

#### FOREWORD

As authorized in 351 DM 1.7, the *Helicopter Short-haul Handbook* was first developed in 1994. Objectives, policies, and standards for all Department of Interior (DOI) short-haul programs were defined in this document.

In January 1999, the "Interagency Helicopter Short-haul Working Group" was established under the direction of the "Interagency Helicopter Operations Committee" (IHOPs). It is recognized that this document may be adopted for use by state or local agencies, however, its content remains the responsibility of DOI, acting upon recommendations from the Short-haul Working Group. Proposed changes or deletions to this document should be addressed through the agency to the working group.

The objectives, policies, and procedures prescribed herein are generally broad in scope and define minimum program standards. It is the responsibility of each using agency to determine, within the parameters of this document, additional requirements necessary for safe and efficient operations. These requirements must identify and define specific and often unique program needs and shall be outlined in agency and/or user specific short-haul operations plans that are both agency and DOI Aviation Management (DOI AM) approved.

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Questions regarding the content of this Handbook may be directed to the DOI Aviation Management (DOI AM), 300 E. Mallard Dr., Ste. 200, Boise, ID 83706-3991. Additional copies of this document may be obtained from the Division of Technical Services at the same address.

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# **CHAPTER 1 - GENERAL INFORMATION**

#### 1.1 Definition

Short-haul: To transport one or more persons suspended beneath a helicopter (HEC – human external cargo.)

#### 1.2 History

The development of the short-haul technique, in this country, has been closely associated with the evolution of helicopter rappelling (heli-rappelling). When ground evacuation was dangerous or impractical, personnel were removed from rappel sites by attaching to rappel lines that were still anchored to the helicopter. While heli-rappel requires extended hover time for the delivery of persons to a specific location, short-haul emphasizes limited hover time, with added capability for the extraction of persons and cargo.

The helicopter short-haul technique was originally researched and developed by Swiss Air Rescue (REGA) in 1966. Short-haul gained popularity in Europe prior to 1970 as an effective rescue technique in mountainous areas. In 1970, National Parks Canada incorporated short-haul (slinging) into their search and rescue program, where it is continues to be widely used.

In the early 1980's, short-haul was adopted and modified by a variety of agencies for use in rescue and law enforcement programs within the United States. Helicopter short-haul continues to be an effective tool in meeting safe and efficient operational objectives within these programs.

#### 1.3 Purpose

This Handbook outlines minimum policies, procedures, qualifications, training requirements, and equipment for helicopter short-haul programs within the DOI.

## 1.4 Approval

Helicopter short-haul programs must be approved by the agency and DOI AM. New program requests shall be forwarded to, and approved by, agency Directors or their delegates and then forwarded to the Director, DOI AM. Requests shall include a copy of agency approval and the proposed local *Short-haul Operations Plan* describing when and how short-haul will be used. The operations plan must include a GO/NO-GO process for risk management purposes. Plans must comply with Departmental and Agency policy and guidelines.

#### 1.5 New Programs

Refer to appendix A, for a new program start-up checklist. Local aviation program managers select spotter trainees. Initial short-haul training shall be conducted by agency and DOI AM approved Training Specialists in accordance with this handbook. Qualified check spotters from other areas shall be used for training and qualification. Subsequent training and spotter selection may be accomplished by an agency and DOI AM approved check spotter.

# **CHAPTER 2 - QUALIFICATIONS & REQUIREMENTS**

#### 2.1 Pilot Requirements.

A safe and effective short-haul program is highly dependent upon precision long-line skills. Accordingly, pilots must comply with the following minimum requirements as outlined in pertinent procurement documents:

- A. Pilots shall be qualified in accordance with 14 CFR 133 for Class A and B external load operations and must meet requirements identified in the procurement document.
- **B.** 50 hours Pilot-In-Command (PIC) in make and model.
- **C.** 25 hours total time in vertical reference experience within the last twelve months, requiring precision placement.
- **D.** Approved for long-line operations.
- **E.** Attend an agency approved short-haul training session.
- **F.** Understand short-haul techniques, short-haul/spotter signals, and operational concerns.
- **G.** Demonstrate ability to work with the short haul spotter.
- H. Successfully complete the Pilot Proficiency Test administered by DOI AM.

#### 2.2 Short-Hauler Training Requirements.

Spotters and short-haulers shall complete the following requirements to the satisfaction of an agency check spotter. The check spotter may require additional training based upon the complexity of the program or for individuals needing more instruction. If a person cannot meet minimum requirements the check spotter shall not qualify the individual for short-haul operations.

## A. Training and Proficiency Platform.

A platform simulating a small, raised landing area may be constructed at each shorthaul base, to train the pilot and maintain proficiency in placement of short-haul personnel. A 4' x 8' platform that is 2-3 feet above the ground, e.g. a picnic table, meets this need. If deemed more applicable by the check spotter, terrain features within a specific training site may be used for this purpose.

#### B. Check Spotter.

An agency state or regional aviation manager must recommend the check spotter. Must have demonstrated ability as a spotter to a qualified check spotter. Final approval will be accomplished by DOI AM. Must demonstrate ability as an instructor. Experience shall include:

- 1) Successfully served as a qualified spotter for two years.
- 2) Must have assisted in the training of at least two spotters.

#### C. Initial Spotter or Spotter Trainee.

- 1) Successful completion of Interagency Helicopter Crewmember Training (S-271) presented by approved agency personnel.
- 2) Familiar with the helicopter procurement document (Contract, Aircraft Rental Agreement, etc.)
- 3) Under the supervision of a qualified check spotter, the initial spotter or trainee shall:
  - (a) Demonstrate knowledge of the inspection, care, and maintenance of short-haul equipment.
  - (b) Demonstrate ability to rig the helicopter for short-haul, provide a safety briefing, and conduct a safety check of short-haul personnel without procedural error.
  - (c) Demonstrate knowledge of emergency procedures.
  - (d) Spot six loads of short-haul personnel (two in typical terrain.) If applicable, four loads of cargo (e.g. a rescue litter) shall be deployed without procedural error.
  - (e) Demonstrate ability to work with the pilot.
  - (f) Demonstrate knowledge of risk assessment and mission structure.

NOTE: The spotter must perform all spotter duties.

#### D. Initial Short-hauler Training

- Successful completion of Interagency Helicopter Crewmember Training (S-271) presented by agency approved personnel.
- 2) Demonstrate knowledge of inspection, care, and maintenance of short-haul equipment and rigging.

- 3) Demonstrate knowledge of short-haul procedures.
- 4) Demonstrate knowledge of emergency procedures.
- 5) Complete a minimum of *two* short-hauls without procedural error. Training should be in typical terrain and should include receiving cargo.

**NOTE:** The spotter should incorporate short-haul scenarios/deployments in typical terrain and/or confined areas.

6) Demonstrate knowledge of risk assessment and mission components.

#### 2.3 Annual Re-qualification Requirements

The pilot, and all short-haul personnel shall participate in annual operational training and complete the following requirements to the satisfaction of the check spotter. If a spotter or short-hauler exceeds 12 months since re-qualification, it will be the decision of the check spotter and/or short-haul program manager whether to re-qualify. The check spotter may require additional training based upon the complexity of the program or for individuals needing more instruction. If a person cannot meet minimum requirements, the check spotter shall not qualify the individual for short-haul operations.

- A. Annual short-haul training shall include the following:
  - 1) Participation in helicopter safety refresher training.
  - 2) Review and discussion of the local Short-haul Operations Plan, emergency procedures and risk assessment.
  - 3) Review of known short-haul related mishaps and incident critiques.
  - 4) Review of the procurement document.

#### B. Pilot

1) The pilot shall successfully complete the Pilot Proficiency Test administered by DOI AM.

## C. Spotter

- 1) Participate and assist in annual short-haul re-currency training.
- 2) Demonstrate knowledge of short-haul procedures and spotter responsibilities to the check spotter without error.

3) Complete *four* short-hauls without procedural error. If applicable, four cargo loads may be substituted for HEC.

# D. Short-Haulers

- 1) Demonstrate knowledge of short-haul procedures without error.
- 2) Complete at least *two* helicopter short-hauls without error. At least one shall be in typical terrain and include receiving of cargo.

# Documentation

It is the responsibility of the spotter or program manager to maintain documentation for initial training, re-qualification, proficiency and operational short-hauls. Documentation shall include:

- 1) Helicopter Load Calculation
- 2) Names of personnel
- 3) Terrain
- 4) Type of short-haul (training or operational)
- 5) Weather and flight conditions
- 6) Use of risk assessment
- 7) SAFECOM, if applicable

## 2.4 **Proficiency Requirements**

It will be the responsibility of the check spotter and/or short-haul program manager to determine, beyond the minimum requirement, the frequency of proficiency short-hauls for all short-haul personnel, including the pilot. In no case, however, will the proficiency period exceed *90 days*. The check spotter may require additional training based upon the complexity of the program, or for individuals needing more instruction. If a person is unable to meet minimum requirements, the check spotter shall not re-qualify the individual for short-haul operations. An operational short-haul within the requalification period will count as a proficiency short-haul. However, a person overdue for a proficiency short-haul shall not use an operational short-haul to re-qualify. Once past the requalification period, only a training short-haul may be used.

NOTE: Additional short-haul requirements shall be identified in the local short-haul operations

## A. Pilot.

The pilot shall perform at least one proficiency short-haul within 90 days or less of the last short-haul (training or operational) to the satisfaction of the check spotter. The check spotter may request the pilot to demonstrate the ability for precision placement on a more frequent basis.

# B. Check Spotter/Spotter.

The check spotter/spotter shall accomplish at least one proficiency short-haul within *90 days* or less of the last short-haul to the satisfaction of the check spotter.

## C. Short-Hauler.

The proficiency requirements for Short-Haulers shall be determined by the Short-Haul Program Manager/Check Spotter and the local short-haul operations plan.

	Initial	Annual	Proficiency
Pilot	Operational training Demonstrate ability to short-haul	Operational training Demo ability to short-haul	Short-haul load once every <b>90</b> <i>days</i> or less
Check Spotter/ Spotter	Operational training Spot <i>six</i> loads <i>(two in</i> <i>typical terrain)</i>	Operational training Spot <i>four</i> loads without procedural error)	Spot once every <b>90 days</b> or less
Short-hauler	Operational training Complete <i>two</i> short- hauls	Operational training Complete <i>two</i> short-hauls without procedural error	Determined By Check spotter/short/haul program manager

## Minimum Requirements:

**NOTE:** Without sacrificing efficiency or safety, short-haul pilots are encouraged to apply and practice precision placement of external loads as often as possible. During routine project work it may be useful to define spot-specific targets, utilizing a long line of the same length as the rope(s) normally used for short-haul. This practice encourages the ongoing maintenance of

precision long line skills.

# **CHAPTER 3 - PERSONAL EQUIPMENT**

#### **3.1** Exceptions to Personal Protective Equipment (PPE)

Reference (351 DM 1), *ALSE (Aviation Life Support Equipment)*, for authorization on exceptions and waivers to PPE.

There are emergency situations that may require exceptions to PPE requirements. Exceptions will be addressed on an incident-by-incident basis. The IC and incident personnel must weigh the merits and use of PPE and the protection it provides in the event of an aircraft crash and/or fire, against the risks presented during special mission requirements. If, during the risk assessment process, deviation from standard PPE is considered, affected incident personnel will be advised of potential hazards. It may be necessary and appropriate during typical terrain training exercises to deviate from PPE requirements to enhance safety and to simulate mission conditions and requirements. (It is better to train for a mission in a controlled setting than to rise to the occasion during an emergency.)

#### A. Waiver Delegation

Discretionary authorization for approval of exceptions is delegated to agencies for those circumstances where the protection of the individual after exiting the aircraft is deemed more critical to personal safety and security than that provided by PPE generally required for flight. Exercise of this authority requires senior management approval at the national level for the agency concerned or a written re-delegation of authority to a lower level, which specifically details the position or person responsible for making the decision. When the exception authorization has been placed in effect by the agency, a copy will be provided to the Director-DOI AM. Exception authorizations must also be included with bureau requests for procurement services when such operations are conducted (351 DM 1.7E(4).

#### **B.** Documentation

A copy of the discretionary authorization shall be included in the agency or user's local Short-haul Operations Plan.

#### **3.2 Personal Protective Equipment (PPE)**

PPE shall be worn in accordance with the ALSE and the IHOG during short-haul training and operations. Items listed below are approved for short-haul. DOI AM may evaluate equipment not listed for approval, pursuant to a letter of request submitted through the agency.

#### A. Helmet

Select the proper size and adjust to fit individual. Design and/or chinstrap shall prevent the helmet from falling over the eyes or off the head. Loose straps should be secured.

- 1) For the spotter or any aircrew member on board the helicopter, an approved aviator's helmet, SPH-4, SPH-5, or equivalent, with avionics for intercom and radio communications is required.
- 2) For short-haulers who will not be inside the aircraft during flight, an approved aviator's helmet, as defined above, is recommended. A climbing helmet (Petzl, Camp, Climb High, or equivalent name brand that is Union International Alpine Association [UIAA] or CE approved) is also permitted.

Helmets require frequent inspection and care. Check the lining and chinstrap. If the helmet is involved in a fall or hit by a falling object; or if cracks, dents, or chips appear to compromise safety of the helmet, remove from service. If the chinstrap is frayed or buckle inoperable, repair or remove from service. Check the helmet warranty prior to painting. Some paints contain acetone or toluene, which may weaken the helmet shell. Follow manufacturer's requirements.

# **B.** Eye Protection

Any of the following are acceptable:

- 1) SPH-4 or SPH-5 with visor **in the down position**.
- 2) Glasses with retainer strap.
- 3) Goggles.

# C. Fire Resistant Clothing

- 1) Nomex, or equivalent (shirt or jacket, pants, or flight suit).
- 2) Nomex or natural fiber undergarments (cotton, wool, silk.)

## D. Gloves

- 1) Nomex/Leather.
- 2) Leather.

## E. Boots

Personnel flying inside the aircraft must wear leather boots, above ankle level. Short-haulers shall utilize footwear that is appropriate for mission safety (e.g. rock climbing shoes, cold weather mountaineering boots, etc.)

