A black helicopter is shown in flight, hovering over a rugged mountain range. The helicopter is positioned in the upper left quadrant of the frame. A yellow rope extends from the helicopter down to a person rappelling down a steep, rocky cliff face in the lower right quadrant. The background features jagged mountain peaks and patches of snow or ice. The entire scene is framed by a black border.

HELICOPTER SHORT-HAUL HANDBOOK

(351 DM 1)

U. S. Department of the Interior

Revised February 2010

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Questions regarding the content of this handbook may be directed to the Aviation Management Directorate (AMD), 300 E. Mallard Drive, Suite 200, Boise, ID 83706-3991. Additional copies of this document may be obtained from the website <http://amd.nbc.gov>.


FOREWORD

As authorized in 351 DM 1, the *Helicopter Short-Haul Handbook* was first developed in 1994. Objectives, policies, and standards for all Department of the Interior (DOI) short-haul programs are defined in this document.

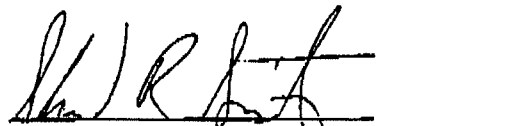
In January 1999, the Interagency Helicopter Short-haul Working Group was established under the direction of the Interagency Helicopter Operations Committee (IHOPs). It is recognized that this document may be adopted for use by State or local agencies; however, its content remains the responsibility of 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.

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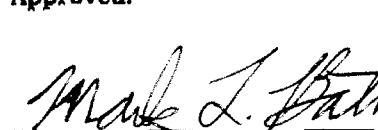

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CHAPTER 1: GENERAL INFORMATION

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 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 of the extraction of persons and cargo.

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 into their search and rescue program, where it continues to be widely used.

In the early 1980s, short-haul was adopted and modified by a variety of agencies for use in rescue and law enforcement programs in 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. New program requests shall be forwarded to and approved by agency Directors or their delegates and then forwarded to the Associate Director, Aviation Management Directorate (AMD) of the DOI National Business Center. 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 agency and departmental policies and guidelines.

1.5 NEW PROGRAMS

Refer to Appendix E for a new program start-up checklist. Local aviation program managers shall select spotter trainees. Initial short-haul training will be conducted by agency and AMD-approved Training Specialists in accordance with this handbook. Qualified check spotters from other approved programs shall be used for training and qualification.

CHAPTER 2: QUALIFICATIONS AND 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.

- Qualified in accordance with 14 CFR 133 for Class A and B external load operations and meet requirements identified in the procurement document.
- 50 hours Pilot-In-Command (PIC) in make and model in the preceding 12 months.
- 25 hours of vertical reference experience requiring precision placement in the preceding 12 months.
- Approved for long-line operations.
- Have successfully completed the AMD-administered Short-Haul Pilot Practical Test outlined in Appendix A.
- Complete annual operational training with the using agency.
- Understand short-haul techniques, short-haul/spotter signals and operational concerns.
- Demonstrate ability to work with the short-haul spotter.

2.2 SPOTTER AND SHORT-HAULER REQUIREMENTS

Spotters and short-haulers shall complete the following minimum requirements. Individuals may require additional training based upon the complexity of the program.

A. Check Spotter

An agency state or regional aviation manager will recommend check spotter candidates. Final approval will be accomplished by AMD. In addition to meeting all spotter requirements, check spotter candidates must:

- 1) Be qualified as a resource helicopter manager.
- 2) Have served as a qualified spotter for 2 years.
- 3) Have demonstrated ability as an instructor and assisted in the training of at least two spotters.

B. Spotter

Spotter candidates must:

- 1) Have completed Interagency Helicopter Crewmember Training (S-271).
- 2) Be familiar with the helicopter procurement documents.
- 3) Under the supervision of a qualified check spotter:

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- 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.

C. Initial Short-Hauler

Short-hauler candidates must:

- 1) Have completed Interagency Helicopter Crewmember Training (S-271).
- 2) Demonstrate knowledge of the 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.
- 6) Demonstrate knowledge of risk assessment and mission components.

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

2.3 ANNUAL REQUALIFICATION 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 or spotter.

A. Annual short-haul training will include:

- 1) Participation in helicopter safety refresher training.
- 2) Review and discussion of the local short-haul operations plan, emergency procedures and risk assessment.

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- 3) Review short-haul related incidents and lessons learned.
- 4) Review of the procurement document.

B. Pilot

In addition to the annual short-haul training, the pilot will successfully complete the AMD-administered Short-Haul Pilot Practical Test outlined in Appendix A.

C. Check Spotter and Spotter

In addition to the annual short-haul training, check spotters and spotters will:

- 1) Demonstrate knowledge of short-haul procedures and spotter responsibilities to another spotter without error.
- 2) Complete four short-hauls without procedural error. If applicable, four cargo loads may be substituted for Human External Cargo (HEC).

D. Short-Hauler

In addition to the annual short-haul training, short-haulers will:

- 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.

E. Documentation

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

- 1) Helicopter load calculation
- 2) Names of personnel involved
- 3) Terrain description
- 4) Type of mission, 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 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 will the proficiency period exceed 90 days. The check spotter may require additional training based on the complexity of the program, or for individuals needing more instruction. An operational short-haul within the proficiency period may count as a proficiency short-haul. Once past the proficiency period, only training short-hauls may be used to requalify.

NOTE: More frequent short-haul proficiency intervals may be identified in the local short-haul operations plan and procurement document.

Minimum Requirements:

	Initial	Annual	Proficiency
Pilot	Pass the pilot practical test. Operational training. Demonstrate ability to short-haul.	Pass the pilot practical test. Operational training. Demonstrate ability to short-haul.	* Short-haul once every 90 days or less.
Check Spotter/ Spotter	Operational training. Spot six loads, two in typical terrain.	Operational training. Spot four loads without procedural error.	Spot once every 90 days or less.
Short-Hauler	Operational training. Complete two short-hauls.	Operational training. Complete two short-hauls without procedural error.	Determined by Spotter or Short-Haul Program Manager.

*The spotter may request the pilot demonstrate the ability for precision placement on a more frequent basis.

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

CHAPTER 3: PERSONAL PROTECTIVE EQUIPMENT (PPE)

3.1 EXCEPTIONS

Reference 351 DM 1, *Aviation Life Support Equipment Handbook (ALSE)*, for authorization for 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 Incident Commander (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 present during special missions. If during the risk assessment process deviation from standard PPE is considered, affected incident personnel will be advised of potential hazards. It may be appropriate during typical terrain training exercises to deviate from PPE requirements to enhance safety and to simulate mission conditions and requirements.

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 redelegation 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 Associate Director, AMD. Exception authorizations must also be included with bureau requests for procurement services when such operations are conducted. See 351 DM 1.

B. Documentation

A copy of the discretionary authorization shall be included in the agency or user's local short-haul operations plan.

3.2 PPE STANDARDS

PPE shall be worn in accordance with the ALSE Handbook during short-haul training and operations. AMD may evaluate new equipment for approval, pursuant to a letter of request submitted through the agency. Alternative PPE may be used **outside** the aircraft to enhance the safety of the short-hauler. The following items are approved for short-hauler use.

A. Helmets

For short-haulers on the rope, an approved aviator's helmet is recommended. A climbing helmet that is Union International Alpine Association- (UIAA) or Common European- (CE) approved is also permitted.

B. Footwear

Short-haulers may 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 system is defined as the points of attachment of the short-haul rope system to the helicopter. This system will include both a primary and a secondary backup anchor. The primary and backup anchor, where applicable, must be designed for spotter and/or pilot release in an emergency. The load must be fully jettisonable, utilizing two separate and independent actions. 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 of the maximum expected static force to the breaking strength of the weakest link in the system. A standard of 450 pounds will be used for the maximum expected static force. The aircraft cargo hook is excluded from this requirement. The Federal Aviation Administration (FAA) or AMD shall approve attachment devices or brackets, their installation and any proposed changes.

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 throughout the entire short-haul system to the extent practical. Reliance on a single component at any point in the system should be avoided.

Maintenance

An FAA-certified Airframe and Powerplant (A&P) mechanic will perform maintenance tasks associated with hard point short-haul anchors. The manufacturer or a holder of an FAA Master Parachute Rigger's certificate will perform maintenance on software anchors.

- Metallic components of the short-haul anchor must be inspected annually, as a minimum.
- Belly bands and 3-ring release systems must 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.
- Modification or repair of the anchor system shall be approved by AMD or certified by the FAA in accordance with applicable Federal Aviation Regulations (FARs).
- The short-haul program manager or spotter will maintain records of inspection, maintenance and use for the anchor system. 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:
 - 1) Identification number issued by the manufacturer.
 - 2) Identity of the user agency.
 - 3) Date of last inspection, how it was accomplished and signature of individual who performed it.
 - 4) Maintenance performed, including the date and location where it occurred, and the signature and certificate type of the person who did the work.

4.2 SHORT-HAUL ROPE

Short-haul rope is used to suspend HEC and cargo beneath the helicopter during short-haul operations. This rope is 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 or high molecular weight polyethylene (e.g., Spectra™ or Dyneema™). Cordage will be single strand or greater and of low-stretch, kernmantle, or braid-on-braid construction.

Any unloaded short-haul rope will have a weight bag of at least 12 pounds 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 requirements:

- Ropes will be marked in a non-destructive manner for identification.
- Short-haul rope history will be documented by the spotter or short-haul program manager following each use. Documentation shall include the date and specific type of use.
- Rope history will begin when the line is purchased and placed into service, noting the date of manufacture. Useful service life should be based on date of manufacture.
- Retirement of a short-haul rope may be dictated by age, documented usage history, or 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.
- Short-haul rope will be retired from service after 5 years from the date of manufacture, regardless of condition.

4.3 HARNESES AND PATIENT EXTRACTION EQUIPMENT

All programs will utilize commercially made harnesses which shall adhere to one or more of the following standards: National Fire Protection Association (NFPA) 1983, NFPA-certified class III, American National Standards Institute (ANSI) Z359.1-1992 or “CE” standards. Additionally, harnesses conforming to the CE standard shall conform to EN 12277, the European Standard for “Mountaineering Equipment—Harnesses—Safety Requirements and Test Methods.”

The manufacturer’s recommendations for proper use will be followed. Short-haul team members will inspect harnesses, daisy chains and extraction equipment frequently (e.g., stitching, buckles, webbing abrasion, etc.) for wear or other damage. 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 that is independent of the D-ring).

For upper body stabilization, short-haulers may use a full body harness, chest harness and seat 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.

Carabiners should be inspected frequently for proper function of gate and locking mechanisms, abrasion, burrs, rough edges, etc. As with other short-haul components and hardware, single points of attachment, such as 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, i.e., cross gate 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 shall be worn where it is accessible and easily removed for emergency use. A lanyard may be used to secure the knife to the user or to a predetermined accessible location.

4.6 SPOTTER ATTACHMENT

Refer to the *Aviation Life Support Equipment (ALSE) Handbook*, Chapter 2.4, “Aircrew Member Secondary Restraint System.”

CHAPTER 5: OPERATIONS

5.1 OPERATIONAL REQUIREMENTS

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 ongoing process during an operation are 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).

- A. A spotter will be in the aircraft during short-haul operations and will be defined in the approved Short-Haul Operations Plan.
- B. A spotter on the bottom of the rope during short-haul operations shall also be defined in the operating plan. It is imperative that the pilot have clear communications with the spotter on the end of the rope.

5.2 HELICOPTER LOAD CALCULATIONS

Interagency Helicopter Load Calculation shall be completed per the instructions for Form AMD-67/FS 5700-17.

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 risk-to-benefit gain 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 must include the pilot, manager and, to the greatest degree possible, all persons involved in the operation.

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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 letdown procedures, if applicable
- Hazards
- Safety considerations
- Emergency procedures
- Situational awareness review

NOTE: Risk assessment is an ongoing process, to be applied throughout the operation.

5.5 PERSONNEL AND HELICOPTER EQUIPMENT CHECKS

A. Personnel 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, chinstrap fastened.
- Eye protection secured.
- Fire resistant clothing properly worn.
- Collar up and flight suit completely zipped. Loose items around neck tucked into clothing.
- Radio operational and on correct frequency.
- Gloves on.
- Sleeves down and secured over gloves.
- 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 if riding in the aircraft.
- Pants or flight suit should be long enough to cover top of boots while in seated position if riding in aircraft.

B. Helicopter Equipment Check

The pilot, spotter and short-haulers will complete the following checklist (may vary by 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 installed correctly, tested and secure.
- Short-haul rope correctly attached to primary and backup anchors.
- Line and brake device available for cargo letdown.
- Cargo secured, but accessible.
- Spotter attachment secure.
- Seat belts secured and operational.
- Maps and mission information secured, but accessible.
- All radios 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 crewmembers.
- Intercom system operational. Due to other air traffic or ground personnel attempting to make radio contact, use of the hot microphone is not recommended.

5.6 PILOT/SPOTTER DUTIES DURING MISSION RECONNAISSANCE FLIGHT

Coordination between the pilot and spotter is essential for the safe and efficient completion of short-haul missions. The spotter will assist the pilot with navigation and flight following as well as be alert to hazards such as other aircraft, wires and blade clearance. The pilot and spotter must evaluate and select short-haul insertion and extraction sites, as well as possible staging areas. Short-haulers may also assist with site selection. Short-haul insertion and 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

Once a site has been selected, a hover check to determine available power shall be done. Other information necessary to complete the GO/ NO GO decision will be gathered. A landing area suitable for rigging the aircraft will be selected.

