



NATIONAL
RAPPEL
OPERATIONS
GUIDE

USDA FOREST SERVICE

2019

Version 1.2

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USDA Forest Service - National Rappel Operations Guide Approval

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USDA Forest Service - National Rappel Operations Guide Overview

The U.S. Forest Service National Rappel Working Team (NRWT), National Rappel Operations Subcommittee (ROS), and the National Rappel Training Subcommittee (RTS) have developed this guide for agency employees conducting Forest Service helicopter rappel operations.

The NROG is available on the National Rappel Program SharePoint site and from the U.S. Forest Service Fire and Aviation website at:

<https://www.fs.fed.us/managing-land/fire/aviation/publications>



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USDA Forest Service Helicopter Rappel Mission Statement

The U.S. Forest Service National Helicopter Rappel Program's primary mission is initial attack. Rappel crews may be utilized for large fire support, all-hazard incident operations, and resource management objectives.

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Chapter 1. Introduction

I. Objective

This guide provides standards for the administration of all rappel units regarding personnel qualifications, organization, certification, standardization, training, equipment and operating procedures. Managers, specialists and technicians shall use this guide in planning, administering and conducting rappel and cargo letdown operations.

II. Scope

The procedures contained in this guide apply to rappel operations conducted by Forest Service rappel bases. The level of standardization is determined by the Forest Service National Rappel Working Team (NRWT).

III. Policy

All Forest Service rappel bases have similar administrative technical requirements for rappel and cargo letdown operations. Operations and procedures shall comply with agency policy, procurement documents, and this operating guide.

IV. Authority

This guide has been submitted by the Rappel Operations Subcommittee (ROS) and the Rappel Training Subcommittee (RTS) to the NRWT for review and concurrence.

This guide has been approved by the Director, Fire and Aviation Management. Host regions and forests are responsible for ensuring rappel bases, spotters and rappellers, under their management, meet national standards for rappel training and operations.

Line officers shall ensure that only qualified personnel supervise and administer rappel operations. Rappel base managers shall ensure operational safety and compliance with standards, equipment and procedures.

V. Standardization of Equipment and Procedure

The total mobility and the interchange of personnel and equipment between units (“boosting”) dictates that personnel qualifications and training, equipment, rappel and cargo letdown delivery methods, and operating procedures must be uniform and standardized. This guide lists standardized training, equipment and procedures for uniform, service-wide application. The Washington Office will have the final approval for new equipment and procedures before they are adopted for service-wide use.

VI. Review and Revision

Users are encouraged to recommend changes to this guide through their respective rappel base manager via written proposal (see Appendix C - Forms). The rappel base manager submits the proposal to the rappel operations or rappel training subcommittee chairperson for group review, concurrence, recommendation, and where applicable, forwarding to the NRWT.

The NRWT may approve proposals and make minor edits to the NROG at any time without further director approval, as long as it does not change meaning or intent. Rewording for clarity, formatting, grammar and spelling changes are examples of minor changes.

Proposals to revise or modify contents of the NROG deemed significant, e.g. life-bearing equipment change, national-level programmatic change (addition or reduction of rappel crews, national budget allocation, and crew size standard), or rappel aircraft change (make and type) shall be reviewed by the Rappel Operations and Rappel Training Subcommittees by November 1 each year. The NRWT shall review the proposal(s) by December 15 with adoption of change contingent on director approval.

Edits deemed significant, that change meaning or intent, shall be tracked on the NROG revision form on page ii of this guide.

Interim revisions (those that occur within the revision cycle) may be necessary. Interim revisions are available on the National Rappel Program SharePoint site and from the US Forest Service Fire and Aviation website at:

<https://www.fs.fed.us/managing-land/fire/aviation/publications>

The NROG shall receive a complete review every three years. The NRWT forwards recommendations to the Assistant Director, Aviation, for review. The Assistant Director, Aviation forwards recommendations to the Director, Fire and Aviation Management for approval. Revisions will be distributed by the Forest Service National Aviation Office.

VII. Disclaimer

The use of trade, firm, product, company or corporation names is for informational and convenience purposes. Such use does not constitute an official evaluation, conclusion, recommendation, endorsement or appraisal of any product or source to the exclusion of others that may also be suitable.

Chapter 2. Administration

I. Organization, Personnel, Staffing and Standards

The rappel program shall maintain a high operating standard led by competent and qualified personnel. It is essential that program leaders are supported locally to ensure staffing levels are aligned with standards set forth in this chapter.

A. Unit Organization

Rappel crews shall be managed and supervised by the local unit. This supervision should be provided from a forest-level fire manager or aviation officer rather than from a district-level manager.

Each rappel base shall be staffed to effectively supervise the base's activities. The staff at permanent bases shall include one base manager, and one or more persons to oversee the following functional areas: operations, equipment and training.

The base organization shall be structured to provide an adequate ratio of managers and assistant managers to squad leaders, and squad leaders to rappellers. Each unit requires a minimum of one squad leader for every five rappellers. Depending on the size, workloads, and responsibility of each unit, additional positions should be established to ensure that all areas of responsibility receive the necessary supervision. Some or all of these positions may require full-time employees to obtain the skill levels necessary to accomplish the job.

The number of qualified spotters should be sufficient to staff the available aircraft fleet. Two spotters per rappel helicopter is the recommended minimum with three or more as the desired target. Organization structures should also strive to provide a clear and attainable career ladder whenever possible.

B. Overhead Personnel Staffing Requirements

National standard position descriptions for helicopter positions are available and should be used by all rappel units. While organizational structures may vary among rappel bases due to size and complexity, each organizational unit should provide qualified personnel to manage a number of functional areas. The following describes these key functional areas and general responsibilities:

1. Rappel Base Manager

The rappel base manager should have administrative and rappel experience, and be thoroughly familiar with aircraft operations and all phases of helicopter rappelling. This individual is responsible for all administrative, facilities, preparedness and fire operations at the rappel base.

2. Operations Manager

The operations manager maintains standardized procedures in rappel operations, organizes project work, and keeps records for all rappeller activities. In some organizations, this individual also may serve as training manager and/or equipment manager. The individual responsible for this position or functional area reports to the base manager. The operations manager must be an experienced rappel spotter and must remain an active rappel spotter.

3. Training Manager

Larger organizations may need a training manager responsible for the various training activities of a rappel unit. In most organizations, the training manager reports to the base manager. This individual must be an experienced rappel spotter and must remain an active spotter. Some bases may combine this position with the operations manager position.

4. Equipment Manager

The equipment manager is responsible for maintaining helicopter rappel-related equipment and reporting deficiencies. Depending on the complexity of the aviation operation, not every base will require a dedicated equipment manager and these responsibilities may be assigned to another functional area manager. This individual must be an experienced and active rappel spotter. The equipment manager will:

- a. Provide technical assistance to the base manager
- b. Maintain base supplies and rappel equipment
- c. Supervise equipment repair and manufacture as applicable
- d. Assist the National Technology and Development Program (NTDP) in testing and development of rappel equipment as requested

5. Assistant Manager

The assistant manager reports directly to the GS-9 rappel base manager and may serve in an acting capacity. On larger crews, where the rappel base manager is a GS-11, the assistant reports directly to the GS-9 crew supervisor. The assistant may perform operations, training, or equipment manager duties as designated on the base organizational chart. This individual is a qualified rappeller and should be supported in attaining a spotter qualification.

6. Clerical Personnel

Each organization, depending upon administrative complexity and need, should have a clerical assistant assigned to assist the base manager with administrative responsibilities at the base.

C. Crew Organization

1. Crew Size

Crew size shall be a minimum of 15 people per rappel helicopter. An 18 or 21-person crew size is the recommended standard to increase IA capability, provide additional leadership to the crew, and add greater flexibility that will allow for off-crew training opportunities to advance operational and aviation qualifications. Rappel module size may increase above the minimum recommended levels depending on funding, size of facilities, local management, and regional/national needs.

2. Span of Control

Rappel crew modules shall adhere to the ICS span of control for supervision, which ranges from three to seven subordinates for each supervisor. Because span of control is influenced by the size, complexity, and specific hazards of the incident or operation, a ratio of one supervisor/leader to five subordinates is most often recommended and should be the target for each rappel crew.

3. Crew Configurations

The tables below show the minimum 15-person crew configuration and the recommended 18 or 21-person crew configuration. These module configurations are for single helicopter rappel crews and were developed with the target span of control in mind.

a. Minimum Standard 15-Person Crew Module

Position Description	Grade	Minimum Tours	Number of Position
Helitack Manager FS1920	GS-09	26/0	1
Helitack Asst. Mgr. FS1918/FS1919	GS-07/GS-08	18/8 Minimum	1
Squad Leader FS1986/FS1987	GS-06/GS-07	13/13 Minimum	2
Senior Firefighter FS0199/FS0200	GS-04/GS-05	13/13 Minimum	4
Apprentice AR5767/AR5768	GS-04/GS-05	13/13 Minimum	3
Firefighter FS0199/FS0200	GS-04/GS-05	Temporary	4

b. Recommended Standard 18-Person Crew Module

Position Description	Grade	Minimum Tours	Number of Position
Helitack Manager FS1920	GS-09	26/0	1
Helitack Asst. Mgr. FS1918/FS1919	GS-07/GS-08	18/8 Minimum	1
Squad Leader FS1986/FS1987	GS-06/GS-07	13/13 Minimum	3
Senior Firefighter FS0199/FS0200	GS-04/GS-05	13/13 Minimum	4
Apprentice	GS-04/GS-05	13/13 Minimum	3
Firefighter	GS-04/GS-05	Temporary	6

c. Recommended Standard 21-Person Crew Module

Position Description	Grade	Minimum Tours	Number of Position
Helitack Manager FS1920	GS-09	26/0	1
Helitack Asst. Mgr. FS1918/FS1919	GS-07/GS-08	18/8 Minimum	2
Squad Leader FS1986/FS1987	GS-06/GS-07	13/13 Minimum	3
Senior Firefighter FS0199/FS0200	GS-04/GS-05	13/13 Minimum	4
Apprentice	GS-04/GS-05	13/13 Minimum	3
Firefighter	GS-04/GS-05	Temporary	8

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Chapter 3. Rappel Position Standards

I. Rappel Pilot Training Requirements

IMPORTANT NOTE: The certifying official at each level may require additional training for pilot, check spotter, spotter or rappeller.

Pilots must meet the appropriate requirements of the contracting document and shall receive training on rappel operations and equipment as listed below. Pilots needing initial rappel certification shall attend a consolidated training session. Vendors may request approval from their designated base COR or base manager if an alternate date is necessary for a pilot who is unable to attend a consolidated rappel session for an initial rappel evaluation, i.e. emergency situation or illness.

The pilot will be evaluated and approved by an agency helicopter inspector pilot for rappel and cargo letdown in accordance with the Interagency Helicopter Pilot Practical Test Standards.

A. Pilot Rappel Training Syllabus

1. Crew resource management discussion with rappel program-specific emphasis
2. Review of operational risk management concepts and tools e.g., GAR model
3. Orientation of unit and agency fire suppression organization, dispatch organization, and communications
4. Briefing and familiarization on rappel anchor and hardpoint for specific model including maintenance inspection procedures
5. Briefing and demonstration of rappel equipment, accessories and PPE
6. Seating arrangements for rappellers and spotters
7. Standard IA configuration and deployment procedures
8. Cargo placement, loading, securing, rigging and letdown procedures
9. Helicopter mock-up training to include cargo letdown, rappel sequence, rappel emergency procedures simulation, and helicopter emergency procedures
10. Expectations for pre-rappel mission briefing
11. Review rappel site selection criteria including:
 - a. Personnel
 - b. Safety zones
 - c. Fire behavior
 - d. Emergency fly-away site, helicopter clearance, and ability to land rather than rappel

12. Pilot and spotter protocols and responsibility to cancel any mission deemed unsafe or too high risk

B. Approval

1. Pilot's final approval for rappel operations will be based upon:
 - a. Completion of spotter-provided briefing and training
 - b. Demonstrated ability to pilot the helicopter during a series of rappels and cargo letdown operations. Pilot's focus will be on spotter direction and aircraft health and stability, not on vertical reference placement of the rappellers
 - c. Demonstrated ability to coordinate with rappel spotter
 - d. Demonstrated knowledge of rappel emergency procedures during emergency procedures simulation and the aircraft emergency procedures' effect on rappel operations
 - e. Demonstrated ability to perform weight and balance computations (including center of gravity) for rappel configurations

C. Pilot Currency

To maintain currency, each pilot must fly at least one error-free helicopter rappel sequence within the preceding 21 days. If currency is lost, an error-free mockup and helicopter rappel sequence flight must be completed prior to any operational rappel. If a total of 28 days pass, the spotter, with the concurrence of the helicopter inspector pilot (HIP), will ensure the pilot is capable of deploying rappellers through the use of mockups and currency rappel flights.

IMPORTANT NOTE: Check spotters may suspend spotter or rappeller qualifications pending review of the next higher certifying level. Revocations of spotter and rappeller qualification will be determined at the appropriate Regional or National Aviation Office.