#### **CHAPTER 4 - SHORT-HAUL EQUIPMENT**

#### 4.1 Short-Haul Rope Attachment Point/Anchor

A short-haul anchor is defined as the point of attachment(s) of the short-haul rope to the helicopter. The FAA or DOI AM shall approve attachment devices or brackets, and the process of attaching to the helicopter. As with high-angle rescue systems, a 10:1 Static System Safety Factor is required for the entire Short-Haul system from anchor to harness. The Static System Safety Factor is the ratio between the maximum expected static force that is expected to be applied to the breaking strength of the weakest link in the system (minimum 450 lb. load).

- **A.** A short-haul anchor system will include both a primary and a secondary (backup) anchor.
- **B.** The primary and backup anchor, where applicable, must be capable of spotter and/or pilot release in an emergency; the load must be fully jettisionable, requiring two separate and independent actions.

**NOTE:** The short-haul anchor is a redundant system designed to prevent a catastrophic loss of the entire short-haul load and, possibly, the HEC. This redundancy, a key safety feature, should be continued down through the entire short-haul system to the extent practical. Reliance on a single component at any point in the system should be avoided. Where single points exist, annual testing and documentation should occur to ensure component reliability.

#### D. Maintenance

A FAA Maintenance Technician or approved vendor A&P mechanic will perform maintenance tasks associated with hard point short-haul anchors. The manufacturer, or a holder of a FAA Master Parachute Riggers' Certificate will perform maintenance on sewn software.

- 1) Metallic components of the short-haul anchor will be inspected annually using non-destructive methods such as dye penetrate or equivalent.
- 2) Textile components; e.g., belly bands, daisy chains will be inspected annually and retired after 5 years from date of manufacture. Software components that become fuel or oil soaked shall be retired from service.
- 3) Modification or repair of the anchor system shall be approved by DOI AM or certified by the FAA in accordance with applicable FAR's.
- 4) Anchors manufactured by DOI AM or the USDA Forest Service will be given an identification number that will be permanently affixed.
- 5) The short-haul program manager or spotter will maintain records of inspection, maintenance, and use. Records will be retained for the life of a particular product or as long as it is in use and shall contain the following information:

- (a) Identification number (issued by manufacturer).
- (b) Identity of the user agency.
- (c) Date of last inspection, how it was accomplished, and signature of individual who performed it.
- (d) The extent of maintenance performed.
  - Date and location of work performed.
  - Signature and certificate type of person performing the work.

# 4.2 Short-haul Rope

"Short-haul rope" is used to suspend human external loads and cargo beneath the helicopter during short-haul operations. This rope will be used for attachment from the helicopter anchor to personnel on the end of the line in lengths that are safe and efficient for the specific needs of the individual short haul program.

The short-haul rope will be constructed of synthetic material which may include nylon, polyester, Spectra<sup>TM</sup> (high molecular weight polyethylene.) Cordage will be of a low-stretch kernmantle or braided construction design.

Any unloaded short-haul rope will have a weight bag (must be at least 20-lbs) attached to it in order to prevent excessive trailing behind the aircraft during forward flight. Additional weight should be considered for rope lengths in excess of 100 feet. Forward flight should not exceed 60 mph with the short-haul rope deployed.

## Short-haul rope shall meet the following specifications:

- 1 Nylon or polyester, kernmantle or braid-on-braid, low-stretch.
- 2 Single strand or greater configuration.
- 3 All short-haul rope systems (rope, anchors, etc.) will have a 10:1 Static System Safety Factor.

## Short-haul rope requirements:

- 1 Ropes will be marked in a non-destructive manner for identification.
- 2 Short-haul rope history will be documented by the Spotter or Helicopter Manager following each use. Documentation shall include the date and specific type of use.
- 3 Rope history will begin when the line is purchased and placed into service, noting the date of manufacturer (use of service should be based on date of manufacture.)
- 4 Retirement of a short-haul rope will be dictated by age, documented usage history, and visual inspection. When in doubt, retire it. (For further guidance with regard to rope wear, inspection, care, and maintenance, refer to manufacturers specifications and guidelines.
- 5 Short-haul anchor components and rope will be retired from service after five years of date of manufacture, regardless of condition.

## 4.3 Harness

Commercially made, or manufactured by a FAA Master Rigger, and approved by local short-haul program manager or check spotter. Follow manufacturer's recommendations for proper use. Inspect harness frequently for wear or other damage (stitching, buckles, webbing abrasion, etc.) Harness types that provide a single metal component for attachment, such as a D-ring, should be backed up (e.g. girth hitch a runner or daisy chain around the waist belt as a backup attachment point that is independent of the D-ring.)

For upper body stabilization, short-haulers may use a full body harness, chest harness and sit harness combination, or pack strap accessory to prevent the unlikely event of inversion.

## 4.4 Carabiners

All carabiners used for short-haul will be of a locking (screw-gate, twist or auto-lock) design. Both steel and aluminum are approved (care should be taken to avoid aluminum-on-steel applications.) Do not use "reverse locking" carabiners. (See Safety Alert, HAVO.)

Carabiners should be inspected frequently (proper function of gate and locking mechanism, abrasion, burrs, rough edges, etc.) As with other short-haul components and hardware, single points of attachment (e.g. a single carabiner) should be avoided and backed up where possible.

**NOTE:** Carabiners are designed to be loaded longitudinally; if load occurs on the side (cross loading), failure may occur. If screw-gate carabiners are used, be aware of the potential for vibration-induced movement of the locking mechanism.

## 4.5 Knife

A knife suitable for rapid cutting (i.e. "Raptor" or "Spyderco") shall be worn where it is accessible and easily removed for emergency use. A lanyard can be used to secure the knife to the user or to a predetermined accessible location.

## 4.6 Spotter Attachment

The point and system of attachment of the spotter to the aircraft (seatbelt excluded) shall be approved by DOI AM during program review.

## 4.7 Equipment Changes

Proposed changes in helicopter equipment shall be concurred by agency management and forwarded to the DOI AM for approval. A formal evaluation period will generally be required prior to final DOI AM approval.

# **CHAPTER 5 – OPERATIONS**

#### 5.1 **Operational Requirements.**

- A. Operations and procedures shall comply with the Departmental Manual, agency aviation policy, the procurement document, this Handbook, and the user-specific Short-haul Operations Plan. All flight operations have a certain inherent degree of risk associated with them. Training and the judicious use of available resources, including helicopters, can help reduce the degree of risk associated with a particular mission. Risk assessment and the fact that it must be an on-going process during an operation is vitally important to a short-haul program. Risk assessment is the subjective analysis of physical hazards and operational procedures used to arrive at a GO/NO-GO decision. Risk assessments support informed GO/NO-GO decisions, which are the responsibility of line management. The pilot retains final authority for a GO/NO-GO decision when safe operation of the aircraft is a factor. (352 DM 1, Aviation Safety; 1.9, A.)
- **B.** A spotter will be in the aircraft during all short-haul operations.
  - (1) Exceptions:
    - (a) Exceptions will be defined in the approved Short-Haul Operations Plan.
    - (b) When the exception authorization has been placed in effect by the bureau, a copy will be provided to the Director-DOI AM.
    - (c) A copy of the exception authorization shall be included with the agency requests for procurement services when such operations are to be conducted.
  - (2) When authorized the spotter will ride as a short-hauler (the following are also applicable if spotter is in the aircraft).
    - (a) It is imperative that the pilot have clear communications with the spotter.
    - (b) The short-haul rope will be attached to a release system that is either spotter or pilot-jettisonable. The release system shall require two separate release actions (primary and backup) to jettison the rope.

## 5.2 Helicopter Load Calculations

A helicopter load calculation will be completed by the pilot and reviewed by the spotter, and/or helicopter manager, for every mission.

## 5.3 Flight Restrictions.

**A.** Flight operations and procedures, including short-haul, shall be conducted from 1/2 hour before official sunrise until 1/2 hour after official sunset, or during extended twilight hours when terrain features can be readily distinguishable for a distance of

at least one-mile (Alaska). Additionally, hand signals from the short-haulers, ground crew, and the aircrew must be clearly visible.

**B.** Visibility for short-haul missions shall be a minimum of 1/2 mile.

**NOTE:** Life threatening emergencies as determined by local management may prompt deviation from the Departmental Manual and/or the Short-haul Handbook. In such an event, thorough documentation and submittal of a SAFECOM is required. The loss-benefit value of deviation should be carefully assessed through risk management procedures.

#### 5.4 Mission Briefing

A briefing shall be provided by appropriate incident managers and/or the spotter prior to short-haul operations and should include the pilot and, to the greatest degree possible, all persons involved in the operation.

- A. As a minimum, the following shall be addressed during the mission briefing:
  - □ Risk Assessment
  - □ Nature of the Mission
  - □ Location
  - □ Terrain
  - □ Weather
  - □ Landing Areas
  - Individual Responsibilities
  - □ Cargo Let-Down procedures (if applicable)
  - □ Hazards
  - □ Safety Considerations
  - Emergency Procedures
  - □ Situational Awareness Review

**NOTE:** Risk assessment is an on-going process, to be applied throughout the operation.

#### 5.5 **Personnel and Helicopter Equipment Checks.**

#### A. Safety Check

Each individual will check themselves and their partner before operations commence. Inspection will work from head to toe and will adapt to specific equipment used.

- □ Helmet properly fitted, chin strap fastened.
- □ Eye protection secured.
- □ Fire resistant clothing properly worn.
- □ Collar up (fire shirt) flight suit completely zipped. Loose items around neck tucked into clothing.

- □ Radio operational.
- □ Sleeves down and secured over gloves.
- □ Gloves on.
- Harness properly fitted, buckles correctly fastened, no twists, loose straps secured (double-check on follow-through buckles). Two separate points of attachment are properly secured to harness and locking carabiners are functional.
- □ Knife easily accessible and secured.
- □ ALSE approved footwear.
- Pants or flight suit should be long enough to cover top of boots while in seated position.

#### **B.** Helicopter Equipment Check

The pilot, spotter, and short-haulers will complete the following checklist (may vary with different type aircraft):

- □ Cargo--Remove items not essential to the mission.
- □ Cabin Configuration--As directed by the pilot, monitor adjustments as the cabin is configured for short-haul.
- □ Anchor and release system are installed correctly, tested and secure.
- □ Short-haul Rope is correctly attached to primary anchor and back-up.
- □ Rope Protector is in place, if applicable.
- □ Line and brake device is available for cargo let-down.
- □ Cargo is secured but accessible.
- □ Spotter anchor attachment is secure.
- □ Seat Belts are secured and operational.
- □ Maps and mission information is secured but accessible.
- Communications check All radios are operational and on correct frequencies. (A radio check should be done to establish communications between the aircraft and appropriate short-haul personnel, including pilot, spotter, short-haulers, and ground crew members.)
- □ Intercom System Operational. Due to other air traffic or ground personnel attempting to make radio contact, use of the hot-mike is not recommended.
- □ Spotter check....PPE, harness, point of attachment.

#### 5.6 Pilot/Spotter Duties (Reconnaissance Check Flight)

- **A.** The following in-flight duties are accomplished by the air crew; pilot-spotter coordination is essential to safe and effective operations.
  - 1. Flight-following is required. The spotter will assist with navigation and be alert to hazards (utilize hazard map, watch for other aircraft, clearances, wires, changing conditions, etc.)

- 2. Evaluate and select short-haul insertion/extraction sites (when possible, seek input from short-haulers.) and staging sites, if necessary.
- 3. Short-haul insertion/extraction sites should be evaluated for the following:
  - □ Proximity to incident (if insertion/extraction site is not at the incident site)
  - □ Approximate size
  - □ Slope
  - □ Rotor clearance
  - □ Wind conditions
  - Ground/aerial hazards
  - □ Approach and departure routes
  - □ Non-incident personnel in the area
- 4. Complete a hover check, power available, and assess for a Go/No-Go decision.
- 5. Select a landing area. Aircraft lands to rig for short-haul.

# 5.7 Spotter Duties (Landing Area)

After landing, the spotter is responsible for preparing for the short-haul.

- A. Spotter inspects short-haul equipment and rigging.
- **B.** Aircraft doors positioned for the mission.
- C. Loose equipment is secured or removed from cabin.
- **D.** Radio frequency should be cleared before starting short-haul.
- **E.** Any additional crew briefing should be done at this time. This may include: hazards spotted situational changes; additional pilot requests/cautions; possible cargo deployments, etc.
- **F.** Complete a communications check (radio and/or hand signals) between pilot, spotter, and/or short-haulers as applicable.
- **G.** Complete a spotter equipment and anchor check.
- H. Repeat buddy check.

#### 5.8 Short-hauler Duties (Preparation for Insertion)

During the lift-off and preparing for the insertion it is important that the short-haulers communicate to the pilot and spotter what is occurring on the end of the line.

- A. Short-haulers remain a safe distance from the helicopter.
- **B.** Helicopter lifts off and establishes hover.
- C. Short-haulers attach to short-haul rope on command.

**NOTE**: If multiple short-haulers, one should be responsible for communications and the other for tending to the short-haul rope.

- **D.** Short-haulers give "ready" signal.
- **E.** Pilot lifts short-haulers and flies to short-haul site. Spotter monitors short-haulers during transport. Prior to insertion pilot will do a final power assurance check.
- **F.** Upon arrival at the short-haul site the short-hauler may assist with vertical reference; e.g." two-zero feet, one-zero feet, on the ground" as the pilot delivers the load in a controlled fashion.
- **G.** Once on the ground, sufficient time should be allowed for the short-haulers to stabilize and secure themselves prior to disconnecting from the short-haul line. Short-haulers communicate to pilot and/or spotter when they are ready to unhook.
- **H.** When directed by the pilot and/or spotter, short-haulers unhook from short-haul rope and signal when they are clear.
- **I.** The helicopter departs the short-haul site and returns when requested.

## 5.9 Short-hauler Duties (Extraction and Transport)

It is critical to maintain communications between personnel on the ground and the pilot, and the short-hauler and/or victim during extraction.