5.7 SPOTTER DUTIES AT STAGING AREA

After landing, the spotter is responsible for preparing the helicopter for short-haul following the helicopter checklist from 5.5 above. Any additional crew briefing should be done at this time. This may include new hazards spotted, situational changes, additional pilot requests/cautions, possible cargo deployments, etc. The spotter should have a buddy check for their harness and also check the spotter attachment. Additionally, all other traffic should be cleared from the frequency to be used for the short-haul.

5.8 SHORT-HAULER DUTIES DURING INSERTION

During the liftoff and preparation for the insertion, it is important that short-haulers communicate to the pilot and spotter what is occurring on the rope.

1. Short-haulers remain a safe distance from the helicopter.
2. Helicopter lifts and establishes hover.
3. Short-haulers attach to short-haul rope after receiving the command from the pilot and/or spotter.

NOTE: If short-haulers are inserted in pairs, one person should be responsible for communications and the other for tending to the short-haul rope.

4. Short-haulers give spotter "ready" signal.
5. Pilot lifts short-haulers and flies to incident site. Spotter monitors short-haulers during transport. Prior to insertion, the pilot will do a final power assurance check.
6. Upon arrival at the incident site, the short-hauler may assist with vertical reference by calling out distances over the radio, e.g., "two-zero feet above the ground, one-zero feet, on the ground," as the pilot delivers the load in a controlled fashion.

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7. 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.
8. When directed by the pilot and/or spotter, short-haulers unhook from short-haul rope and signal when they are clear.
9. The helicopter departs the short-haul site and returns when requested.

5.9 SHORT-HAULER DUTIES DURING EXTRACTION

1. It is critical to maintain communications between personnel on the ground, the pilot, the spotter and the short-haulers during extraction.
2. At the short-haul extraction site, prior to extraction:
 - Communicate any pertinent new information to the helicopter crew.
 - Communicate any situational changes.
 - Move unnecessary people away.
3. Short-haulers and/or victim are attached to short-haul lines on command.
4. Short-haulers give "ready" signal.
5. Pilot lifts short-haulers, clears obstacles, and flies to landing area. Spotter observes short-haulers during transport.
6. Short-hauler may assist pilot with vertical reference to the ground; e.g., "two-zero feet, one-zero feet, on the ground."
7. 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.
8. The helicopter lands and personnel and/or victim are loaded inside the helicopter for extended flight.

NOTE: Following any training exercise or actual mission, a "hot debrief" should be conducted. Research has shown 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 followup.
- Reinforce lesson learned.

5.10 ADMINISTRATIVE DUTIES

The program manager shall be responsible for the completion of documentation related to short-haul activities.

The spotter shall have sufficient training, qualifications and experience to accomplish the following duties and responsibilities:

- Contractual problems are communicated to appropriate personnel (helicopter manager, project inspector, COAR, etc.).
- SAFECOMs completed when necessary.
- Monitor currency of short-haul personnel and schedule training as needed.
- Ensure that short-haul logbooks for personnel and equipment are current.

5.11 CARGO LETDOWN

Cargo letdown shall comply with requirements and procedures outlined in the *Interagency Helicopter Rappel Guide*.

NOTE: Cargo letdown 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 potential scenarios and actions that may best mitigate any associated hazards. Training for effective crew resource management should be a part of this process.

It is imperative that everyone involved in short-haul understand how instantaneously an in-flight emergency may occur. Survival of short-haul personnel during an in-flight emergency is best accomplished by having suspended personnel remain attached to the rope while the pilot attempts emergency landing. Examples of formalized emergency planning procedures are outlined below.

WARNING: Short-haul operations are inherently dangerous and could be fatal. This must be discussed in detail during training and recurrency. Release of the short-haul line is a possible consideration while human external cargo (HEC) is attached beneath the aircraft. In case of an aircraft emergency, the pilot may attempt to land with HEC attached to the short-haul line. The decision of any short-hauler to cut away from the line is a personal choice depending on the circumstances and best chance for survival.

In-flight emergency situations may include:

- Power failure in flight or hover
- Transmission failure
- Tail rotor emergencies (e.g., component failure, stuck pedal, LTE)
- Full Authority Digital Engine Control (FADEC) failure
- Line or load entanglement
- Turbulence or wind

6.1 HELICOPTER IN FLIGHT, CONTROL AND POWER MAINTAINED

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

- Notify the spotter and short-haul personnel and set them on the ground as soon as possible.
- 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.

NOTE: Once on the ground, personnel should 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. The pilot may:

- Declare the emergency to the spotter and short-haulers.
- Attempt to get short-haulers on the ground. Short-haulers will rapidly unhook or cut lines and seek protection.
- 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 is necessary to release the line. Pilot will notify the spotter and ground personnel that line may be released.

NOTE: Again, it is imperative 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 emergency include:

- Improved pilot/spotter release systems.
- Training in crew resource management, situational awareness and risk management.
- Water ditching training.
- Improved pilot proficiency evaluations.
- Emphasis on typical terrain training.
- Acquisition of the best aircraft for the job.
- Information sharing on lessons learned.
- Evaluation and testing of new technology which could lead to operational improvements and increased safety.
- Use of improved PPE such as new flame resistant fabrics.
- 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.

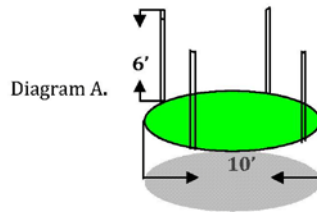
Takeoffs are optional, landings are mandatory!

APPENDIX A: SHORT-HAUL PILOT PRACTICAL TEST COURSE REQUIREMENTS

The short-haul evaluation consists of two courses that can be set up as a temporary or permanent site. The materials that are used may vary, but the dimensions must be constructed as follows:

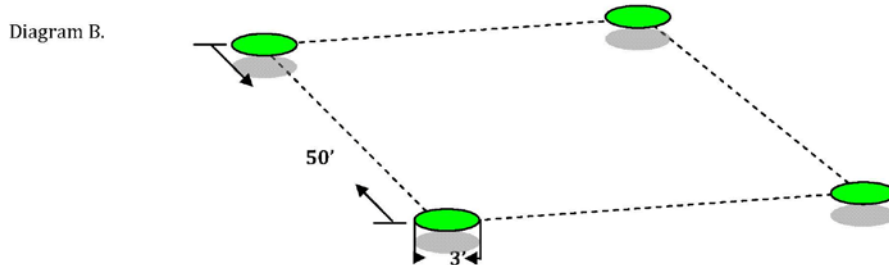
A. Phase One Evaluation Course

Construct a highly visible **circle** 10 feet in diameter with a minimum of four (4) small diameter poles that extend from the surface to an approximate height of 6 feet, spaced equally around the perimeter of the circle. This course should be set up in an area that gives adequate clearance for the helicopter to approach and depart and have safe clearance to complete hover turns. The course must be clearly identifiable to the pilot from the air.



B. Phase Two Evaluation Course

Construct a square course with sides 50 feet in length. At each of the corners, a 3-foot diameter circle should be placed with its center on the corner. The course should be set up in a clear area so that the helicopter can hover turn at each circle. The four (4) circles must be clearly identifiable to the pilot from the air.



SHORT-HAUL PILOT PRACTICAL TEST STANDARD

Prior to the evaluation, the short-haul course and procedures will be discussed with the applicant.

The Short-Haul Pilot Practical Test consists of four phases. All four phases of the evaluation must be successfully completed in succession in order to pass. Pilots will have three chances to successfully complete the four phases of the evaluation. When the four phases of the evaluation have been successfully passed, the pilot can then advance to the short-haul training provided by the using agency.

The practical test is based on optimal weather conditions. Variations from the following evaluation standards resulting from the existing weather conditions at the location where the test takes place will be discussed by the Inspector Pilot, Short-Haul Check Spotter and the Pilot to be evaluated prior to the test.

PHASE I – Precision Long-Line

Objective

To 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 conditions that may be present.

Procedure

With a line length appropriate for the using unit (minimum 100 feet) and a load 6 to 8 feet long and weighing 150 to 200 pounds, the pilot will depart and fly a normal traffic pattern. Upon return, the pilot will place the load over a designated course (10-foot diameter circle) at a load altitude not to exceed 6 feet and maintain complete control and stability of the load within the area for 2 out of 3 minutes. If the load contacts the ground and such contact causes the load to tilt or contact is used to stop the load from swinging, 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.

PHASE II – Load Control and Placement

Objective

To observe and evaluate the pilot's ability to control, maneuver and precisely place loads on predetermined spots. To observe the pilot's reactions to existing weather conditions and their effects on the ability of the pilot to maintain control and maneuver the helicopter and load.

Procedure

With the same length of line and load as used in Phase I, the pilot will demonstrate load control and placement by flying the load through a predetermined ground course. This will be a square course with four (4) circles (3 feet in diameter) at each of the corners. The pilot will maneuver the load at an altitude not to exceed 6 feet above the surface without touching the ground except at the targets. The pilot will maneuver the load in line with each side of the course and place the load on the ground inside each of the circles. All load placements must be done in a manner that demonstrates that the pilot has complete control of the load and the vertical rate of decent at touchdown. When the load is placed on the ground it should not tilt and such contact with the ground should not be used to stop the load's momentum. The pilot can start the course at any corner. **There is no time limit on this portion of the evaluation.**

PHASE III – Typical Terrain

Objective

To observe the interaction between the pilot, spotter and ground personnel. To observe the pilot's control of loads and judgment operating in typical terrain. To emphasize the precision placement of loads on predetermined targets.

Procedure

With a line length appropriate to the using unit (minimum 150 feet) and a similar load as used in Phase I, the pilot will be required to maneuver in typical terrain. Typical terrain may include cliff areas, narrow or confined ridge crests, pinnacles, areas of moving water, 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, a spotter will be aboard the aircraft when the spotter's presence in the aircraft is part of the using unit's operational plan.

The last element will be an exercise for the pilot and spotter to demonstrate crew coordination for simulated entanglement procedures by releasing the primary and secondary anchors. Simulated procedures will be accomplished using a non-weighted line. This exercise should be accomplished using a practice rope and/or anchor system. The rope and anchor used **will not** be reused for actual short-haul operations.

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 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: "Human" is a fully qualified short-haul person.

It should be noted that if the inspector identifies deficiencies in airmanship or operational knowledge (not directly addressed in the mission evaluation) that could adversely affect contract performance, it will be at the inspector's discretion to further explore those areas and/or terminate the evaluation.

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Inspector Instructions for Pilot Carding: Short-Haul

The Department of the Interior is providing clarification of the approval procedures for short-haul pilots. These procedures were created to insure standardization of the evaluation process while providing continuity with departmental policy, the *Short-Haul Handbook*, *Interagency Helicopter Practical Test Standards* and contract specifications.

Phase I

A proficiency evaluation shall be conducted in accordance with the *Helicopter Short-Haul Handbook* for the short-haul proficiency evaluation. Upon successful completion of the proficiency evaluation and verification by a qualified short-haul spotter that the pilot has completed the using unit's annual training session, the Inspector Pilot will card the pilot for short-haul operations. When the pilot has not received the annual training prior to the practical test, the Inspector Pilot may issue a letter to the pilot that authorizes the pilot to participate in the using unit's annual short-haul training session; however, this letter does not constitute approval for operational short-haul missions. The pilot and the using unit will then continue with Phase II and Phase III.

Phase II

The using unit must provide pilots with an annual short-haul training session. This training shall be conducted and documented by a qualified short-haul spotter in accordance with the *Helicopter Short-Haul Handbook*. Upon the applicant's satisfactory demonstration of knowledge and skills and attendance at the annual training, the inspector will endorse the applicant's pilot card:

"SHORT-HAUL"

Endorse the card with the month and year demonstrated.

(Example: DO- 04/06) DO= Demonstrated Operation

List the location of the contract base.

Phase III

Upon satisfactory completion of the annual short-haul training listed in Phase II, the using unit's short-haul spotter or the aviation manager will forward a signed letter to the Inspector Pilot that the short-haul pilot has completed the required training. This letter will be placed in the pilot's file. At this time, the pilot will be approved and operational with a short-haul endorsement on an AMD-30B, Helicopter Pilot Qualification Card, and an AMD-68, Inspection Report, approval document denoting the specific contract.

Note: Annual testing required.