II. Rappel Check Spotter

A. Rappel Check Spotter Duties

1. Initial spotter evaluation and certification
2. Monitor and provide oversight for rappeller and spotter training
3. Monitor operations for standardization purposes

B. Rappel Check Spotter Prerequisites

1. Must have been a qualified spotter for three seasons

2. Must have demonstrated ability as a lead instructor at national rappel training sessions, of which at least one is an initial rappeller training

C. Rappel Check Spotter Designation

Approval of check spotters shall be designated annually by the national rappel specialist as requested by the regional helicopter operations specialist.

D. Rappel Check Spotter Proficiency

To maintain currency, each check spotter must maintain currency/proficiency as a rappel spotter (see Section III, G, of this chapter).

E. Rappel Check Spotter Annual Certification

Each check spotter must be certified as a rappel spotter (see Section III, E, of this chapter).

III. Rappel Spotter

A. Rappel Spotter Duties

1. Safely deploy rappellers according to policy outlined in this guide
2. Ensure only standard procedures and equipment found in this guide are used and followed
3. Provide initial and recurrent training and certifications for rappellers. Provide training in accordance with the Helicopter Rappel Spotter Qualification Record.

B. Rappel Spotter Prerequisites

1. Trainee rappel spotter prerequisites:
 - a. One fire season (90 days) on a helicopter rappel crew
 - b. Currently qualified as a helicopter manager
 - c. Completion of 20 live rappels, with four of those being operational
 - d. Other recommended training: M-410 or equivalent, contracting officer representative training, and operational risk management training
 - e. Ride-along on rappel and/or cargo missions
 - f. It will be the responsibility of the base manager, with concurrence of a check spotter, to designate initial spotter trainees
2. Rappel spotter certification prerequisites:
 - a. Currently qualified as a helicopter manager
 - b. Currently qualified as an incident commander type 4
 - c. Has assisted in instruction of rappel training
 - d. Completion of Forest Service-certified CRM course in accordance with FSH 5709.16, Ch.20, 21.1, 8 and 21.6

C. Rappel Spotter Training

Rappellers meeting the spotter prerequisites are encouraged to submit a nomination for the annual National Rappel Spotter Immersion Academy and request initiation of a Helicopter Rappel Spotter Training Qualification Record through their first-line supervisor. A spotter trainee is not required to attend the spotter immersion academy, however, they shall follow the same training curriculum found in Appendix B.

Complete the Helicopter Rappel Spotter Training Qualification Record and pass a final evaluation administered by a qualified check spotter. A spotter trainee will have no more than two opportunities to pass a check ride per season. Trainees' future status will be determined (i.e. continue or discontinue training) and documented by majority of available check spotters. Check spotters shall notify candidate's base manager prior to evaluation and RTS post evaluation.

D. Rappel Spotter Initial Certification

The spotter trainee shall recertify as a rappeller, complete all training requirements as a spotter, be recommended for certification by a check spotter, be reviewed by the regional helicopter operations specialist, and be certified by the local unit official. The national rappel specialist shall be notified upon certification.

E. Rappel Spotter Annual Certification

Annual spotter certification requires training and demonstration of competency.

1. Each year, to obtain annual certification, a spotter must:
 - a. Obtain annual certification as a rappeller
 - b. Maintain Forest Service CRM currency in accordance with FSH 5709.16, Ch.20, 21.1, 8 and 21.6
 - c. Complete annual certification as outlined in the Annual Spotter Certification Training Record
 - d. Complete deployment of three typically-configured loads of rappellers with at least one successful deployment of rappellers and cargo from helicopter to the satisfaction of a qualified check spotter. Typical terrain and a full complement of initial attack cargo shall be utilized for at least one of the three loads.
 - e. A spotter will have no more than two opportunities to obtain annual certification. After the second failed check ride, a spotter will not be an active spotter for that operational season.

F. Spotter Trainee Annual Certification

Spotter trainees need to meet all annual certification requirements as a rappeller. Additionally, a spotter trainee that is approved to spot operationally shall perform three live spots with a qualified spotter in typical terrain, one of which shall be with a check spotter.

1. If trainee is approved to spot live, they must complete annual certification as outlined in the Annual Spotter Certification Training Record
2. Spotter trainees who are not approved to spot live will continue as directed in the Spotter Trainee Qualification Record

G. Rappel Spotter Currency

To maintain currency, each spotter shall make at least one error-free helicopter spot in any 14 consecutive days. If a simulator or mockup spot is used to maintain currency during any 14-day period, a helicopter spot must be completed during the next 14-day cycle. If currency is lost, an error-free mockup and helicopter spot must be completed prior to any operational spots. If two currency periods pass (28 days), a qualified spotter will ensure the spotter is capable of performing the spot through the use of mockups or training spots.

H. Rappel Spotter Lapsed Annual Certification

If a spotter has lost his/her annual certification for a time period of two operational seasons (skipped two seasons of certification), the individual shall complete rappel spotter annual certification requirements (see Section III, E above) and will operate under direct supervision of a qualified spotter for a time period determined by a check spotter. A check spotter may use past performance and experience as a means to determine an acceptable time period.

After performing under supervision for the prescribed time period, a formal check ride will be conducted utilizing the Spotter Training Handbook Final Sign-Off Sheet. It is recommended that the check ride occur on an operational rappel. If the individual fails the check ride, he/she will be required to begin spotter training as an initial spotter candidate.

If a previously qualified spotter has not been certified in the three previous operational seasons, the individual will begin spotter training as a new spotter candidate in accordance with Section III, C and D above.

IV. Rappeller

A. Rappeller Prerequisites

For consideration as a rappeller, a rappeller candidate must meet the requirements for a helicopter crewmember trainee as stated in Forest Service policy.

B. Rappeller Initial Training

All components of the rappel training must be completed in accordance with Appendix A of this guide.

C. Rappeller Annual Certification

To be certified as a rappeller, an individual who has qualified the previous year will:

1. Participate in an equipment and procedures review
2. Demonstrate knowledge of rappel principles
3. Complete the performance-based requirements outlined in Part D., Rappeller Performance-Based Requirements, below

D. Rappeller Performance-Based Requirements

To be qualified as a rappeller, an individual must perform a number of error free performance-based rappel procedures. Refer to Appendix C Forms - Annual Certification.

1. The performance-based standards are as follows (a.-d. will be completed from an elevated platform with full rope weight):
 - a. Perform three simulator exits
 - b. Perform one simulator re-entry from each side
 - c. Untie three knots during simulator rappels
 - d. Complete three emergency tie-off procedures (ETO)
 - e. Perform helicopter mock-up rappels and re-entry procedures as initiated by the spotter, until proficiency is demonstrated from all seating positions
 - f. Complete three helicopter rappels, typical terrain shall be utilized for at least one of the three rappels
 - g. If a veteran rappeller commits a major penalty during live rappels in a vet re-certification, the rappeller will be removed from that consolidated training session. Based upon past performance, the error committed, and spotter/check spotter discretion, the rappeller may be given a second opportunity at the next available consolidated training session. This will be the last opportunity to re-cert for a given year. If a second major is committed, the rappeller will not be certified to rappel that season.

E. Rappeller Currency

To maintain currency, each rappeller shall make at least one error-free helicopter rappel, helicopter mock-up, or simulator rappel in any 14 consecutive days. If a simulator or mockup is used to maintain currency during any 14-day period, a helicopter rappel must be completed during the next 14-day cycle. If currency is lost, an error-free simulator rappel or mockup and a helicopter rappel must be completed prior to any operational rappels. If two rappel periods pass (28 days), a qualified spotter will ensure the rappeller is capable of performing the rappel through the use of mockups and training rappels.

F. Rappeller Mid-Season Error

If during the operational season a rappeller commits an error during a live rappel (proficiency or operational), the spotter will determine the severity of the error and follow one of the courses of action listed below. See Appendix A, Rappeller Training Syllabus, Lesson One, for a full description of errors and penalties.

1. Mid-season major:

If a rappeller commits a major error during a live rappel (proficiency/operational) the spotter will not allow the rappeller to continue. Upon return to the base, the rappeller will be debriefed and placed in loss-of-proficiency status. The major error must be reviewed by the rappeller's supervisor and a check spotter. The rappeller may regain operational status once proficiency performance elements are met (this may include additional live rappels).

Based upon the rappeller's demonstrated ability and record of errors, a check spotter may suspend the rappeller from further rappel operations (see note box, Chapter 3, II). Once suspended, the rappeller will not be eligible for reinstatement during that calendar year and may only regain certification by attending annual certification training in a subsequent year.

2. Mid-season minor:

Occasional minor errors should be handled at the crew organizational level (spotter/direct supervisor) and only be elevated to a check spotter if it becomes habitual and cannot be rectified otherwise.

G. Rappeller Lapsed Annual Certification

If a rappeller has lost his/her annual certification for more than two consecutive operational seasons, that individual may recertify as a rappeller by attending a consolidated rappel training session and completing the requirements for rappeller annual certification (see Appendix A, Rappeller Training).

If a recertifying rappeller cannot consistently demonstrate proficiency during the rappeller annual certification training, the individual may only be recertified by the successful completion of rappeller initial training requirements (see Chapter 3, IV, B above).

If three or more consecutive seasons elapse since the individual's last certification as a rappeller, the individual shall complete rappeller initial training requirements at a consolidated rappel training.

H. Rappeller Fitness Standards

All rappellers must meet Office of Personnel Management Qualification Standards Handbook requirements for positions under the General Schedule. In addition, these individuals must meet the following annually:

1. Current requirements for medical standards
2. Rappeller candidates must pass the Work Capacity Test at the arduous level

I. Desired Fitness Goals

Physical fitness is a core value of the rappel program. Training to build strength and cardiovascular endurance should be a component of preseason and seasonal training.

All rappel personnel shall maintain a high fitness level and be able to perform all physical tasks that are necessary to accomplish the rappel and firefighting mission.

1. It is recommended that all personnel perform the elements listed below as a way to measure cardio-respiratory endurance and muscular fitness.
 - a. 1.5-mile run in 11 minutes
 - b. 25 push-ups in 60 seconds
 - c. 7 pullups
 - d. 3-mile, level terrain, pack-out with 85 lbs. in 90 minutes or less

Chapter 4. Rappel and Cargo Letdown Equipment

I. Equipment Standards

**IMPORTANT NOTE: Approved rappel equipment is identified on the Wildland Fire Helicopter Rappel website:
<https://www.fs.fed.us/t-d/programs/fire/rappel/index.htm>**

All equipment used in rappel operations will be approved by the National Rappel Working Team. All equipment will be monitored during use for wear and stress-related damage. Shortening the service life or removing a component from service may be done as necessary to maintain an adequate margin of safety within the program.

A Rappel Equipment Inspection Form shall be maintained for the life cycle of the rappel rope, descender, rappeller tether, rappel harness, spotter harness (including extendable tether), spotter anchor, and cargo letdown line.

Any equipment irregularities must be reported in accordance with Appendix E, Rappel Equipment Irregularity Reporting Protocols.

All rappel equipment that is removed from service (retired) must be destroyed to the point that it can no longer be utilized for its intended purpose. All rappel equipment that has been retired remains government property and should be handled according to policy.

All proposed rappel aircraft shall be subject to a screening and evaluation process, to be completed by the Helicopter Screening and Evaluation Board (HSEB).

II. Rappel Platform Training Simulator

IMPORTANT NOTE: See NTDP Tech Tip 0857–2354–MTDC for more information on tower design and construction.

A rappel platform simulating the cabin area, seating positions, and skid heights of the helicopter will be utilized to train rappellers.

A. Tower and Simulator Requirements

1. A minimum height of 20 feet above ground level. Rappeller experience will be greatly enhanced from a higher platform
2. The tower, stairs, platform, handrails, rappel anchor and spotter tether attachment point shall meet agency and OSHA requirements for construction (Walking-Working Surfaces/1910)

3. The rappel anchor and spotter tether anchor must meet OSHA standards for fall arrest (Fall Protection Systems Criteria and Practices/1926.502; Safety belts, Lifelines and Lanyards/1926.104)
4. Rappel tower should be inspected annually and daily before any use. A program manager may delegate inspections. Example inspection forms can be found in Appendix C

III. Individual Rappeller/Spotter Equipment

A. Nomex Clothing and Boots

Spotters and rappellers shall wear a Nomex shirt and Nomex pants or a Nomex flight suit for rappelling operations. If wearing a Nomex flight suit while rappelling, clothing under the flight suit shall be dictated by mission requirements (e.g., fireline PPE). Boots shall meet National Fire Protection Association (NFPA) standards for fireline operations (see FSH 6709.11, Chapter 20 for boot standards).

B. Helmets

Rappel personnel shall comply with the standards set forth in the 2018 Interagency Aviation Life Support Equipment Guide (ALSE), and the USFS/DOI 2019 Aviation Helmet Standard document: <https://www.doi.gov/aviation/library/guides>

C. Eye Protection

For any rappel operation, rappellers must wear eye protection that meets ANSI Z87.1. A flight helmet with the visor down meets this requirement.