- A. At the short-haul extraction site, prior to extraction:
  - **□** Communicate any pertinent new information to the helicopter crew.
  - □ Situational changes.
  - □ Newly discovered hazards, etc.
  - □ Move unnecessary people (e.g., victim's party, etc.) away.
- **B.** Short-haulers and/or victim are attached to short-haul lines on command.
- **C.** Short-haulers give "ready" signal.

- **D.** Pilot lifts short-haulers, clears obstacles, and flies to landing area. Spotter keeps view of short-haulers during transport.
- **E.** Short-hauler may assist pilot with vertical reference to the ground, e.g. "two zero feet, one zero feet, on the ground."
- **F.** Once short-haulers are stable and secure, and after they receive direction from the pilot or spotter to unhook, they do so and signal when they are clear.
- **G.** The helicopter lands and personnel and/or victim are loaded inside the helicopter for extended flight.

**NOTE:** Following any training exercise or an actual mission, consideration should be made to conduct a "hot debrief." Research has found that this is a key ingredient of many successful teams. The hot debrief conducted immediately following the mission can meet the following objectives:

- □ Provide feedback to involved personnel.
- □ Identify areas of concern for follow-up.
- □ Reinforce lesson learned.

#### 5.10 Administrative Duties

The spotter and/or check spotter shall be responsible for completing documentation relating to short-haul activities.

- **A.** The spotter shall have sufficient training, qualifications, and experience to accomplish the following duties and responsibilities:
  - 1) Contractual problems are communicated to appropriate personnel (helicopter manager, project inspector, COAR, etc.)
  - 2) SafeCom completed when necessary.
- **B.** The Check Spotter will be responsible for coordinating the following activities:
  - 1) Monitor currency of short-haul personnel and schedule training as needed.
  - 2) Assure that short-haul logbooks for personnel and equipment are current.

#### 5.11 Cargo Letdown

Cargo letdown shall comply with requirements and procedures outlined in Appendix I.

NOTE: Cargo let-down was designed to augment helicopter capabilities. It is not a

replacement for long-line operations. Exposure and risk assessment must be addressed in the process of determining which type of helicopter delivery system to use.

# **CHAPTER 6 – EMERGENCY PROCEDURES**

Preplanning for emergency procedures is a critical component of risk management. Accordingly, each short-haul program must evaluate and discuss, in depth, the variety of potential scenarios and actions that may best mitigate any unplanned event. Training for effective "cockpit resource management" should be a part of this process.

It is imperative that everyone involved in short-haul understand how instantaneous an in-flight emergency can occur. Survivability of short-haul personnel during an in-flight emergency is best accomplished by having suspended personnel remain attached to the aircraft as it makes an emergency landing. Release of the sort-haul line <u>is not</u> an operational consideration while human external cargo (HEC) is attached beneath the aircraft. The short-haul line will not be jettisoned. The only exception is line entanglement, or the probability that this may happen. In case of an aircraft emergency, the pilot will conduct a landing (e.g. autorotation) with HEC attached to the short-haul line. The choice by any short-hauler to cut away from the line is a personal decision depending on the circumstances and best chance for survival.

<u>Short-haul operations are inherently dangerous and could be fatal.</u> This must be discussed in detail during training, recurrency and mission briefings.

Examples of formalized emergency planning procedures are outlined below.

## 6.1 Helicopter In-Hover, Control and Power Maintained

Examples: Caution indicator or chip light on, gradual loss of oil pressure, etc.

- **A.** The pilot may decide to:
  - 1) Notify the spotter and short-haul personnel and set them on the ground as soon as possible.
  - 2) Continue with the flight and notify the spotter and short-haulers that a precautionary landing will occur as soon as a suitable landing area is found.
- **B.** On the ground, personnel rapidly unhook or cut lines and seek protection.

#### 6.2 Helicopter Loss of Control or Power, Engine Failure

Examples: Loss of tail rotor authority, transmission failure, compressor stall, engine failure, hydraulic boost pump failure, etc.

- **A.** The pilot will:
  - 1) Declare the emergency to the spotter and short-haulers.
  - 2) Attempt to get short-haulers on the ground. Short-haulers will rapidly unhook or cut lines and seek protection.

3) Attempt to maneuver helicopter away from personnel on the ground.

# 6.3 Short-Haul Line Entanglement

In the event of possible line entanglement, the pilot may decide it necessary to release the line. Pilot will notify the spotter and ground personnel that line may be released.

**NOTE:** Again, it is <u>imperative</u> that potential emergency scenarios, actions and reactions likely required of all involved personnel are discussed as thoroughly as possible prior to flight.

Ongoing efforts within the helicopter short-haul community to improve the survivability of personnel during both normal flight operations and in the event of an unplanned emergency include:

- □ Improved pilot/spotter release systems.
- Training in cockpit resource management, situational awareness, and risk management.
- □ Water ditching.
- □ Improved pilot proficiency testing and evaluation.
- Emphasis on typical terrain training.
- □ Acquisition of the best machine for the job.
- □ Information sharing on "lessons learned".
- Evaluation and testing of new technology which could lead to operational improvements and safety.
- □ Improved PPE (e.g. use of new flame resistant fabrics, etc.).
- □ Interface with the international short-haul community.
- Organized helicopter short-haul workshops.
- Pursuit of additional program funding for training and equipment.

These efforts reflect a proactive approach to risk management and hazard mitigation that should exist within each helicopter short-haul program.

"Takeoffs are optional, landings are mandatory!"

# New Short-Haul Program Start-Up Checklist

For new short-haul programs initial start-up can be a daunting and intimidating process for designated short-haul program managers. The start-up is a process that takes time to initiate and should be given ample time to implement. A new short-haul program should progress in a logical sequence.

The following checklist is intended to provide direction to assist in the process.

## 1.1 Approval

- Short-haul program manager designated for local short-haul program. Usually this person initiates short-haul proposal and presents to bureau or agency management for initial approval.
- Helicopter short-haul programs must be approved by the agency. New program requests shall be forwarded to, and approved by, agency Directors or their delegates and then forwarded to the Director, DOI AM.
- Requests shall include a copy of agency approval and the proposed local <u>Short-haul Operations Plan</u> (refer to Appendix B for an example of a Unit Short-haul Operations Plan) describing when and how short-haul will be used. The operations plan must include a GO/NO-GO process for risk management purposes. Plans must comply with Departmental and Agency policy and guidelines.
  - A short-haul operations plan is normally written by the local program aviation manager, which details program requirements for the local unit. The plan should be referenced in the local unit's aviation management plan. It is recommended that new programs utilize the template from Appendix B and get input from the initial check spotter, RAMO and DOI-AM specialists. Initial approval must be completed by all involved parties and finally approved by agency Directors.
- **1.2 Program Funding** It is extremely important that funding is available to provide for initial start-up and continual support of the short-haul program. Some funding considerations are:
  - <u>Helicopter Costs</u> Pilot and short-haul personnel proficiency training will require additional helicopter cost, requiring between 8-10 hours of flight time per year (\$5,000 to \$10,000)
  - <u>Short-haul Equipment Purchase</u> The initial equipment purchase may cost between \$5,000 and \$10,000. Annual equipment upkeep will be at least \$1000 per year.

Appendix A – New Short-haul Program Start-Up

□ Additional annual costs for training and workshops, approximately \$2,000-5,000.

# 1.3 Training/Workshops (requirements may vary by region)

- Pilot Proficiency Pilot will have to pass a four phase short-haul proficiency test. This will require practice time. The cost of the accrued helicopter flight time will have to be negotiated between unit and contractor by DOI-AM contracting officer. An obstacle course will need to be developed and practiced in preparation for the official test by a DOI-AM check pilot.
- <u>Short-haul Personnel will</u> be required to attend Helicopter Crewmember Training, S-271 and annual short-haul training. Will be required to maintain proficiency every 90 days.
  - There may be additional cost if unit does not have a check spotter.
  - Check spotters are required to attend S-271 and Helicopter Manager Course, S-372.
  - Short-haul program managers and/or spotters should attend the annual short-haul workshop.
  - Check spotters required to maintain *biennial* helicopter project manager workshop.

**1.4 Time Frame** – Anticipate at least 8-12 months as a minimum before initial shorthaul training can begin. The amount of time required to initiate a short-haul program will vary due to a number of factors:

- What type of aircraft is intended for use?
  - Will the aircraft type require new development of equipment or procedures? Helicopter models currently not being used for short-haul may require at least 12 months for equipment evaluation and approval.
- What type of helicopter contract? A new or existing contract will require the contract to include additional pilot proficiency and aircraft equipment modifications.

## 1.5 Program preparation. -

#### Approval Process

- o Local
- Regional
- National
- Send to AM Associate Director

# Program Funding

- Helicopter contract It is important to contact the closest DOI AM area or regional office as soon as possible to initiate the aircraft procurement and pilot approval process.
- Short-haul equipment purchase Helicopter short-haul anchor will be associated with helicopter make and model. Make and model may influence procurement and installation. Develop estimate of total cost for personnel and aircraft associated equipment.
- Annual training costs Short-haul personnel, and pilot proficiency.
- Miscellaneous costs -
- Einal Details
  - <u>Aircraft Inspection</u> New make and model of aircraft that have not been used for short-haul previously may require additional research and evaluation. Sufficient time will be required prior to the pilot proficiency test.
  - <u>Pilot Proficiency Test</u> Evaluation will be conducted by a DOI AM pilot inspector and the local short-haul program manager. Evaluation should not occur consecutive to short-haul training. Ample time should be provided in case the contract pilot fails and requires more practice.
  - <u>Short-haul Training</u> Training should not be scheduled until the aircraft inspection and the pilot proficiency test have been successfully completed.

<u>NOTE:</u> It is imperative that the local short-haul program manager and the identified DOI AM area or regional office maintain close contact throughout the entire start-up process. Sufficient pre-planning must occur at each stage to eliminate additional costs and prepare for the next stage.

# Yellowstone National Park Helicopter Short-Haul Operations Plan

pproved:	
Superintendent:	
Recommended:	
Chief Ranger:	
ecommended:	
Park Aviation Officer:	

#### **INTRODUCTION**

Helicopter Short-haul Rescue involves the use of a rescue line (doubled kern mantle static line rope) attached to a helicopter's center of gravity point to insert or extract rescue personnel and injured persons in an emergency situation, from a remote accident site where safe helicopter landings are not possible.

This technique allows technical rescue personnel an extra tool with which to expeditiously remove a seriously injured subject from a remote location. Without its availability, an Incident Commander would be faced with a lengthy conventional rescue including increased hazards to the patient and rescue personnel. Short-haul rescue incorporates utilization of the Incident Command System (ICS) and thorough risk analysis procedures to manage the execution of a rescue, and evaluate and implement risk management measures.

The short-haul technique has greatly expedited the evacuation of seriously injured people from the backcountry to a hospital or other care facility. A rescue that historically would have taken 18 to 24 hours can now be completed in a fraction of the time, enhancing patient comfort and survivability. The short-haul technique enables rescue to be accomplished with fewer personnel than required by conventional rescue means, eliminates the need for evacuations over hazardous technical terrain reducing wear on equipment and risk exposure to victims and rescue personnel alike. Under certain situations, the rescue of an individual would not have been possible without the short-haul technique. However as with any helicopter application, risks exist and consequences are potentially fatal to all participants.

Short-hau1 becomes the tool of choice when incident sites are too small to land in safely yet they are close to a staging helispot. A primary advantage of the technique is its simplicity. The pilot is called upon to perform a simple long-line sling load technique identical to those they conduct during the course of routine fire and project external cargo work, while rescue personnel need only clip into and out of the system using conventional rescue rigging equipment and predetermined communications protocols. No descending device is required and hover time is minimal.

#### <u>HISTORY</u>

The Yellowstone short-haul rescue program is an out growth of the helirappel program that was started in conjunction with Grand Teton Park in 1985. Five Yellowstone helitack crew members and four West Yellowstone Interagency Fire Center (WYIFC) smokejumpers completed a 40 hour training session taught by personnel from Yosemite National Park and the DOI Aviation Management (DOI AM) from Boise, Idaho. The helicopter used was an Aerospatial SA 315B, Lama.

In July 1986, DOI AM personnel came to Yellowstone to continue with the helirappel and short-haul training. They worked with personnel from the RM & VP staff and the West Yellowstone Interagency Fire Center to establish helirappel and short-haul procedures for the 'Lama'. Ten additional personnel from the Resource Management & Visitor Protection staff and four West Yellowstone Interagency Fire Center personnel completed the requisite training to become approved helirappellers. Three additional spotters were approved.

By 1989 the shortcomings of helirappel were becoming apparent. These included but were not limited to, prolonged hover time, movement through the confined space of the helicopter, reliance upon a descending device and most important, no extraction capability. Short-haul was examined as an alternative by DOI AM and Grand Teton personnel. The Yellowstone program reflects subsequent guidelines developed by DOI AM, the Interagency Steering Committee and the meeting between DOI AM and Grand Teton personnel.

In 1991, Denali National Park authorized a short-haul program. The following year a Yellowstone National Park helitack crewmember was detailed to Denali annually to

manage the Denali exclusive use contract helicopter. Due to the fact that the parks were using identical aircraft, had the common personnel link, and were philosophically in tune, Yellowstone chose to have its program reflect many of Denali's procedures. Upon returning from Denali each summer, the Yellowstone detailer possessed many new innovations developed in Alaska. Communications protocols were kept the same to avoid confusion on the part of the detailer. Though Denali hired the detailer as a permanent Denali employee in 1999, the decision was made to keep the programs parallel due to the previous successes realized in safety and mission efficiency.

Versions of the short-haul technique have been used for over 20 years by European, and Parks Canada rescue personnel, as well as the US military. The technique has been in use in Parks Canada since the early 1970's with no accidents during the course of approximately 1000 rescue missions and at least that many training flights.

In the years since its inception, the short-haul program has witnessed steady refinement and improvement each year. Yellowstone personnel participate on the Interagency Steering Committee, which recommends short-haul program policy and training standards to Helicopter Operation Specialists from all agencies. Yellowstone's program incorporates these national standards and will continue to adjust, reflecting change occurring within the national program.