APPENDIX B: EXAMPLE OF TRAINING OUTLINE

Unit I: Program Orientation and Overview

Suggested Time: 3 to 4 hours

Training Aids: Flip chart, *Helicopter 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	NOTES
<p>Make sure students have copies of the Short-Haul Handbook and local Short-Haul 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.</p> <p>I. Program history</p> <ul style="list-style-type: none"> ➤ Local ➤ National <p>II. Review Departmental and Bureau Policy and Guidelines</p> <p>A. Review Short-Haul Handbook</p> <p>1. User Specific</p> <ul style="list-style-type: none"> a. New Programs b. Pilot Requirements c. Training Requirements <ul style="list-style-type: none"> • Check Spotter • Spotter • Short-Hauler • Annual Requalification • Proficiency Requirements d. Operational Requirements <ul style="list-style-type: none"> • Load Calculations • Flight Restrictions • Mission Briefing • Risk Assessment • Equipment Checks • Duties e. In-Flight Emergencies <p>III. Review Local Short-Haul Operations Plan</p> <ul style="list-style-type: none"> A. User Specific B. Restrictions <p>IV. Equipment Orientation</p> <p>A. Personal Equipment</p> <p>1. Personal Protective Equipment (PPE)</p> <ul style="list-style-type: none"> • Clothing • Helmet • Harness • Daisy Chains • Other (PFD, Footwear, Packs, etc.) • Use of PPE Waiver 	<p><i>Instructor will review with students the policy requirements and short-haul guidelines.</i></p> <p><i>Students should understand why and how the program developed locally and nationally. (Helicopter Short-Haul Handbook, 1.2)</i></p> <p><i>Short-Haul Handbook, 1.5</i> <i>Short-Haul Handbook, 2.1</i> <i>Short-Haul Handbook, 2.2</i></p> <p><i>DOI ALSE Handbook, IHOG</i></p>

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OUTLINE	NOTES
<p>B. Anchor</p> <ol style="list-style-type: none"> 1. FAA Approved <ul style="list-style-type: none"> • Supplemental Type Certificate (STC) • Major Repair and Alteration (FAA Form 337) 2. Construction Specifications 3. Installation Procedures 4. Inspection Requirements <p>C. Short-Haul Attachment Line(s), Pre-Rigged</p> <ol style="list-style-type: none"> 1. Hardware (carabiners, steel rings, specs and care) <ul style="list-style-type: none"> • Material construction and requirements • Inspection (preflight and postflight) • Care during use • Cleaning • Storage • Retirement 2. Software (rope specs and care) <ul style="list-style-type: none"> • Construction and requirements • Inspection (preflight and postflight) • Care during use • Cleaning • Storage • Retirement • Knots • Weight bag <p>V. Communications</p> <ol style="list-style-type: none"> A. Radio B. Hand Signal C. Siren/PA D. Other <p>VI. Safety and Emergency Concerns</p> <ol style="list-style-type: none"> A. Hazards and Problems B. Entanglement <ul style="list-style-type: none"> • Prevention • Release procedures C. Crash Procedures <ul style="list-style-type: none"> • Pilot duties • Spotter duties • Short-haul personnel D. Survival Equipment and Use <ul style="list-style-type: none"> • Signal mirror • Signal smoke • Other <p>VII. Documentation</p> <ol style="list-style-type: none"> A. Training and Qualifications B. Operational Short-Haul C. Training Short-Hauls D. Case Incident Reports E. SAFECOM/Mishaps 	<p><i>Discuss welded rings, types of carabiners, inspection requirements, and maintenance.</i></p> <p><i>Instructor and/or check spotter will demonstrate how to tie knots and see that students are proficient.</i></p> <p><i>Standard hand signals will be demonstrated and practiced.</i></p> <p><i>Review local short-haul operations plan and local policy.</i></p> <p><i>Pilot brief students on helicopter and emergency procedures.</i></p>

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Unit II: Field Training

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

OUTLINE	NOTES
<p>Step-by-Step Orientation (with Helicopter)</p> <p>A. Ground Mockup</p> <ol style="list-style-type: none"> 1. Pilot Briefing 2. Spotter Duties <ul style="list-style-type: none"> • Rigs equipment and rope • Doors removed and secured • Loose equipment removed/secured • Radio frequency established • Radio check with pilot and personnel • Understanding of mission/role 3. Short-Haul Personnel Inspection (buddy check) <ul style="list-style-type: none"> • Helmet (fit, loose straps) • Eye protection • Ear protection • Fire resistant clothing • Knife • Radio • Harness • Gloves • Boots • Pack • Other equipment • Communications <p>II. Static Suspension (Short-Haul Personnel)</p> <ol style="list-style-type: none"> A. Adjust harness. B. Practice use of attachment points. <p>III. Lift Training</p> <ol style="list-style-type: none"> A. Short-haul personnel (in pairs if applicable). B. Students are raised 10 feet off ground and set down. <p>IV. Circuit Training</p> <ol style="list-style-type: none"> A. Use raised platform. B. Complete ¼-mile circuit. C. Short-hauler duties (preparation for short-haul insertion). <ol style="list-style-type: none"> 1. Aircraft lifts to hover until rope(s) is off the ground. Pilot, spotter, and short-haulers confirm radio comm. 2. Short-haulers attach to rope(s) on command. 3. Short-haulers give "ready" signal. 4. Pilot lifts short-haulers and flies to short-haul site (raised platform). 5. Upon arrival, short-hauler will radio pilot the vertical distance from load to the ground (e.g., "two-zero feet," "one-zero feet," "down and comfortable.") 6. Short-haulers unhook from rope(s) on command and communicate they are clear. 	<p><i>Spotter and pilot will check cabin and configuration for short-haul.</i></p> <p><i>The pilot and spotter will install and test anchor (primary and secondary).</i></p> <p><i>Short-haulers should observe and double-check this procedure.</i></p> <p><i>Short-haul rope, knots, carabiners, and other equipment attached correctly, checked and operational.</i></p> <p><i>Each short-hauler will check partner, working from head to toe.</i></p> <p><i>Check knife for lanyard and easy accessibility.</i></p> <p><i>Radio/comm check.</i></p> <p><i>Demonstrate harness adjustment and use of attachment points.</i></p> <p><i>Conducted at heli-base or equivalent.</i></p> <p><i>Rotate personnel through training sequence.</i></p> <p><i>To reduce risk and eliminate line twist, don't attach until ropes are completely off the ground.</i></p> <p><i>Weight bag may be kept on the ground to give pilot a reference point and eliminate striking rescuers.</i></p> <p><i>If more than one short-hauler, one is responsible for communications, the other for tending the rope/bag.</i></p> <p><i>Pilot should provide time for short-haulers to stabilize and secure themselves before giving the command to disconnect from rope(s).</i></p>

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OUTLINE	NOTES
<p>V. Typical Terrain Training</p> <p>A. Varied Locations.</p> <p>B. Include Typical Hazards (snow, pinnacle, ledge, moving water, etc.)</p> <p>C. Pilot Duties (recon check flight)</p> <ol style="list-style-type: none"> 1. Flight following (spotter can assist with navigation, watching for other aircraft, hazards, etc). 2. Pilot, spotter, and short-haulers will select a short-haul site. 3. Evaluate short-haul site for: <ul style="list-style-type: none"> -proximity to incident -size -slope -rotor clearance -wind conditions 4. Complete hover check and Go/No-Go decision. 5. Select landing area to rig for short-haul. <p>D. Short-Hauler Duties (Extraction)</p> <ol style="list-style-type: none"> 1. Short-Hauler and/or victim are attached to short-haul line(s) on command. Wait until rope is off ground. 2. Short-Haulers give "ready" signal. 3. Pilot lifts and flies to landing area. 4. Upon arrival, short-hauler will radio pilot the vertical distance between load and ground (e.g., "two-zero feet," "one-zero feet"). 5. Short-Hauler and/or litter is unhooked from rope(s) on command and communicate to pilot "clear." 	<p><i>Evaluate training locations ahead of time.</i></p> <p><i>Depending upon use, training may be broken into two scenarios: 1) short-hauler delivery and/or extraction; 2) litter delivery and/or patient extraction.</i></p> <p><i>Depending upon the circumstances, rope may not leave the ground. This should be discussed with the pilot and all personnel.</i></p> <p><i>Circumstances may dictate personnel on the ground to communicate to the pilot when short-haulers are "ready" and also provide vertical distance between short-haulers and the ground.</i></p>
<p>VI. Cargo Letdown</p> <p>A. Equipment</p> <p>B. Letdown Line</p> <ol style="list-style-type: none"> 1. Brake device 2. Carabiners 3. Knife 4. Line bag 5. Equipment or cargo bag 6. Aircraft anchor or hard point <p>C. Operating Procedures</p> <ol style="list-style-type: none"> 1. Preflight briefing 2. Preflight inspection (equipment) <ul style="list-style-type: none"> - Spotter - Helicopter - Deployment 3. In-flight duties 4. Deployment <p>D. Emergency Procedures</p> <ol style="list-style-type: none"> 1. Helicopter <ul style="list-style-type: none"> - Control - Precautionary - Power loss - Catastrophic failure 	<p><i>For cargo letdown, refer to the Interagency Helicopter Rappel Guide.</i></p> <p><i>Display and demo various equipment used.</i></p> <p><i>Should be based upon local protocols.</i></p> <p><i>Establish proficiency requirements for students.</i></p> <p><i>Rescue personnel PPE (water).</i></p> <p><i>PFD, wetsuit, booties or sandals, waterproof communications/radio.</i></p> <p><i>Provide students equipment needs for various terrain and demo.</i></p>

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OUTLINE	NOTES
<ul style="list-style-type: none"> 2. Deployment <ul style="list-style-type: none"> – In helicopter – During descent – On the ground 3. Corrective Actions <ul style="list-style-type: none"> – Abort – Lock off – Fly away – Cut line <p>VII. Search and Rescue</p> <ul style="list-style-type: none"> A. Equipment <ul style="list-style-type: none"> 1. Litter/Bauman bag <ul style="list-style-type: none"> – Patient protection (packaging) – Rigging – Use of tail rope – Use of drogue chute 2. Rescue net or collar <ul style="list-style-type: none"> – Rigging – Safety precautions 3. Screamer suit <ul style="list-style-type: none"> – Rigging – Safety precautions B. Terrain <ul style="list-style-type: none"> 1. Tall timber 2. Cliffs 3. Pinnacles 4. Swiftwater 5. Snow 6. High altitude <p>VIII. Law Enforcement</p> <ul style="list-style-type: none"> A. Equipment B. Terrain C. Other procedures <p>IX. Typical Mission</p> <ul style="list-style-type: none"> A. Create a realistic situation B. Pilot and spotter briefing C. Spotter duties D. Short-hauler duties <ul style="list-style-type: none"> 1. Buddy check 2. Preparation for short-haul 3. Extraction E. Pilot duties (recon check flight) <p>X. Critique and Wrap-Up</p> <ul style="list-style-type: none"> A. Debrief. B. Review emergency procedures. C. Seek input for program improvement. 	<p><i>Establish proficiency requirements for students.</i></p> <p><i>Planning for mission should be accomplished with input from instructors, program manager, pilot and check spotter.</i></p> <p><i>Utilize risk assessment and risk management tools/procedures.</i></p> <p><i>Everyone encouraged to participate.</i></p> <p><i>Request written evaluations from students.</i></p> <p><i>Document feedback, both positive and negative.</i></p>



_____ **Aviation Training Record**
(Name of Park)

Date:

Time:

Total Training Time:

CME Time:

Purpose:

Location:

Weather:

Equipment Used:

Helicopter:

Short-Haul Line Length:

Other:

Description:

NHD:

HD:

Total Deployments:

Personnel involved: (in bold)

Pilot(s):

APPENDIX C: HAND SIGNALS

SPOTTER HAND SIGNALS



Short-Hauler's Hook Up



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



OKAY



CONNECT



DISCONNECT

APPENDIX D: EXAMPLES OF SHORT-HAUL RISK ANALYSES

RECONNAISSANCE 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/Dropoff 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/lb) _____
 ROTOR CLEARANCES _____

Incident Conditions

LOAD CALCULATION DONE (circle one) GO NO-GO
 DISTANCE TO SAFE LANDING AREA _____
 INCIDENT COMMANDER APPROVAL YES NO

Procedure Used (circle one)

Conventional Rescue/Short-Haul

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INCIDENT NAME _____ CASE INCIDENT # _____
LOCATION _____
INCIDENT COMMANDER _____ DATE _____

LOAD CALCULATION

ELEVATION OF STAGING SITE _____ FEET
ELEVATION OF ACCIDENT SITE _____ FEET
PILOT NAME _____
PATIENT WEIGHT (if known) _____ LB
FUEL ON BOARD _____ GALLONS
TEMPERATURE (if known or estimate: -2° C/1000 feet) _____ °C _____ °F
LOAD CALCULATION COMPLETED YES NO

PATIENT MEDICAL CONSIDERATIONS

TIME OF ACCIDENT _____ TIME REPORTED _____
SUMMARY OF SUSPECTED PATIENT INJURIES _____
MECHANISM OF INJURY _____
MEDICAL CONTROL CONCURS WITH SHORT-HAUL YES NO NOT APPLICABLE

RESCUE CONSIDERATIONS

SHORT-HAUL SITE DESCRIPTION (Technical Terrain; Non-Technical Terrain; Swiftwater; etc.) _____

ALTERNATIVES:

NUMBER OF PEOPLE REQUIRED FOR GROUND-BASED RESCUE _____
ESTIMATED TIME FOR GROUND-BASED RESCUE _____ HOURS
RISKS ASSOCIATED WITH GROUND-BASED RESCUE HAVE BEEN DISCUSSED YES NO
MOVE PATIENT TO ALTERNATE LOCATION (Helispot) YES NO

ENVIRONMENTAL CONSIDERATIONS

SUNRISE _____ AM SUNSET _____ PM

As reported from the short-haul site, if possible:

WIND SPEED (Not to exceed 35mph) _____ mph
GUST SPREAD (Not to exceed 17mph) _____ mph
VISIBILITY (1/2 mile minimum) _____ mile(s)

ALTERNATIVES:

DELAY OPERATION FOR IMPROVED CONDITIONS YES NO
PREDICTED WEATHER _____

AIRCRAFT CONSIDERATIONS (Reconnaissance check flight information relayed to IC)

OUTSIDE AIR TEMPERATURE (OAT) _____ °F _____ °C
PRESSURE ALTITUDE _____ FEET TORQUE _____ %
ADEQUATE ROTOR CLEARANCE (1.5 X Rotor disc diameter) YES NO
DECISION TO SHORT-HAUL MADE BY FLIGHT CREW YES NO
INCIDENT COMMANDER CONCURS YES NO

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Short-Haul Risk Analysis

	Go	Caution	No Go
Wind Speed/Direction _____ Knots _____			
0 to 24 Knots	0		
24 to 30 Knots		0	
30 + Knots			0
Wind Gust Spread _____ Knots			
0 to 12 Knots	0		
12 to 15 Knots		0	
15 + Knots			0
Rotor Pitch _____ AEROSPATIALE LAMA ONLY			
0 to .85	0		
.85 to .90	0		
.90 +			0
Rotor Clearance _____ Feet			
36 + feet	0		
18 to 36 feet		0	
0 to 18 feet		0	
Visibility _____ Miles			
½ mile plus	0		
0 to ½ miles			0
Turbulence			
None	0		
Light to moderate		0	
Severe			0
Helicopter Rescue Time Limits (SUNSET)			
3 to 14 hours	0		
1 to 3 hours		0	
0 to 1 hour		0	
Helicopter-Trained Personnel			
Well trained	0		
Some helicopter training		0	
Never around helicopters			0
Pilot Briefed and Trained in Mission Type			
Knows area, mission and trained well	0		
Knows mission, some training, was told about hazards	0		
Told mission and limited training		0+	
Ground Base Rescue			
12 + hours	0		
3 to 12 hours		0	
1 to 3 hours		0+	
Patient			
Critical	0		
Delayed		0	
Deceased	0+		
Mission Planning			
Management approved	0		
Load calculation done	0		
Within allowable payload	0		
Have enough fuel for the mission	0		
Fuel truck is prepositioned	0		
Communications are acceptable	0		

There are many subjective elements in this analysis. It is meant to be a guide through a thought process. Sound judgment 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 verify available information.
- Develop an accurate “*mental image*” of the mission.