D. Gloves

1. Spotters shall, at a minimum, wear approved flight gloves. For additional heat protection, spotters may wear a rappel-type glove for cargo letdown. The Sullivan PV (short) glove, the Sullivan PVG (gauntlet) glove, the PMI GL2200 Lightweight Rappel Glove, and the Metolius Climbing $\frac{3}{4}$ Finger Glove are approved for cargo letdown operations. The Metolius glove shall only be used in conjunction with a flight glove.
2. Rappeller's gloves shall be all leather, with double-leather palms and fingers, and provide sufficient heat protection during a rappel descent. For wildland-fire rappel operations, the Sullivan PV (short) or PVG (gauntlet) rappel gloves are approved.
3. Inspection:
 - a. Inspect stitching for abrasion and wear
 - b. Leather should be free from cuts or holes. Pay special attention to the area between thumb and forefinger
 - c. Leather should be inspected for oils, pitch or other contaminants
 - d. Hook and loop Velcro should adhere well when pressed together
 - e. Gloves must be inspected by user prior to each use

E. Belly Deployment (BD) Bag

1. Criteria:

BD bag must be constructed in accordance with drawing #MTDC-1115. The maximum weight of the BD bag shall not exceed 30 pounds. The female end of the click-lock buckle must be attached to the harness by a webbing loop manufactured in accordance with drawing #MTDC-1023. The webbing loops/buckles must be attached to the rappel harness according to the directions in Appendix F - Specified Equipment Attachment Standards. Loose straps must be secured to prevent entanglement during the rappel process.

2. Inspection:

- a. BD bags must be inspected by user prior to operation
- b. Inspect stitching and fabric for abrasion and wear
- c. Zipper should function properly and store completely in pocket
- d. Check to ensure all buckles function properly

F. Required Minimum Personal Rappeller Equipment

1. The following items are essential and must be carried on each rappeller during any rappel operation. These items are to provide essential safety and survival equipment in the event cargo equipment delivery is delayed.

- a. Fire shelter
- b. Hard hat
- c. Leather gloves
- d. Headlamp
- e. 2 quarts of water
- f. First-aid kit
- g. 10 AA batteries
- h. Space blanket/sleeping bag
- i. Food (1 meal)
- j. 1 fusee
- k. Line gear
- l. BD bag

2. The remaining items must be carried with each stick (2) of rappellers:

- a. Radio
- b. Compass
- c. Map of the area or GPS with appropriate maps installed.

g. Required Minimum Rappeller Initial Attack Cargo Equipment List

1. In addition to the items carried by each rappeller, the following items shall be packed into an approved container and delivered to each stick of rappellers:
 - a. Food for 36 hours
 - b. 3 gallons of water
 - c. 2 hand tools
 - d. 1 tent fly (9'x10')
 - e. 1 roll of toilet paper
 - f. 6 trash bags
 - g. 1 first-aid kit
 - h. 2 pack-out bags
 - i. 1 water treatment
 - j. 1 box (24) AA batteries
 - k. 2 rolls of flagging
 - l. 100 ft. of parachute cord
 - m. 1 roll of fiber tape
 - n. 1 weather kit
 - o. 6 fusees
 - p. 1 bastard file
 - q. IC kit/paperwork
 - r. 1 pen
2. A power chainsaw, crosscut saw, fuel, oil, necessary accoutrements, and additional water may be packaged in approved cargo containers and delivered to rappellers.
3. Potable water and other small items may also be packaged in an approved 5-gallon cube that is harnessed (#MTDC-1087) and delivered along with the cargo and chainsaw equipment containers.

H. Spotter Harness

Rappel and cargo letdown spotters shall wear the Miller Revolution Harness during all helicopter rappel/cargo letdown and tower operations. The harness shall be issued and tagged with a unique identifier that corresponds the date of manufacture. Harness tags from the manufacturer may be used.

1. Two harness sizes are available:
 - a. The small/medium size model RDT-QC/S/MBK will fit most spotters
 - b. A larger size harness model RDT-QC/UBK is also available
2. Inspection:

IMPORTANT NOTE: The following equipment must have a date stamp or tag and will have a life cycle of 10 years from the date of manufacture: extendable spotter tether (NTDP-1132), ARS spotter anchor, Yate's rappeller tether, HR4 Rappel Harness, Miller Revolution spotter harness, and cargo letdown lines (MTDC-983).

- a. The spotter harness must be inspected by the user prior touse
- b. Inspect stitching and webbing for abrasion, wear or other damage
- c. Check leg strap buckles, chest strap buckles, dorsal D-ring and adjusters for correct adjustment and function
- d. Check pivot link connectors for correct function
- e. Each spotter harness shall have a date tag and will have a life cycle of 10 years from the date of manufacture
- f. A Rappel Equipment Inspection Form shall be maintained for the life cycle of the spotter harness

I. Extendable Spotter Harness Tether

The extendable spotter harness tether is the interface between the spotter harness's dorsal attachment point and an approved hardpoint. The extendable spotter tether for the Miller Revolution Harness RDT-QC/S/MBK and RDT-QC/UBK will be manufactured in accordance with drawing #NTDP-1132.

1. The harness tether in its non-extended configuration shall be adjusted to an overall length of 27 inches to prevent the harness dorsal attachment point from extending past the door sill of the helicopter. The tag end of webbing that locks the adjuster shall be tacked onto the webbing loop that passes through the dorsal D-ring using nylon 'Super Tack' cord or a $\frac{3}{4}$ " bar tack as shown in Appendix F.
2. The Rock Exotica rockD Lanyard Pin Carabiner (C2S LPAA) is attached to the free end of the spotter tether connecting to a STC or manufacturer-approved helicopter hardpoint, tower hardpoint, or other approved tether attachment point.

3. The tether is designed to extend an additional 18 inches in length, as necessary, to assist a rappeller in distress or to clear a letdown operation. To extend the tether, the spotter will depress the two side-release buttons while putting slight pressure on the tether, making sure the buckle halves release. The additional tether webbing will deploy as tension is added to the tether. There is no need to manually deploy or unfasten the pull-the-dot snap straps when deploying the tether extension. When the extended length is no longer required, the spotter will reconnect the ISC buckle as soon as practical. The extendable section of webbing will be re-secured by refastening the pull-the-dot snap straps when the mission has ended.
4. If a spotter releases the extendable section of the tether to assist a rappeller or cargo letdown problem during tower training, a proficiency rappel, or an operational rappel, that action is considered a reportable event. The SAFERAP system will be used to report such deployments whenever they occur.
5. Each spotter harness tether shall have a date stamp or tag and will have a life cycle of 10 years from the date of manufacture.
6. Inspection:
 - a. The tether shall be inspected with the spotter harness prior to operation. A shared Rappel Equipment Inspection Form may be utilized to document both the harness and tether.
 - b. Inspect stitching and webbing for abrasion, wear or other damage
 - c. Metal hardware should be free from cracks, dings or other damage
 - d. Extendable tether material must be stowed and captured by the pull-the-dot snap straps
 - e. Meets lifetime criteria for use (10 years)

J. Rappel Spotter Anchor

1. The means for attaching the rappel spotter tether to the aircraft will be the Air Rescue Systems (ARS) Anchor (18”).
2. The ARS Anchor will be installed in the aircraft as outlined in Chapter 5, IV, C, of this guide in accordance with the ELAM STC installation instructions.
3. Each ARS Anchor shall have a date stamp or tag and will have a life cycle of 10 years from the date of manufacture. A unique base identifier must be added to the tag, which will correspond to an ARS Anchor Rappel Equipment Inspection Form.
4. Inspection:
 - a. Inspect stitching and webbing for abrasion, wear or other damage
 - b. Attachment ring and oval links should be free from cracks, dings or other damage. When installed, the oval links shall be wrench tightened.
 - c. Meets lifetime criteria for use (10 years)

- d. Rappel Equipment Inspection Form shall be maintained for the life cycle of the ARS anchor. At a minimum, annual pre-use inspections must be documented in a Rappel Equipment Inspection Form.
- e. Spotter Anchor is a component of a daily rappel rigging check, performed by a qualified spotter.

K. Rappel Harness System

The Rock-N-Rescue HR-4 Wildland Fire Rappel Harness System is comprised of several components, each requiring special consideration. This harness is the only harness approved for wildland-fire rappel missions.

1. HR4 Rappel Harness: This harness shall be issued and tagged with a unique identifier. Harness tags from the manufacturer may be used. The harness will be donned over the user's head without disconnecting any hardware equipment.
 - a. Harness inspection:
 - i. The harness and connecting hardware must be inspected by the rappeller prior to operation
 - ii. Inspect stitching and webbing for abrasion, wear or other damage
 - iii. Check buckles and adjuster hardware for damage and correct function
 - iv. Each harness shall have a life cycle of 10 years from the date of manufacture
 - v. A Rappel Equipment Inspection Form shall be maintained for the life cycle of the rappel harness
2. The Rock Exotica rockD Lanyard Pin Carabiner (C2S LPAA) will be attached to the webbing bridge of the HR4 harness with the lanyard pin installed (FIGURE 4-1).

- a. Carabiner inspection:
 - i. Check all parts for cracks, deformation, corrosion, wear, etc. Verify that the gate and sleeve close, lock and function properly in every respect. The key slot must not be impaired by dirt, corrosion, etc. Ensure that the lanyard pin is in place and secured by the locking setscrew.
 - ii. Fully open the gate of the carabiner, then release. Ensure that the gate locks upon closing.



Figure 4-1

b. Replacement of carabiner:

The carabiner shall be installed by a qualified spotter. Proper installation shall be independently verified by an additional rappeller/spotter prior to use, and the Rappel Equipment Inspection Form sheet shall be updated to reflect the replacement.

L. Yate's Rappeller Tether

The rappeller tether shall be used as a secondary restraint during the rappel sequence and not removed until the rappeller weights the descent system and is given the rappel signal. The built-in shock attenuator ("screamer") is designed to deploy if the tether is subjected to a 600 pound force. Retire the tether if it is subjected to or shows evidence of a fall.

IMPORTANT NOTE: Any equipment item with lifetime retirement criteria shall be retired once it meets that time limitation. If manufacturer's date stamps become illegible, damaged or lost, the equipment shall be retired and documented. Any equipment with a lifetime limitation that cannot be age-verified shall be retired.

1. Each rappel tether shall have a date tag and unique identifier and will have a life cycle of 10 years from the date of manufacture.
2. Inspection:
 - a. Inspect stitching and webbing for abrasion, wear or other damage
 - b. Hardware must be free from cracks, dings or other damage
 - c. Check snap shackle for proper function
 - d. Inspect shock attenuator ("screamer") for wear and evidence of deployment
 - e. When installed, the oval links shall be wrench tightened
 - f. Meets lifetime criteria for use (10years)
 - g. A Rappel Equipment Inspection Form shall be maintained for the life cycle of the rappeller tether. At a minimum, annual pre-use inspections must be documented in the rappeller tether Rappel Equipment Inspection Form.
 - h. Rappeller tethers are a component of a daily rappel rigging check, performed by a qualified spotter

IV. Rappel Rope

A. Rope Standards

The only rope approved for helicopter rappel operations is the 11mm Bluewater Armortec Rope. This is an aramid, polyester and nylon kernmantle rope with a breaking strength of 8200 pounds. Each rope end will be terminated using a dual sewn termination and metal thimble. Rope lengths of 250' and 300' are approved for helicopter rappel operations. For easy identification, 300' ropes will be designated with a black tracer stitch running the length of the rope. Ropes of other lengths may be utilized for tower and training purposes.

The rope length, serial number, part number and date of manufacture are listed on both ends of the rope under the plastic termination protectors. Each rope end protector must be marked "A" or "B" with a permanent marker. These identifiers will be used to track rope usage.

B. Procedures for Putting New Rappel Ropes into Service

1. Remove new rope from packaging and randomly flake into a pile on a clean, dry surface (not concrete or asphalt).
2. Carefully inspect the entire rope, including terminated ends and thimbles, for defects or abnormalities.
3. Mark each end with an "A" or "B", create a new Rappel Equipment Inspection Form documenting the pre-use inspection, and enter the rope serial number into RapRec.
4. Secure the rope to a properly sized rope bag and flake the rope into the bag.
5. Place an Ok tag on the thimble.

C. Rope Care

1. Drying wet ropes:

If ropes become wet, the ropes should be air dried away from direct sunlight. Do not dry ropes on concrete or asphalt surfaces; chemicals in concrete and asphalt can contaminate and damage ropes. Never dry a rope in a clothes dryer. Ropes shall be inspected once dry.