# **SAFETY**

All operations will comply with the following regulatory documents:

- USDOI, DM 350-354, Aviation Policy
- RM/DO-60 (Aviation Management Guidelines) DOI 351 DM 1, Helicopter Short-haul Handbook 2. 3.
- 4.
- 5.
- The Interagency Helicopter Operations Guide(IHOG) Intermountain Region Aviation Management Plan Yellowstone National Park Aviation Management Plan 6.
- 14 Code of Federal Regulations (Federal Aviation Regulations) 7.
- 29 CFR 1910. 132 (d) (occupational safety code)
- National Fire Protection Association codes 1983 and 1006

#### In addition to the above documents, Yellowstone short-haul operations will be guided by the following standard aviation safety principles listed below.

- 1. Use of risk analysis
  - Standard Yellowstone Aviation Risk Analysis (Appendix A) will be used а.
  - as part of pre-flight planning as it would be for any other type mission. The Short-haul Risk Analysis (Appendix B) will be used for all b. helicopter supported SAR missions based on data collected during the recon flight of the scene.
  - Risk analyses used must have measurable "go/no go" parameters and C. be based upon the DOI Helicopter Short-haul Handbook guidelines.
  - All risk analyses must be documented at the time of the recon flight d. and included in the final report packet.
- 2. Pilot input

In addition to all pilot authorities and responsibilities outlined in the regulatory documents, the pilot will also play a key decision making role in the short-haul arena regarding the following areas of concern.

Ensuring that all operations must be in full compliance with FAA a. regulations pertaining to class "D" external loads (human cargo)

- Provide input regarding appropriate mission staffing and aircrew configuration. As per IHOG chapter 10, Section IV, "The pilot has final b. authority regarding carrying an aircrew member during external load operations"
- Pilot will provide input in determining other mission considerations as C. indicated by site specific safety needs derived from the risk analyses.
- Use of alternative rescue capabilities/techniques.
  - a. Power on landings (with appropriate waiver and training program in place)
  - b. Crew shuttle ground rescue team
  - c. Long-line cargo to ground rescue personnel
- 4. <u>Maximum helicopter performance</u> a. Limit payload to maximize helicopter performance
  - Meticulous fuel management 1.
    - Limit aircrew members to the minimum necessary number
  - 2. 3. Utilize standard gear inventory based on minimum scene time/risk exposure (Appendix C)
  - 4. Use of recon flight to gauge winds for safest approach
- Operational flexibility
  - Utilization of either internal spotter or external spotter а.
  - Ability b. to tailor operational procedures to terrain/helispot management concerns
  - Rendezvous with Advanced Life Support transport vs. direct C. transport to hospital
  - d. Use of rope extensions to mitigate rotor clearance concerns and/or need for internal spotter
- Limit exposure

All possible measures will be taken to limit cumulative risk exposure:

- short-haul distance: seek closest staging area possible a.
- limit number of evolutions at the incident site b.
- limit number of short-haulers/spotters on the rope C.
- d. minimize total number of aircrew members
- 7. Sterile cockpit

All operations will be conducted with simple, preset commands between pilot and spotter to limit pilot distractions.

- Best Observation Perspective 8.
  - Defer distance judgements to crew members having best perspective regarding:
    - a. Rotor clearance
    - b. Patient/victim condition (panicked or combative)
    - c. Scene/landing site characteristics (vegetation concerns, poor footing etc.)
    - d. Closing distances to the ground during landing
- <u>Two-way Communications Loop</u>

Conduct spotter function from the end of the rope. Persons on the rope will have direct communications with the pilot creating a simple two-way communications loop.

## **Personal Protective Equipment**

Personal protective equipment (PPE) is mandatory for all Special Use DOI aircraft activities (350 DM 3.9). The Aviation Life Support Equipment Handbook (ALSE 351 DM 1) is the regulatory authority for PPE policy issues. All helicopter short-haul flights in Yellowstone require the following minimum PPE: SPH-5 flight helmet, nomex clothing, leather or Nomex gloves, hearing protection, and leather boots. Boots must extend above the ankle such that there is no exposure between the boots and fire resistant clothing protecting the legs.

Additional equipment includes the following items. All rigging equipment must be NFPA 1983 and 1006, and 29 CFR 1910. 132(d) compliant.

Rope-13 mm (1/2 inch) static kernmantel rope tied double with a double

fisherman's knot and rigged with double figure 8 knots at each end.

Weight bag- a bag weighing 15-20 lbs. attached near the end of the short-haul line to prevent it from rising into the tail rotor.

<u>Carabiners</u> - (2) Locking "D" carabiners, preferably steel but aluminum is acceptable

<u>Harness</u> - commercially sewn seat harness or harness sewn by licensed Master Rigger

Slings - (2) 45cm double ended sling and/or commercial daisy chain.

In addition a radio with frequencies compatible to those in the helicopter is required as well as a chest harness, and an interconnect compatible with the flight helmet being worn.

PPE deviations will be addressed as per procedures outlined in the IHOG, Chapter 6 and the ALSE waiver process.

#### PROGRAM MANAGEMENT

General program management guidelines are included to alleviate the need for the user to consult a variety of documents.

#### Annual Review

Due to the profound hazards inherent to this activity, this plan will be reviewed annually by the Park Superintendent in consultation with the Chief Ranger and Park Aviation Manager. The sign off sheet is attached as Appendix E.

#### Mission Approval

Short-haul training and demonstration flights shall be approved in writing on the <u>Elight</u> <u>Request</u> form by the Chief Ranger and Park Aviation Manager or designate before the execution of the mission.

The IHOG states in Chapter 3, Section II, that the line officer (Superintendent) is responsible for the "go/no go" decision associated with high-risk activities. The Yellowstone Park Superintendent has delegated this authority to the Park Aviation Manager via the park aviation management plan. The Park Aviation Manager may delegate authority for short-haul approval for SAR missions to the Incident Commander on board the aircraft. The Incident Commander will complete the short-haul risk analysis and make the "go/no go" decision in consultation with the pilot.

#### Pilots and Aircraft

Only pilots and aircraft specifically approved by DOI AM to perform short-haul operations will be utilized. Pilots must have trained with park personnel on these techniques prior to actual mission use. The spotter and pilot must have a minimum of two short-haul evolutions annually before conducting an actual mission.

The helicopter must be equipped with air to ground communications, doors that can be removed or locked back into place, and a load mirror. For those short-haul missions requiring an internal spotter as determined by the pilot, the spotter will position himself on the side of the aircraft opposite the pilot. The spotter will be secured to the aircraft via a National Fire Protection Association (NFPA) approved sling strap in addition to being seated with seatbelt fastened during takeoff and landing.

Short-haul lines will <u>not</u> be solely attached to the aircraft cargo hook. A back-up anchor system must be used. The Yellowstone program incorporates a three-ring-circus

rigging anchor fastened to an DOI AM approved hard point near the cargo hook. The pilot has the ability to release this device mechanically without changing position.

Pilot duty hours will comply with and contractual requirements. It is the duty of the pilot to keep the Helitack Foreman informed as of his status relative to those guidelines. There are no additional duty hour restrictions pertinent to short-haul missions. Crew duty hours will comply with national wildland firefighter duty limitations.

#### Pilot Evaluations

The pilot must be carded for long-line missions prior to being tested for short-haul. Pilot training and evaluation consists of the check spotter working with the pilot prior to any actual

missions to establish pilot procedures and performance in training flights.

The pilot must understand the entire short-haul sequence to be able to react accordingly during in flight emergency. For every mission including training, a pilot briefing and personnel safety briefing will be conducted.

Training flights will be conducted to provide the pilot experience in flying objects using the short-haul system. The first flights will involve inanimate objects, i.e. logs, bags of rocks, etc. Later flights will involve short-haul in open areas with spotters. Final evaluation will come from practical application in placement of short-haul personnel into typical terrain and weather conditions. Conditions may also be more extreme than would be acceptable for operational missions as the evaluation is being conducted under controlled conditions. Reference Pilot / Spotter Proficiency Checklist (Appendix D). DOI AM will be the final pilot testing authority.

#### **OPERATIONS**

#### Procedures

All Short-haul operations will be conducted in accordance with the procedures outlined in this plan.

The Short-haul rescue technique may be used under any of the following situations.

- The injured person exhibits airway problems, respiratory distress and/or evidence of circulatory compromise.
- significant freezing of extremities as to limit mobility is present
- When a conventional rescue would expose rescue team members to a high degree of personal risk. There are a number of locations in the area where a conventional litter lowering or raising operation would expose the team and the victims(s) to a greater risk than would be experienced in the use of the short haul technique.
- A short-haul may be considered for use if the "totality of the circumstances" indicate that this technique would be the best way to proceed. Factors such as the duration and difficulty of a conventional evacuation, patient safety and possible medical complications, transport time to a definitive care facility, weather (past, present and predicted), locations and manpower availability should be considered.

Rescue personnel may be extracted from the incident site using short-haul at the conclusion of a rescue when there is an immediate threat to their life, health, or safety. Rescue personnel will normally be removed from the nearest safe available helispot at the conclusion of a rescue.

An attendant with each patient will be used unless the pilot determines aircraft performance shows there is inadequate power and control margin to lift and carry the additional weight, based on the helicopter load calculation.

CPR will not be conducted in-flight during a short-haul rescue, insertion of intravenous lines be prior to a short-haul mission is discouraged but not prohibited.
### Appendix B – Unit Short-haul Operations Plan (Example)

Body recoveries can be performed using short-haul technique with an attendant. An attendant may fly off during a body recovery if there is an immediate or potential threat to their life, health, or safety. If the above-mentioned items are not a factor, the corpse will be slung out using a cargo net, rescue litter, screamer suit or by their harness. If the attendant flies out with the body, the body will be hooked to a tag line so the body hangs below the attendant's feet.

Rescue personnel will clip in directly to the end of the static line via a full body harness or commercially sewn seat harness. A sewn chest harness or webbing looped around the pack straps and tied, will be used for a chest harness, after approval by the spotter.

Carrying personnel in the short-haul configuration during training is restricted to maintaining conditions that would simulate those experienced in an actual mission.

Maximum forward air speed is 52 Knots (60 mph)

### Mission Planning

Mission planning for short-haul is composed of the same activities as any other helicopter operation as articulated in the *Yellowstone National Park Aviation Management Plan.* The following activities are emphasized for short-haul mission planning for safety purposes. They are generally components of the risk analysis process.

### Load Calculations

The pilot will complete a helicopter load calculation, OAS form 67, prior to take off from the base and a second time utilizing the data gathered during the reconnaissance flight. The load calculation for the first short-haul evolution may be utilized for subsequent evolutions if pertinent conditions remain constant and if payloads remain equal to or less than the payload of the first evolution. Established fixed weight reduction weights will be incorporated into the load calculations.

### Wind Restrictions

Light helicopters are precluded from performing Special Uses (mountain landings, shorthauls, etc.) when wind speeds exceed 30 knots or when gust spreads exceed 15 knots. Light helicopters may fly cross-country above 500 AGL under conditions when wind speeds do not exceed 50 knots. More specific wind limitations are described for each Special Use technique.

### Flight Restrictions

No special use helicopter flights will be undertaken unless there is a minimum of 1/2mile visibility. All flights will remain clear of clouds. Flight operations will be conducted in accordance with DEPARTMENTAL MANUAL 351, Chapter 1, Section 8: Helicopter Flight Limitations. For planning purposes those times from 1/2 hour before sunrise until 1/2 hour after sunset may be used.

### Reconnaissance Flight

Prior to conducting an actual short-haul mission, a preliminary load calculation will be prepared for a reconnaissance check flight. The ship will then fly to the incident scene in a mission ready configuration and perform a recon check flight. If a suitable helispot can be located within reasonable distance of the incident site the medivac will proceed without the use of short-haul. If none exists, initiation of short-haul techniques will proceed.

During the recon flight, primary and secondary staging areas will be identified and selected. The pilot will determine outside air temperature (OAT), wind direction and

speed, density altitude of site, and rotor clearance, and perform a hover and power check. The spotter is responsible for estimating the weight of any patient(s) to be picked up, obstructions in the area, ground characteristics of site (small ledge, scree slope, need for tag line, etc). The Incident Commander and spotter then complete the

### Appendix B – Unit Short-haul Operations Plan (Example)

Helicopter Risk Analysis based on the data gathered from this flight and the input of the pilot. Based on all of these activities, the pilot then informs the Incident Commander that a short-haul mission falls within the performance and power limitations of the helicopter and can be conducted with an adequate safety margin or it can't.

At the staging area, a second load calculation will be prepared and a procedural review conducted prior to conducting the actual short-haul mission. The Incident Commander will make the go/no go decision and the decision to use an on board spotter will also be made by the pilot in consultation with the Incident Commander at this time.

### Operational Sequence

The operational sequence is required procedure. Following the recon flight, the helicopter flies to the incident staging helispot with the short-haul equipment and rescue personnel on board (number of personnel dependent upon allowable payload). Equipment to include: short-haul pack, survival gear, litter or screamer suit, and additional medical equipment (as needed).

Extra rescue personnel are dropped off. Loose cargo in the cabin is removed or

secured. Pilot prepares load calculation. A review of procedures is conducted with Spotter, Pilot and other rescue personnel.

Spotter (this person may also be a short-haul rescuer) rigs the end of short-haul line(s) to the helicopter. Spotter goes through the four-step check of the short-haul line attachment. The Spotter then inspects the line, knots and the weight bag for damage. For the sake of redundancy, the other short-haul rescuer checks the line attachment, knots and weight bag. All persons to be short hauled will have their harness and attachment point "buddy" checked.

Following the 'buddy' check the Spotter announces "**ready**". The pilot says "**coming up**". The pilot brings the line to the short-haulers. Spotter grasps the loops at the end of the short-haul rope and says, "**got it**". The pilot gives the command "**hook up**" when he is satisfied with the stability of the hover. Short-haulers hook up and give each other a thumbs up when they are ready and have buddy checked each others attachment points. The spotter notifies the pilot that they are ready to be lifted by saying, "**ready**". The pilot acknowledges by saying, "**coming up**".