2. HAZARD ASSESSMENT

METHOD (Techniques and 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 and 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 over water**
- Current and predicted weather identified
- Sufficient daylight to complete the mission
- Operating within performance capabilities of man and machine

MANAGEMENT (Controls, Procedures, Oversight and Supervision)

- ICS established and communicated
- Compliance with policies and SOPs
- Safety openly promoted
- 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?

5. EVALUATE

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



National Park

(Name of Park)

GAR RISK ASSESSMENT – HELICOPTER SHORT-HAUL

Employing the **GAR** Model (**GREEN AMBER RED**)

A **GAR** Risk Assessment, which creates a **GO-NO GO** decision tool, will be conducted by involved personnel prior to a helicopter short-haul mission.

Compute the total level of risk for each hazard identified below. Assign a risk score of **0** (No Risk) through **10** (Maximum Risk) for each element. This is your personal estimate of risk. Add the individual risk scores to come up with a Total Risk Score.

SUPERVISION

Presence of qualified, accessible, and effective supervision. Clear chain of command in place.

PLANNING

Adequate incident information is available and clear. There is sufficient time to plan, operational guidelines are current, briefing of personnel is being conducted and team input solicited?

CONTINGENCY RESOURCES

Backup resources that can assist if needed. Evaluate shared communications plan and frequencies. Has alternate plan to short-haul been evaluated?

COMMUNICATION

Evaluate how well personnel are briefed and communicating. How effective is communication system and is there is an established communication plan? Operating environment values input.

TEAM SELECTION

Team selection should consider the qualifications and experience level of the individuals. Consider the experience for the mission being performed.

TEAM FITNESS

Consider physical and mental state of the crew. Evaluate team morale and any distractions.

ENVIRONMENT

Consider factors affecting performance of personnel and equipment such as time, temperature, precipitation, topography and altitude. Evaluate site factors such as narrow canyons, forest canopy, technical terrain, snow, swiftwater, etc.

INCIDENT COMPLEXITY

Evaluate severity, exposure time and probability of mishap. Assess difficulty of the mission and proficiency of personnel.

GAR RISK ASSESSMENT WORKSHEET

		NAME:	NAME:	NAME:
SUPERVISION	0-10			
PLANNING	0-10			
CONTINGENCY RESOURCES	0-10			
COMMUNICATION	0-10			
TEAM SELECTION	0-10			
TEAM FITNESS	0-10			
ENVIRONMENT	0-10			
INCIDENT COMPLEXITY	0-10			
TOTAL RISK SCORE	1-80			

GREEN	AMBER	RED
1-35	36-60	61-80
LOW RISK- Proceed With Mission	MODERATE RISK- Proceed With Caution	HIGH RISK- Implement Measures Prior To Proceeding

NOTE: The ability to assign numerical values or *color codes* to hazards is not the most important piece of risk assessment. Team discussion is what is critical to understanding the risks and how they will be managed. Any category rated greater than five should receive specific mitigation.

APPENDIX E: 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 Associate Director, AMD.
- ❑ Requests shall include a copy of agency approval and the proposed local **short-haul operations plan** (refer to the Exhibit 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 the Exhibit and get input from the Short-Haul Working Group and AMD 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:

- ❑ Helicopter costs – Pilot and short-haul personnel proficiency training will require additional helicopter cost, requiring between 8 to 10 hours of flight time per year (\$5,000 to \$10,000).
- ❑ Short-Haul equipment purchase - The initial equipment purchase may cost between \$5,000 and \$10,000. Annual equipment upkeep will be at least \$1,000 per year.
- ❑ Additional annual costs for training and workshops, approximately \$2,000 to 5,000.

1.3 Training/Workshops (Requirements May Vary by Region)

- ❑ Pilot proficiency - Pilot will have to pass a four-phase short-haul proficiency evaluation. This will require practice time. The cost of the accrued helicopter flight time will have to be negotiated between unit and contractor by the National Business Center's Aviation Management contracting officer. A short-haul proficiency course has been developed and should be practiced in preparation for the official test by an AMD check pilot. (See Appendix A.)
- ❑ Short-Haul personnel will 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 be qualified as a resource helicopter manager.
 - Short-haul program managers and/or spotters should attend the annual short-haul workshop.
 - Check spotters required to attend **triennial** helicopter manager workshop (RT-372).

1.4 Timeframe. Anticipate at least 8 to 12 months as a minimum before initial short-haul 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 procurement document? A new or existing procurement document will require the procurement document to include additional pilot proficiency and aircraft equipment modifications.

1.5 Program Preparation

- Approval Process
 - Local
 - Regional
 - National
 - Send to AMD Associate Director
- Program Funding
 - Helicopter procurement document – It is important to contact the appropriate AMD region 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.
- Final Details
 - Aircraft inspection – 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.
 - Pilot proficiency – Evaluation will be conducted by an AMD 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 additional proficiency training.
 - Short-Haul training – Training should not be scheduled until the aircraft inspection and the pilot proficiency test have been successfully completed.

NOTE: It is imperative that the local short-haul program manager and the identified AMD regional office maintain close contact throughout the entire start-up process. Sufficient preplanning must occur at each stage to eliminate additional costs and prepare for the next stage. After the approval process, program funding and final details, as defined above, are completed, the program is now considered an operational short-haul program.

APPENDIX F: ANNUAL SHORT-HAUL REPORT

This report will be submitted annually to the Interagency Helicopter Short-Haul Working Group Chairperson.

Year:

Unit Name:

Unit Address:

Point of Contact:

TOTAL NUMBER OF **TRAINING** SHORT-HAUL EVOLUTIONS¹:

TOTAL NUMBER OF SHORT-HAUL **TRAINING** FLIGHT HOURS:

TOTAL NUMBER OF **SAR** SHORT-HAUL OPERATIONS:

TOTAL NUMBER OF **SAR** SHORT-HAUL EVOLUTIONS:

TOTAL NUMBER OF PEOPLE **RESCUED** BY SHORT-HAUL:

TOTAL NUMBER OF **LIVES SAVED**² USING SHORT-HAUL:

TOTAL NUMBER OF **LE** SHORT-HAUL OPERATIONS:

TOTAL NUMBER OF **LE** SHORT-HAUL EVOLUTIONS:

TOTAL NUMBER OF QUALIFIED SHORT-HAULERS:

TOTAL NUMBER OF QUALIFIED SHORT-HAULER SPOTTERS:

TOTAL NUMBER OF QUALIFIED SHORT-HAUL CHECK SPOTTERS:

SIGNIFICANT LESSONS LEARNED:

¹EVOLUTION: MOVING ONE OR TWO PEOPLE FROM POINT A TO POINT B; CAN BE EITHER AN INSERTION OR AN EXTRACTION.

²LIVES SAVED: WITHOUT NPS SHORT-HAUL INTERVENTION, A LIFE OR LIMB WOULD HAVE BEEN LOST.

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 screw-locking carabiners to unlock. Commercial manufacturers include 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 (*illustration*) 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 manufacturers 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 (2,268 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 multipoint chin restraint system to prevent the helmet from being knocked off the user’s head. Commercially produced helmets typically meet the standards of a certifying body such as 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.

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.

DOI National Business Center Aviation Management Directorate (AMD): Department of the Interior organization which is responsible for Department-wide functions related to aircraft services and facilities.

Evacuation Harness: A simple, quick-donning universal harness, which is used for rescue of a stranded subject. These harnesses include triangular-style designs as well as military hoisting vests (screamer suit). Several commercial manufacturers include Petzl, Mammut, Kong and 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. Harness 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. For example, a Type III/light helicopter needs a 15-foot by 15-foot touchdown pad with a 75-foot 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-hauler for emergency cutaway 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 safe 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.

Knot: Aeronautical measurement of airspeed corresponding to 1.15 statute 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 used 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 involves rolling to one side upon contact with the ground in order to distribute impact to 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 U.S. 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.

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Precautionary Landing: Deviation from the planned flight to land due to a perceived threat or emergency that might affect 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 (*aka* a patch cord): Connection between a handheld radio and a flight helmet or headset, which is typically utilized for communication in noisy environments.

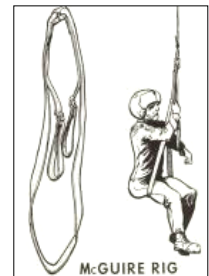
Reconnaissance Flight: The initial flight conducted with the pilot and spotter prior to an insertion or extraction. This flight permits the flight crew to focus on evaluating all hazards and conditions at a short-haul site without a human load suspended beneath the aircraft.

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.

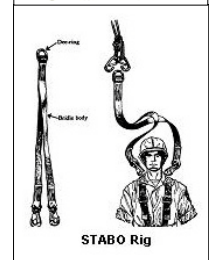
A short-haul system is rigged to the aircraft in a manner to permit emergency release of the line. Short-haul was initially introduced at the First International Helicopter Symposium held at the Eiger Glacier in September 1966. The "knotted-rope technique" was introduced by REGA President Fritz Buhler 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 onto 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 the short-haul line from their harnesses.

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, such as a narrow canyon, cliff face or narrow mountain ridge.

Spotter: Helicopter crewmember 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 circumstances.

Staging Helispot: A landing zone used by the short-haul crew to rig 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. For example, a light/Type III helicopter needs a 15-foot by 15-foot landing pad with a 75-foot safety circle.

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

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 short-haul 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 becomes 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 a 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 with each bearing sequentially less of the load. The release is a pin which holds the smallest of the rings down. The pin is connected to a release cable that is pulled to release. The improved design and reliability of the three-ring release (*illustration*) has resulted in it being preferred over the Capewell Release for most short-haul programs.



Typical Terrain: The anticipated environment in which operations may be conducted such as confined areas with features that may include steep slopes, 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 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.

EXHIBIT: EXAMPLE OF UNIT SHORT-HAUL OPERATIONS PLAN

This exhibit is not policy. It is for informational purposes only.

**UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE
HELICOPTER SHORT-HAUL OPERATIONS PLAN**

_____ **National Park**
(Name of Park)

Division of Ranger Activities

Prepared: _____
Sub-District Ranger

Reviewed: _____
Fire and Aviation Officer

Recommended: _____
Chief Park Ranger

Approved: _____
Superintendent

Date: _____

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Exhibit (Not Policy)**

AUTHORITY

The National Park Service (NPS) is authorized to perform search and rescue (SAR) (16 USC 1a-6 and 16 USC 12). NPS policy states that "the saving of human life will take priority over all other Park operations" (**NPS Management Policies, 2001, 8.2.5.1**).

The authority for short-haul operations is found in the United States Department of the Interior's aviation policy, Departmental Manual 351 DM 1, "Special Use Activities."

Objectives, Policies and Standards for short-haul programs are included in the *Department of the Interior's Helicopter Short-Haul Handbook*.

All short-haul operations conducted in _____ National Park will follow the guidelines as outlined in the following documents:

- A. DO/RM-60 (Aviation Management Guidelines).
- B. _____ Aviation Management Policy and Reference Manual.
- C. Interagency Aviation Management Plan (enter year)
- D. _____ National Park SAR Plan.
- E. Annual operating plan for the _____ National Park interagency helicopter contract.
- F. Pertinent sections of the Department Manual (aviation policy), Parts 350 to 354, and Operational Procedures Memoranda.
- G. _____ National Park Helicopter Short-Haul Operations Plan.

DEFINITION

Short-Haul: To transport one or more persons suspended beneath a helicopter (**HEC** – human external cargo) (*Helicopter Short-Haul Handbook*, 351 DM 1).

Helicopter Short-Haul: The transportation of personnel suspended under a helicopter on a fixed line to or from the closest available landing site from which a helicopter can safely operate.

INTRODUCTION

Versions of helicopter short-haul have been used in Europe for many years as an effective method of rescue in several different mountainous regions. The helicopter short-haul technique was originally researched and developed by Swiss Air Rescue (REGA) in 1966. In 1970, Parks Canada incorporated the technique into their search and rescue program and has been using it successfully ever since. The development of the short-haul technique in the United States has been closely associated with the historical development of helicopter rappelling.

