close to the original state as possible. Remove wind indicators, pad markers, flagging, litter, etc.

VII. CARGO TRANSPORT

The following protocols details key information only, summarized from IHOG Chapter 11, Cargo Transport. For full details on weighing and rigging external loads, IHOG Chapter 11 should be referenced.

The safe and efficient transport of cargo utilizing helicopters is a high priority. If performed incorrectly, there is the potential for dropped external loads, spillage of hazardous materials, overgrossed weight condition, cargo interference with the rotor systems, and other serious safety hazards. Incorrect methods of rigging and transporting cargo can result, and have resulted, in catastrophic accidents.

Only aircraft designed and equipped to carry external loads may transport them. The pilots and the aircraft must be FAA-certified and AM carded to transport external loads.

1. Qualified Personnel.

A. Ground Personnel.

All personnel supervising and coordinating external-cargo transport activities should be trained and qualified. Trained personnel should be provided at all loading and unloading sites.

IHOG recommend 3 persons per Type 3 (e.g. Bell Long Ranger) for handling cargo transport. This provides for (i) a Site Controller (IHOG Parking Tender),

(ii) Loadmaster (s), and (iii) hook-up person. For IC-purposes, the Loadmaster and hook-up person could be combined as one person, depending on circumstances.

B. Pilot Qualification

The Pilot must be qualified and AM carded for carriage of external loads and, where applicable, for longline with remote electric hook operation.

2. Load Calculations and Manifesting

During cargo transport operations, load calculations shall be performed prior to any flight activity. Weight of each cargo item should be inscribed on each cargo piece, and total cargo for each load transported recorded.

3. Air Crew Member on Board During External Load Missions

As a general rule, only the Pilot(s) shall be aboard a helicopter during external load operations. However, under some circumstances, an air crew member may be onboard to enhance mission accomplishment. Refer to FAR 133 and IHOG Chapter 10 for conditions.

4. Hazardous Materials Transport and Handling

The transport of hazardous materials (or “HazMat”) by air is regulated by the Department of Transport and require special containers, specific labeling, special handling etc: Some of the more common HazMat materials are:

- Explosives
- Diesel fuel
- Kerosene
- Gasoline
- Jet fuel
- Propane
- Blazo fuel
- Solvents
- Fusees
- Argon bottles
- Wet cell batteries
- Aerosols
- Pressurized containers
- Foam concentrate

Aircraft may only carry hazardous materials when other means of transport are either impossible or impractical because of time, cost, or safety.

- (a) Only crew members essential to mission accomplishment may fly on an aircraft carrying hazardous materials.

- (b) The Department of the Interior and AM provides specific requirements and guidelines for carrying hazardous materials on aircraft. You must refer to the Interagency Aviation Transport of Hazardous Materials Guide, or in local or State agency policy, for procedures and legal requirements.
- (c) Personnel who engage in the transport of hazardous materials via aircraft must have been trained in HazMat, have a current exemption and a HazMat Response Guide on board. This includes vendors whose helicopters carry hazardous materials. IHOG recommends that the guide or handbook must be on board the aircraft at all times.

5. Cargo Preparation

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

A. Pilot Approval

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

- Hazardous material(s) being transported.
- Correct packaging of the hazardous material.

B. Weighing.

Weigh cargo and inform the Pilot of actual weights. Portable scales can be easily set up at remote helibases and helispots. Figure 4 shows various methods of weighing cargo. **DO NOT EXCEED ALLOWABLE PAYLOAD.** Have the cargo weighed, packaged, and marked for destination prior to the arrival of the helicopter.

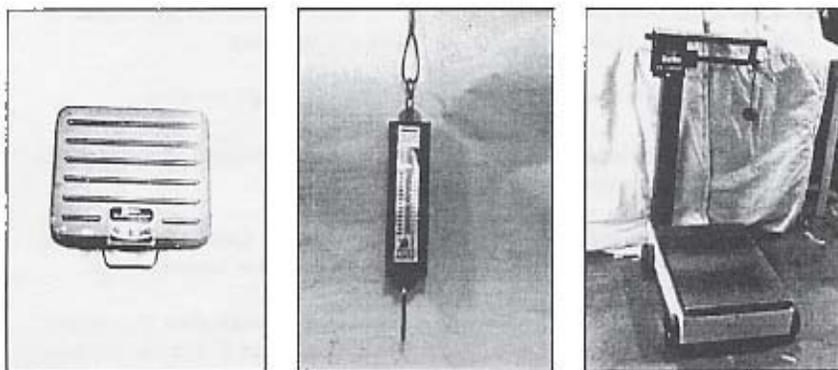


Figure 4. Methods for weighing cargo

C. Methods of Identifying Cargo Destinations.

When multiple destinations are involved in a cargo transport operation, the destination of a cargo load must be identified in order for it to be transported to the correct location. Ensure the Pilot knows exactly where the load is to be dropped.