Rescuers are short-hauled to the incident site. Rescuers can assist pilot with depth perception by calling out vertical distance remaining, starting at 20 feet. Upon landing the spotter says **"down".** When both short-haulers have gained a stable stance the spotter says, **"comfortable"**. The pilot gives approval to **"unhook"**.

Upon unhooking the spotter informs the pilot that they are **"clear"**. Pilot departs incident site. Helicopter performs normal flight to the helispot or orbits until rescue personnel have completed all preparations for extraction.

While helicopter is away from incident site, short-haul rescuers complete all extraction preparations. Victim is placed in litter and securely tied in, head, ear and eye protection provided if feasible, victim briefed, tail rope established (if necessary).

A screamer suit or harness may be used for extraction of a subject instead of a rescue litter if injuries do not require a litter. The use of the victim's own harness is not approved for short-haul.

Rescue personnel inform pilot they are ready for pickup and the entire procedure communication sequence is repeated.

Pilot lowers load to receiving personnel. Pilot holds hover when the load is 4 to 5 feet off ground. Receiving personnel stabilize litter and pilot lowers final distance to ground.

Appendix B – Unit Short-haul Operations Plan (Example)

When litter is on the ground, receiving team disconnects short-haul line following pilot approval. Rescue personnel signal helicopter that the litter is disconnected, and immediately reassess the patient.

Pilot lands the helicopter. When ground personnel are ready, short-haul equipment is removed from aircraft, inspected and stowed. Patient is transported to a definitive-care facility internally, via transfer to life-flight or by ground ambulance.

### **Emergency Procedures**

In the event of an emergency requiring the pilot to jettison the personnel from beneath the aircraft, due either to mechanical failure or the line entanglement, he/she will announce an emergency and disengage the back-up anchor. Once the back up anchor has been released the load will be transferred solely to the cargo hook, which will give the pilot final control over releasing of the short-haul rope. Such an action may be **fatal to personnel suspended beneath the helicopter.** 

In the event that radio communications are lost during the short-haul mission, hand signals will be used to finish the short-haul evolution. Arms outstretched to the sides indicate a problem signaling the pilot to take the short-haul rescuers to the ground immediately. Other hand signals are as follows:

<u>Spotter</u>

**Ready**–lift arms from sides to over head repeatedly in standard "lift sling" signal **Down and Comfortable**–arms outstretched to the sides **Clear**–push short-haul line away

<u>Pilot</u>

**Coming up**–gently raise helicopter **Hook up**–bring line to short-haulers, nod head when hover is stable **Unhook**–nod head when hover is stable

### DOCUMENTATION

All short-haul operations, training or actual mission uses, will be thoroughly documented - Each time a rope is used, the use will be logged.

- Each time a spotter deploys a short-haul evolution, that deployment will be logged.

A 10-343 (Case Incident Report) will be completed to document all short-haul training. On any operational mission that any of these techniques are used on, a 10-344 (Supplemental Case Incident report) will be completed and included with the SAR case incident report. This 10-344 will be entitled "Air Operations Summary" and will thoroughly detail all aspects of air operations conducted during the mission. The OAS\_23 flight use record will also reflect flight use devoted to short\_haul.

# QUALIFICATIONS

**Spotter** Those persons involved in the short-haul program as spotters must have the following qualifications:

- Pass an Arduous Duty Physical Examination every three years
- Achieve a satisfactory performance on the Yellowstone Advance Physical Fitness Test annually.
- Must be a member of the park aviation management program as evidence shows the increased potential for accidents when complex operations are undertaken by incidental users.
- Participate in the short-haul program as a short-haul rescuer for 3 seasons
- Meet all requirements as noted in the DOI Short-haul Handbook
- Must be Helicopter Manager qualified to NWCG 310–1 standard.
- Must complete Basic Aviation Safety Refresher annually
- Have a current First Responder Certificate or greater

### Short-hauler

- Must complete Basic Aviation Safety Refresher annually
- Must complete a ground mock-up and communications review
- Must be essential to the completion of the rescue mission •
- Meet all requirements as identified in the DOI Short-haul Handbook

All short-haul rescuers must be accompanied by a gualified short-haul spotter unless the requirements are such that a qualified spotter is in the helicopter rather than at the end of the rope.

### Recertification

Each year personnel involved in short-haul will complete the three 3 hour short-haul course. Each training program will be limited to 12 individuals to assure complete training for the

persons involved. The training will cover the following topics:

- Rigging
- Communications
- Operational procedures and guidelines .
- Conduct at least 2 mock-ups
- Conduct at least 2 evolutions in typical terrain
- Helicopter safety
- Helispot management

Proficiency Refer to the DOI Helicopter Short-haul Handbook Chapter 2.4

Superintendent, Yellowstone NP	Date:
Superintendent, Yellowstone NP	Date:
Superintendent, Vellewstone ND	Date:
	Date:
Superintendent, Yellowstone NP	Date
Superintendent, Yellowstone NP	Date:
Superintendent, Yellowstone NP	Date:
Superintendent, Yellowstone NP	Date:

# Certification of Annual Review

# SHORT-HAUL PILOT TEST

The short-haul pilot proficiency test consists of four phases. All four phases of the test must be successfully completed in order to pass. Pilots will have three chances to successfully complete the four phases of the test.

The proficiency test is based on "normal" weather conditions encountered at the flight operations area. Variations from these standards resulting from weather conditions outside of "normal" will be discussed by the Inspector Pilot, Short-Haul Check Spotter and the Pilot to be tested prior to the test.

# PHASE I - Precision Long-line

**Objective:** Observe and evaluate the pilot's skills and ability for vertical reference flight. Observe the pilot's control of the helicopter as well as the load. Observe the pilot's response to variable weather elements that may be present.

**Procedure:** With a line length appropriate for the using unit (minimum 50 feet) and a load 6-8 foot long, weighing 150-200 pounds, and bridle rigged in the upper one-third of object for vertical suspension, the pilot will depart and fly a normal traffic pattern. Upon return, the pilot will place the load over a designated area (10 foot diameter circle or 10 foot square) at a load altitude not to exceed 6 feet and hold it in position for 2 out of 3 minutes. If the load contacts the ground and such contact causes the load to tilt, failure of this Phase will occur. The helicopter should be rigged so the load is suspended as it would be during normal short-haul operations. This provides an accurate simulation of the placement of a rescuer at a short-haul site. A short-haul spotter may or may not be used. The short-haul line may or may not be completely pilot-jettisonable.

# **PHASE II - Load Control and Placement**

**Objective:** To observe and evaluate the pilot's ability to control and precisely place loads. To observe the pilot's reaction to "normal" weather conditions and their effects on the ability of the pilot to maneuver the helicopter.

**Procedure:** With the same line and load, the pilot will demonstrate load control and placement by flying the load through a predetermined ground course. This may be a square, triangle or other defined course (e.g. road slalom) easily identified at the test site. Altitude of the load will be not exceed 6 feet above the ground throughout the maneuver with placement occurring at designated locations with a tolerance of not more than 4 feet. All load placements must be done in a manner that demonstrates that the pilot has complete control of the vertical rate of descent at touchdown.

# PHASE III - Pilot/Spotter Interface

**Objective:** To observe the interface between the pilot and spotter. To evaluate the pilot's ability to conform to spotter instructions.

**Procedure:** The objectives of PHASE II, emphasizing precision placement on predetermined targets, will be repeated with the addition of placement in the type of terrain that is typically encountered during operations. Typical terrain may include the following types of features: confined areas, cliff areas, narrow or confined ridge crests, confined pinnacles, areas of moving water, and areas such as snowfields or glaciers. If the using unit is operating in areas where lighting variations or background contrast is a factor, flight operations under these conditions should be demonstrated. Additionally, an "in aircraft spotter" will be aboard, if that is part of the using unit's operational plan.

The last element will be for the pilot and spotter to demonstrate emergency procedures by releasing the primary and secondary anchors (ie. cargo hook and belly band). Emergency procedures will be accomplished using a "dummy load" of at least 150 lbs. attached to hardware and line that will not be used for actual shorthaul purposes.

# PHASE IV - Human Short-Haul

**Objective:** To observe the pilot during a human short-haul operation. To evaluate the pilot's control of the aircraft and the load control during the operation.

**Procedure:** Upon successful completion of the above three phases, the pilot will demonstrate the ability to work with a human on the end of the short-haul line. The pilot must demonstrate the ability to place a human at a predetermined target with the same tolerance as outlined in Phase II. The pilot shall demonstrate total control of the load at all times.

**NOTE:** "<u>HUMAN</u>" is a qualified short-haul person.

# TRAINING OUTLINE

Unit I: Program Orientation & Overview

- Suggested Time: 3 4 hours
- Training Aids: Flip chart, Short-Haul Handbook, Local Short-Haul Operations Plan, DOI Aviation Life Support Equipment Handbook (ALSE), Interagency Helicopter Operations Guide (IHOG)

Objectives: To provide students with a general overview of short-haul program and policy requirements.

OUTLINE	<u>NOTES</u>
Make sure students have copies of the SH Handbook and local SH Operations Plan, ALSE Handbook, and IHOG. It is preferable that students are given these documents, along with other pertinent reading material, prior to scheduled training.	Instructor will review with studentspolicy requirements and SH guidelines.
I. Program history -Local -National	Students should understand why and how the program developed locally and nationally. (Helicopter SH Handbook, 1.2)
II. Review Departmental and Bureau Policy & Guidelines	
<ul> <li>A. Review SH Handbook</li> <li>1. User Specific <ul> <li>a. New Programs</li> <li>b. Pilot Requirements</li> <li>c. Training Requirements</li> <li>c. Training Requirements</li> <li>c. Check Spotter</li> <li>Spotter</li> <li>Short-hauler</li> <li>Annual Re-qualification</li> <li>Proficiency Requirements</li> </ul> </li> <li>d. Operational Requirements</li> <li>Load Calculations</li> <li>Flight Restrictions</li> <li>Mission Briefing</li> <li>Risk Assessment</li> <li>Equipment Checks</li> <li>Duties</li> <li>e. In-flight Emergencies</li> </ul>	SH Handbook, 1.5 SH Handbook, 2.1 SH Handbook, 2.2

<ul><li>III. Review Local SH Operations Plan</li><li>A. User Specific</li><li>B. Restrictions</li></ul>	
<ul> <li>IV. Equipment Orientation</li> <li>A. Personal Equipment</li> <li>1. Personal Protective Equipment (PPE) <ul> <li>Clothing</li> <li>Helmet</li> <li>Harness</li> <li>Daisy Chains</li> <li>Other (PFD, Footwear, Packs, etc.)</li> <li>Use of PPE Waiver</li> </ul> </li> </ul>	DOI ALSE Handbook, IHOG
<ul> <li>B. Anchor</li> <li>1. FAA Approved <ul> <li>Supplemental Type Certificate (STC)</li> <li>Major Repair &amp; Alteration (FAA Form 337)</li> </ul> </li> <li>2. Construction Specifications <ul> <li>Installation Procedures</li> <li>Inspection Requirements</li> </ul> </li> </ul>	<i>Discuss welded rings, types of carabiners, inspection requirements, maintenance.</i>
<ul> <li>C. Short-haul Attachment Line(s), pre-rigged <ol> <li>Hardware (carabiners, steel rings, specs &amp; care)</li> <li>Material construction &amp; requirements</li> <li>Inspection (preflight &amp; postflight)</li> <li>Care during use</li> <li>Cleaning</li> <li>Storage</li> <li>Retirement</li> </ol> </li> <li>2. Software (Rope specs &amp; care) <ul> <li>Construction &amp; requirements</li> <li>Inspection (preflight &amp; postflight)</li> <li>Care during use</li> <li>Cleaning</li> <li>Storage</li> <li>Cleaning</li> <li>Storage</li> <li>Retirement</li> </ul> </li> <li>Storage</li> <li>Retirement</li> <li>Knots</li> <li>Weight Bag</li> </ul>	Instructor and/or check spotter will demonstrate how to tie knots and see that students are proficient.

<ul> <li>V. Communications</li> <li>A. Radio</li> <li>B. Hand Signals</li> <li>C. Siren/PA</li> </ul>	Standard hand signals will be demonstrated and practiced.
<ul> <li>D. Other</li> <li>VI. Safety &amp; Emergency Concerns</li> <li>A. Hazards &amp; Problems</li> <li>B. Entanglement <ul> <li>Prevention</li> <li>Release procedures</li> </ul> </li> <li>C. Crash Procedures <ul> <li>Pilot duties</li> <li>Spotter duties</li> <li>Short-haul personnel</li> </ul> </li> <li>D. Survival equipment &amp; Use</li> </ul>	Review local short-haul operations plan and local policy. Pilot brief students on helicopter and emergency procedures
<ul> <li>Signal mirror</li> <li>Signal smoke</li> <li>Other</li> </ul> VII. Documentation <ul> <li>A. Training &amp; Qualifications</li> <li>B. Operational Short-hauls</li> <li>C. Training Short-hauls</li> <li>D. Case Incident Reports</li> <li>E. SAFECOM/Mishaps</li> </ul>	

Unit II:	Field Training
Suggested Time:	6-12 hours
Training Aids:	Helicopter, lifting device, raised platform, ground markers/targets, local equipment (SAR/EMS/LE), typical terrain.
Objectives:	To train and qualify students in safe short-haul procedures for specific missions.