2. Rope cleaning:

Ropes may be washed using a mild soap and cool water bath. Rope specific soaps are available from multiple manufactures (examples of acceptable cleaners are Edelweiss Rope Wash, Beal Rope Cleaner, Sterling Rope Wash, and PMI Rope Soap). Completely submerge the rope in soapy water and agitate to remove dirt particles. Rinse well in several baths of clean water. It is extremely important to remove all soap residue, as leftover soap will attract dirt. After rinsing, loosely coil

the rope and air dry in the shade. Never use cleaners with bleach or bleach substitute. Never wash or dry a rope in a washing machine or dryer. Once dry, inspect the rope.

3. Extending service life:

- a. Avoid stepping on ropes
- b. Avoid prolonged exposure to sunlight - dry ropes in the shade
- c. Avoid exposure of ropes to rough surfaces
- d. Avoid dragging ropes on the ground
- e. After ropes have been released from helicopter, avoid dragging ropes across limbs and brush whenever possible
- f. Avoid contact with all chemicals that may contaminate rope
- g. Keep ropes away from heat sources
- h. Avoid laying ropes on concrete or asphalt

4. Storage:

All ropes shall be stored under clean and dry conditions. After being placed in service, ropes may be stored in rope bags, provided that clean, dry storage conditions prevail.

D. Rope Use

Rope use and inspection criteria have been developed based on manufacturer recommendations along with guidelines from the Cordage Institute regarding the inspection of kernmantle ropes.

1. No rope shall be used for more than five years from the date of manufacturing.
2. Helicopter rappel rope-use information shall be kept for each rope utilizing the RapRec system. Information entered RapRec shall include:
 - a. The length, date, type and location of rappel
 - b. The name of the rappeller(s) that used the rope
 - c. The end of the rope that was attached to the helicopter or tower
3. No rope shall be used if it shows evidence of overheating, visible damage that would compromise its strength or safety, or contamination with foam concentrate, retardant or any petroleum product.

E. Rope Inspection

Ropes shall be inspected and documented after each use and at the beginning of each season.

1. The strength of a kernmantle rope resides in the core of the rope. Because you cannot see the core, it is important that inspections thoroughly evaluate the core by feeling the rope. The core of the rope should be uniform when felt by hand. Any abnormalities must be brought to the attention of a spotter. Additionally, if the core or inner sheath fibers can be visually seen through the aramid sheath, the rope should be removed from service. To inspect, first untangle the rope into a loose, knot-free or "flaked" pile on a clean surface. Next, inspect a short section at a time. Feel the rope, without gloves, for deformities, burrs, or anything out of the ordinary. Look for visual indications of abuse, such as cuts, core damage, or heat glazing. If damage is apparent, remove the rope from service and document it on the Rappel Equipment Inspection Form. The entire length of the rope should be inspected regardless of the length of rope rappelled.
2. Thimbles and sewn terminations shall be inspected after each use. Inspect thimbles for deformities, cracks and sharp edges. Sharp edges of thimbles may be smoothed using an emery cloth or a fine file. Make sure metal filings do not drop into the rope weave. Visibly inspect the sewn terminations through the plastic protective cover. Any rope with termination thread that appears to have been broken, cut, pulled, or damaged in any way, should be retired.
3. After the rope has been inspected and Ok'd for service, a tag will be placed through the thimble to signify the rope is ready for use (see FIGURE 4-2).
4. To maintain even wear and to maximize each ropes' useful life, rope ends will be rotated after each rappel sequence. To track this, each end shall be marked "A" and "B" respectively. Permanent marker shall be used to mark ends on the protective plastic wrap that covers the terminations.
5. A Rappel Equipment Inspection Form shall be maintained for the life cycle of the rope.



Figure 4-2

F. Rope Service Life Factors

1. Dirt:

Any contaminant that works into the fibers and construction of the rope can cause deterioration. Mud, dirt and sand can cause abrasion damage to rope fibers and descenders. Because of the potential for fiber abrasion, ropes should not be stepped on. Look for excessive mud and dirt and wash the rope as needed. Feel the rope for particles that could possibly work into the rope. Avoid dragging the rope over the ground.

2. Chemicals:

Contact with acids or bleach must be avoided. Chemical damage to ropes can occur and may not be visually detected. Because of this potential hazard, ropes should always be stored in a rope bag away from batteries and chemicals. Alkalis, oxidizing and reducing agents (e.g., bleach, fire retardant or foam) are all known to damage ropes.

3. Cross-Contamination:

Any surface that ropes or other rappel gear may contact should be inspected for the presence of contaminants. Textiles and leather can absorb and transfer contaminants to other gear. Petroleum products can reduce the friction between the rope and the descender. Pitch from coniferous trees can increase the friction between the rope and the descender, making it more difficult to descend. Fire retardant contains powerful corrosive agents that can damage ropes and metal hardware. Any source of contamination, including dirty fire shirts, chainsaw bar oil stains, dirty Nomex pants, and dirty/retardant-covered line gear, must not be allowed to contact ropes, gloves, harnesses, descenders, carabiners and any other rappel gear. Ropes and rappel gear should always be stored in a clean, dry, chemical-free, rodent-proof lockers or vehicle compartments when not in use. The interior seats and cabin of helicopters used for rappelling must be kept exceptionally clean.

V. Descender

A. Descender

The ISC D4 Work/Rescue Descender, shall be used for all rappel operations. This is a bobbin/cam squeeze-type descender. The descender shall only be used with 11mm Bluewater Armortec Rope. Each descender will have a unique serial number factory stamped on the cover of the descender.

1. Helicopter rappel use information shall be kept for each descender utilizing the RapRec system. Information entered into RapRec shall include:
 - a. The length, date, type and location of the rappel
 - b. The name of the rappeller that used the descender

B. Configuration

There is only one correct configuration for this descender. The rope attached to the anchor of the tower or helicopter will be routed around the cam in the direction of the engraved arrow and pass between the bobbin and cam as



Figure 4-3

shown in Figure 4-3. The cover must be closed with the button out. The attachment carabiner must be securely captured. All rappellers will demonstrate proficiency in descender rigging prior to rappelling from towers or helicopters. **Improper rigging of the descender can lead to serious injury or death.**

C. Care and Inspection

1. To extend service life of equipment, be sure to:
 - a. Avoid rough handling
 - b. Do not drop or drag on the ground
 - c. Keep clean
2. Descender inspection:
 - a. Visually inspect the entire descender for damage and irregularities. Look for cracks, corrosion, sharp edges and deformation. Inspect the bobbin for the appearance of the brass wear indicator. If the brass wear indicator can be seen, retire the device. Sharp edges caused by carabiner contact can be smoothed out using an emery cloth or a small file. If the long axis of the carabiner attachment hole exceeds 1.25", retire the device.
 - b. Check for loose fasteners/components
 - c. Verify that the cam, when in primed position, moves freely
 - d. Ensure that the side plates align correctly. Pay attention to the push button to ensure it engages fully into the moving side plate when the cover is closed. You will hear an audible "click" when the frame seats correctly.
 - e. Verify that the handle rotates freely and that there are three audible "clicks" during a full handle rotation. Check that the interaction of the cam and handle is fully functional. To do this:

- i. Move the handle to primed position
 - ii. Open the moving side plate to expose the cam
 - iii. Apply and maintain pressure to the cam in the direction of the anchor
 - iv. Pull the handle through rappel position and into panic position. When steps iii and iv are performed, the function of the handle and cam should move together. When the handle reaches the panic position, the cam must snap forward in the direction of the applied pressure.
 - f. A Rappel Equipment Inspection Form must be maintained for the life of each descender.
3. Cleaning and lubrication:
 - a. If the device has been heavily soiled, pay close attention to the motion of the parts to ensure that dirt and foreign objects have not entered and compromised the mechanism. If there is any doubt about the function of the device, retire it. If the device becomes dirty, it is acceptable to wash and lubricate the device following these manufacturer recommendations:
 - i. Using warm (< 85 degrees F) water and mild household detergent, wash the device using a soft cloth or nylon brush. Do not submerge the device completely in the detergent/water. Rinse the device thoroughly in clean water, and allow to dry naturally, turning the device several times during drying to ensure that trapped water is allowed to drain.
 - ii. Apply a small amount (1-2 drops) of light oil such as 3-IN-ONE oil to the push button, moving side plate rivet head, and handle. Cycle the device a few times to distribute the oil.
 - iii. Complete a descender inspection prior to returning to service and include comments regarding the cleaning in the Rappel Equipment Inspection Form.

VI. Ancillary Equipment

A. Carabiners

The only carabiners approved for life bearing use shall be the Rock Exotica rockD Carabiner (C2S AA), and Rock Exotica rockD Lanyard Carabiner (C2S LPAA).

For cargo letdown operations, the SMC Lite Stainless Steel Locking (Bright) Carabiner will be used. Ensure that carabiners are stamped “*MEETS NFPA 1983 (2001 ED)*” or newer.

IMPORTANT NOTE: Carabiners are designed to be loaded longitudinally – if loading occurs on the side or gate, failure may occur.

1. Inspection before and after each use:
 - a. Check all parts for cracks, deformation, corrosion, wear, etc
Verify that the gate and sleeve close, lock, and function properly in every respect. The key lock slot must not be impaired by dirt or corrosion
 - b. Carabiners shall be inspected prior to each use
2. Retire from service and destroy if the equipment:
 - a. Arrests a fall or is exposed to other extreme loading
 - b. Does not pass inspection or there is any doubt about its reliability
 - c. Is misused, altered, damaged, or exposed to harmful chemicals
3. For programs wishing to identify their equipment, the following information is offered:

It is only acceptable to use a hand-held, electric-type engraver to place identifying marks on hardware. DO NOT strike with a hammer and stamps or use other similar methods.

Once the marking process has been completed, ALWAYS inspect the product for proper fit and function PRIOR to returning it to service. For carabiners, it is recommended to mark along the spine of the frame. DO NOT mark on or near the lock or pivot tabs of the frame and stay away from rope bearing areas. DO NOT mark on the gate. For steel and stainless-steel products, use a medium setting with medium to heavy pressure. For aluminum products, use a low setting with light to medium pressure. Depth of engraving equal to the thickness of a piece of paper should be enough to last the life of the product.

B. Knife/Knife Sheaths

All rappellers and spotters are required to have an approved knife with lanyard readily accessible for emergency use. The only approved emergency knife is the Raptor Knife (dual blade).

IMPORTANT NOTE: Spotter and rappeller will independently verify the work performed and document their inspection by signing off in the Rappel Equipment Inspection Form.

1. The rappeller knife shall be enclosed within the NTDP rappeller knife sheath (#MTDC-1041) and attached to the rappel harness in the manner shown in Appendix F.
2. The spotter knife shall be enclosed within the NTDP rappel spotter knife sheath (#MTDC-1042) and attached to the spotter harness on the left shoulder strap as shown in Appendix F.

3. Inspection:

- a. Knife sheaths are to be inspected during a harness inspection. Inspect fabric and stitching for cuts and abrasion. Inspect bar tacks and attachment loops for damage
- b. Knives shall be inspected annually prior to field season and prior to being installed on a harness. Inspections shall be documented in the Rappel Equipment Inspection Form
- c. Ensure knives used for rappelling have properly installed blades. Knife blades shall be replaced after any use.
- d. Handle/body of knife should be free from damage; screws should be tight
- e. Ensure the lanyard is stowed and attached as shown in Appendix F
- f. Pull snap(s) should close/open with enough resistance to prevent inadvertently opening

C. Cargo Restraints

Rappel cargo within the aircraft cargo area (transmission-well positions) shall be restrained by one of the following cargo restraints:

1. Davis Aircraft Products Part #FDC6400-569-1-080-80-10
2. NTDP-1156 Helicopter Cargo Restraint

D. Cargo Area Barriers

Cargo area barriers shall isolate the passengers from the cargo area (transmission wells). The contracting document provides specifications for approved cargo area barriers. Barriers shall be provided by the helicopter vendor.

E. Rappel Anchors

The approved anchor for USFS Bell medium helicopters is the USDA Forest Service External Load Attach Mechanism (ELAM) Rappel Anchor, STC #SH261WE. The anchor shall be inspected and documented daily by the vendor in accordance with the ELAM Rotorcraft Maintenance Manual Supplement (RMMS).

IMPORTANT NOTE: Contact USFS aerospace engineer at 208-387-5877, or the National Rappel Specialist at 208-387-5634 to obtain electronic versions of the installation and inspection standards for the External Load Attach Mechanism (ELAM), including the ring and stud fittings.

The maximum equipped weight of a rappeller, including full protective clothing, boots, BD bag, rappel harness, rope and flight helmet may not exceed 300 pounds (this is an equipment limitation: rappel anchors are not certified for use with static loads exceeding 300 pounds).

1. Spotter shall visually inspect the anchor daily. The helicopter mechanic shall be notified if any of the following conditions are discovered:
 - a. Loose or missing hardware
 - b. Unusual wear patterns
 - c. Corrosion or damage

VII. Cargo Deployment Equipment

A. Figure 8 with Ears

For wildland fire rappel and cargo letdown operations, the steel or aluminum CMC Rescue 8 with ears are the only approved letdown device. To rig the figure 8, a loop of the letdown line is passed through the center opening of the figure 8, and over the top. A technique referred to as a “double wrap” can be used for heavier loads. To perform a double wrap repeat the original process.