The following are suggested methods:

- Lay out separate cargo areas for each helispot. Identify these areas with markers: “H1”, “H2”, etc. Note that these do not have to be separate cargo pads.
- At the minimum, mark the destination clearly on the cargo using a heavy marker, or tag each piece. Cargo could be color-coded with spray paint on each box or attach a painted tag to the cargo identifying the helispot. Ensure that all personnel are aware of the coding system. Example: H1 = Blue, H2 = Red, etc.

6. Equipment Inspection

Prior to commencing the operation, the Helicopter Manager, Loadmaster, or other person responsible for the cargo transport should inspect all equipment (for example, leadlines, swivels, nets, cargo racks, tie-down straps) for wear or damage.

7. Cargo Inspection

The Loadmaster, or other person responsible for the cargo transport, should inspect all cargo. Inspection should include, as applicable, the following:

- Liquid containers should be boxed or secured in an upright position.
- Boxes should be taped shut and all items tied down or secured, including Sigg and other fuel holding containers.
- All garbage should be double-bagged in plastic garbage bags. Garbage is best moved inside hard containers or strong sacks.
- Hazardous materials should be marked and the Pilot aware of items being transported.
- Do not transport liquid hazardous materials (for example, gasoline) with food or personal gear.
- 12V batteries should be packed in hard-plastic battery cases. If not sealed, batteries must be transported in an upright position to prevent leakage (in a secondary container or secured to a flat base).
- Sharp edges of tools should be protected by tool guards or tape to protect the cargo net or other containers.

- Avoid small and/or lightweight cargo items that could fall out of cargo nets. Small and/or lightweight items should be packed in larger boxes, or secured to larger items.

8. Establishing the Loading Area

Refer to Section VI for general guidance on establishing loading areas.

9. Loading and Rigging Procedures

This section provides summarized key points only, refer to IHOG Manual Chapter 11 for more details.

A. Internal Cargo.

- Where possible, store internal cargo in the cargo hold, regardless of whether passengers are being transported with the cargo. Cargo should not be stored under the passenger seating.

CAUTION: All packs must be secured if carried in the passenger compartment. Packs should not be carried unsecured in a passenger's lap or on the floor. Packs can be carried in the cargo compartment, in external cargo racks or in an external sling.

- Do not exceed the weight limit of the cargo hold. If in doubt, ask the Pilot.

B. Proper Rigging Methods for External Cargo.

- Ground personnel and Pilots should be thoroughly trained and briefed on rigging, hook-up, hand signals, and safety before any operation is commenced.
- Rigging should be frequently inspected for wear and damage, and tagged if unusable.
- The aerodynamic configuration of a load may cause it to spin and oscillate, which in turn may cause the Pilot to experience control problems with the helicopter. The degree of the control problem may be small and easily handled, or the Pilot may experience extreme difficulty and the Pilot may return with the load for re-rigging, or, in extreme cases, to release the load, either intentionally or inadvertently.

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

The following section provides guidelines for commonly-used standard rigging procedures. Refer to IHOG Chapter 22 for more detailed discussion of additional and unusual load configurations.

(1) Rigging tips for external cargo

Some general rigging tips for external cargo transport include:

- Use longlines to avoid the helicopter being close to obstacles on the ground.
- On longline jobs, EVERY load gets a swivel to avoid line twisting. Multiple loads on the same longline require multiple swivels. One net/bag may revolve faster than the other.
- For a longline without a remote hook release, a swivel is required at the bottom of a longline at the cargo attachment source, and personnel are required at both ends of the operation (pick-up and drop-off).

CAUTION: The primary reason to use swivels is to prevent line twisting. Swivels allow multiple net loads to rotate independently in flight without twisting the leadline or longline. When using multiple net loads, a swivel must be placed between the leadlines and the remote or belly hook. A swivel should also be in place for each net.