OUTLINE	NOTES		
I. Step-by-step Orientation (with helicopter)	Spotter and pilot will check cabin and configuration for short-haul		
A. Ground mock-up			
1. Pilot briefing	The pilot and spotter will install		
2. Spoller Dulles Bigs aquipment & ropo	socondary)		
Rigs equipment & tope     Doors removed and secured	Short-haulers should observe		
Loose equipment removed/secured     Dedia fraguency established	and double-check this procedure.		
Radio frequency established     Padio check with pilot & personnel	Short haul rone knots		
Inderstanding of mission/role	carabiners and other equipment		
3. SH Personnel Inspection (buddy check)	attached correctly, checked and		
<ul> <li>Helmet (fit, loose straps)</li> </ul>	operational.		
Eye Protection			
Ear Protection	Each short-hauler will check		
<ul> <li>Fire resistant clothing</li> </ul>	partner, working from head to		
Knife	toe.		
	Observe the familian serve and an electronic		
Harness	Check knife for lanyard and easy		
Gioves     Boots			
<ul> <li>Boots</li> <li>Pack</li> </ul>	Radio/comm check		
Other equipment			
Communications			
II. Static Suspension (SH Personnel)			
	Demonstrate harness adjustment		
A. Adjust Harness	and use of attachment points.		
B. Practice use of attachment points			

<ul><li>III. Lift Training</li><li>A. Short-haul personnel (in pairs if applicable)</li><li>B. Students are raised ten feet off ground and set down.</li></ul>	Conducted at helibase or
IV. Circuit Training A. Use raised platform	equivalent.
B. Complete ¼ mile circuit	
<ul> <li>C. Short-hauler duties (preparation for short-haul insertion) <ol> <li>Aircraft lifts to hover until rope(s) are off the ground. Pilot, spotter, and short-haulers confirm radio comm.</li> <li>Short-haulers attach to rope(s) on command</li> <li>Short-haulers give "ready" signal</li> <li>Pilot lifts SH's &amp; flys to SH site (raised platform</li> <li>Upon arrival, Short-hauler will radio pilot the vertical distance from load to the ground (e.g. "two-zero feet", "one-zero feet", "own &amp; comfortable"</li> <li>SH's unhook from rope(s) on command &amp; communicate they are clear.</li> </ol> </li> </ul>	Rotate personnel through training sequence. To reduce risk and eliminate line twist, don't attach until ropes are completely off the ground. Weight bag may be kept on the ground to give pilot a reference point and eliminate striking rescuers. If more than one short-hauler, one is responsible for communications, the other for tending the rope/bag. Pilot should provide time for SH's to stabilize and secure themselves before giving the command to disconnect from
A. Varied Locations	rope(s)
<ul> <li>B. Include typical hazards (snow, pinnacle, ledge, moving water, etc)</li> <li>C. Bilet dution (record check flight)</li> </ul>	Evaluate training locations ahead of time.
<ol> <li>Pilot duties (recon check flight)</li> <li>Flight following (spotter can assist with navigation, watching for other aircraft, hazards, etc)</li> <li>Pilot, spotter, and short-haulers will select a short-haul site.</li> <li>Evaluate SH site for:         <ul> <li>proximity to incident</li> <li>size</li> <li>slope</li> </ul> </li> </ol>	Depending upon use, training may be broken into two scenarios: 1) Short-hauler delivery and/or extraction. 2) Litter delivery and/or patient extraction.

<ul> <li>–rotor clearance</li> <li>–wind conditions</li> </ul>	
<ol><li>Complete hover check and Go-No-Go</li></ol>	
5. Select landing area to rig for SH	
D. Short-hauler Duties (Extraction)	Depending upon the
1. SH's and/or victim are attached to SH	circumstances, rope may not
around	leave the ground. This should be
grounu. 2 SH's give "ready" signal	nersonnel
3 Pilot lifts and flies to landing area	personner.
4. Upon arrival, SH'er will radio pilot the	Circumstances may dictate
vertical distance between load and	personnel on the ground to
ground (e.g. "two-zero feet", "one-zero	communicate to the pilot when
feet")	short-haulers are "ready" and
5. SH'er and/or litter is unhooked from	also provide vertical distance
rope(s) on command & communicate to	between short-haulers and the
pilot "clear"	ground.
VI. Cargo Lat Down	For cargo lat down, refer to the
	Interagency Heliconter Rappel
A Equipment	Guide
B. Let-down line	
1. Brake Device	
2. Carabiners	
3. Knife	
4. Line Bag	
5. Equipment or cargo bag	
C. Operating Procedures	
1. Pre-flight briefing	
2. Pre-flight inspection (equipment)	
-Spotter	
-Helicopter	
-Deployment	
2. In-flight duties	
3. Deployment	
D. Emergency Procedures	
1. Helicopter	
-Control	
-Precautionary	
-Power Loss	
-Catastrophic failure	

<ol> <li>Deployment         <ul> <li>In helicopter</li> <li>During Descent</li> <li>On the ground</li> </ul> </li> <li>Corrective Actions         <ul> <li>Abort</li> <li>Lock off</li> <li>Fly away</li> <li>Cut line</li> </ul> </li> </ol>	
VII. Search & Rescue	Display & demo various equipment used.
<ul> <li>1. Litter/Bauman Bag <ul> <li>Patient protection (packaging)</li> <li>Rigging</li> <li>Use of tail rope</li> <li>Use of drogue chute</li> </ul> </li> <li>2. Rescue net or collar <ul> <li>Rigging</li> <li>Safety precautions</li> </ul> </li> <li>3. Screamer suit <ul> <li>Rigging</li> <li>Safety precautions</li> </ul> </li> <li>B. Terrain <ul> <li>Tall timber</li> <li>Cliffs</li> <li>Pinnacles</li> <li>Swiftwater</li> <li>Snow</li> <li>High altitude</li> </ul> </li> </ul>	Should be based upon local protocols. Establish proficiency requirements for students. Rescue personnel PPE (water) PFD, Wetsuit, booties or sandals, waterproof communications/radio Provide students equipment needs for various terrain & demo Establish proficiency requirements for students. Planning for mission should be accomplished with input from instructors, program manager.
VIII. Law Enforcement	pilot and check spotter.
A. Equipment B. Terrain	Utilize risk assessment and risk management tools/procedures.
C. Other procedures	

IX.	Typical Mission	
	A. Create a realistic situation	
	B. Pilot & spotter briefing	
	C. Spotter duties	
	<ul> <li>D. Short-hauler duties</li> <li>1. Buddy check</li> <li>2. Preparation for SH</li> <li>3. Extraction</li> </ul>	
	E. Pilot duties (Recon Check Flight)	
Х.	Critique & Wrap-up	Everyone encouraged to
	A. Debrief	Participate.
	B. Review emergency procedures	students.
	C. Seek input for program improvement	Document feedback, both positive & negative.

# **SPOTTER HAND SIGNALS**







Short-hauler's Unhook



Wave-off – Don't Hook Up!

# SHORT-HAULER HAND SIGNALS



**MOVE UPWARD** 



**MOVE DOWNWARD** 



HOLD HOVER



**MOVE FORWARD** 



WAVE-OFF/DON'T LAND





DISCONNECT



OKAY

# CARGO LETDOWN PROCEDURES

# I. INTRODUCTION

"*Helicopter cargo letdown*" is defined as the deployment of cargo from a hovering helicopter by the means of an approved webbing, descent device, and auxiliary equipment.

The Helicopter Cargo Letdown Procedures consists of material compiled from the private sector, bureaus, and agencies within the Department of Interior and USDA Forest Service. This will allow the user to utilize helicopter cargo letdown to accomplish a wide variety of tasks or projects safely and economically. Cargo letdown was designed to augment helicopter cargobilities; *it is not a replacement for long-line operations*. Exposure and risk assessment must be addressed in the process of deciding which type of helicopter cargo delivery system to use.

A. Objectives

The intent is to develop standardization in training of individual spotters and pilots in a variety of helicopters for the safe and efficient deployment of cargo.

B. Applications

Cargo letdown operations expand the capability of the helicopter by delivering cargo on incidents and projects.

# **II. QUALIFICATIONS**

- A. Pilot
  - 1. Pilots Requirements

Pilots must meet the following requirements:

- a. DOI Department Manual parts 350-354 or USDA Forest Service 5700 Manual.
- b. Meet experience requirements for long-line activities of current contract and may be required to perform and agency check ride.
- c. Pilots must attend a familiarization session covering cargo letdown procedures and techniques, crew coordination and emergency procedures.
- d. Demonstrate ability to operate helicopter during cargo letdown sequence.

- e. Demonstrate ability to work with spotter.
- 2. Pilot Familiarization and Qualification

Pilots must attend an annual familiarization session covering cargo deployment sequences.

- B. Spotter
  - 1. Spotter Training and Qualification
    - a. Successfully complete Interagency Helicopter Crewmember Training (S-271).
    - b. Demonstrate ability to rig helicopter and gear for cargo letdown operations.
    - c. Complete three (3) simulated deployments. Perform all of the duties of the spotter from the initial call through return to base.
    - d. Simulate deployment without procedural error.
    - e. Under the supervision of a qualified check spotter, must spot ten (10) loads from the helicopter, five (5) of which are in typical terrain.
    - f. Show principles of inspection, care, maintenance, and repair of cargo letdown equipment.
    - g. Identify the spotter's duties and responsibilities.
      - NOTE: It should be noted that these are minimum requirements and the instructor/check spotter may request additional training due to the complexity of the expected operations, or an individual's needs for training in specific areas. If an individual cannot meet all of the above minimum requirements, the instructor/check spotter will not approve the spotter for cargo letdown operations.
    - 2. Spotter Proficiency

Individuals will make at least one cargo letdown every 90 days or less.

- 3. Annual Spotter Re-qualification
  - a. Must attend and successfully complete annual cargo letdown training.

- b. Simulate a deployment without error.
- c. Complete deployment of three loads of cargo without procedural error.
- d. Demonstrate knowledge of standard procedures of cargo letdown.
- 3. Check Spotter Requirements and Qualification
  - a. Must have been a qualified spotter for two (2) years.
  - b. Must have assisted in training of at least two (2) spotters.
    - NOTE: New programs will be approved DOI AM and state or regional aviation manager for DOI, or regional aviation officer for Forest Service. Instructors and local managers will designate a minimum of one check spotter per base.
- 4. Annual Check Spotter Proficiency
  - a. Demonstrate a knowledge of standard procedures of cargo letdown.
  - b. Simulate a deployment without procedural error.
  - c. Deploy three (3) loads of cargo in a typical terrain without procedural error.

# NOTE: If currency is lost during the annual qualification period, the check spotter must complete the proficiency requirements to remain current.

# **III. SPOTTER SAFETY CHECKS**

- A. Standard Procedures. All training and actual deployment missions will use the following steps and procedures. The intent is to standardize and maintain continuity between units.
  - 1. Pre-Deployment Briefing. Prior to any cargo letdown operation, the spotter will brief all personnel involved.
    - a. Brief pilot with pertinent information affecting deployment mission and environmental concerns (weather, wind, terrain, landing areas, density altitude, etc.)

- b. Pilot/spotter will brief on emergency procedures and verbal communications during deployment sequence.
- c. Clear and concise communication between the pilot and the spotter will take place during the entire cargo letdown process. Communication must be completely understood by both the pilot and spotter.
- 2. Pre-flight Inspection. Each spotter will conduct an equipment check prior to boarding the helicopter.
  - a. Personal Equipment
    - (1) Aviator's protective helmet is properly fitted and secured. Avionics are operational and cord is long enough to provide sufficient length to accommodate spotter's movement in the cabin without interfering with cargo letdown line.
    - (2) Collar turned up, fire shirt buttoned to top or nomex flight suit zipped up completely.
    - (3) Sleeves down and over gloves.
    - (4) Nomex/leather gloves on.
    - (5) Harness correctly fitted and loose straps secured with no twists.
    - (6) Buckles secure and attached correctly.
    - (7) Knife easily accessible.
    - (8) Leather boots. (Nomex will extend below boot tops)
    - NOTE: Take special care in checking correct buckle attachments and looking for loose ends of straps that could become entangled in the line and/or descent device.

# HELPFUL HINTS

- Maintain a taught letdown line at all times. *DO NOT* allow unarrested descent.
- Attempt to minimize contact with fuselage, step, skid, or basket when deploying cargo.
- A 5 foot section on each end of the letdown line and a 10 foot section in the center of the line should be clearly marked. Use center-of-line indicators to help determine whether splitting the load is an option.
- □ The shadow from the load may be useful in determining height above ground.
- Keep helicopter control input to a minimum after descent begins to minimize load oscillations.
- Secure load behind rocks, logs, or bushes whenever possible on steep terrain to avoid rolling.
- If tight spin develops during letdown, accelerate letdown process as much as possible.
- All cargo containers must be manufactured with high strength, abrasion resistant materials.
- Aircraft utilizing external cargo operations should minimize flight time with external cargo and maintain an air speed that allows for the external load to remain stable.
- Steel figure 8's will retain more heat than aluminum figure 8's. Excessive heat build up on the figure 8 could cause melting of letdown line during cargo deployment.

# V EMERGENCY PROCEDURES

*"Emergency procedures"* are defined as the standard established procedures used to respond to a situation, serious in nature, developing suddenly or unexpectedly, and demanding immediate action.

- A. Helicopter Emergency
  - 1. In-Hover/Control and Power Maintained or Engine Failure, Power Loss

A problem may be indicated by a caution or chip detector light coming on, gradual oil pressure loss, hydraulic boost pump failure, etc. If the pilot determines the emergency is immediate and the deployment sequence must be deviated from, the following procedures will be initiated:

- a. Pilot will declare the emergency to the spotter.
- b. Spotter will cut line.
- c. Spotter will fasten seat belt.

- d. Spotter will report actions both to pilot.
- B. Deployment Problems

If the spotter is confronted with a problem during the descent (e.g., pitch on the line, a knot, line entangled in trees, etc.).

- 1. The spotter will declare the emergency and state the problem.
- 2. The spotter and pilot will determine necessary action (i.e., cut line, lock off and fly away, lower load to ground by decreasing altitude, etc.).
- C. Lock Off and Fly Away Procedures

When the spotter and pilot jointly determine and agree that there is a need to lock off and fly away (like a sling load), the following procedures will be followed:

- 1. Pilot will maintain hover.
- 2. Spotter will place brake hand on the running end of line, approximately one foot away from descent device.
- 3. Spotter will loop running end of line up and over descent device ears twice, locking between loaded line and descent device, locking off is accomplished. (Lock-Off Procedure.)
- 4. Spotter will notify pilot that load has been locked off and direct pilot to fly away.