A helicopter rappel program was initiated in Grand Teton National Park during the fall of 1985. Nine rangers completed a 40-hour training session taught by personnel from Yosemite National Park and the Office of Aircraft Services (now referred to as AMD) from Boise, Idaho. The helicopter used was an Aerospatiale SA 315B Lama. The training followed the standards and curriculum approved by AMD and included classroom, low-tower, high-tower and airborne work. All nine rangers attending the course were certified as heli-rappellers. In addition, the three permanent rangers in the Jenny Lake Subdistrict were certified as spotters.

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Exhibit (Not Policy)**

In the spring of 1986, AMD personnel again came to Grand Teton National Park. They worked with the Jenny Lake Subdistrict staff to establish rappel and short-haul procedures for the Bell 206 L-III. At the conclusion of this session, AMD gave approval to use both procedures on actual missions. Eight additional backcountry/climbing rangers from Jenny Lake completed the requisite training to become certified heli-rappellers by July 1986. The program was considered to be fully operational at that time. In 1989, short-haul/insertion was introduced as an alternative to heli-rappel as a method of rescuer deployment. In 1993, based on the collective input from the Jenny Lake Subdistrict staff, a decision was made to discontinue the helicopter rappel portion of the program. This decision was based primarily on the feeling that the single most important concern is the **overall safety to rescue personnel**. The extended hover time that is required during the execution of a helicopter rappel sequence places additional stress and strain on the pilot and the aircraft, which are both operating at a high level. During a helicopter rappel sequence, the aircraft and flight crew are necessarily very proximal to complex, mountainous terrain which can substantially reduce autorotation options. For these reasons, the risks associated with the transport of personnel external to the helicopter versus the risks associated with the extended hover time required for rappel deployment were considered to be less and short-haul/insertion was adopted as the preferred and only technique.

PROGRAM JUSTIFICATION

The use of the helicopter short-haul technique has a number of advantages over more conventional means of search and rescue. Rescue personnel can be inserted directly into an accident victim's position in a remote area, thereby greatly enhancing the speed of the response. The short-haul procedure greatly decreases the evacuation time of an injured person from the backcountry to an advanced medical care facility. Furthermore, the technique precludes the need for lengthy evacuations over difficult or technical terrain. These evacuations often expose rescue personnel to significant hazards for extended time periods. The subsequent savings in time and wear and tear on rescue personnel will therefore reduce the overall hazard to the SAR team and to the patient(s).

Helicopter short-haul has enhanced the overall safety of SAR operations in _____ National Park by virtually eliminating the need for a pilot to perform hazardous toe-in and one-skid mountain landings. Since the inception of this program in 1985 multiple lives have been saved through the use of this technique and mountain rescue in _____ National Park has, to a certain degree, been revolutionized.

<p>NOTE: Short-haul operations are potentially dangerous and could be FATAL. This possibility must be discussed in detail during training, recurrency, and mission briefings with pilots and all participants in the helicopter short-haul program.</p>

INITIAL QUALIFICATIONS AND REQUIREMENTS

The positions of pilot, check spotter, spotter, spotter trainee and short-hauler will comply with the initial qualification, annual requalification and proficiency requirements as outlined in the *Helicopter Short-Haul Handbook* (351 DM 1). These positions and their associated requirements are listed below.

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:

- 50 hours Pilot-In-Command (PIC) in make, model, and series in the last 12 months.
- 25 hours total time in vertical reference experience within the last 12 months, requiring precision placement.
- Successfully complete the Pilot Proficiency Test administered by AMD and the _____ National Park short-haul program manager/check spotter prior to the start of the contract period.
- Approved for long-line operations.
- Attend an agency approved short-haul training session.
- Understand short-haul techniques, short-haul spotter signals and operational concerns.
- Demonstrate ability to pilot the helicopter during a series of short-hauls in terrain that is typically encountered during search and rescue operations that occur in _____ National Park.
- Demonstrate ability to work with the short-haul spotter.
- Understand emergency procedures including the operation of the 3-ring release backup anchor system.

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 AMD. The person in this position must have demonstrated ability as an instructor. Experience shall include:

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

Initial Spotter or Spotter Trainee

- Successful completion of Interagency Helicopter Crewmember Training (S-271) presented by approved agency personnel.
- Familiar with helicopter procurement document.
- Under the supervision of a qualified check spotter, the initial spotter or trainee shall:
 - (a) Demonstrate knowledge of inspection, care, and maintenance of short-haul equipment.
 - (b) Demonstrate ability to rig 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 pilot.
- Demonstrate knowledge of risk assessment and mission structure.

NOTE: The spotter must perform all spotter duties. The check spotter may determine the number of short-hauls necessary to qualify a new spotter above the minimum requirements.

Initial Short-Hauler Training

- Successful completion of Interagency Helicopter Crewmember Training (S-271) presented by agency approved personnel.
- Demonstrate knowledge of inspection, care and maintenance of short-haul equipment and rigging.
- Demonstrate knowledge of short-haul procedures.
- Demonstrate knowledge of emergency procedures.
- Complete a minimum of **two** short-hauls without procedural error. Training should be in typical terrain and should include receiving cargo.
- Demonstrate knowledge of risk assessment and mission structure.

NOTE: Local manager and/or check spotter may require additional training to develop or improve efficiency. The check spotter should incorporate short-haul scenarios/deployments in typical terrain and/or confined areas.

ANNUAL REQUALIFICATION 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 requalification, it will be the decision of the check spotter and/or short-haul program manager whether to requalify. 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.

Annual short-haul training shall include the following:

- Participation in helicopter safety refresher training.
- Review and discuss local short-haul operations plan, emergency procedures, and risk assessment.
- Review of known short-haul related mishaps and incident critiques.
- Familiarize and review the helicopter procurement document.

Pilot

- The pilot shall successfully complete the Pilot Proficiency Test administered by AMD and check spotter.

Spotter

- Participate and assist in annual short-haul recurrency training.
- Demonstrate knowledge of short-haul procedures and spotter responsibilities to the check spotter without error.
- Complete **four** short-hauls without procedural error. If applicable, **four** cargo loads may be substituted for HEC.

Short-Hauler

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

PROFICIENCY REQUIREMENTS

Pilot

- The pilot shall perform at least one proficiency short-haul within **28 days** of the last short-haul to the satisfaction of the check spotter. An operational short-haul within the requalification period will count as a proficiency short-haul. However, a pilot overdue for a proficiency short-haul shall not use an operational short-haul to requalify. Once past the requalification period, only a training short-haul may be used. The check spotter may request the pilot to demonstrate the ability for precision placement in typical terrain on a more frequent basis.

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 project work, it may be useful to define spot-specific targets, utilizing a longline of the same length as the rope(s) normally used for short-haul. This practice encourages the maintenance of precision longline skills.

Spotter

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

Short-Hauler

- Proficiency requirements for the individual short-haulers will be determined by the check spotter and/program manager.

TRAINING

Philosophy and Objectives

The _____ National Park helicopter short-haul managers will strive to provide realistic training scenarios for pilots and rescue personnel, utilizing the type of terrain typically encountered during actual missions. Every attempt will be made to keep the risks associated with the short-haul training to a minimum. Pilots possess varying degrees of expertise and experience. The training program will, therefore, follow a logical progression beginning with group discussion and mockups to precision placement exercises using empty litters and dummy loads. When the required comfort level between a particular pilot and rescue personnel is achieved, actual short-haul/insertion training will then take place using live loads. Transportation of personnel via short-haul is recognized as a valid training tool during training sessions and appropriate risk assessment procedures shall be followed. Program managers will continue to evaluate pilot performance throughout the year and adapt training/proficiency exercises according to perceived needs.

GENERAL OPERATIONAL GUIDELINES

Pilots and Aircraft

Only pilots and aircraft carded by AMD to perform helicopter short-haul operations will be utilized for this special use. Pilots must have trained with rescue personnel for short-haul and short-haul/insertion techniques prior to actual mission use.

The helicopter must be equipped as specified in the procurement document. In a light helicopter, the aircrew consists of the pilot and spotter. The spotter will wear a full body harness and be attached to an appropriate hard point via two daisy chains and locking carabiners.

Flight crewmembers shall be limited to the following flight hour and duty hour limitations:

- (a) All flight crewmembers shall have two 24-hour periods of rest (off duty) within any 14 consecutive calendar days. In the conterminous United States, these two 24-hour rest periods shall be 2 calendar days off duty.
- (b) All flight crewmembers shall have a minimum of 10 consecutive hours of rest (off duty) not to include any preflight or postflight activity prior to any assigned duty period.
- (c) Time spent by a flight crewmember going to or from a duty assignment, and not local in character, shall not be considered part of a crew rest period.
- (d) For a single-pilot crew, the following limitations apply in addition to (a), (b), and (c) above:
 - A maximum of 8 hours flight time during any assigned duty period.
 - A maximum of 14 consecutive duty hours during any duty period.
 - A maximum of 42 hours flight time during any consecutive 6-day period. When a pilot acquires 36 or more flight hours in a consecutive 6-day period, the pilot shall be given the following 24-hour period of rest (off duty) and a new 6-day cycle shall begin. In the conterminous United States, this 24-hour period shall be 1 calendar day off duty.

(351 DM 3, "Flight Crewmember Policy")

Mission Briefing and Risk Assessment

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. As a minimum, the following shall be addressed during the mission briefing:

- Risk assessment (written)
- Nature of the mission
- Location
- Terrain
- Weather
- Landing areas
- Individual responsibilities
- Hazards
- Safety considerations
- Emergency procedures
- Situational awareness review
- Passenger briefing

NOTE: Risk assessment is an ongoing process, to be applied throughout the operation.

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Each mission will have a resource helicopter manager at a minimum. A helicopter crewmember can be delegated duties such as directing helicopter landings and takeoffs, cargo and personnel manifesting and loading, and hover hookups.

Risk assessment is the subjective analysis of physical hazards and operational procedures 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 NO-GO decision when safe operation of the aircraft is a factor. **(352 DM 1, “Aviation Safety”)**

All flight operations, including **Special Use Activities**, 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 ongoing process during an operation are vitally important to a short-haul program. (See Exhibit Appendix 4 for a copy of the Helicopter Short-Haul Risk Analysis form.)

Aircrew Coordination-Situational Awareness

Situational awareness refers to an aircrew’s ability to maintain an accurate perception of the external environment, to accurately identify the source and nature of problems, and to be able to detect those situations requiring immediate action. Factors that reduce situational awareness include insufficient communication, fatigue/stress, task overload/underload, group mindset, “press on regardless” philosophy, and degraded operating conditions.

The loss of situational awareness can be prevented in a number of different ways. Remember that **all** rescue personnel have a say in what transpires during the mission. Flight crewmembers should actively question and evaluate mission progress, continually analyze the situation, constantly update and revise their image of the mission, and should consider alternatives to original mission objectives. “Always leave yourself a way out” (C. Yeager). Assertive behavior such as making suggestions, providing relevant information without being asked, asking questions, and confronting ambiguities is expected when situations warrant. Rescue personnel as well as pilots should openly state their opinions on decisions and procedures and should refuse unreasonable requests. Remember that **it’s okay to say no!** Any member of the rescue team can stop the operation until concerns are resolved.

Load Calculations

A helicopter load calculation, form AMD-67, Helicopter Load Calculation, will be completed for all flights to ensure that the helicopter will perform within the limitations established by the helicopter manufacturer, without exceeding the gross weight for the environmental conditions where the helicopter is to be operated. It is the pilot’s responsibility to complete the load calculation correctly, using proper performance charts. The pilot is also responsible for computing the allowable payload.

One load calculation is valid between points of similar elevation, temperature, and fuel load, provided the load for each flight leg is manifested. A new load calculation is required when there is a change of:

- $\pm 5^{\circ}$ C. in temperature, or,
- $\pm 1,000$ feet change of altitude, or,
- Any increase of payload to be carried, including more than 5 gallons in fuel load.

(Interagency Helicopter Operations Guide (IHOG) Chapter 7: “Helicopter Load Calculations and Manifests”)

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Flight Operations and Procedures

The following is excerpted from **351 DM 1**:

(3) Wind Restrictions. Helicopter operations shall be shut down if the wind exceeds those limitations established in the Operator's Flight Manual or manufacturer's recommendations. If no wind limitation has been prescribed by the manufacturer, helicopter operations shall be terminated when wind speed exceeds the following conditions:

(a) Low level operations:

- Light helicopter: 30 knots, or a maximum gust spread of 15 knots.
- Medium/large helicopters: 40 knots, or a maximum gust spread of 15 knots.

(b) Flights more than 500 feet from the surface: 50-knot winds.

Day/Night Flight Limitations

Day visual flight rules (VFR) only. Except as noted under **Authorization for Night-Flying Operations**, or for reasons of life-or-death emergency, single-engine helicopters will be limited to flight during daylight hours and only under VFR conditions (minimum ½-mile visibility). Daylight hours are defined as 30 minutes before official sunrise until 30 minutes after official sunset.

(IHOG Chapter 6: "Helicopter Capabilities and Limitations")

Personal Protective Equipment

Reference 351 DM 1, *Aviation Life Support Equipment (ALSE)*, 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 Incident Commander (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.) If a waiver is necessary, refer to the ALSE Handbook, chapter 1.5. Notification to the Superintendent's office through the Chief Park Ranger must take place when deviation from PPE standards is used. This notification can take place postincident.

NOTE: Life-threatening emergencies as determined by local management may require deviation from the Departmental Manual and/or the Short-Haul Handbook. Refer to *Helicopter Short-Haul Handbook* for discretionary authorization for deviation from PPE requirements.

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. Equipment not listed may be evaluated for approval by AMD pursuant to a letter of request submitted through the agency.