- The swivel must have a rating equal to or greater than the load to be carried, with an ultimate strength of three times the weight of the load.
- The loading area and approach-departure paths should be cleared of any debris or objects that could fly up and strike personnel or the helicopter.
- Ground personnel involved in rigging cargo shall wear PPE.
- Never stand under a load, or between the load and an immovable object when working around operating helicopters.
- Security and alignment of the rigging must be checked as the load is pulled taut by the helicopter. Never place one's hand(s) in an area where it could be caught or pinched by the rigging. The Site Controller should direct the Pilot to release tension on the load and land if the load requires re-rigging.

- A two-point sling with less than a 45 degree angle to the hook or longline is usually the common method for most loads that will not fit into a cargo net (Fig. 5).
- Use a four-point sling for box-like loads (Fig. 5).
- A spreader bar is useful for stabilizing a load, or where the sling may catch or damage the load if attached conventionally. Four cables with two bars are used for a 4-point hook-up (Fig. 5.)
- Never fly with an unweighted sling or net. The forward motion of the helicopter will cause the sling to trail and drift up toward the tail, with potential to become caught in the tail rotor. Leadlines and longlines should be shorter or much longer than the distance between the hook and the tail rotor.
- Never attempt to perform rigging of unusual loads without prior training and/or experience.

(2) Cargo Net.

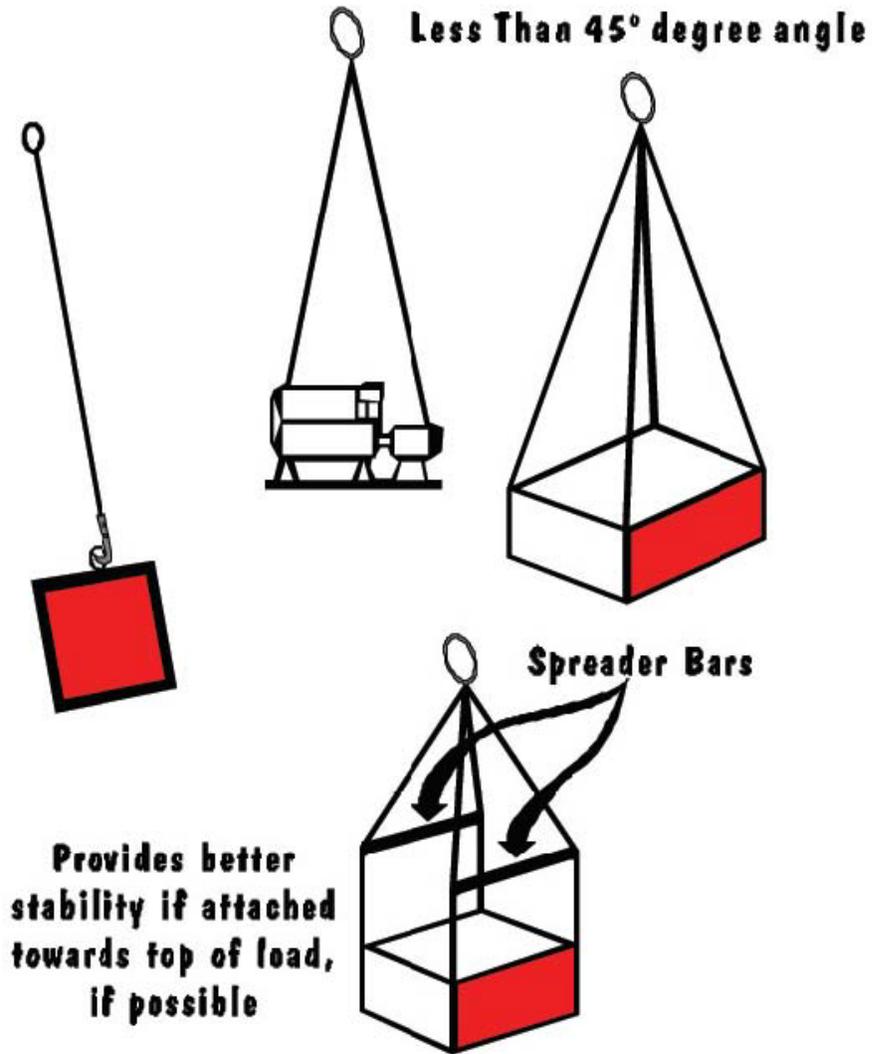
Some considerations when working with cargo nets include:

- Center the weight and make the load as symmetrical as possible. Heavy items should be set in the center of the net first, with light items on top.
- Pull tension on the “purse string(s)”. (The purse strings are the lines that encircle the top or outside perimeter of the net). If the net has a double encircling line, both should be even in length to attach leadline or swivel.
- After the net is secured, look for holes or openings in the net where items could slip through.
- Attach a swivel between steel ring(s) on the “purse string(s)” and the cargo hook if no leadline is being utilized.
- Tag the load with destination and total weight of load, including net, swivel and other accessories.