1. In order to extend the service life:
 - a. Avoid rough handling
 - b. Not drop or drag on the ground
 - c. Keep clean
2. Inspection:
 - a. Inspect for grooves developing in figure 8. When a groove develops beyond the anodized surface of the aluminum figure eight, wear will rapidly occur. If the groove is beyond 1/16” deep, retire the figure 8
 - b. Inspect the figure 8 for aluminum flaking. This develops rough edges that could cause excessive wear on the line. If flaking is evident, remove the figure eight from service
 - c. Inspect for cracks or breaks. If cracks are evident, retire figure 8
 - d. Figure 8 must be inspected by a spotter prior to each use

B. Carabiners

1. Only the SMC Lite Stainless Steel Locking D Carabiner (bright) is authorized for cargo letdown use. See Chapter 4, VI, A, above for additional carabiner standards.

C. Cargo Letdown Lines

1. Letdown lines are available in lengths of 250 feet or 300 feet. Both letdown lines shall conform to military specification, Mil-W-5625K, for ¾” woven nylon tubular webbing. Webbing conforming to this standard has a minimum breaking strength of 2,300 pounds. Each letdown line will be identified by a unique base identifier, with all letdown uses being tracked through the RapRec system. Identifiers shall be marked on each end of the line.

2. Letdown lines of 250 feet in length will be of $\frac{3}{4}$ " white tubular nylon webbing. Letdown lines of 300 feet in length will be of $\frac{3}{4}$ " yellow tubular nylon webbing, and both lines will conform to drawing #MTDC-983.
3. To maintain even wear and maximize each line's useful life, line ends will be rotated after each use. To track equipment usage, each end shall be marked "A" or "B".
4. A 25-foot section from each end and a 10-foot section in the middle of each letdown line shall be clearly marked with black dye. Use only Rit Dye to mark lines.
5. Accordion Packs:
 - a. Accordion packs will be constructed as to easily identify a 250-foot letdown line from a 300-foot letdown line.
 - b. Accordion packs for 250-foot letdown lines will be constructed of white cotton duck cloth with black seam tape. Accordion pack construction will conform to #MTDC-974.
 - c. Accordion packs for 300-foot letdown lines will be constructed from white cotton duck cloth with yellow seam tape. Accordion pack construction will conform to #MTDC-1037.
 - d. To further identify accordion packs, 1-inch stencils will be used to mark the outside surface of accordion packs with the length of letdown line to be used.
6. Packing of letdown lines:

Letdown lines will be packed in accordance with the "Wildland Fire Helicopter Rappel Cargo Letdown Accordion Pack" video produced by NTDP. Edge protection may be necessary along helicopter door edge or helicopter skids to reduce abrasion of the line.
7. Inspection:
 - a. Letdown lines shall be inspected and documented annually prior to field season, and after every use
 - b. RapRec will be used to track letdown line use history
 - c. Letdown lines will be inspected for wear and burns after cargo deployment and have the ends reversed for the next letdown sequence
 - d. Inspect stitching and webbing for abrasion, wear, cuts, chemical contamination or other damage

- i. No letdown line shall be used for more than 10 years from date of manufacture
- ii. A Rappel Equipment Inspection Form shall be maintained for the lifecycle of the letdown line

D. Cargo Containers and Box Harnesses

Bags used for cargo deployment are to be manufactured with high-strength, abrasion-resistant materials. The attachment points on the bag must be reinforced to ensure there is not a failure during deployment.

Cargo boxes shall be constructed from double-wall, 1/4"-thick cardboard with a minimum burst-strength rating of 500 pounds, and shall be certified by the manufacturer as having passed the edge crush test of 71 pounds (71-ECT). Cargo boxes must be girded with an approved box harness for deployment.

The maximum allowable weight per IA cargo letdown container shall not exceed 100 pounds. Maximum allowable weight for non-IA letdown containers shall not exceed 125 pounds. Maximum allowable weight for cubee boxes shall not exceed 50 pounds. Weight limits are imposed to assure that container-rated load limits are not exceeded and to expedite deployment from the helicopter.

Approved cargo letdown containers shall pass a static-strength test with no failure or ruptured stitches when loaded to a weight of 468.75 pounds (safety factor of 3.75 to 1).

1. The following cargo letdown containers are approved for letdown operations:
 - a. Cargo box – side closure cardboard box with exterior dimensions of 12.5" x 16.25" x 36"
 - b. Standard 5-gallon cubee (NFES 0048) box for delivery of potable water and other small items
 - c. Metolius El Cap Haul Bag
 - d. Klamath Bag

Procurement sources for approved cargo letdown containers, harnesses and cargo loops are listed on the NTDP rappel website.

2. Approved cargo box and cubee box shall each require an approved harness and cargo loop for cargo letdown. Letdown equipment shall conform to the following drawing numbers:
 - a. Cargo box harness #MTDC-1088
 - b. Cubee harness #MTDC-1087
 - c. Cargo loop #MTDC-1112

3. Inspection criteria for cargo boxes:
 - a. Inspect interior and exterior of the empty box for punctures, rips, cuts, severe abrasion, or failure of glued overlapsections
 - b. Inspect for water damage, which may weaken the integrity of the cardboard or weaken the internal glue that attaches the corrugation to the exterior panels
 - c. Inspect for chemical contamination
4. Inspection criteria for box harnesses and cargo loops:
 - a. Prior to installing, inspect bar tacks and stitching for worn, cut or broken threads
 - b. Prior to installing, inspect inner and outer sides of webbing for extensive wear, cuts, abrasion, burns, mold and chemical contamination
 - c. Inspect metal closure buckles on harnesses for proper function and for cracks, bends, and sharp or rough spots that may snag or cut webbing
5. Inspection criteria for Metolius El Cap Haul Bag and KlamathBag:
 - a. Inspect stitching for worn, cut or broken threads that may compromise bag integrity
 - b. Inspect container material for extensive wear, punctures, rips, cuts, abrasion, burns, mold or chemical contamination
 - c. Inspect sling webbing for wear, cuts, severe abrasion, burns, mold and chemical contamination
6. Cargo boxes, box harnesses, cargo bags, and cargo loops shall be retired if inspection reveals damage or anomalies in accordance with the inspection criteria.

Chapter 5. Rappel and Cargo Letdown Operations

I. Aircraft Model



The Bell Helicopter 205 A1++, 210 and 212 (HP, Single) are the only models currently approved for U.S. Forest Service rappel operations.

II. Operational Responsibilities

The spotter shall be responsible for coordinating all rappel activities (pre and post-rappel). Before departure, the spotter must consider the operational factors that may influence whether the aircraft should depart from the base of operations either rappel-configured or rappel-equipped.

The spotter will provide coordination with incident management teams, local units for smaller incidents, and IA staging.

The rappel module will complete a GAR Risk Assessment for all rappel operations. The GAR Risk Assessment model creates a GO/NO-GO decision tool. The assessment may be completed at the beginning of an operational period. This completed assessment must be reviewed and updated if the team or mission changes or other mission-specific information becomes available.

Incident management teams shall allow for rappel proficiencies while rappel helicopters are assigned to their incident. The rappel spotter should work with the helibase manager to find a time and location for proficiency rappels that will have the most efficient means and have the least impact on helibase operations. The helibase manager shall inform air operations (AOBD) of the planned rappel proficiency prior to the next days' operational shift. Inputting the action on the ICS-220 is at air operations' discretion.

III. Pre-Rappel Briefing

Prior to any rappel mission, the spotter must brief all personnel involved as to the nature of the mission and its objectives. The information should include: environmental concerns such as weather and fire behavior (if known), individual responsibilities, incident-specific information such as location (e.g., division assignment), radio frequencies, name of communication center, and any other relevant information. Prior to any rappel operation, the pilot and spotter will identify the performance limitations for the aircraft. These limitations will ensure the performance is in the maximum-continuous range.

IMPORTANT NOTE: Weight and balance (W&B) calculations will be performed for standard rappel configurations and emergency rappel scenarios prior to the commencement of rappel operations each season. The purpose is to ensure the center of gravity (CG) will remain within limits. Because of the dynamic environment of the rappel operation where rappellers and spotters move inside and outside of the aircraft in flight, it may be possible to exceed the aircraft's CG limitations during rappel operations. In cases where it may be possible to exceed a CG limit during normal or emergency situations, W&B calculations will be performed prior to each rappel mission accounting for actual rappeller, spotter and cargo weights. If a mission-specific W&B calculation indicates the CG could be exceeded during any phase of the rappel operation, the load configuration must be adjusted or the mission aborted. Calculation documentation must be maintained at the base of operations.

IV. Pre-Flight Procedures

IMPORTANT NOTE: The standard load of rappellers is four, seated in the aft-facing bench seat. Loads less than four are acceptable. Normal deployment of rappellers shall occur from both doors, two rappellers, simultaneously. Two-door operations and simultaneous deployment of rappellers reduces overall hover time and unloads weight from the aircraft more quickly. A single rappeller may be deployed as necessary to meet specific mission and personnel needs.

A. Configure Helicopter

1. For rappel operations, aircraft shall be set up in the following configuration:
 - a. Remove the right side, two-place, forward-facing bench seat (right of center spotter seat)
 - b. Ensure passenger cabin door posts are secure

- c. Install approved cargo restraints in right-side transmission well
- d. Ensure cargo barriers (e.g. netting) around right-side transmission well are secure.
- e. Install two sets of rappeller tethers at the seatbelt rings on the aft-facing bench seat: one set on the ring between the first and third rappeller positions, and one set on the ring between the second and fourth positions (see FIGURE 5-1 and FIGURE 5-2).



Figure 5-1



Figure 5-2

IMPORTANT NOTE: The aft-facing bench seat positions are the only approved seating for rappellers when conducting rappel operations. Specific seating arrangement for each helicopter must be approved in the helicopter flight manual or STC.

B. Cargo Loading

IMPORTANT NOTE: During rappel missions, IA letdown cargo shall be carried in the right transmission well. Cargo may be deployed from either side of the aircraft as long as a W&B calculation performed by the pilot assures that the CG limits will not be exceeded at any phase during the flight.

1. Cargo shall be loaded and secured under the supervision of a qualified rappeller
 - a. Load standard rappel cargo (IA fire equipment, chainsaw, cubee) in approved containers in right transmission well cargo area
 - b. Restrain cargo utilizing approved cargo restraints
 - c. Secure cargo behind approved cargo area barrier (e.g., netting)

C. Spotter Tether Attachment Point

1. Install the spotter tether attachment above the spotter seat on the upper half of the transmission housing

- a. Each end of the tether shall be connected to the provided and mounted ring and stud fittings.
- b. The two ring and stud fittings shall be installed by the helicopter operator on the outside edge of the transmission housing, one on each one of the two approved installation point waterlines (WL 62.2 or 68.9, see FIGURE 5-3) in accordance with the USFS ELAM STC installation instructions.



Figure 5-3

D. Rigging Rappel Anchor

1. The rappel anchor (ELAM) shall be rigged in the following manner under the supervision of a qualified spotter:
 - a. Install rockD carabiners to overhead anchor hardpoints, with wide-end down, gates facing aft (see FIGURE 5-4)
 - b. Install rockD carabiner at the forward slot of each door bracket, barrel down, gate facing inboard (FIGURE 5-5, b.-d)



Figure 5-4

- c. Install a second rockD carabiner to each upper carabiner, barrel down, gatefacing aft
- d. Thread each rope through the lower carabiner at the door bracket
- e. Attach each rope end thimble to the carabiner on the overhead anchor
- f. Secure rope bag
- g. Spotter shall then inspect all rappel rigging once installed



Figure 5-5

E. Pre-flight Briefing and Administration

1. Prior to departure, the pilot and involved personnel shall receive a briefing on mission objectives, communications, known hazards and any special mission information.
2. Load calculations and manifests complete and posted.