# NOTE: Spotter will maintain grip on line with brake hand and have knife ready during fly away.

5. Pilot will fly load, as a sling load, to nearest suitable landing area, lower to ground and depart.

# MODEL SPECIFIC PROCEDURES



# **AEROSPATIALE SA 315B (Lama)**

### **Cargo Deployment Procedures**

### Floor Internal Cargo

- 1. Pre Deployment
  - A. The pilot and spotter configure aircraft for mission. Spotter puts on harness, knife readily accessible.
  - B. Visually inspect anchor.
  - C. Secure cargo in helicopter.
  - D. Secure harness tether to an approved attachment point. Assure carabiners, figure 8 and letdown lines are on board. Enter aircraft and buckle seat belt.
- 2. Approach to Drop Site:
  - A. Recon area for hazards and confirm deployment site with pilot.
  - B. Identify and check alternate site.
  - C. Rig letdown line through figure 8, attach figure 8 to positive locking steel carabiner and to floor anchor with carabiner. Then attach end of letdown line to positive locking steel carabiner on cargo and lock carabiner. Take up any additional slack. Lock letdown line on figure 8. Inform pilot cargo is rigged.
  - D. Spotter may elect to remain seat belted, unfasten seatbelt, or move to rearward facing spotters seat.
  - E. Inform ground personnel to stay clear of cargo during deployment.

- F. Inform flight following that the radio will be off frequency (if not already done).
- G. Activate hot mike. From this point on all spotter actions are verbalized to pilot.
- 3. Hover Position
  - A. Communicate with pilot to position helicopter over deployment spot. Terminology should use pilot's perspective (*your side, my side, forward, back and up or down relative to altitude above the ground*).
  - B. Spotter Checks power with pilot. Suggested verbiage to use when in hover over spot:

SPOTTER:	"How's Power?"
PILOT:	"Power is good"
SPOTTER:	"Ready To Deploy"
PILOT:	"Go Ahead"

# CAUTION: Spotter shall not move cargo outside the aircraft until the pilot announces power is good.

- 4. Cargo Deployment
  - A. Ease cargo out of door, lowering between fuselage and skid.
  - B. Unlock letdown line from figure 8 and lower cargo with positive control of letdown line. Via hot mike, keep pilot informed of actions and progress of cargo descent:
    - □ "Cargo out the door";
    - "Cargo halfway down";
    - □ "Cargo on ground, etc. "
  - C. When cargo is on ground, hold slack in line to prevent billowing (if deploying split load, attach cargo to letdown line and repeat steps a and b), unhook figure 8, remove figure 8 from letdown line, and secure figure 8 in aircraft.
  - D. Wrap excess letdown line around rope bag and drop bag to the ground.
  - E. Inform pilot if more cargo is to be lowered with additional letdown line. Pilot will determine whether to hover or orbit area until cargo is ready for subsequent deployment. When cargo deployment is complete and rigging is clear of aircraft, inform pilot *"We're clear to fly away".*

### **RECONNAISANCE FLIGHT CHECKLIST**

### Mission Information

CASE NUMBER INCIDENT NAME LOCATION ELEVATION DATE/TIME of OCCURRENCE DATE/TIME REPORTED HELICOPTER TYPE PILOT SPOTTER

### Patient Medical Status (if known)

TRAUMA SCORE (12 or less is critical) EST. TIME TO DO CONVENTIONAL RESCUE EST. TIME TO DO WITH SHORT-HAUL

### Weather

OUTSIDE AIR TEMPERATURE (F/C)	
RELATIVE WIND DIRECTION	DEGREES
TRUE WIND DIRECTION	DEGREES
WIND SPEED (mph/knots)	
GUST SPREAD (mph/knots)	
PRESSURE ALTITUDE	FEET
TURBULENCE (circle one)	NONE – LIGHT-MODERATE-SEVERE

### Pickup/drop-off Site Characteristics

TECHNICAL TERRAIN VEGETATION SLOPE (% slope) SNOW/ICE (describe) GROUND TRAVEL HAZARDS DISTANCE TO SAFE LANDING AREA

### Hover/Power Check

TORQUE PITCH (lama) OR N1 TOT FUEL ON BOARD (gallons/lbs) ROTOR CLEARANCES

### **Incident Conditions**

LOAD CALCULATION DONE (circle one) DISTANCE TO SAFE LANDING AREA INCIDENT COMMANDER APPROVAL

### Procedure Used (circle one)

GO NO-GO

YES

Conventional Rescue/Short-haul

Appendix G -	Short-haul F	Risk Analysis	(Exam6:14 PMples)
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INCIDENT NAME	CASE INCIDENT#
LOCATION	
INCIDENT COMMANDER	DATE
LOAD CALCULATION         ELEVATION OF STAGING SITE	∘C ∘E
DATIENT MEDICAL CONSIDERATIONS	
TIME OF ACCIDENT TIME REPORTE	D
MECHANISM OF INJURY	
MEDICAL CONTROL CONCURS WITH SHORT-HAUL	′ES 🛛 NO 🗆 NOT APPLICABLE 🗆
ALTERNATIVES: NUMBER OF PEOPLE REQUIRED FOR GROUND-BASED ESTIMATED TIME FOR GROUND-BASED RESCUE RISKS ASSOCIATED WITH GROUND-BASED RESCUE H MOVE PATIENT TO ALTERNATE LOCATION (Helispot)	n-technical terrain; Swiftwater; etc.)
ENVIRONMENTAL CONSIDERATIONS         SUNRISE       AM         SUNSET       PM         As reported from the short-haul site, if possible:         WIND SPEED (Not to exceed 35mph)         GUST SPREAD (Not to exceed 17mph)	mph
	mile(s)
ALTERNATIVES: DELAY OPERATION FOR IMPROVED CONDITIONS YE PREDICTED WEATHER	ES 🗆 NO 🗆
AIRCRAFT CONSIDERATIONS (Reconnaissance cl	neck flight information relaved to IC)
OUTSIDE AIR TEMPERATURE (OAT) ©E PRESSURE ALTITUDE FEET TORQUE ADEQUATE ROTOR CLEARANCE (1.5 X Rotor disc diame	<u> </u>
DECISION TO SHORT-HAUL MADE BY FLIGHT CREW INCIDENT COMMANDER CONCURS YES D NO D	YES D NO D

### Short-haul Risk Analysis

Wind Speed / Dire	ction	Knots	Go	Caution	No Go
0 to 24	Knots		0	0	
24 10 30	Knots			0	0
Wind Gust Spread	d	Knots			0
0 to 12	Knots		0		
12 to 15	Knots		-	0	
15 +	Knots				0
Rotor Pitch					
0 to .85			0		
.85 to .90			0		
.90 +					0
Rotor Clearance	<u> </u>	Feet	0		
30 + IEEL 18 to 36 fe	aat		0	0	
0 to 18 fee				0	0
Visibility	21	Miles			U
<sup>1</sup> / <sub>2</sub> mile plu	IS	Wilco	0		
0 to $\frac{1}{2}$ mile	es		•		0
Turbulence					
None			0		
light to mo	oderate			0	
severe					0
Helicopter Rescue	: time limits (S	SUNSET)	-		
3 to 14 hou	urs		0	0	
	rs			0	0
U to 1 hour	[ noreonnol				0
	personner		Ο		
some helic	u conter training	r	0	0	
never arou	und heliconter	d rs		0	0
Pilot Briefed & Trai	ined in missic	on type			Ū
Knows Are	ea . mission 8	k trained well	0		
Knows mis	ssion, some t	raining, was told about hazards	0		
Told missi	on & limited t	raining		0+	
Ground Base Reso	cue	-			
12 + hours	3		0		
3 to 12 ho	urs			0	
1 to 3 hour	rs			0+	
Patient			•		
Critical			0	0	
Delayed				0	
Deceased				0+	
Mission Planning					
Manadem	ent Approved	l	0		
Load Calc	ulation done		õ		
Within allo	wable pavloa	ad	Õ		
Have enou	ugh fuel for th	e mission	Ō		
Fuel truck	is pre-positio	ined	Ō		
Communic	cations are ac	cceptable	-	0	

There are many subjective elements in this analysis. It is meant to be a guide through a thought process. Sound judgement is the key.

0+; proceed with **extreme caution**, the risk/benefit ratio is especially questionable

# SHORT HAUL RISK MANAGEMENT CHECKLIST



### 1. SITUATIONAL AWARENESS

- Gather and <u>verify</u> available information
- Develop an accurate "mental image" of the mission.

### 2. HAZARD ASSESSMENT

### METHOD (Techniques & Methods How Mission Will Be Conducted)

- □ In the best interest of rescuer(s) and subject safety.
- □ Alternate techniques adequately evaluated (time required & hazards)
- Adequate communications in place.
  - □ Check for omissions or deficiencies
  - Backup plan prepared.

### MAN (Generic Reference to Incident Personnel)

- □ Personnel trained and qualified for the mission.
- Personnel have provided for personal preparedness.
- □ Flight crew duty limits
- Mental & physical condition of rescuers

### MISSION (The Incident Assignment)

- Operational tempo is appropriate
- □ Urgency is not driving the mission.

### MEDIUM (Environmental Forces)

- □ Airspace conflicts/hazards
- Environmental hazards identified and considered in mission planning including;
  - Altitude, rotor clearance, slope, ice, snow, heat, loose rock, exposure or overwater.
- Current and predicted weather identified.
- □ Sufficient daylight to complete the mission.
- Operating within performance capabilities of man and machine.

### MANAGEMENT (Controls, Procedures, Oversight & Supervision)

- □ ICS established and communicated.
- Compliance with policies and SOP's.
- □ Safety <u>openly promoted</u>.
- □ After-action review planned.

### 3. HAZARD CONTROL

- Identify risks and implement controls to them.
- 4. DECISION POINT

Form a GO/NO-GO decision based upon hazard mitigation.

### TIME MANAGEMENT

- 1. Do I have to act immediately?
- 2. How much time do I have?
- 3. What can I do in that time?
- 4. Can I alter the time available?
- 5. Should I?
- 6. Tempo control?

### 1. EVALUATE

- Continually update your *"mental image"* of the mission.
- Continually measure how well the plan is working
- Adjust the response as necessary.

# GRAND TETON NATIONAL PARK SEARCH AND RESCUE TRAINING LOG

DATE: LOCATION: HOURS: DESCRIPTION:

### INDIVIDUALS INVOLVED (In Bold): JENNY LAKE SUBDISTRICT:

OTHERS:

SUMMITTED BY: Signature\_\_\_\_\_ Date\_\_\_\_\_

_
_

# ANNUAL SHORT-HAUL REPORT

This report will be submitted annually to the Interagency Short-haul Chairperson.

YEAR -

Unit Name:

**Unit Address:** 

**Point of Contact:** 

TOTAL NUMBER OF SHORT-HAULS PERFORMED

TOTAL NUMBER OF **TRAINING** SHORT-HAULS

TOTAL NUMBER OF *RESCUE* SHORT-HAULS

TOTAL NUMBER OF RESCUE PERFORMED

TOTAL NUMBER OF LIVES SAVED USING SHORT-HAUL

# HELICOPTER RESCUE SOURCE LIST

# Aeronautical Accessories, Inc.

P.O. Box 3689, Bristol, TN 37625, USA 423.538.5151 or 800.251.7094 www.aero-access.com

Helicopter Rappel Bracket

# Billy Pugh Company

1415 North Water, P.O. Box 802, Corpus Christi, TX 78401 361.884.9351 www.billypugh.com

# Helicopter Yoke Band & Rescue Nets

# **CMC Rescue**

P. O. Drawer 6870, Santa Barbara, CA 93160-6870 800.235.5741 or 805.562.9120 www.cmcrescue.com

### Manufacturer and Rescue Equipment Distributor

David Clark Company Post Office Box 15054, Worcester, MA 01615-0054 508.751.5800 www.davidclark.com

Communication headsets

# **Department Of Interior - Aviation Management**

300 E. Mallard Dr., Ste.200, Boise, ID 83706 208-433-5076 www.oas.gov

Federal Agency

# Flight Suits, Ltd.

1675 Pioneer Way, El Cajon, CA 92020 800.748.6693 or 619.440.2700 www.flightsuits.com

Nomex Flight Suits, Flight Helmets

# Gentex Corporation

P.O. Box 315, Carbondale, PA 18407 570.282.3550 www.gentexcorp.com

Flight Helmets

Heli-Dyne Systems, Inc. 9000 Trinity Blvd., Hurst, TX 76053 817.282.9804 www.heli-dvne.com

Helicopter accessories

### Lifesaving Systems Corporation

220 Elsberry Road, Apollo Beach, FL 33572-2289 813.645.2748 www.lifesavingsystems.com

Rescue straps, helicopter rescue equipment supplier

# Mammut (Technical Rescue Products Division),

Mammut tec AG Industriestr. Birren, CH 5703 Seon Tel. +41 / (0) 62 769 82 32 Fax +41 / (0) 62 769 82 11 www.mammut.ch

### Rope manufacturer, Helicopter Rescue Accessories

Mason Electric Company, Inc. (Formerly Carter Engineering Company) 605 8<sup>th</sup> Street, San Fernando, CA 91341 818.361.3366 or 800.232.7700 www.mason-electric.com

Radio/Helmet Interfaces

# Massif Mountain Gear Company

1000 SE M Street, Grants Pass, OR 97526 541.201.0023 www.massif.com

Flamestop M Nomex Fleece Outerwear

# National Interagency Fire Center (NIFC)

3833 S. Development Avenue, Boise, Idaho 83705-5354 208.334.2662 or 208.387.5512 www.nifc.gov

Nomex Flightsuits, Flight Helmets

# **Onboard Systems International**

11212 NW St. Helens Road, Portland, OR 97231 503.286.4956 or 800.275.0883 www.onboardsystems.com
## Class "D" Certified Cargo Hooks

#### **OTTO Communications**

2 E. Main Street, Carpentersville IL 60110 847.428.7171 www.ottoeng.com

Radio Headsets, Throat/Skull Microphones

# Para-Gear Equipment Company

3839 West Oakton Street, Skokie, IL 60076 847.679.5905 www.paragear.com

# Three-Ring Release and Custom-sewn Rigging Products

# Pigeon Mountain Industries, Inc. (PMI)

P.O. Box 803, Lafayette GA 30728 UŚA 706.764.1437 www.pmirope.com

#### Rope manufacturer, rescue equipment, hardware

#### **Petzl America**

Freeport Center Building M-7, PO Box 160447, Clearfield, UT 84016 801.327.3805 www.petzl.com