(3) Rigging Methods.

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

- i. Hookup while the aircraft is on the ground,
- ii. Hover hookup attaching the rigged load directly to the cargo hook (no leadline),
- iii. Hover hookup utilizing a leadline or,
- iv. Hover hookup using a longline with a remote electric hook or carousel.



USE SWIVEL AT ALL TIMES BETWEEN THE LOAD'S LINE(S) AND THE CARGO HOOK

Figure 5. Single, two- and four-point loads

(a) Preparation for the Hookup.

Basic tasks that should be performed prior to performing any external load operation include:

- Prepare by removing any items from the helicopter that are not essential.

- Check both the rigging of the load and the external load equipment according to the requirements and guidelines discussed previously.
- Attach the load to a swivel. Use of a swivel is required in most cases. If using the longline with remote electric hook configuration, attach the swivel to the remote electric hook.

(b) Hookup with Helicopter on the Ground

This method is usually utilized with the helicopter shut down, and involves the least amount of risk to those involved. The Pilot should be present when hooking the load to the aircraft. The pilot should check the manual and electrical release prior to load transport.

(c) Hover Hookup with No Leadline

This method involves attaching the load (for example, a cargo net with swivel) directly to the cargo hook. This procedure is not recommended unless there is enough line for the hookup person to stand almost upright below the helicopter.

(d) Hover Hookup with Leadline

Hover hookups with leadline are effective when multiple loads need to be transported in a short time frame, and when the load destination involves terrain on which the helicopter is unable to land.

(e) Hover Hookup with Longline and Remote Electric Hook

Hover hookups with longline and remote electric hook are effective:

- When multiple loads need to be transported within short time frames, when the load is on terrain on which the helicopter is unable to land or takeoff, and the surrounding vegetation and/or terrain is such that the helicopter is unable to perform a hover hookup with a standard length of leadline.
- When ground personnel are not at the site.

C. Required Personnel.

(a) Hookup with Helicopter on the Ground

Only one person is necessary for this type of operation, since the Site Controller can accomplish the hookup, then exit and perform marshalling duties.

(b) Hover Hookup

Only qualified and trained personnel shall perform hover hookup operations. It is recommended that two individuals perform the operation: a Site Controller, and the individual performing the hookup.

On longline with remote electric hook operations, only if circumstances dictate may one person perform the hookup, provided there is air-to-ground radio communication between the Pilot and the individual performing the hookup.

Individuals must be trained and qualified to perform hover hookups, and be knowledgeable in the operating characteristics of the cargo hook, and remote hook.

10. Radio Communications

For external load operations, a discrete operating frequency should be established, and a Site Controller identified. The Pilot shall receive radio communications from only one person: (1) the Site Controller, or (2) the hookup person.

Radio Language

- All radio communications should be **clear**, concise and professional in manner.
- Conversations should be kept to a minimum to reduce congestion.
- Radio frequencies for direct contact with the Pilot and contact via the repeater should be established and tested prior to the mission.
- Radio call signs should be established prior to take-off, and a procedure determined for contact and sign-off.

11. Briefing

A pre-mission safety briefing must be conducted with the Pilot, the Parking Tender, and the hookup person. Emergency procedures and, where necessary, standard hand signals should be discussed.

(a) Helicopter Hand Signals

The Pilot usually should receive hand signals from only one person (for example, the Site Controller).

(b) Emergency Procedures

Prior to hover hookup operations, emergency procedures must be established between the Pilot and ground crew. The emergency briefing is usually presented by the Pilot and addresses procedures in the event of a mechanical failure.

- The Pilot should indicate that the intent will be to move the helicopter away from the hook-up person underneath the aircraft. Generally, this will be to the Pilot's side of the helicopter, but confirm this with each Pilot.
- The hook-up person should move in the opposite direction from that of the helicopter, or fall flat next to the load and attempt to gain as much protection as possible.

12. External Load Operation Sites

Landing Area rotor clearance standards for external load operations where aircraft must descend below any obstacles/barriers.

- (a) The performance of external load missions must be contingent upon proper assessment and preparation of the delivery site by first removing and mitigating hazards.
 - (b) In areas of sloping terrain or with obstacles rising to one or more sides of the cargo pickup/delivery area, the Pilot shall maintain rotor clearance from all obstacles equivalent to the landing area safety circle requirements. If specified clearance cannot be maintained, the pilot shall decline the mission until hazards are removed, additional line can be added or a better location can be identified.
- The safety circle is generally recognized as 1 ½ times the rotor diameter. If the helicopter is within ½ rotor diameter of the highest obstacle, the pilot should consider adding another length of line.