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A. Helmet

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

- For the spotter or any helicopter crewmember on board the helicopter, an approved aviator's helmet (see the ALSE Handbook) with avionics for intercom and radio communications is required.
- For short-haulers **who will not be inside the aircraft** during flight, an approved aviator's helmet, as outlined above, is recommended. A climbing helmet (Petzl, Camp, Climb High, or equivalent name brand that is Union Internationale 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 the safety of the helmet, remove from service. If the chinstrap is frayed or if the buckle is 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 the manufacturer's requirements.

B. Eye Protection

Any of the following are acceptable:

- (1) Helmets with the visor in the down position
- (2) Glasses with retainer strap
- (3) Goggles

C. Fire Resistant Clothing

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

D. Gloves

- (1) Nomex/leather
- (2) Leather

E. Boots

Personnel flying inside the aircraft must wear leather boots, above ankle level. Short-haulers should utilize footwear that is appropriate for mission safety and the environment into which they will be placed (e.g., rock climbing shoes, cold weather mountaineering boots, etc.).

F. Harness

Commercially made, or manufactured by an FAA Master Rigger, and approved by local 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.

G. Carabiner(s)

All carabiners used for short-haul will be of a locking (screw-gate, twist or auto-lock) design. Both steel and aluminum are approved. 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 wherever 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.

H. Knife

A knife suitable for rapid cutting (i.e., Raptor) 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.

I. Spotter Attachment

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

J. Equipment Changes

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

HELICOPTER SHORT-HAUL INSERTION: OPERATIONAL GUIDELINE

Based on an appropriate risk assessment, short-haul insertion may be used under any of the following circumstances:

- When there is a need to expedite the transport of personnel to an accident scene.
- When a conventional approach would expose rescue personnel to a higher degree of risk.
- When an accident site cannot be readily accessed by ground approach or conventional helicopter landing.

Only rescue personnel who have received the required training will use this technique. One or two rescuers may be inserted at a time, based on specific site factors and helicopter load calculations.

HELICOPTER SHORT-HAUL: OPERATIONAL GUIDELINE

Based on an appropriate risk assessment, short-haul for patient evacuation may be used under any of the following circumstances:

- When a patient has life and/or loss of limb threatening injuries or other medical complications that warrant prompt evacuation.
- When a conventional rescue operation would expose rescue personnel and/or patient to a higher degree of risk. The following factors can contribute to this: duration and/or difficulty of a conventional evacuation; patient safety and potential medical complications; weather (past, present and predicted); available daylight; resource availability.

NOTE: Helicopter short-haul: The transportation of personnel suspended under a helicopter on a fixed line to or from the closest available landing site from which a helicopter can safely operate.

Based on the totality of circumstances, a collective decision between the Incident Commander and the air crew can be made to bring a patient (attended or unattended) back to the ICP (Incident Command Post). A longer flight may contradict the definition of short-haul; however, it may be less risky and therefore enhance the overall safety of the mission. This collective decision can be based on a number of different factors including, but not limited to: patient medical condition; the elimination of several additional flights to unimproved helispots in order to preposition personnel to receive and place patients for transport inside the aircraft; or any other situation that may arise in which deviation from the above definition is thought to be critical for mission success and safety.

Spotter Checklist

- PPE is complete and is worn properly.
- Harness is on and properly buckled.
- Daisy chains on, ready for clip-in to anchor.
- All loose items stored and secured in cockpit and passenger compartment. All seatbelts buckled and secured.
- All cargo compartments closed and inspected.

Helicopter Equipment Check

- Cargo: Remove items not essential to the mission and secure all other cargo.
- Cabin configuration: As directed by the pilot, monitor adjustments as the cabin is configured for short-haul.
- 3-ring release system is installed correctly, tested, and secure.
- Short-haul rope is correctly attached to the primary anchor (hook) and connected to the backup anchor (3-ring release).
- Spotter anchor attachment is secure.
- Seatbelts are secure and operational.
- Maps and mission information are secured but accessible.
- Communications check: All radios are operational and on correct frequencies. (A radio check must be done to establish communications between the aircraft and appropriate personnel, including pilot, spotter, short-haulers, and ground crewmembers.)
- Intercom system operational. Due to other air traffic or ground personnel attempting to make radio contact, use of the hot-mike is not recommended.

Reconnaissance Check Flight

The decision to use the short-haul technique is not taken lightly. It begins with a request by the IC to the pilot and aircrew to perform a reconnaissance check flight to find out whether a short-haul is possible. After completion of an appropriate risk assessment but prior to conducting a short-haul or short-haul/insertion mission, a load calculation will be prepared for a reconnaissance check flight. Within the allowable payload, the rescue personnel required for the mission will be aboard the aircraft during the reconnaissance check flight.

The main purpose of the reconnaissance check flight is to afford the opportunity for the pilot and the spotter to select a suitable short-haul site and determine that all conditions are suitable for a short-haul operation. Flight Following during all flights 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.). Together, the spotter and pilot will evaluate the following short-haul site characteristics: proximity to the incident site (if insertion/extraction site is not at the incident site); approximate size; slope; rotor clearance; wind conditions; ground hazards; approach and departure routes; whether nonincident personnel are in the area; and flight hazards. If rescue personnel are already on site, they should assist with the gathering of this pertinent information. The pilot will perform a hover/power check at the proposed short-haul site during which the following additional criteria will be noted: GPS location (location of staging site, if using one); outside air temperature (OAT); power (adequate or not adequate to hold hover at the site); pressure altitude; and GPS coordinates of the site. **The information gathered during the hover check must be relayed to the IC by the pilot or spotter.** These factors are critical to the ongoing risk assessment process. Secondary pickup or dropoff sites may also be identified during the check flight.

Based on the information from the reconnaissance check flight, the pilot will make the final determination if, under existing conditions, a short-haul or short-haul/insertion is within the performance capabilities and power limitations of the helicopter. The pilot and spotter then make the final GO/NO-GO decision as to whether or not a helicopter short-haul or short-haul/insertion is warranted after consideration of all other related factors (technical climbing requirements for rescue personnel and any other additional SAR considerations, EMS considerations, approaching weather, etc.). Concurrence with the Incident Commander should be obtained if at all possible.

Patient Packaging and Evacuation

The patient's airway must be protected during a short-haul operation. A suction device should be readily accessible and Medical Control may authorize the prophylactic use of anti-emetics. A patient in an unattended litter should be packaged in a left lateral recumbent position (see Exhibit Appendix 2).

Patients who do not require evacuation by litter may be transported in an evacuation suit. The suit will be clipped to the end of the short-haul ropes by a locking carabiner. Additionally, the patient will be equipped with another harness with a daisy chain which is also clipped to the end of the short-haul rope.

An attendant may accompany the patient during the short-haul if the load calculation allows for the additional payload and if rescue personnel consider an attendant necessary for the overall success of the mission. To facilitate hookup procedures, the patient and short-haul attendant may prepare for extraction by clipping into a ring. The ring is then clipped directly to the carabiners at the end of the short-haul rope. This configuration can also be used during insertion and extraction of rescue personnel. The use of a ring can speed up the hookup or the "unhook" procedure.

Circumstances may warrant the use of short-haul to evacuate stranded persons in a water environment. An example of this situation would include persons stranded on log jams because of overturned rafts or canoes. In this situation, normal short-haul/insertion procedures are followed.

HELICOPTER SHORT-HAUL/INSERTION PROCEDURES

Decision Phase

After an appropriate risk assessment, the IC may consider the use of helicopter short-haul/insertion as a means of delivering rescue personnel to an incident site based on established operational guidelines.

Operational Phase

A briefing for all participants in the operation is conducted by the Incident Commander.

A load calculation is prepared for a reconnaissance check flight and the proposed insertion operation.

Spotter, rescuer(s), short-haul rope and equipment are loaded into the aircraft. The short-haul system can also be rigged at this time with the rope still bagged and secured to an adequate hard point within the aircraft. (If the spotter rigs the aircraft at this time, checks of the cargo hook as well as a final check of the hook mechanism and the rest of the short-haul system must be completed.)

Flight Following is required during all short-haul operations. The reconnaissance check flight is conducted and rescue personnel on board help the pilot and spotter select the insertion site and other alternative sites. Information obtained during the hover/power check is relayed to the IC. Terrain limitations and load calculations determine whether to insert one or two rescuers at a time.

The helicopter departs the insertion site and lands at the most appropriate helispot, which also serves as a staging area for the insertion mission. The pilot may choose to complete another load calculation before continuing with the mission.

Appropriate doors are removed from the aircraft.

Unless previously done, the spotter rigs the aircraft for short-haul.

- Install 3-ring release system on the aircraft. This involves removal of the diaper pin and nut on the end of the bolt at the secondary hook attachment point. The bolt is then placed through the upper ring of the 3-ring release system and the nut and diaper pin placed back on the bolt.
- The flexible cable housing is then run through the keeper clips on the underside of the aircraft and routed to and onto the deck of the rear passenger compartment on the pilot side of the aircraft.
- The flexible cable housing is routed to the center of the deck and then forward to the metal plate located immediately behind the collective control. The release toggle is then secured using twist pins to this plate. Additionally, the cable housing is secured to the deck at the rappel anchor plate and, in this way, as much slack as possible is removed from the system.
- Beneath the aircraft, ensure that all of the slack is out of the black release cable, that it is visible in the inspection window, and that the tip of it extends to at least the bottom of the lowest ring of the 3-ring release system.
- Hook ring into the cargo hook.
- Clip captive eye carabiner from the short-haul ropes to the bottom end of the 3-ring release.
- Perform hook checks.
 - **Mechanical.**
 - **Electrical.**
 - **Mechanical release on hook mechanism, reclip ring into hook.**
- Pull down on ring and ensure that the cargo hook is locked into its upper position.
- Inspect 3-ring release handle near the collective control and ensure that it is configured correctly.
- Lay out and inspect short-haul rope in front of the helicopter.
- Check position of weight bag (6 feet from the end of the rope) on the short-haul rope.
- Inspect dual locking carabiners and ensure that the gates move easily and that the locking sleeves are backed off.

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The system is then double-checked by the spotter and the rescue personnel who are involved with the operation. Final systems checks include:

- Every part of the rigging system is correct.
- Hook checks have been done and hook is in "locked" position.
- Appropriate carabiner gates have been locked.
- 3-ring release has extra cable showing beyond clear window and excess passes through "keeper" sleeve.
- No tangling or interference with any other equipment beneath the helicopter.
- Pilot release mechanism is checked and secure beside collective control.

NOTE: Damage to the aircraft may occur if the 3-ring release is not secured either to the short-haul rope system or, if the short-haul rope is removed, to another adequate hard point.

Rescuers double-check each other's harnesses, helmets, PPE, and all other equipment. Each rescuer has knife readily available. Each rescuer wears two daisy chains adjusted so that the ends of the chains are within arms' reach and adjusted so that rescuers are lifted off the ground simultaneously. Daisy chains are attached to harnesses via girth hitches and the outside daisy chain is adjusted so as not to be under tension when **weighted**. One rescuer wears an approved flight helmet with radio in a chest pack to communicate with the pilot. Radios must be on a direct channel frequency (usually Federal **NIMMS**-168.550 MHz). Second rescuer has a radio, but it should be turned down or off. If heavy packs are worn, it is strongly suggested that some form of chest harness be used.

Pilot checks radio communication with rescuers outside. Rescuers tell pilot when they are ready. Spotter clips into an adequate hard point within the aircraft with daisy chains of adequate length to allow visual inspection of the belly of the helicopter should a problem occur with the rope system. The spotter is seated with seatbelt fastened during takeoff and landing.

Pilot takes off and lifts rope clear of ground to eliminate any twists. Pilot then establishes a hover over the rescuer(s). When the rescuers have control of the end of the line (preferably pilot places weight bag on the ground at this point) and are ready to hook up, they communicate by radio "**we have the rope.**" When he is ready, pilot radios rescuers to "**hook up**"; simultaneously, the spotter gives the single, extended-arm signal. Rescuers clip into rope via two twist-lock carabiners. When hooked up, rescuer with radio and helmet indicates to the pilot "**hooked and ready**" while the other rescuer maintains control of the rope and gives lifting signal.

Pilot lifts rescuer(s) and flies to insertion site. Forward flight speed will not exceed 60 knots. In-flight spinning or position changes can be prevented by extending an arm or a leg. Wearing a pack tends to minimize the tendency to spin. In-flight radio communication quality is best if the helmet boom mike is flush against lips and cupped by a hand and the head is turned away from the wind.

Communication Commandments

- If communication between the pilot and spotter is lost or becomes inadequate, the pilot will initiate an **ABORT**.
- If, at any time during the transport or ferry portion of the short-haul insertion or extraction, radio communication is lost or becomes inadequate, the pilot will initiate an **ABORT**.
- If the short-hauler(s) lose communication or wish to initiate an **ABORT**, a **wave-off** signal is given. See **HAND SIGNALS**. This may be especially true with the first insertion operation to a previously unknown location.
- Once safely on the ground, and as long as communication still exists between pilot and spotter, hookup or unhook procedures can be accomplished using only hand signals.

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Pilot will announce a short final to the insertion site, slow down and stabilize the rescuers on the line prior to setting them down.

Rescuer(s) will help pilot's depth perception by calling out distance above the ground. Rescuer(s) should also point out any hazards in the area to the pilot. All rescuer radio traffic **must** be crisp and brief. Keying the microphone inappropriately may override critical communications between pilot and rescue personnel.