F. Buddy Check

IMPORTANT NOTE: A buddy check will be completed prior to a rappeller preparing to board the aircraft. All steps of the buddy check are to be performed visually and/or tactilely for thoroughness. Rappeller being checked will be attentive to each step of the buddy check process. If a discrepancy is found, this check needs to be started over from the beginning. Items noted below in bold typeface must be checked both visually and tactilely. *Italicized words in parentheses are for instructing/information purposes only.*

1. Flight helmet
 - a. In good condition (*no cracks or damage*)
 - b. Visor down or up with approved eye protection (*that meets ANSI Z87.1*)
 - c. Mic boom up (*multiple mic booms exist and can be visually inspected for correct placement*)
 - d. Chin strap in place (*adjusted for snug fit, with no loose ends*)
 - e. Avionics cord secured (inside Nomex shirt or flight suit)
2. Nomex Shirt
 - a. Shirt collar up, buttoned to the top and tucked in, or flight suit fully zipped
 - b. Pockets secured
 - c. Sleeves down
3. Rappel gloves
 - a. **Gloves in good condition** (*free of pitch or contaminants, stitching and padding intact with no holes in palms, between fingers, flap, thumb/forefinger gusset*)
4. Harness
 - a. Risers
 - i. Snug fit
 - ii. Webbing and visible stitching in good condition
 - iii. No twists
 - iv. Loose ends secured
 - b. Lat straps
 - i. Snug fit
 - ii. Webbing & stitching in good condition
 - iii. No twists
 - iv. Loose ends secured

- c. Webbing bridge
 - i. Webbing and stitching in good condition
 - ii. No twists
 - d. Carabiner and Descender
 - i. Gate is closed and locked**
 - ii. Lanyard pin in place**
 - iii. Descender attached**
5. BD bag
 - a. Click locks secured, horns out**
 - b. Top straps through handle, buckles secured
 - c. Side straps tight
 - d. Zipper closed
 - e. Double tap on BD bag to indicate rappeller to lift bag
 - f. Bottom of BD bag in good condition
 6. Leg straps
 - a. Buckles attached, no fabric caught
 - b. Snug fit
 - c. Webbing and stitching in good condition
 - d. No twists
 - e. Loose ends secured
 - 7. Raptor knife**
 - a. In sheath**
 - b. Snaps secured**
 - c. Lanyard stowed**
 - d. Horn facing aft**
 8. Nomex pants and boots
 - a. Pockets secured
 - b. Pants over boots
 9. Single tap on BD bag to indicate rappeller to turn around
 10. Helmet in good condition (*No cracks or damage*)
 11. Hair tucked in
 12. Harness
 - a. Webbing and stitching in good condition
 - b. No twists
 - c. Loose ends secure
 - d. Tag pouch secure

13. Nomex
 - a. Waist belt clear
 - b. Pockets secured
14. Indicate rappeller to turn around with a single tap on the left shoulder
15. Exchange thumbs-up indicating a complete buddy check

G. Boarding Sequence

1. Once the buddy check has been completed, rappellers organize into proper rappel order and prepare to board the aircraft. Rappellers load from inboard seats out.
2. Starting with rappellers boarding on the right side of aircraft then moving to the left side, the spotter performs an equipment check on each rappeller, replicating the steps for a buddy check. If all is correct, a thumbs-up signal is exchanged. If a discrepancy is identified, it will be immediately corrected, and the spotter will restart the equipment check from the beginning.
3. Once complete, each rappeller boards the aircraft and takes a pre-assigned seat. The first rappeller boarding on each side will perform visual and tactile checks on equipment (door bracket carabiners, rope routing, and rope attachment at ceiling bracket). Move into seat, fasten rappeller tether to inboard side of the webbing bridge with release handle facing downward (tether shall not cross rappellers body), and then attach seatbelt (under descender and tether).
4. The rappeller plugs into the ICS system if appropriate.
5. The last rappeller to be loaded performs spotter check and gives “thumbs-up” (see H, below) prior to boarding the aircraft. If all is correct, a thumbs-up signal is exchanged, then the rappeller boards the aircraft.
6. Spotter completes the preflight walk around.
7. Spotter enters aircraft, ensures aircraft doors are closed, checks carabiners, rope routing, and that the ropes are attached. Spotter taps inboard rappellers’ and points to rigging. Thumbs-up signal between spotter and inboard rappellers indicates inspections have been performed.
8. Spotter checks the rappellers’ seat belts and rappeller tethers.
9. Spotter connects tether, plugs into radio system, takes seat, fastens seat belt, displays tether showing that the carabiner is attached to spotter anchor and seat belt is secure. If all is correct, a thumbs-up signal is exchanged with all rappellers on board.
10. Outboard rappellers secure rope bags

H. Equipment Check of Spotter by Rappeller

IMPORTANT NOTE: Spotter being checked will be attentive to each step of the equipment check process. If a discrepancy is found, this check needs to be started over from the beginning. *Italicized words in parentheses are for instructing/information purposes only.*

1. Flight helmet
 - a. In good condition (*no cracks or damage, avionics in place, no eye protection required*)
 - b. Chin strap in place
2. Nomex shirt
 - a. Shirt collar up, buttoned to the top and tucked in, or flight suit fully zipped
 - b. Sleeves down
3. Gloves
 - a. In good condition (*Nomex flight glove, PMI GS2200, or Metolius climbing ¾ finger with Nomex flight gloves. Gloves shall have no holes and be free of contaminants*)
4. Harness
 - a. Chest and leg straps buckled
 - b. Snug fit
 - c. Webbing and stitching in good condition
 - d. No twists
 - e. Loose ends secured
5. Nomex and boots
 - a. Pants over boots
6. Raptor knife
 - i. In sheath
 - ii. Snap secured
 - iii. Lanyard stowed
 - iv. Horn facing to the left
7. Signal spotter to turn around with a tap on the knife sheath
8. Helmet in good condition
9. Harness
 - a. Webbing and stitching in good condition
 - b. No twists
 - c. Loose ends secure
 - d. Spotter tether attached to dorsal D-ring and tacked
 - e. Extendable tether locked, and snaps secure
 - f. Carabiner in place at end of tether

10. Signal spotter to turn around with a single tap on left shoulder
11. Exchange thumbs-up, indicating a complete spotter check

I. Rope Security

Prior to flight, spotter will ensure rope bags are secured in the aircraft. Spotter will ensure outboard rappellers have rope control prior to opening aircraft doors.

J. Preparing for Flight

1. Prior to flight, spotter and pilot establish communication through intercom and ensure the following steps are accomplished:
 - a. Ensure all mission-specific items have been addressed
 - b. Set radio frequencies as appropriate
 - c. Confirm coordinates are entered into GPS if applicable
 - d. Spotter states to pilot, "OK to depart"**
2. Once in flight, contact appropriate flight-following authority (ATGS, HLCO, dispatch, etc.)

V. In-Flight Procedures

All communications between spotter and pilot related to the deployment of rappellers and cargo will be done in the form of challenge and response. Spotter shall provide constant feedback to the pilot regarding the position and movement of the aircraft, proximity to hazards, and progress of the rappellers and cargo descent.

During deployment of rappellers and cargo, the pilot shall maintain the hover utilizing horizontal, vertical, or a combination of reference points that provide a stable rappel hover. Pilots should not attempt to maneuver the rappellers on the rope as they would with longline cargo procedures.

A. Pre-Rappel Sequence

The safety of personnel and aircraft must be the primary consideration when the spotter and pilot select rappel or landing sites. The pilot shall be the final authority on flight procedures. Fire behavior and safety shall also be considered prior to deploying rappellers.

1. Pilot flies a high-level reconnaissance of the area. The spotter works with the pilot to select an appropriate rappel site, identify hazards and an emergency site.
2. Contact appropriate flight-following authority (ATGS, HLCO, dispatch, etc.) prior to commencing the rappel operation. Spotter communicates with flight following authority and pilot regarding number of rappellers to be deployed.
3. Adjust radios as needed to ensure pilot and spotter communication will not be compromised by excessive radio traffic. Radios must remain on and dialed to the appropriate flight-following frequency.
4. Where possible, helicopter should maintain at least a 50-foot clearance above any obstacles before starting a rappel. If this is not possible and the helicopter must descend below the canopy, rotor clearance must meet the current standards in the IHOG.
5. Before starting rappel operations, a HOG power check is accomplished at an altitude comparable to the rappel site or greater. A positive rate of climb must be established without exceeding aircraft limitations. Pilot states, **“Hover established, positive rate of climb, power is good.”**
6. Spotter responds, **“Power is good.”**
7. Spotter directs rappellers to unplug and stow ICS communications.

B. Rappel Sequence

1. Pilot states to spotter, **“One minute out, airspeed below 40 knots.”**

2. Spotter responds, **“One minute out, airspeed below 40 knots, coming out of my seatbelt.”**
3. Spotter activates hot mic if not already activated.
4. Spotter states to pilot, **“Opening aircraft doors.”** Once spotter has opened aircraft doors, spotter states to pilot, **“Reset master caution.”**
5. Pilot responds, **“Master caution reset.”** Spotter/pilot communicate adequate rotor clearance, power assessments, and rappel spot status throughout the rappel sequence using pilot’s perspective (left, right, forward, back, and up or down relative to altitude above the ground). Spotter must visually and verbally clear main and tail rotor from obstacles prior to giving directions to move the aircraft.
6. Once over the rappel site, spotter states to pilot, **“Ready to drop ropes, how is the power?”**
7. Pilot confirms power. If within limits, pilot responds to spotter, **“Power is good, drop ropes.”**
8. Spotter drops rope outside skid and ensures it is free of knots and rope bag is on the ground. Spotter repeats process for second rope. If the spotter identifies a knot or other problem on the rope, this must be communicated to the rappeller and pilot. The rappeller and pilot must acknowledge.
9. Spotter states to pilot, **“Rappellers hooking up.”**
10. Pilot responds, **“Rappellers hooking up.”**
11. Spotter then gives the Remove Seat Belt hand signal to each rappeller.
12. Rappeller removes seat belt, slides to outboard position on the bench seat, grasps rope, rigs descender with foot trap utilizing outboard foot, inspects rigged descender and presents to spotter with outboard hand on rope to the ground, and inboard hand on rappeller tether.
13. Spotter inspects rigged descender and rappeller tether.
14. Spotter states to pilot, **“Rappellers to the skids.”**
15. Pilot responds, **“Rappellers to the skids.”**
16. Spotter gives Move to Skid hand signal to each rappeller. Rappeller moves to the skid, squares up with rope on right side of body, with left hand moves descender handle to “primed position”, visually clears rope to the ground, places right hand on rappeller tether release, returns eyes to spotter in ready position. If a rappeller identifies a knot or other problem on the rope, this must be communicated to the spotter. The spotter must acknowledge.
17. Spotter states to pilot, **“Ready to send rappellers, how is the power?”**
18. Pilot verifies power. If within limits, pilot responds to spotter, **“Power is good, send rappellers.”**

19. Spotter responds, **“Sending rappellers”** and gives Begin Descent hand signal to each rappeller.
20. Rappellers release rappeller tether, transition over skid, and descend to the ground.
21. Spotter keeps pilot apprised of rappellers’ progress down the rope; states to pilot, **“Rappellers off the skid ... half way ... on the ground.”**
22. Once on the ground, rappeller manipulates cam with thumb to gain slack, opens cover, removes rope to derig descender, and moves to a safe area away from the rappel site. Rappellers must use appropriate hand signal (or radio if quickly accessible) to inform spotter if there is a bad rope or rappel site.
23. Once rappellers move to a safe area, spotter may repeat rappel process from Step 9 to deploy additional rappellers.
24. Once complete, spotter states to pilot, **“De-rigging ropes.”**
25. Spotter states to the pilot, **“Right side/left side rope away, right side/left side door shut.”**
26. Spotter states, **“Clear to depart.”**
27. Pilot responds, **“Clear to depart?”** Spotter states, **“Affirmative, clear to depart.”**
28. The spotter, with concurrence from the pilot, may initiate the cargo deployment procedures at this time. Pilot may elect to maintain hover or circle until cargo is prepared. See Section VII, below, for cargo deployment procedures.
29. Once rappel and cargo deployment operations are complete, spotter will:
 - a. Return radio to normal operational mode and establish radio contact with ground personnel
 - b. Inform flight-following authority that rappel operation has been completed
 - c. Secure loose items in the helicopter
 - d. Fasten seat belt
30. The helicopter shall remain in the area until rappellers have positive communication with dispatch, division, etc.

C. Rigging Ropes in Flight

After the completion of the first mission and prior to landing, there may be a need to deploy additional rappellers at a different location. In this case ropes must be rigged in flight. Remaining rappellers must perform a visual check after the spotter completes the rigging process. Once complete, a thumbs-up is exchanged and the rappel sequence will resume at Section V, A, 1, above.

VI. Post-Rappel

A. Administrative/Debrief

1. Complete necessary documentation pertinent to the mission.
2. Spotter/pilot will critique the mission and/or discuss problems that may have occurred.
3. Upon return of rappellers, spotter and rappellers will critique the mission.

VII. Cargo Deployment Procedures

A. Cargo Deployment Procedures

The deployment of cargo generally occurs as part of the rappel operation following the deployment of rappellers. When cargo is deployed as part of the rappel mission, Sections B and C below are incorporated in the pre-flight procedures with Section IV, J, above. Sections D and E below provide particular detail not directly addressed in the rappel procedures and should be reviewed and followed.

Cargo may also be deployed independently of the rappel mission for the purpose of resupplying firefighters or supporting other operational missions. The following procedures encapsulate the cargo delivery operation.

B. Pre-Flight Procedures for Cargo Deployment Missions

1. Prior to departure, the pilot and involved personnel shall receive a briefing on mission objectives, communications, known hazards and emergency procedures.
2. Spotter puts on harness, ensures safety knife is attached to harness.
3. Load calculations and manifests complete and posted.
4. Spotter completes necessary pre-flight inspections.
5. Prior to flight, the spotter must receive a spotter equipment check. When ground personnel are unavailable, the spotter shall have the pilot perform this check. Positive communication between the spotter and pilot must occur to ensure spotter has attached his/her tether to the spotter anchor.