Pilots have the final say in accepting and/or denying any mission.

13. Personal Protective Equipment

See Section V.

14. Grounding

Static electricity may present a problem to ground crews when hooking up sling loads to hovering helicopters. Unfortunately, there is no method of grounding that ensures that the hookup person will not receive some amount of electrical shock when the load touches the hook. Discuss the risk of electrical shock with the Pilot.

15. Procedures for Hover Hookups

A. General.

There are standard procedures for any hover hookup, regardless of whether or not a leadline or longline is used. These include (but are not limited to):

- The cargo load should be placed in front of the helicopter skids, with no potential for lines to become snagged over the skids.
- The cargo net's perimeter lines should be drawn over the top of the load and laid so that the lines and leadline are prevented from becoming entangled in the net during liftoff.
- The Site Controller should direct the Pilot by radio or standard hand signals. Placement of loads carried by longline and remote electric hook may be done independently by the Pilot if no ground personnel are available.
- The Site Controller should be far enough back of the load to remain visible to the Pilot at all times; the longer the line, the farther back from the load the Site Controllers must be.
- The Site Controller should position him/herself to maintain visual contact with the Pilot from the Pilot's position in the cockpit.
- After the hookup is completed, the hookup person should exit from underneath the helicopter to the front and in full view of the Pilot; the hookup person should then proceed to a position that is not underneath the departure path of the helicopter.
- When the hookup person is clear of the helicopter, the Site Controller may signal the Pilot to begin movement of the load.

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

- The Site Controller must pay close attention as the helicopter lifts up and tension is applied to the line; an improperly-rigged or placed load can become snagged at any time.
- If there is a problem with the load, the Site Controller should communicate appropriately with the Pilot.
- The hookup person, having exited, should remain ready to take direction from the Site Controller should the load or line become snagged.
- Always keep the load between you and the helicopter.
- When receiving a load, stay clear of the landing area.

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

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

→ **NOTE:** Longlines should be attached to the helicopter while it is on the ground and NOT hover hooked/plugged.

→ **IMPORTANT CAUTION:** Hover hookups to connect electrical power accessories should not be performed. If an electrical connection is loose or not functioning, the pilot should land the helicopter to rectify the problem on the ground.

B. Longline and Longline with Remote Electric Hook Procedures.

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

The sling load should be placed on the ground in the center of the loading area.

- On approach, the signal person should advise the Pilot on load clearance from trees, load height above the ground, and any problems that might arise in the pickup or drop zones.
- When attaching a load to the remote electric hook, the hookup person should allow the hook to contact the ground before touching it. This grounds the hook and eliminates the possibility of shock from static electricity.
- On approach or departure to the remote hook, the hook-up person shall not step over the longline while attaching the load.

- When receiving a load, stay clear of the landing area. Let the Pilot set the load on the ground, release it from the remote electric hook (if there is an electronic hook) before entering the area.

VIII. AERIAL BAITING OPERATIONS

An aerial baiting operation requires adherence to standard practices similar to those for external cargo load operations. Key points include:

(a) Spreader Bucket Operations

- The spreader bucket should be placed in front of the helicopter skids, with no potential for lines to become snagged over the skids.
- The bucket should placed on the ground by the Pilot on the designated loading spot before bait is loaded, and not be pulled into position by the loaders.
- The longline should be over the top of the spreader bucket so that the line does not becoming entangled in the bucket during liftoff.
- The Site Controller should direct the Pilot by radio or standard hand signals, to place the bucket.
- The Site Controller should be far enough back from the bucket to remain visible to the Pilot at all times, and should position him/herself to maintain visual contact with the Pilot from the Pilot's position in the cockpit.
- When the bait loading has been completed, the Site Controller may signal the Pilot to begin movement of the bucket.
- When the bucket is lifted up, ground personnel should keep out of the flight path to avoid injury.
- The Site Controller must pay close attention as the helicopter lifts up and tension is applied to the bucket line.
- If there is a problem with the bucket, the Site Controller should communicate appropriately with the Pilot.
- Always keep the bucket between the bait loaders and the helicopter.