When landing on uneven terrain, rescuer(s) should allow time to stabilize themselves before announcing "**down and comfortable.**" **Additionally, the weight bag should be on the ground on the exit side of the rescuers.** When ready, the pilot will say "**unhook**"; simultaneously, the spotter will give the single, extended-arm signal. Rescuer(s) unclip(s) and by radio tell(s) the pilot that they are clear of the rope by saying "**unhooked and clear.**" The rescuer who is not doing the radio communication holds and tends the end of the rope with one hand until it is clear of the ground while giving the lifting signal with the other hand.

Rescuers should not clip into a ground anchor while still attached to the insertion line. The following procedure should be used if rescuers need to clip into a ground anchor:

1. Touch down and remain clipped to short-haul rope.
2. Establish ground anchor and unclip nontensioned daisy chain.
3. When directed by pilot, unclip second daisy chain and clip this second daisy chain into the anchor while **holding on to the anchor firmly.**

HELICOPTER SHORT-HAUL PROCEDURES

Decision Phase

After an appropriate risk assessment, the IC may consider the use of helicopter short-haul as a means of delivering rescue personnel to an incident site based on established operational guidelines.

Operational Phase

A briefing for all participants in the operation is conducted by the Incident Commander.

A load calculation is prepared for a reconnaissance check flight and the proposed short-haul operation.

Spotter, rescuer(s), short-haul rope and equipment are loaded into the aircraft. The short-haul system can also be rigged at this time with the rope still bagged and secured to an adequate hard point within the aircraft. (See complete rigging outline below)

Flight Following is required during all short-haul operations. The reconnaissance check flight is conducted and rescue personnel on board (and on the ground, if possible) help the pilot and spotter evaluate the incident site for short-haul as well as identify alternative sites. Information obtained during the hover/power check is relayed to the IC.

The helicopter departs the insertion site and lands at the most appropriate helispot, which also serves as a staging area for the insertion mission. The pilot may choose to complete another load calculation before continuing with the mission.

Appropriate doors are removed from the aircraft.

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Unless previously done, the spotter rigs the aircraft for short-haul.

- Install 3-ring release system on the aircraft. This involves removal of the diaper pin and nut on the end of the bolt at the secondary hook attachment point. The bolt is then placed through the upper ring of the 3-ring release system and the nut and diaper pin placed back on the bolt.
- The flexible cable housing is then run through the keeper clips on the underside of the aircraft and routed to and onto the deck of the rear passenger compartment on the pilot side of the aircraft.
- The flexible cable housing is routed to the center of the deck and then forward to the metal plate located immediately behind the collective control. The release toggle is then secured using twist pins to this plate. Additionally, the cable housing is secured to the deck at the rappel anchor plate and, in this way, as much slack as possible is removed from the system.
- Beneath the aircraft, ensure that all of the slack is out of the black release cable, that it is visible in the inspection window, and that the tip of it extends to at least the bottom of the lowest ring of the 3-ring release system.
- Hook ring into the cargo hook.
- Clip captive eye carabiner from the short-haul ropes to the bottom end of the 3-ring release.
- Perform hook checks.
 - **Mechanical.**
 - **Electrical.**
 - **Mechanical release on hook mechanism, reclip ring into hook.**
- Pull down on ring and ensure that the cargo hook is locked into its upper position.
- Inspect 3-ring release handle near the collective control and ensure that it is configured correctly.
- Lay out and inspect short-haul rope in front of the helicopter.
- Check position of weight bag (6 feet from the end of the rope) on the short-haul rope.
- Inspect dual locking carabiners and ensure that the gates move easily and that the locking sleeves are backed off.

The system is then double-checked by the spotter and the rescue personnel who are involved with the operation. Final systems checks include:

- Every part of the rigging system is correct.
- Hook checks have been done and hook is in "locked" position.
- Appropriate carabiner gates have been locked.
- 3-ring release has extra cable showing beyond clear window and excess passes through "keeper" sleeve.
- No tangling or interference with any other equipment beneath the helicopter.
- Pilot release mechanism is checked and secure beside collective control.

NOTE: Damage to the aircraft may occur if the 3-ring release is not secured either to the short-haul rope system or, if the short-haul rope is removed, to another adequate hard point.

Spotter clips into an adequate hard point within the aircraft with a daisy chain of adequate length to allow access to the belly of the ship should a problem occur with the rope system. Spotter is seated with seatbelt fastened for takeoff and landing.

Pilot checks communication with the rescuers outside and spotter inside (usually Federal NIMMS-168.550 MHz), takes off and lifts rope clear of the ground to eliminate any twists in the rope. Pilot then establishes a hover over the rescuer(s) and the short-haul litter, presents the end of the short-haul rope to them, and eases the weight bag to the ground (rescue personnel guide the weight bag to the ground on the exit side of the litter).

Rescuers gain control of the end of the short-haul rope and indicate via radio "**we have the rope.**" When the pilot is ready for them to hook the short-haul rope to the litter, he indicates that they can do this by saying "**hook up**"; the spotter simultaneously gives the single, extended-arm signal. Ground personnel indicate that the hookup process is complete by saying "**hooked and ready**" and giving the lifting signal. The pilot then brings the short-haul litter up into the air and proceeds to the incident site or an alternate site nearby. **NOTE:** The exit side of the short-haul site should be clearly communicated to all involved personnel. Rescue personnel must all be positioned on the non-exit side of the site for the actual operation.

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Communication Commandments

- If communication between the pilot and spotter is lost or becomes inadequate, the pilot will initiate an **ABORT**.
- If, at any time during the transport or ferry portion of the short-haul litter insertion or extraction, radio communication becomes lost or inadequate, the pilot will initiate an **ABORT**.
- If the ground crew loses communication or wishes to initiate an **ABORT**, a **wave-off** signal is given. See **HAND SIGNALS**.
- Once safely on the ground, and as long as communication still exists between pilot and spotter, hookup or unhook procedures can be accomplished using only hand signals.

Pilot will announce a short final to the short-haul site and the on-scene, designated Communications Leader gives the pilot as accurate a description of wind speed and direction as possible. As the pilot continues the delivery of the litter, the Communications Leader will help the pilot's depth perception by calling out distance above the ground. All radio traffic should be crisp and brief. Keying the microphone inappropriately may override critical communications between pilot and rescue personnel.

When the litter has been delivered and rescue personnel have control of the end of the short-haul line (the weight bag should be on the ground on the exit side of the area), they should indicate to the pilot that they are ready to disconnect the short-haul rope by saying "**we have the litter.**" When the pilot is ready for them to do so, he responds by saying "**unhook**"; the spotter will give the single, extended-arm signal at this point. When they have done so, they indicate to the pilot "**unhooked and clear**" and one rescuer gives the lifting signal. Ground personnel should control the end of the short-haul line until pilot clears the scene and the line is off the ground. Pilot then returns to an appropriate landing zone.

While the helicopter is away from the scene, ground personnel complete all prehookup preparations. Patient is placed in litter (see Exhibit Appendix 2) and secured to the "God" ring. If a litter attendant is considered necessary for the mission, that person prepares for the short-haul.

Rescue personnel inform the pilot that they are ready for pickup. The helicopter returns to the pickup site. Prior to helicopter arrival, site Communications Leader tests radio communication with the pilot, using his/her helmet headset.

The pilot will announce a short final to the short-haul site and the Communications Leader gives the pilot as accurate description of wind speed and direction as possible. As the pilot continues the delivery of the short-haul rope, the Communications Leader will help the pilot's depth perception by calling out distance above the ground. All rescuer radio traffic should be crisp and brief. Keying the microphone inappropriately may override critical communications between pilot and rescue personnel.

Rescuers grasp the end of the short-haul rope and take control of it and the weight bag (again the weight bag is preferably guided to the ground toward the exit path of the litter). The same voice commands as before are used with rescue personnel initiating the procedure by saying "**we have the rope.**"

The pilot informs the Communications Leader via radio to attach short-haul line to the steel ring on the litter pre-rigs with two locking steel carabiners by saying "**hook up**"; spotter simultaneously gives the single, extended-arm signal.

The Communications Leader informs the pilot that the attachment is complete and that he may begin raising the load by saying "**hooked and ready**" and by giving the lifting signal.

The helicopter lifts litter and flies to an appropriate landing zone.

The pilot lowers the litter to the receiving team. The pilot holds hover when the litter is 4 to 5 feet off ground. The receiving team stabilizes the litter and the pilot lowers the final distance to the ground. When the litter and the rope bag are on the ground, the receiving team indicates once again to the pilot "**we have the litter.**" The pilot indicates to them "**unhook**"; the spotter simultaneously gives the single, extended-arm signal. The ground team informs pilot that the litter is disconnected by saying "**unhooked and clear**" and by giving the lifting signal. The ground team immediately checks the status of the patient, particularly the airway.

DOCUMENTATION

Documentation will be kept current by the helicopter short-haul program manager. All short-haul training will be tracked in order to ensure that personnel fulfill initial, annual recertification, and proficiency requirements. The use history of short-haul ropes and associated hardware will also be tracked. Helicopter load calculations and helicopter risk assessments for a particular short-haul operation will become a permanent part of the official incident report. Documentation will also be maintained for equipment testing.

HAND SIGNALS

A loss of radio communication between the pilot and rescue personnel during the transport or ferry portion of a short-haul or short-haul insertion operation indicates an automatic **abort**. The following three hand signals are given by the spotter to the Communications Leader and other involved rescue personnel on the ground. These serve as redundant, visual indications that certain, critical maneuvers must occur immediately.

- A **single, extended-arm** signal with a closed fist is used to indicate either a “hookup” or an “unhook” procedure should occur immediately. **NOTE: For a number of years, two distinct signals were used that corresponded to either “hook up” or “unhook.” However, during the hook or unhook part of the sequence, the ground crew knows what the appropriate action is and is simply looking for a visual confirmation from the spotter. The single, extended-arm is a clear and unmistakable signal. Therefore, _____ National Park decided to simplify the hand signals and drop the “clasped hands signal.”**
- If an **ABORT** or **DO NOT LAND** or **PUT US DOWN NOW** type of command is desired either by the rescue personnel on the ground or those at the end of the short-haul rope, a **wave-off** signal is given by waving outstretched arms from the sides to a crossed-in-front position (horizontal plane). This signal can also be given by the spotter to ground personnel and indicates that they should clear away from the short-haul site **immediately** and seek protection.
- After a hookup procedure has been accomplished, rescue personnel will give a **lifting** signal with one arm circling overhead while tending the short-haul ropes and weight bag with the other hand.

It is imperative that rescue personnel on the ground, especially the person designated as Communications Leader, look up at the spotter during the critical phases of the operation so that these hand signals may be clearly communicated.

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 instantaneously 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.

WARNING: Short-haul operations are inherently dangerous and could be fatal. This must be discussed in detail during training and recurrency. Release of the short-haul line is a possible consideration while human external cargo (HEC) is attached beneath the aircraft. In case of an aircraft emergency, the pilot may attempt to land with HEC attached to the short-haul line. The decision of any short-hauler to cut away from the line is a personal choice depending on the circumstances and the best chance for survival.

NOTE: During either short-haul training or actual missions, a number of different scenarios may occur that would prompt aircrew or anyone involved with a particular incident to terminate the training or mission until a perceived problem has been corrected. These scenarios include, but are not limited to the following:

- **Any problem that is detected with the aircraft or with the short-haul equipment that is connected to the aircraft.**
- **Any problem associated with either the primary short-haul anchor (cargo hook) or the secondary short-haul anchor (three-ring release).**
- **Problems associated with the PPE worn by aircrew or short-haulers.**

Examples of formalized emergency planning procedures are outlined below.

Helicopter In-Hover, Control and Power Maintained

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

The pilot may decide to:

- Notify the spotter and short-haul personnel and set them on the ground as soon as possible.
- 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.
- On the ground, personnel rapidly unhook or cut lines and seek protection.

Helicopter Loss of Control or Power, Engine Failure

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

The pilot will:

- Declare the emergency to the spotter and short-haulers.
- Attempt to get short-haulers on the ground. Short-haulers will rapidly unhook or cut lines and seek protection.
- Attempt to maneuver helicopter away from personnel on the ground.

Short-Haul Line Entanglement

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

NOTE: Again, it is **imperative** 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!

EXHIBIT APPENDIX 1

____ National Park Rescue Personnel (Short-Haul Qualified)
(Year) (Name of Park)

SHORT-HAUL PROGRAM MANAGER

Name: _____

SHORT-HAUL CHECK SPOTTERS

List Names:

SHORT-HAUL SPOTTERS

List Names:

Resource Helicopter Manager Qualified*

SHORT-HAULERS

List names:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

EXHIBIT APPENDIX 2

Left-Side Lateral Recumbent Patient Packaging

Scoop Stretcher

Stabilize patient (if spinal injury is suspected, proceed accordingly).

Apply C-collar, climbing harness, daisy chains (2) and long sling.

Lay bottom half of Benham Bag adjacent to patient.

Adjust scoop stretcher for length and apply to patient. (Consider PASG for hypovolemic patients and/or for splinting. If indicated, apply now; RECHECK @ STAGING AREA!)

Use Conterra straps to secure patient to scoop stretcher (soft padding between legs and beneath lower lumbar area).

Apply Ferno head blocks. (Reverse normal orientation of blocks to accommodate curve of scoop stretcher.)

Use cloth adhesive tape around forehead and stretcher and chin (place 4X4 on patient forehead). *Arms flexed with hands near face for alert and oriented patient.

Place patient (on scoop stretcher) onto lower half of Benham Bag and cover with upper half.

Log roll patient onto side (right side for left lateral recumbent).

Log roll patient into litter in lateral recumbent position (aim for patient's left side to be centered in litter).

Place pads in front of patient (location of injuries will dictate pad placement). *Avoid placement above hips.