C. Rigging and Loading Cargo

1. Spotter will configure helicopter to meet the needs of the specific cargo mission.
2. Spotter rigs cargo with carabiners and secures in helicopter in accordance with Section IV, B, of this chapter.
3. Spotter checks cargo delivery equipment to ensure proper number of letdown lines, extra carabiners, and figure 8 are available and secured in accessible location.

4. Spotter visually inspects anchor in accordance with the ELAM STC (Chapter 4, VI, E).
5. Spotter boards aircraft, connects tether, fastens seat belt, and plugs into avionics.
6. Spotter tells pilot, **“Tether attached, OK to depart.”** Pilot responds, **“Tether attached, departing.”**

D. Pre-Cargo Delivery Sequence

1. Pilot flies a reconnaissance of the area to look for hazards and works with spotter to select an appropriate cargo delivery site.
2. Contact appropriate flight following authority (ATGS, HLCO, dispatch, etc.) prior to commencing the cargo operation. Spotter communicates with pilot regarding number of loads to be deployed.
3. Inform ground personnel to stay clear of cargo during deployment.
4. Adjust radios as needed to ensure pilot and spotter communication will not be compromised by excessive radio chatter. Radios must remain on and dialed to the appropriate flight-following frequency.
5. Where possible, helicopter should maintain at least a 50-foot clearance above any obstacles before starting a cargo operation. If this is not possible and the helicopter must descend below the canopy, rotor clearance must meet the current standards in the IHOG.
6. Before starting cargo operations, A HOGE power check is accomplished at an altitude comparable to the cargo site or greater. A positive rate of climb must be established without exceeding aircraft limitations. Pilot states, **“Hover established, positive rate of climb, power is good.”**
7. Spotter responds, **“Power is good.”**
8. Spotter activates hot mic if not already activated.
9. If not previously performed, spotter removes restraining straps from cargo, ensures remaining cargo is secure, and positions cargo in doorway.
10. Spotter rigs figure eight with cargo letdown line and attaches figure eight using one carabiner in anchor bracket, barrel down, gate facing inboard. Spotter attaches end of letdown line to cargo with SMC Lite Stainless-Steel Locking Carabiner; locks carabiner. Spotter relays to pilot when rigging is complete.
11. Cargo letdown pack must be connected to a hardpoint in the aircraft.
12. Pilot reduces forward airspeed on approach to cargo site. The pilot states to spotter, **“One minute out, airspeed below 40 knots.”**

13. Spotter responds, “**One minute out, airspeed below 40 knots, opening aircraft doors.**” Once spotter has opened aircraft door, spotter states to pilot, “**Reset master caution.**”

14. Pilot responds, “**Master caution reset.**”

E. Cargo Deployment Sequence

Spotter/pilot communicate adequate rotor clearance, power assessments, and cargo delivery spot status throughout the operation using pilot’s perspective (left, right, forward, back, and up or down relative to altitude above the ground). Spotter must visually and verbally clear main and tail rotor from obstacles prior to giving directions to move the aircraft.

1. Once established over the cargo delivery spot, spotter states to pilot, “**Ready to send cargo, how is the power?**”
2. Pilot confirms power. If within limits, pilot responds to spotter, “**Power is good, send cargo.**”
3. Spotter states to pilot, “**Sending cargo,**” then eases cargo out the door over the flight step and skid.
4. Spotter begins lowering cargo with positive control of letdown line; does not allow un-arrested descent of cargo. Spotter keeps pilot informed of actions and progress of cargo descent, “**Cargo is out the door ... halfway down ... cargo is on the ground.**”
5. When cargo is on the ground, spotter unhooks figure 8 from carabiner and removes letdown line. Spotter holds slack in line to prevent billowing and unhooks letdown line bag from hardpoint. Spotter wraps excess letdown line around bag and throws it clear of aircraft.
6. Spotter informs pilot if more cargo is to be lowered. Pilot/spotter will determine whether to hold hover or orbit area until cargo is ready for subsequent deployment.
7. When cargo deployment is complete, spotter states to pilot, “Derigging line, line is away, door shut, **clear to depart.**” Door may remain open for mission needs, however the spotter will close the door prior to leaving area of operation and/or before airspeed above 40 knots, then returns to seat and fastens seat belt.
8. Pilot responds, “**Clear to depart?**”
9. Spotter states, “**Affirmative, clear to depart.**”
10. Radio returned to normal operational mode and flight-following authority is informed that cargo operation has been completed.

VIII. Hand Signals

The following standard hand signals shall be used:

A. Thumbs-Up

Used by rappellers and spotters to indicate "I agree" or "I am OK" (FIGURE 5-6).



Figure 5-6

B. Remove Seat Belt

Imitate removing lap belt – spotter gives signal to each rappeller (FIGURE 5-7).



Figure 5-7

C. Move to Skid

Hands clasped at chest level with elbows out - signal given by spotter to rappellers to direct movement to pre-rappel position (FIGURE 5-8).



Figure 5-8

D. Begin Descent

Arms extended with open palms down, sweeping downward motion – signal given by spotter to rappellers directing rappellers to begin descent (FIGURE 5-9).



Figure 5-9

E. Spread Eagle

Arms and legs outstretched while looking up to establish eye contact with spotter – signal given by rappeller to spotter to indicate that rappeller has locked handle and further descent is not possible (FIGURE 5-10).



Figure 5-10

F. Begin ETO

Horizontal arm wave with outstretched arm – signal given by spotter to rappeller after rappeller has given spread eagle signal – signal indicates that rappeller should tie-off and cut rope below him/her and prepare to be lifted out (FIGURE 5-11).



Figure 5-11

G. Lift-Out

Upward motion with outstretched arms – signal given by rappeller to spotter to indicate that rope below rappeller has been cut and rappeller is ready to be lifted up. Signal is given until rappeller and rope are raised above all surrounding obstacles (FIGURE 5-12).

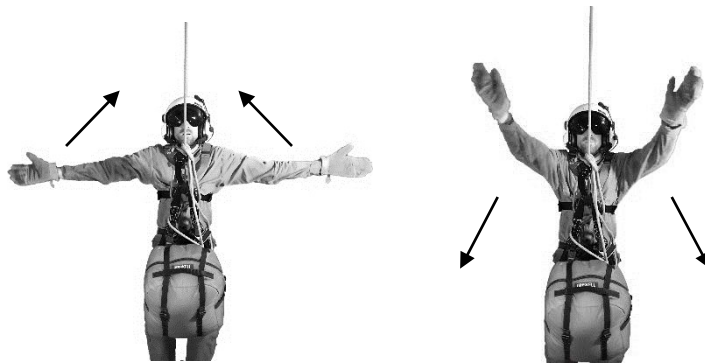


Figure 5-12

H. Clear to Fly Away

Both arms extended in front of body with palms together – signal given by rappeller during lift-out and fly away indicating that rappeller is clear of obstacles and pilot can begin forward flight. Rappeller then protects half hitches once in forward flight (FIGURE 5-13).



Figure 5-13

I. Bad Rope

With one arm outstretched, slashing motion across outstretched arm with other arm – signal given by rappeller to spotter to indicate there is something wrong with the rope and spotter should drop it (FIGURE 5-14).



Figure 5-14

J. Discontinue Rappel

Slashing motion across throat with one arm – signal given by rappeller to spotter indicating bad rappel site, discontinue rappel (FIGURE 5-15).



Figure 5-15

K. Knot

Finger pointing down the rope – signal by spotter or rappeller indicating a knot in a deployed rope – this signal must be acknowledged by a head nod (FIGURE 5-16).



Figure 5-16

L. Return to Seat Belt

With arms extended and fists clenched, bring fists and elbows together— signal given by spotter to indicate rappeller(s) should return to seat and buckle seat belt (FIGURE 5-17).



Figure 5-17

M. Communication Lost

Single clenched fist – spotter will signal to the pilot the loss of communication with a shoulder tap and presentation of a single clenched fist. When ready to depart, spotter will signal to pilot with a shoulder tap and thumbs-up (FIGURE 5-18).



Figure 5-18

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Chapter 6. Rappel and Cargo Operations Emergency Procedures

I. Rappeller Emergency Procedures and Signals

Emergency procedures are defined as established methods prescribed to respond to a situation, serious in nature, developing suddenly or unexpectedly, and demanding immediate action.

A. Rappeller Emergency Tie-Off (ETO) Procedure

1. If during a rappel, the rappeller encounters a problem that will hinder his/her progress to the ground, the rappeller will attempt to clear the problem. The rappeller may execute a midline stop to correct the problem. If a rappeller still cannot resolve the problem, the rappeller will lock the handle, return attention to the spotter and give the **Spread-Eagle** signal. If the spotter gives the **Begin ETO** signal (horizontal arm wave), the rappeller will initiate an emergency tie-off (ETO) and cut the rope below them. If no ETO signal is given, the rappeller will be lowered to the ground (see Chapter 5 for hand signal descriptions).
2. ETO is a procedure completed to permanently secure the rappeller's position on the rope. Some situations when a tie-off may be required are:
 - a. The rope becomes entangled, preventing the rappeller from descending or creating a hazard to the helicopter.
 - b. A knot on the rope has become lodged in the descent device.
 - c. The rappeller has a descender malfunction.
3. When a problem occurs and the helicopter has insufficient clearance from obstacles to lower rappeller to ground or there is a problem with the rappel site/landing area, the spotter will signal the rappeller to begin the ETO procedure.
4. The ETO procedure is as follows:
 - a. Bring running end of rappel rope through the harness between the webbing and rappeller's body from right to left where the descender is attached. Pull up 3-4 feet of slack to form a running loop.
 - b. Bring loop up and over descender in a clockwise direction going behind the rappel rope and form a half hitch around the fixed end (to helicopter) of rope. Pull half hitch tight.
 - c. Form another half hitch on top of the first one. Pull tight. A 6 to 18-inch looped tail should remain.
 - d. Move rope to left side of body and cut the running end of rope approximately 4-6 feet below the descender.

- e. After the rope has been cut, the rappeller stows knife and gives the spotter the **Lift-Out** signal. This indicates to the spotter that the rope has been cut and that the helicopter should climb until the rappeller is clear of obstacles. After all obstacles have been cleared, the rappeller will indicate this with the **Clear to Fly Away** signal. The rappeller will protect half hitches during flight. Then, the helicopter transports the rappeller to the emergency site. Upon arriving at a safe landing site, the rappeller is lowered to the ground.
- f. Once on the ground, the rappeller shall untie half hitches, derig descender and clear the area. If this isn't possible the rappeller will wait for slack in the rope, preventing possible snap back towards the helicopter rotors. Then the rappeller removes the Raptor knife and cuts the rappel rope above the half hitches and clears the area.

B. Rappeller in Distress

1. Problems after rappel: For operations where multiple rappellers are deployed from a single rope, procedures are in place to allow the first rappellers to the ground to signal a problem to the spotter.
 - a. If a rope defect or problem is evident, the rappeller will give the **Bad Rope** signal (See Chapter 5, Section VIII, I), indicating to the spotter the rope is unsafe and the mission should to be completed with a new rope.
 - b. If a rappeller on the ground recognizes the rappel site is a safety problem, the rappeller will give the **Discontinue Rappel** signal (See Chapter 5, Section VIII, J), indicating to the spotter that site is unacceptable, and another location should be selected.

II. In-Flight Emergencies

IMPORTANT NOTE: There are many circumstances that can constitute an in-flight emergency. Pilots, spotters and rappellers must understand that the consequences of an emergency change significantly once rappellers are committed to the rope. It is extremely important for a pilot and spotter to have a firm understanding of the situation and discuss up front as many circumstances as possible prior to operations. In the midst of an emergency is NOT the appropriate time and place to discover that, “what you heard is not what I meant.” This should be accomplished through briefings and on-the-ground emergency exercises.

A. Emergency Communications and Categories

In the rappel environment, clear and concise communication culminating in a coordinated response between the spotter and pilot is critical to a successful outcome.

1. During rappel operations, there are two basic categories of in-flight emergencies:
 - a. Those that require an **immediate** response (land as soon as possible)
 - b. Those that permit a **delayed** response (land as soon as practicable)

B. Immediate Response Emergencies (Land as Soon as Possible)

There are a limited number of emergencies that fall into this category. In the rappel environment, these emergencies are characterized by a need to depart the rappel hover without delay. In this type of emergency, the possibility of affecting a positive outcome will be impacted by the ability to jettison ropes quickly.

1. Examples of possible emergencies:
 - a. Engine failure
 - b. Tail rotor failure
 - c. Hard-over of controls
 - d. Engine over speed/driveshaft failure
 - e. Compressor stall (single engine)
 - f. Governor failure low side (twin engine)
 - g. Governor failure (single engine)

C. Delayed Response Emergencies (Land as Soon as Practicable)

There are any numbers of events, typically mechanical or environmental, that fall into this category. In the rappel environment, these events are characterized by an ability to delay the departure from the rappel hover. In events of this nature, there is typically time to complete a rappel or cargo deployment prior to departing the hover.