(b) Additional Safety Protocols

- Safety briefing should take place each night before operations with tasks allocated to specific personnel.
- Pilots should brief personnel on actions when helicopter malfunctions, i.e. pilots to direct machine away from loaders.
- Site Controller will monitor all activities, not be involved in actual loading and to oversee safety. Site controller will be in radio contact with pilot.
- Appropriate Helicopter and Pesticide Application PPE will be worn.
- Team members will be tasked with collecting all bags as they are emptied to ensure that they do not go into the rotors.
- Emergency kit (tent, food, first aid, etc) to be stored at each loading site in case of injury or inability to return to base.
- For lifting and tipping 50 lb bait bags personnel to use appropriate posture and available platforms when loading buckets to reduce lifting. Team member's tasks to be rotated. Back supports to be provided.

(c) Aerial bait spread

Risks include bird strike, mechanical failure, and weather conditions.

- Pilots will keep in constant communication so that in the event of an accident they can be located promptly.
- The Pilot must decide if birds constitute an unacceptable hazard.
- Pilots have final say as to whether flying will be possible due to adverse weather.

IX. PERSONNEL TRANSPORT

The safe transport of personnel in helicopters is of the highest priority. Utilizing standard procedures will ensure we meet objectives of transporting personnel safely and efficiently.

Refer to the Section I. for definitions of flight crew member, air crew member, and flight passenger.

(1) Minimum requirements

- All passengers on board a helicopter should have the appropriate training and/or safety briefing. If an AM operation, all passengers should have AM B3 certification (see Section I).
- All passengers should receive a safety and mission briefing prior to take-off (see Section I)
- All passengers will wear appropriate PPE (see Section V)

Only passengers essential to the mission will be onboard a helicopter

- Where passengers include non-certified or untrained individuals (e.g. VIPs, media, photographers, donors), they will be accompanied by at least one trained or certified individual. Partner agencies should advise on protocols for the transportation of non-essential personnel.
- Designated helicopter management personnel must supervise and coordinate passenger transport activities.
- During passenger transport operations, load calculations and standards shall be adhered to.
- As a general rule, only the Pilot(s) shall be onboard helicopters when conducting external load operations. The Pilot has final authority regarding carrying an aircrew member during external load operations.

(2) Procedures for Transporting Personnel

Designated Aviation Safety Officer or other helicopter management personnel must supervise and coordinate passenger transport activities, to ensure that personnel have appropriate PPE, and that allowable payload limitations are not exceeded.

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

(3) Passenger Safety Briefings.

A safety briefing should be given by the Pilot or as delegated by the Pilot, prior to personnel transport (see Section II.G, and Appendix II)

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

(4) Passenger Loading Procedures after Safety Briefing.

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

- Helicopter Crew members or other authorized, trained personnel people shall assist in loading operations.
- Prior to approaching the helicopter, remove or secure any external items which might blow away/fall (e.g. hats, canteens, cameras).
- Prior to approaching the helicopter, remove items which might impede proper fastening of seatbelts/shoulder harnesses.
- Stay in safe area prescribed by helicopter crew or other authorized personnel until given the direction to load.
- When approaching, stay close to the helicopter body.
- Find seat belt and fasten; if unable, helicopter crew person can assist.
- Personal items carried on board must be adequately secured.
- Ensure PPE is properly worn.
- Ensure that all personnel understand the instructions given by Pilot or Manager.

(5) In-Flight Precautions

- No smoking during flight.
- Keep clear of controls: DO NOT TOUCH controls, except in an emergency.
- Secure all items, especially when flying with the door(s) off.
- Understand emergency procedures and read instructions pertaining to emergency egress; if in doubt, ask questions.

(6) Unloading Procedures

- Off-loading during shutdown of helicopter should be avoided.
- Wait for Pilot, helicopter crew member, or other authorized personnel to give clear signal for offloading.
- Remove seat belts, refasten and lay on seat.
- Maintain tight 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 Pilot.
- After exiting the helicopter, walk to the front of the helicopter, or an area of safety as indicated by the Pilot. Avoid the helicopter flight path.

CAUTION: Ensure that seat belts are inside the aircraft when closing doors. A loose seat belt can cause several thousand dollars of damage when the helicopter becomes airborne.

CAUTION: when exiting the aircraft, do not walk toward the tail rotor or uphill. If in doubt, ask the Pilot or other crew members on the approved exit route.

X. RADIO COMMUNICATIONS

Radio Language

- All radio communications should be **clear**, concise and professional in manner. Please remember that we are guests on all radio frequencies and that transmissions may be overheard.
- Conversations should be kept to a minimum to reduce congestion.
- Radio frequencies for direct contact with the Pilot and contact via the repeater should be established and tested prior to the mission.
- Radio call signs should be established prior to take-off, and a procedure determined for contact and sign-off.