Rotate patient to "drainage position." >90°. **Think gravity clearing of airway.**

Place long pad in back of patient if needed to prevent over rotation. Make sure all pads are **TIED/CLIPPED IN!**

Attach 4 "Springer straps" from top rail of scoop stretcher to sides of litter (2 at the head, 2 at knees in opposition).

Attach daisy chains (toward the superior and inferior aspects of patient) to girth-hitched prussic loops.

Fasten seatbelts.

Attach prerigged litter spider.

Clip patient into ring with long daisy or tie in loop.

Attach V-Vac suction unit to litter near head. (No O2 masks during short-haul; consider cannula.)

Rotate patient in litter to maintain supine position until moments before short-haul and at staging area.

Supplies needed: litter pre-rig; seatbelt straps; scoop stretcher; Conterra straps; soft padding; tape; C-collar (adjustable); Ferno head block immobilizer (attached to scoop); Benham bag; climbing harness; (2) daisy chains; (1) long sling; (3) twistlock carabiners; (2) Prussik loops on rail of litter; (3) ensolite pads rolled up and labeled for padding; (4) Springer straps.

EXHIBIT APPENDIX 3

Left-Side Lateral Recumbent Patient Packaging

Evacu-Bag

Stabilize patient (if spinal injury is suspected, proceed accordingly).

Apply C-collar, climbing harness, daisy chains (2), and long sling.

Consider using litter as flat surface for packaging, place bottom half of Benham Bag underneath Evacu-Bag.

Flatten out Evacu-Bag to distribute the contents of the bag.

Center patient on Evacu-Bag (consider lifting patient vs. log roll) *Arms folded across chest with hands near face for alert and oriented patient.

Wrap bag around patient and fasten straps. Straps should be tightened carefully to avoid twisting along patient's spine. C-spine is not secure until bag is rigid.

At the head, roll corners of bag under to function as head blocks once bag is evacuated.

Evacuate air from bag, tightening straps simultaneously. Bag is tight enough when finger depression remains in bag.

Use cloth adhesive tape around forehead and bag.

Cover patient with upper half of Benham Bag.

If not already in the litter, log roll patient onto their right side, then roll patient into litter onto their left side for left-lateral recumbent position (aim for patient's left side to be centered in litter).

Rotate patient to "drainage position." >90°. **Think gravity clearing of airway.**

Attach four "Springer straps" from top rail of litter to cord loops on Evacu-Bag. Two-each just below shoulder and hip.

Attach daisy chains (toward the superior and inferior aspects of patient) to girth-hitched prussic loops.

Fasten seatbelts.

Attach prerigged litter spider.

Clip patient into ring with long sling from harness.

Attach V-Vac suction unit to litter near head. (No O2 masks during short-haul; consider nasal cannula.)

Rotate patient in litter to maintain supine position until moments before short-haul and at staging area.

Supplies needed: litter pre-rig; seatbelt straps; Evacu-Bag (with pump, repair kit, etc.); cloth adhesive tape; C-Collar (adjustable); Benham Bag; climbing harness; (2) daisy chains; (1) long sling; (3) twistlock carabiners; (2) Prussik loops (on litter rail); (4) Springer straps.

EXHIBIT APPENDIX 4

_____ National Park

Short-Haul Risk Analysis



Incident Name: _____ **IC:** _____ **Date:** _____

Time: _____

1. SITUATIONAL AWARENESS

- Gather and verify available information.
- Develop an accurate “*mental image*” of the mission.

2. HAZARD ASSESSMENT

METHOD (Techniques and Methods How Mission Will Be Conducted)

- In the best interest of rescuer(s) and subject safety.
- Alternate techniques adequately evaluated (*time required and hazards*).

Alternatives:

Number of people required for ground-based rescue: _____ Estimated time: _____ hr

Risks associated with ground-based rescue have been discussed: Yes No

- Adequate communications in place.
- Check for omissions or deficiencies.
- Backup plan prepared.

MAN (Generic Reference to Incident Personnel and Patient)

- Personnel trained and qualified for the mission.
- Patient’s condition and/or environment warrant short-haul.

MISSION (The Incident Assignment)

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

MEDIUM (Environmental Forces)

- ❑ Environmental hazards identified and considered in mission planning including:

Environmental Considerations: Sunrise _____ am Sunset _____ pm As reported from the short-haul site: Wind speed (not to exceed 35 mph): _____ mph

Site Hazards: _____ _____ _____ _____
--

- ❑ Sufficient daylight to complete the mission.
- ❑ Operating within performance capabilities of man and machine including:

Aircraft Considerations: Outside Air Temperature (OAT): _____ °F _____ °C Pressure altitude: _____ feet Adequate rotor clearance: Yes <input type="checkbox"/> No <input type="checkbox"/> Power check: _____ Load calculation completed: Yes <input type="checkbox"/> No <input type="checkbox"/>
--

MANAGEMENT (Controls, Procedures, Oversight and Supervision)

- ❑ ICS established and communicated.
- ❑ Compliance with policies and SOPs.
- ❑ Safety openly promoted.
- ❑ After-action review planned.

3. HAZARD CONTROL

- ❑ Identify risks and implement controls to them.
- ❑ **If a problem is detected with the aircraft (primary/secondary anchors), or with the short-haul equipment attached to the aircraft, or with PPE used by aircrew or short-haulers, terminate short-haul mission or training until problem is corrected.**

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?
--

5. EVALUATE

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

EXHIBIT GLOSSARY

Aircraft Accident: An unplanned event that does substantial damage or causes serious injuries when associated with the operation of applicable aircraft, occurring between the time the engine(s) is (are) started or rotors turning for the purpose of commencing flight, until the aircraft comes to rest with engines and propellers or rotors stopped, and the brakes set or wheel chocks in place and all persons have disembarked.

Aircraft Incident: An unplanned event that results in damage which is less than serious aircraft accident criteria, or injury less than medical attention (that is, first aid). A situation involving an aircraft and/or personnel which has the potential of resulting in an aircraft accident is also classified as an aircraft incident. Examples include a forced or precautionary landing, and aircraft ground mishap or ground damage to an aircraft, and a near midair collision.

Allowable Payload: The allowable payload represents the amount of weight that is available for passengers and/or cargo. On the load calculation form, the allowable payload is the operating weight subtracted from the selected weight.

Autorotation: A rotorcraft flight condition in which the lifting rotor is driven by action of the air when the rotorcraft is in motion. No engine power is supplied to the main rotor, and lift is developed from the free turning of the rotor blades, which are driven by aerodynamic forces. Rotor inertia is used as the helicopter nears the ground to check the descent.

Aviation Mishap: An unplanned, unintended event involving aircraft operations that results in damage to an aircraft, injuries to personnel, or presents the potential for such. Mishaps include aircraft accidents, serious aircraft incidents, aircraft incidents, aviation hazards, and aircraft maintenance deficiencies.

Basic Ordering Agreement (BOA): A written instrument of understanding, negotiated between an agency, contracting activity, or contracting office and a contractor, that contains (1) terms and clauses applying to future contracts between parties; (2) a description of supplies or services to be provided; and (3) methods for pricing, issuing, and delivering future orders.

Collective Pitch Control: The method of control by which the pitch of all rotor blades is varied equally and simultaneously. The collective regulates the pitch angle, or angle of attack, of the main rotor blades. It is used as the primary power control. As the pitch of the blades is increased, lift is induced, causing the helicopter to lift off the ground, hover, or climb, as long as sufficient power is available.

Cyclic Pitch Control: The control which changes the pitch of the rotor blades individually during a cycle of revolution by regulating the tilt of the rotor disc and, therefore, the direction and velocity of horizontal flight. The cyclic is used as the primary control for bank, horizontal movement, and speed. The main rotor system is tilted in the direction of stick movement causing the helicopter to move in that direction.

Density Altitude: Pressure altitude corrected for outside air temperature and humidity.

Emergency: Emergencies can be classified two ways:

1. **Life-Threatening Emergency:** A situation or occurrence of a serious nature, developing suddenly and unexpectedly and demanding immediate action to prevent loss of life.
2. **Operational Emergency:** An unforeseen combination of circumstances that calls for immediate action, but is not life threatening.

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Ground Effect: When a helicopter is operated near the surface, the downwash velocity created by the rotor blades cannot be fully developed due to the proximity of (interference with) the surface. This restraint of rotor downwash occurs as the helicopter reaches a relatively low altitude - usually one-half a rotor diameter. A "cushion" of air beneath a helicopter hovering or operating near the surface results as air is pushed downward by the main rotor system and semi-compressed against the surface. The net result is a beneficial increase in lift and a lower power requirement to support a given weight. This ground cushion is normally effective, although diminishing, up to a height above the surface equal to the radius of a main rotor blade. Ground effect is adversely affected by uneven terrain below the rotor disc, vegetation (tall grass), etc.

Gust Spread: The difference between the highest and lowest wind speed.

Helispot: A safe takeoff and landing area meeting AMD obstruction-free clearance standards (light helicopters: 15-foot by 15-foot level landing pad and a 75-foot safety circle). For use during SAR operations, a helispot may be temporary and not have other site improvements.

Hobbs Meter: A flight hour recording device that is activated when power is applied.

Hover In Ground Effect: Operating at such an altitude (usually one-half the rotor diameter above the surface) that the influence of ground effect is realized.

Hover Out Of Ground Effect: Hovering without the benefit of the ground effect cushion. For any given altitude, hovering out of ground effect takes more power than hovering in ground effect.

Incident Commander: (IC) The individual responsible for the management of all incident operations.

Light Helicopter: A helicopter with certified gross weight of less than 7,000 pounds. Under the ICS helicopter typing system, a light helicopter is a Type 3 helicopter and must have an allowable payload at 59° F. at sea level of 1,000 pounds, 2 to 5 passenger seats, and a retardant or water-carrying capacity of 100 gallons.

Knot: 1.15 statute miles per hour.

Medium Helicopter: A helicopter with a certified gross weight between 7,000 and 12,500 pounds. Under the ICS helicopter typing system, a medium helicopter is a Type 2 helicopter and must have an allowable payload at 59° F. at sea level of 2,500 pounds, 6 to 10 passenger seats (unless restricted category), and a minimum retardant or water-carrying capability of 300 gallons.

Manifest: A written list of personnel and/or cargo and their weights to be transported.

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

Point-To-Point Flight: Typically, the flight originates at one developed airport or permanent wheelbase, with flight being directed to another developed airport or wheelbase. The flight is conducted solely for the purpose of transportation of persons or cargo for administrative or travel purposes, and does not involve mission-type flight.

Project Helicopter Manager: This position supervises operations involving transport of groups of personnel or cargo from/to unimproved landing sites, external load operations, or other complex special-use project operations.

Program Manager: The individual who is responsible to the _____ National Park SAR Coordinator for implementation of the short-haul program. The Program Manager's responsibilities include ensuring that initial, annual, and proficiency requirements are fulfilled by all personnel involved with the program. Additionally, the Short-Haul Program Manager is a _____ area ranger (SAR specialist).

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Public Aircraft: An aircraft used exclusively in the service of any government or of any political subdivision thereof, including the government of any State, territory, or possession of the United States, or the District of Columbia, but not including any government-owned aircraft engaged in carrying persons or property for commercial purposes. "Used exclusively in the service of" means for, other than the Federal Government, an aircraft, which is owned and operated by a governmental entity for not less than 90 continuous days.

Rescue Personnel: _____ National Park personnel who are proficient in technical mountain rescue, who have participated in _____ National Park technical rescue training, and who are currently certified in helicopter short-haul. Personnel must be appropriately skilled and equipped to the extent that they are able to leave any short-haul site without helicopter support.

Short-Haul: The transportation of personnel suspended under a helicopter on a fixed line to or from the closest available landing site from which a helicopter can safely operate. During a short-haul insertion, rescue personnel are lifted from one site while suspended below the aircraft on ropes, and then placed down at or near an accident site. Similarly, during a short-haul extraction, an accident victim in a litter is lifted from the scene of a mishap and transported to a helispot or short-haul staging area.

Short-Haul Site: Drop point for rescue personnel involved in a short-haul evolution that is preferably adjacent to the patient. This can also refer to the patient extraction site.

Short-Haul Staging Area: A safe helispot that is located as close to the short-haul site as possible.

Special Use Activities: Operations involving the utilization of airplanes and helicopters in support of Department of the Interior programs which are not point-to-point flight activities and which require special considerations due to their functional use. This may require deviation from normal operating practices when authorized by AMD. Special pilot qualifications and techniques, special aircraft equipment, and personal protective equipment are required to enhance the safe transportation of personnel and property. These activities include: low level flight; mountain flying (helicopter); precision reconnaissance (including fire recon); toe-in, single-skid, and step-out landing; cargo letdown; external load - short line $\leq 50'$ (helicopter); external load - long line $\geq 50'$ (helicopter); rappel; short-haul; aerial ignition; water/retardant application. **(DOI AM Operational Procedures Memorandum: Special Use Activities and Revised Standards for Technical Oversight)**

Spotter: The individual aboard the helicopter who serves as Incident Air Operations Chief. The Spotter performs the aerial reconnaissance check flight, assists the pilot with information regarding rotor clearance, and is responsible for the rigging and release of the safety backup lines in the event of an emergency. Additionally, the Spotter evaluates overall site characteristics as they relate to mission requirements. This may include options for lowering or raising, retreat of rescue personnel over technical terrain, and objective hazards such as rock and icefall. It is therefore imperative that the Spotter be experienced in climbing and mountaineering, technical, mountain rescue operations, and has personal knowledge of terrain and climbing routes throughout _____ National Park.