#### Rescue equipment, harnesses, sewn webbing products

# Rainy Day Equipment P.O. Box 818, Nakusp, British Columbia, Canada VOG 1RO 250.265.4740 or 265.4766 email: jerrymav@columbiacable.net Contact: Mavis Munn

"Bauman Bag" (Heli-rescue Bag) Manufacturer, Harness, Screamer Suit

#### Res-Q-Mfg.

2144 S. Memorial Dr., Tulsa, OK 74129 918.664.5997

Helo Attachment Belt, Res-Q-Ring

#### **Rescue Systems, Inc. (RSI)**

Highway 95, Box RSI, Lake Powell, Utah 84533-0110

Appendix J – Equipment, Supplies, References 435.979.4664 or 800.552.1133 www.rescuesystems.com

#### Rescue equipment, hardware, sewn webbing products

# SEI Industries International

7400 Wilson Avenue, Delta, British Columbia, Canada V4G 1E5 604.946.3131 www.sei-ind.com

P1R Short Haul Rescue System (Transport Canada Approved)

# SkyHook Rescue Systems Inc.

Terry Asherin, President 7074 Estepa Drive, Tujunga, CA 91042 818.293.0320 www.skyhookrescue.com

Helicopter Extraction Systems

#### Switlik Parachute Company

1325 East State Street, Trenton, NJ 08609 609.587.3300 www.switlik.com

#### Aviation Crew Flotation Vests, Anti-Exposre Suits

#### **Television Equipment, Inc.**

P.O. Box 404, 2022 Route 22, Brewster, NY 10509 310.457.7401 www.swatheadsets.com

#### Waterproof Communication Headsets

#### The Rescue Source/RESCUE3

9075 Elk Grove Boulevard, #200, P.O. Box 519, Elk Grove, California 95759 800.45.RESCU or 916-685-3066 www.rescue3.com

Swiftwater Rescue Supplies, Harnesses, Rescue Equipment Supplier

#### Traverse Rescue

103 2689 Kyle Road, Kelowna, BC V1Z2M9, Canada 250.769.0723 or 888.599.3355 www.traverserescue.com

#### Harnesses, adjustable anchor straps

#### Tyromont

Köllensperger Eisenwaren Ges.m.b.H.

Appendix J – Equipment, Supplies, References Bert Köllensperger Str.6, A-6065 THAUR bei Innsbruck Tel: 05223 - 505-0 Fax: 05223 - 505-14 www.worldport.at/300/324/index.html

Heli-rescue Bag Manufacturer

# United States Forgecraft

P.O. Box 387, Fort Smith, AR 72902 501.782.8651 www.forgecraft.com

Rigging hardware manufacturer

# Yates Gear Inc. 2608 Hartnell Ave. #6, Redding, CA 96002 530.222.4606 or 800.YATES.16 www.yatesgear.com

Harnesses, Daisy Chains

Revised 03-04

# HELICOPTER SHORT-HAUL GLOSSARY

**Attendant-** Individual rescuer attached adjacent to litter or victim during a short-haul rescue. Typically a trained EMS provider, who needs to monitor the airway of a patient packaged in a litter.

**Auto-Locking Carabiner-** Carabiner with spring-loaded locking gate mechanism. Typically the sleeve on the carabiner gate must be rotated before the carabiner can be opened. Once the gate is released to close, the sleeve rotates automatically to positively lock the carabiner. Auto-locking carabiners are preferred for short-haul applications since they are not affected by aircraft vibration, which may cause traditional locking carabiners to unlock. Numerous manufacturers including Petzl, DMM *(illustration)*, ISC and Kong.

Bauman Bag- (aka Heli-rescue Bag, Jenny Bag); A soft hammock style stretcher

constructed of cordura material suspended from a single centered connection point for short-haul rescue. Generically these are referred to as heli-rescue bags. One of the major design features of the Bauman Bag is how aerodynamically stable it is during helicopter rescue evolutions. Named for Tom Bauman of Rainy Day Equipment, Inc. The Bauman Bag Stretcher evolved from the original *"Horizontal Lifesaving Net"* created by Fritz Buhler, Swiss Air Rescue in 1966, which was constructed of a lightweight fishnet material that was small

enough to fit in a rescuer's pocket. Commercial heli-rescue bag manufactuers include; Rainy Day Equipment (Canada) and Tyromont (Austria).

**Capewell Release-** A double action release mechanism designed to reliably function while subjected to a load. The Capewell lanyard-type parachute canopy release *(illustration)* is a hand activated mechanical device for detaching the parachute harness from the canopy. This design was first patented in 1947. The manufacturer subjects each release to a 5,000 pound (2268 kg) pull test.

**Climbing Helmet-** Protective headwear used in rock climbing and technical rescue. These helmets will have an internal suspension system to protect the head from a blow and a multi-point chin restraint system to prevent the helmet from being knocked off the user's head. Commercially produced helmets are typically marked that it meets the standards of a certifying body. e.g. ANSI, UIAA or CE norm.

**Connector Strap-** (*aka* Daisy Chain, Sewn Anchor Strap). A commercially sewn webbing or cordage tether, which the short-haul rescuer uses to connect their harness to the short-haul line.







Appendix K – Glossary

**Density Altitude-** Pressure altitude corrected for the outside air temperature and humidity. Refers to a theoretical air density which exists under standard conditions of a given latitude.

**Evacuation Harness-** A simple quick donning universal harness, which is used for the quick rescue of a stranded subject. These harnesses include triangular style designs as well as military hoisting vests (screamer suit). Several commercial manufacturers including; Petzl, Mammut, Kong, Spinks Industries.

**Extraction-** The phase of a short-haul evolution involving transport of personnel from a short haul site to a staging helispot.

**Harness-** A commercially-sewn climbing or rescue harness. Design elements typically include contrasting stitching in order to inspect for wear and double pass-through buckles to provide for security. Harnesses features may include extra padding, gear loops or hard connection points. Dependent upon agency preference and application short-haul rescuers may either wear an independent seat harness, a seat and chest harness combination or a full body harness. Commercially manufactured harnesses typically are manufactured to meet ANSI, NFPA or CE Norm standards. *Warning: Improvised or hand tied harnesses should be avoided for short haul applications, due to the potential for error.* 

**Hazard-** Any real or potential condition that can cause mission degradation, injury, illness, death to personnel or damage to or loss of equipment or property.

**Helispot-** A safe takeoff and landing area meeting obstruction-free clearance standards (Type III/Light helicopter = 15' X 15' touchdown pad with a 75' safety circle). For use during rescue operations a helispot may be temporary and not have other site improvements.

**Hook Knife-** A J-shaped bladed knife designed to quickly cut through cordage or webbing. Used by a short-haul rescuer for emergency cut away from the short haul line or connector straps.

**Human External Cargo (HEC)** – Classification given by the FAA to the suspension of human loads beneath a rotorcraft.

**In-Flight Emergency-** A condition threatening the continued flight of the helicopter. This includes critical conditions such as loss of engine power, tail rotor failure or other major mechanical malfunction. Such situations will require an immediate autorotation to the ground. A human load suspended for a short-haul evolution at that time of an emergency autorotation may sustain bodily injury upon contact with the ground. (See also Precautionary Landing)

**Insertion-** The phase of a short-haul evolution involving the transport of personnel from a staging helispot into a short haul site.

Appendix K – Glossary

**Knot-** Aeronautical measurement of airspeed corresponding to 1.15 statue miles per hour.

**Munter Hitch-** (*aka* Italian Hitch). A bi-directional friction hitch that can be used for belaying a load. The Munter Hitch is rigged around a carabiner, which provides the surface for generating friction. During a short-haul evolution involving the deployment of a tail-rope, the Munter Hitch can be employed by a rescuer as a method for belaying a stretcher.



**Parachute Landing Fall (PLF)-** A parachutist technique for taking a hard landing without sustaining critical injuries. The landing technique involving rolling to one side upon contact with the ground in order distribute impact upon the body and lessen the likelihood of spinal injury or leg fracture.

**Personal Flotation Device (PFD)-** A wearable vest-style device which provides buoyancy to the user in water. A swiftwater rescue PFD is typically a US Coast Guard approved Type III/IV.

**Power Assurance Check** – The pilot will bring the helicopter to a stable hover and demonstrate a positive rate of climb prior to actual short-haul insertion. This check will be accomplished at actual altitude and temperature for initial insertion. There should be sufficient altitude to allow the helicopter fly away capability if power required, exceeds power available.

**Precautionary Landing-** Deviation from the flight to land the helicopter due to a perceived threat or emergency that might effect airworthiness of the aircraft. This includes such circumstances as isolated weather conditions, communication equipment failure, chip/warning light activation or other minor mechanical problems.

**Radio Interface Cable-** Connection between a handheld radio and a flight helmet or headset, which is typically utilized for communication in noisy environments.

**Reconnaissance Flight-** The initial check flight conducted with only the pilot and spotter on board prior to an insertion or extraction. This flight permits the flight crew to focus on evaluating all hazards and conditions at a short-haul site without a human load suspended beneath the aircraft.

**Short-Haul-** (*aka* HSRS- Helicopter Sling Rescue System [Parks Canada], Fixed-Line Flyaway, Fixed Rope Technique, Helicopter Rescue Strop [New Zealand National Parks]) Technique of transporting personnel beneath a helicopter while suspended on a fixed rope. This technique permits insertion and extraction of personnel from a site where a helicopter could not typically land and is less hazardous than a toe-in or one-skid landing. A short-haul system is rigged to the aircraft in a manner to permit emergency release of the line.

Short-haul was initially introduced at the First International Helicopter Symposium held at the Eiger Glacier in September 1966. The "knotted rope technique" technique was introduced by REGA President, Fritz Buhler, to the mountain



rescue community. Buhler's prototype of modern short-haul was preceded by some early failures with other methods that included use of a rope ladder and lowering a rescuer on the end of a rope from a helicopter. The first workable design involved an 8 meter rope attached to the helicopter, with knots at 40 centimeter intervals, and a poma

ski-lift style disc seat attached at the end of the line. A rescuer would actually climb down the line from the aircraft and sit on the disc while hanging on to the line.

Meanwhile the U.S. military developed several static helicopter extraction or "exfiltration" techniques for use in combat applications particularly in Vietnam. These included the Hanson Harness, McGuire Rig, JOES (Jungle Operations Extraction System), SPIE (Special Patrol Insertion/Extraction) Rig and the STABO Rig. The STABO Rig was developed by U.S. Army Special Forces circa 1966.

**Short-Haul Hand Signals-** Set of one-handed signals used by both the spotter and short haul rescuer to communicate effectively between aircraft and the end of the short-haul line during critical phases of insertion and extraction.

**Short-Haul Rescuer-** Personnel trained and qualified in short-haul procedures. During a short-haul evolution they are suspended at the end of short-haul line from their harness.

**Short-Haul Site-** The location where personnel will be inserted to or extracted from during a short-haul evolution. The short-haul site does not meet the requirements for a landing zone and may be in a canyon, on a cliff face or on a narrow mountain ridge.

**Spotter-** Helicopter crew member who assists the pilot during a short-haul evolution. The spotter aids with visual reference of the human load, rotor clearances, observing ground activities and hazards, watching for additional aircraft in the airspace and performing communication duties. The spotter may be positioned in the aft cabin of the helicopter dependent upon make and model and more than one spotter may be required depending upon the circumstance.

**Staging Helispot-** The field landing zone used by the short-haul crew to rig and deploy for a short-haul mission. The reconnaissance flight normally commences from this site and is typically where the flight crew and rescuers will conduct a mission briefing. This landing zone meets the site requirements for a helispot based upon the model of helicopter involved (e.g. Light or Type III helicopter = 15' X 15' landing pad with a 75' safety circle).

**Stokes Litter-** A rigid basket-style stretcher. Evolved from original military design (NSN 6530-00-042-8131). Use of a Stokes Litter or similar solid plastic litter is <u>not</u> recommended for short-haul evolutions due to the violent spinning that can occur in flight.





#### Appendix K – Glossary

Warning: The use of a solid plastic stretcher (e.g. Ferno- Washington Model 71 or 71-S) during a short haul evolution could be dangerous due to the violent spinning that can result.

**Tail Rope-** A short belay line utilized when a stretcher is located in an exposed shorthaul site for extraction. This provides security for the stretcher as it is initially lifted off the ground. One end of the line is anchored to the ground and then run through a point on the stretcher and back to a friction belay device. As the stretcher become airborne the running end of the rope exits through the belay device and detaches from the stretcher leaving the rope on the ground.

**Technical Terrain-** Terrain with the degree of vertical exposure that experienced climbers or rescue personnel would feel the need for an anchored safety rope or belay in order to safely work.

**Three-Ring Release-** A mechanism designed for parachute canopy release, while under load. This release can be employed in short haul anchor systems. This device is constructed of three consecutively smaller metal rings, which are levered over one another and each holding sequentially less of the load. The actual release is a pin, which holds the smallest of the rings down. The pin is connected to a release cable that is pulled to activate release. The improved design and reliability of the three-ring release (illustration) has caused it to become more preferred in rigging applications than the Capewell Release buckle.



**Typical Terrain** – The anticipated environment in which operations may be conducted (ie. confined areas with features that may include steep slope, cliff faces, tall trees, etc.).

**Weight Bag-** Weight suspended on short-haul line to prevent it from becoming entangled in the helicopter rotor system during forward flight when there is no personnel or equipment suspended on the line. This weight may be positioned a short distance from the distal end of the short-haul line to prevent it from encumbering short-haul personnel. The weight may be comprised of a water-filled container, padded lead weight, sand, road cinders, etc.

**Yoke Band-** A short-haul anchor system that is constructed of a belt which is secured around the fuselage of the helicopter going through the aft cabin doors. Typically the aircraft doors must be removed or pinned open to allow installation of this equipment. The yoke band must have a dual-action release mechanism to permit emergency release, which is typically performed by the spotter.

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