XI. AIRCRAFT MISHAP & ACCIDENT REPORTING

- Aircraft mishap, accident and emergency will be managed by the vendor helicopter contractor, unless otherwise arranged.
- Overdue or missing aircraft will be managed by the vendor helicopter contract.
 - An aircraft is considered “overdue” when the pilot fails to check-in within the time-frame specified in the flight following request, or when an aircraft operation on an FAA Flight Plan fails to arrive within 30 minutes past ETA and its location cannot be established.
 - An aircraft is considered “missing” when it has been reported to a Flight Service Station (FSS) as being “overdue” and FSS has completed its administrative search for the aircraft.
- Protocols for aircraft accident reporting and management, and procedures for overdue or missing aircraft should be detailed in the vendor company’s Aviation Safety Plan.
- For DOI and AMD operations, FAA and AM protocols should be adhered to by the vendor contractor, and the AM “Interagency Mishap and Response Guide & Checklist” should be referred to.
- For Island Conservation personnel, refer to the projects field safety plan for management of personnel in a helicopter accident and emergency.
- For IC and partner agency communications regarding a helicopter accident and emergency (e.g. informing partners, media release), refer to the appropriate project’s Communications Plan.

Emergency Response Actions

Time is a critical factor in responding to an emergency situation. Immediate positive action is necessary; delay may effect someone’s survival.

(a) Rescue Operations

- Preserve life
- Secure the area (deny access except to credentialed officials)
- Do whatever is necessary to extricate injured occupants, and to extinguish fires.
- Deactivate the ELT/EPIRB if no longer needed.

(b) Site Safety Precautions

Aircraft wreckage sites are hazardous. Personnel involved in recovery may be exposed to physical hazards such as hazardous cargo, flammable and toxic fluids, and sharp or heavy objects. Determine if HazMat is onboard and request appropriate assistance. It is important to exercise good judgment, utilize PPE and protective devices, and use extreme caution when working in wreckage. Do not exceed your personal physical limitations.

(c) Wreckage Security.

Treat the area like a crime scene. Arrange for security at the accident scene. Wreckage and cargo should not be removed or disturbed unless necessary. Document and/or photograph the location of any debris which must be disturbed in order to carry out rescues or fire suppression. Perishable evidence and witness information must be quickly documented.

APPENDIX I: TEMPORARY HELIBASE MANAGERS' REMINDERS LIST

I. Purpose.

The purpose of the Temporary Helibase Manager's Reminders List is to provide the Manager with a comprehensive list of items, procedures and systems pertaining to helibase and helispot management and operations. If items on the Reminders List are adequately covered, then the Daily Helicopter Operations Briefing/Debriefing Checklist should show few, if any discrepancies.

II. Applicability.

Use of the Helibase Manager's Reminders List is optional, but its use is highly recommended on all multiple aircraft helibases prior to or immediately after the commencement of air operations. Review of the list at appropriate times during the course of an incident or project is also recommended.

HELIBASE MANAGERS REMINDER LIST

I. Temporary Helibase Site Selection and Layout

A. Relationship to Base Camp

- Easy access for personnel and cargo movement.
- Flight routes are away from base camp, and effects of noise and dust on base camp have been considered.
- Radio and phone communications can be established.
- If site is unavoidably far from base camp, consider establishing a helispot nearby for recon flights.

B. Location Relative to Project Site

- Turn around times are economical; flight exposure of passengers and crews have been reduced to an acceptable level.
- Weather factors (wind, inversion, fog etc.) have been considered and discussed.

C. Site

- Site is adequate for number and types of helicopters.
- Landing pads and safety circles can be established with adequate separation for number of helicopters being used.
- Fuel site is separate from landing pad, but accessible by helicopters.
- Safe hover lanes and approach-departure paths can be established, given number of helicopters.
- Separation of cargo and personnel pads.
- Cargo and crew manifesting area size is adequate.

- Communications can be established between Pilots, Site Manager and Project Manager.
- Site is signed appropriately.

D. Hazard Map

- A flight hazard map has been evaluated and posted on the display board. Pilots and other personnel have been instructed to provide additional information as observed.

E. Helibase Operations and Communications Area

- An operations and communications area has been established and pad can be monitored from this area.

F. Environment

- Appropriate environmental constraints will be considered for helibase construction, while still maintaining safety.

II. Helispot Site Selection and Layout (review for each helispot established) e.g. vessel

A. Location and Site Selection

- Location is appropriate relative to project site.
- Weather (e.g. fog inversion, winds etc.) has been considered and input received from pilots.
- Helispot is adequate for number and types of helicopters utilizing the helispot.
- Helispot is adequate for number of personnel who may be transported to and from the helispot.

B. Construction

- Appropriate environmental considerations have been considered for helispot construction, while still maintaining safety.
- Helispot is numbered and marked, location has been taken from GPS, recorded, and relayed to appropriate personnel.
- Hazards identified, recorded and discussed with pilots.
- Approach and departure paths discussed and established.
- Helispot furnished with wind indicators.
- Helispot furnished with Helicopter Crash Kit and adequate number of fire extinguishers.
- Site is signed appropriately.

III. Personnel and Organization

- Personnel positions have been assigned and are filled with trained and qualified persons.
- Personnel have been assigned jobs and understand the job requirements.
- A Helicopter Management Organization Chart has been posted on a display board and is updated.
- Personnel length of assignment and rotation schedule established.
- Camps are staffed with appropriate personnel.

IV. Communications

- A Communications Plan is posted on a display board, and updated as necessary. Radio frequencies and changes known to everyone
- Flight following and Take Off and Landing procedures known and discussed, A Flight Following Log has been established.
- Communications within the helibase and to helispots adequate.
- Adequate number and types of radios available for personnel and helispots.
- All radios tested prior to commencement of operations. Spare batteries available.
- Frequencies not overloaded. Frequency discipline has been discussed with pilots and project personnel.

V. General Planning, Information, and Organizational needs

- Names of helicopter crew (Pilots, passengers, flight crew, ground crew) is recorded on an information sheet and submitted to the Helicopter Operations Manager/Project Leader.
- Helicopter Load Calculations are completed as required
- Medivac/medical support is available as needed.
- Weather updates are being requested and recorded if there is a change in weather.
- An evacuation plan has been established in the event of a fire. Adequate measures are in place to provide ground fire protection at the helibase and helispots.

VI. Operations

- Helibase or helispot managers are providing appropriate communications (radio or hand signals) and are maintaining control and access to the pads.
- Proper wind direction is being given.
- Adequate fuel supply is available.
- Appropriate Fire Extinguishers have been supplied for each fueling pad.
- Foreign object damage (FOD) control measures have been taken.
- Cargo area is clean and organized. Cargo is secured.
- Hazardous materials are properly identified and marked.
- Crew cleaning and eating areas are clean and maintained. All material secured.

- Aircraft and equipment is secured at night.

VII. Demobilization

- Aircraft and equipment is secured at night.
- Demobilization briefings have been received.
- Personnel roles have been assigned.
- Flight Plan and Flight Following schedule for home journey has been documented.

VIII. Helibase and Helispot Rehabilitation

- Coordinate with Project Manager and land agencies concerning any rehabilitation requirements for the helibase and helispots.
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APPENDIX II: PRE-FLIGHT BRIEFINGS

I. Helicopter/Project Manager to Pilot

- 1. Pilot Card:** Qualified and current for aircraft type and mission.
- 2. Aircraft Card:** Aircraft Approved for mission?
- 3. Flight Plan:** FAA or Agency Flight plan filed.
- 4. Flight Following/Radio/AFF Equipment:** Flight following procedures in place; radio/AFF equipment is adequate and operational. During takeoffs and landings there should be no radio traffic that might distract the pilot.
- 5. Nature of Mission:** Pilot briefed on nature and sequence of mission.
- 6. Analysis of Known Hazards:** Known hazards discussed; high-level recon prior to decent to low-level.
- 7. PIC Concept:** Pilot shall not be pressured into performing missions beyond pilot's capability or that of the aircraft.
- 8. Hazardous Materials:** Identify any Hazardous Materials that will be transported and notify the Pilot. Take appropriate actions.

II. Passenger Briefing

Pilot or designated Helicopter Manager must brief all passengers prior to flight:

- 1. Personal Protective Equipment**
- 2. Survival Equipment** as applicable (PFD, Life Rafts, etc.) is indicated to passengers

3. NO Smoking & other rules in and around aircraft

4. Approach and departure paths:

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

5. Tools and Equipment:

- Secure hand tools and equipment awaiting transport
- Make assignments for carrying tools/equipment to/from helicopter
- Carry tools/long objects parallel to the ground, never on shoulder
- Portable Radios turned off

6. In-Flight Discipline:

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

7. In-Flight Emergency Procedures

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