1. Examples of possible problems:
 - a. Transmission/engine/tail rotor gear box chip light
 - b. Hydraulic failure
 - c. Oil temperature/oil pressure light
 - d. Hydraulic temperature or pressure light
 - e. Unknown master caution
 - f. Fire light (requires pilot check of controls and for fire on board)
 - g. Stuck pedal
 - h. Fuel control or governor failure high side (twin engine)
 - i. Electrical failure
 - j. Fuel/air filter clog
 - k. Fuel pump failure
 - l. Decrease in rotor RPM
 - m. Compressor stall (twin engine)
 - n. Severe up or down drafts

IMPORTANT NOTE: The example of possible problems listed above note delayed responses and may not require immediate action other than communication and monitoring; response actions can vary in time from seconds to minutes.

III. Pilot and Spotter Actions – Rappel Operations

A. Rappel Immediate Response Actions

1. See Table 6-1 on the next page for pilot and spotter actions during an in-flight emergency requiring an immediate response.

IMPORTANT NOTE: The “Abort, Abort” and the subsequent actions taken by the pilot and spotter will occur almost simultaneously. The pilot will attempt to gain forward flight, if possible, which will require that the spotter clears ropes without hesitation. The pilot is not expected to wait for the “Clear” from the spotter before taking action to appropriately respond to the emergency. Any failure to immediately clear the aircraft of ropes may pose a threat to the aircraft and personnel on board, as well as increase the risk to rappellers on the ropes.

Rappel - Immediate Response (Land As Soon As Possible)			
PILOT DUTIES			
It is imperative that the pilot diagnose this emergency accurately and without delay. Additionally, the pilot must simultaneously alert the spotter by stating “ABORT, ABORT.”			
SPOTTER DUTIES			
The spotter’s response must be immediate; however, actions will vary depending on the phase of the rappel when the emergency occurs. It is critical that spotters understand the sequence. Unnecessary delay may result in a catastrophic outcome for the aircraft and crew.			
PHASE OF RAPPEL		PILOT STATES	SPOTTER ACTION/RESPONSE
	RAPPELLERS SECURE, ROPES SECURE	“ABORT, ABORT”	SPOTTER: State <u>“CLEAR”</u> Immediately take seat and fasten seat belt Doors and other cabin duties should not take priority over getting to a seat and into a seat belt RAPPELLERS: Secure rope bags due to cabin doors remaining open throughout descent and landing
	RAPPELLERS SECURE, ROPES DEPLOYED	“ABORT, ABORT”	SPOTTER: <u>CUT ROPES</u>, state <u>“CLEAR”</u> Immediately take seat and fasten seat belt Doors and other cabin duties should not take priority over getting to a seat and into a seat belt
	RAPPELLERS OUT OF SEAT BELTS, ROPES DEPLOYED	“ABORT, ABORT”	SPOTTER: Give rappellers <u>RETURN TO SEAT BELT SIGNAL</u>, <u>CUT ROPES</u> below descender, state <u>“CLEAR”</u> Immediately take seat and fasten seat belt
	RAPPELLERS ON SKIDS	“ABORT, ABORT”	SPOTTER: Give rappellers <u>RETURN TO SEAT BELT SIGNAL</u>, <u>CUT ROPES</u> below descender, state <u>“CLEAR”</u> Immediately take seat and fasten seat belt
	RAPPELLERS IN DESCENT (OFF SKIDS)	“ABORT, ABORT”	SPOTTER: <u>CONFIRMS THE EMERGENCY</u> <i>(Either by the obvious flight profile of the aircraft or by challenge and response with the pilot)</i> CUT ROPES, state <u>“CLEAR”</u> Immediately take seat and fasten seat belt
	RAPPEL COMPLETE, DERIGGING AIRCRAFT	“ABORT, ABORT”	SPOTTER: <u>CUT ROPES</u>, state <u>“CLEAR”</u> Immediately take seat and fasten seat belt Doors and other cabin duties should not take priority over getting to a seat and into a seat belt

Table 6-1

B. Rappel Delayed Response Actions

1. See TABLE 6-2 on the next page for pilot and spotter actions during an in-flight emergency or situation that may be addressed through a delayed response.

IMPORTANT NOTE: Events of an environmental nature may be resolved by waiting for the event to subside or relocating to an alternate rappel site. An event of this nature requires that the pilot inform the spotter of the actions required to address the event. If at any point continued flight is hazardous due to environmental conditions, the pilot will state “Expedite, Expedite.”

Rappel - Delayed Response (Land as Soon as Practicable)			
PILOT DUTIES			
When experiencing a delayed response emergency, “EXPEDITE, EXPEDITE,” is intended as the initial alert for the crew - communicating that the rappel must be halted due to an aircraft malfunction or environmental condition. It should not be the only communication passed. As the situation allows, the pilot should advise the crew of the aircraft status and the intended duration of the flight. It must be understood if rappellers have left the skids, the aircraft will remain stable until the rappel is complete and ropes have been cut.			
SPOTTER DUTIES			
Unnecessary delays should be avoided due to the critical nature of the flight profile. The only time there should be an excessive delay is when rappellers are in the descent; the spotter should advise the pilot as to the amount of time needed to get the rappellers on the ground and cut ropes.			
PHASE OF RAPPEL		PILOT STATES	SPOTTER ACTION/RESPONSE
	RAPPELLERS SECURE, ROPES SECURE	“EXPEDITE, EXPEDITE”	Close aircraft doors, take seat and fasten seat belt, state “CLEAR”
	RAPPELLERS SECURE, ROPES DEPLOYED	“EXPEDITE, EXPEDITE”	CUT ROPES Visually verify ropes are clear of skids, close aircraft doors, take seat and fasten seat belt, state “CLEAR”
	RAPPELLERS OUT OF SEAT BELTS, ROPES DEPLOYED	“EXPEDITE, EXPEDITE”	Give rappellers RETURN TO SEAT BELT SIGNAL Once rappellers are in seat belts, CUT ROPES below descenders, visually verify ropes are clear of skids, close aircraft doors, take seat and fasten seat belt, state “CLEAR”
	RAPPELLERS ON SKIDS	“EXPEDITE, EXPEDITE”	Give rappellers RETURN TO SEAT BELT SIGNAL Once rappellers are in seat belts, CUT ROPES below descenders, visually verify ropes are clear of skids, close aircraft doors, take seat and fasten seat belt, state “CLEAR”
	RAPPELLERS IN DESCENT (OFF SKIDS)	“EXPEDITE, EXPEDITE”	CONFIRM EMERGENCY/PROBLEM Discuss the progress of the rappel with the pilot, <u>once rappellers are on the ground, CUT ROPES,</u> visually verify ropes are clear of skids, close aircraft doors take seat and fasten seat belt, state “CLEAR”
	RAPPEL COMPLETE, DERIGGING AIRCRAFT	“EXPEDITE, EXPEDITE”	CUT ROPES, visually verify ropes are clear of skids, close aircraft DOORS, take seat and fasten seat belt, state “CLEAR”

Table 6-2

IV. Pilot and Spotter Actions – Cargo Deployment Operations

A. Cargo Deployment Immediate Response Actions

1. See TABLE 6-3 below for pilot and spotter actions during an in-flight emergency requiring an immediate response.

Cargo Delivery - Immediate Response (Land As Soon As Possible)			
PILOT DUTIES			
It is imperative that pilots diagnose this emergency accurately without delay. Additionally, they must simultaneously alert the spotter by stating “ABORT, ABORT.”			
SPOTTER DUTIES			
Spotter’s response must be immediate; however, actions will vary depending on the phase of cargo when the emergency occurs. It is critical spotters understand the sequence.			
PHASE OF CARGO LETDOWN		PILOT STATES	SPOTTER ACTION/RESPONSE
	CARGO SECURE	“ABORT, ABORT”	State “CLEAR” Immediately take seat and fasten seat belt. Doors and other cabin duties should not take priority over getting to a seat and into a seat belt.
	CARGO UNSECURE DOORS CLOSED	“ABORT, ABORT”	State “CLEAR” Immediately take seat and fasten seat belt. Securing cargo and other cabin duties should not take priority over getting to a seat and into a seat belt.
	CARGO UNSECURED INSIDE AIRCRAFT DOORS OPEN	“ABORT, ABORT”	CUT LINE, JETTISON CARGO OUT OPEN DOOR. state “CLEAR” Immediately take seat and fasten seat belt. Doors and other cabin duties should not take priority over getting to a seat and into a seat belt.
	CARGO OUTSIDE AIRCRAFT	“ABORT, ABORT”	CUT LINE, state “CLEAR” Immediately take seat and fasten seat belt.

Table 6-3

B. Cargo Deployment Delayed Response Actions

1. See TABLE 6-4 below for pilot and spotter actions during an in-flight emergency or situation that may be addressed through a delayed response.

Cargo Delivery – Delayed Response (Land as Soon as Practicable)			
PILOT DUTIES			
When experiencing this type of emergency, “EXPEDITE, EXPEDITE” is intended as the initial alert for the crew communicating that the cargo deployment must be curtailed due to an aircraft malfunction or environmental condition. Communication shall not be limited, and pilot should advise the crew of the status of the aircraft and the intended duration of the flight.			
SPOTTER DUTIES			
Unnecessary delays should be avoided due to the critical nature of the flight profile. The only time there should be any delay is during the cargo deployment sequence. If there is to be a delay, the spotter should advise the pilot as to the amount of time needed to get the cargo on the ground and cut line.			
PHASE OF CARGO LETDOWN		PILOT STATES	SPOTTER ACTION/RESPONSE
	CARGO SECURE	“EXPEDITE, EXPEDITE”	Close aircraft door, take seat and fasten seat belt State “CLEAR”
	CARGO UNSECURE INSIDE AIRCRAFT	“EXPEDITE, EXPEDITE”	Close aircraft door, secure cargo, take seat and fasten seatbelt, state “CLEAR”
	CARGO UNSECURE OUTSIDE AIRCRAFT	“EXPEDITE, EXPEDITE”	Complete cargo deployment, “CUT LINE” , close door, take seat and fasten seatbelt, state “CLEAR”

Table 6-4

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Chapter 7. Documentation

I. Records and Reports - General

IMPORTANT NOTE: The rappel report will be entered into RapRec by the base that administers the contract for the aircraft used for the rappel or cargo letdown.

Record keeping is mandatory for administering rappel operations. Accurate records and reports on rappel activities, equipment use, training and injury statistics shall be maintained. All rappel reports will be entered into RapRec within 14 days of the rappel activities. In order to reduce duplication errors, rappel reports will be entered into RapRec by the base that administers the contract for the aircraft used for rappel or cargo letdown, regardless of the equipment or personnel involved. For this reason, it is important for each base to keep its RapRec equipment and personnel rosters up to date. During consolidated training, rappel reports will be entered into RapRec by the documentation unit.

All Rappel Equipment Inspection Forms are official documents and will be kept on the forms contained in Appendix C or electronic equivalent. Rappel Equipment Inspection Forms will be archived for a minimum of seven years.

All rappel equipment that is removed from service (retired) must be destroyed to the point that it can no longer be utilized for its intended purpose. Any equipment that requires documentation must show a retirement date on the Rappel Equipment Inspection Form when removed from service. Additionally, the retired status must be updated in RapRec.

A. Unit Records

Each unit shall maintain records documenting training for rappellers and spotters and records documenting the use and inspection of specified equipment. The forms for documenting training, the certification of personnel and tracking the equipment are found in Appendix C - Forms. See Sections II and III below for specific information and requirements for each record.

IMPORTANT NOTE: All-electronic records should be backed up to an external drive or server. A hard copy of electronic records will be printed at least once annually.

B. Rappel Injury Reporting

All rappel related injuries (rappel sequence) shall be reported through established local protocols, local helicopter operations specialist, and entered into the SafeRap system.

C. Rappel Program Proposal Form

Users are encouraged to recommend changes to this guide through their respective rappel base manager via written proposal (see Appendix C - Forms). The rappel base manager submits the proposal to the rappel operations or rappel training subcommittee chairperson for group review, concurrence, recommendation, and where applicable, forwarding to the NRWT.

II. Training, Certification, and Proficiency Records

A. Rappel Unit Log

All rappels, spots, and related information must be entered into the Rappel/Spotter Log and RapRec, and shall be readily available for review. The spotter or rappel base manager will ensure information is entered in a timely manner and that RapRec is kept current.

B. Rappeller Training Records

The Rappeller Training Record for initial training and recertification of rappellers shall document each individual step in the training. Competency at each level of the training must be demonstrated by the trainee before the spotter shall permit advancement to the next step (see Appendix C - Forms, C-6 and C-7,). Each rappeller will maintain a record of training, proficiency and operational rappels in the Rappel/Spotter Log and RapRec.

C. Spotter Training Records

The Helicopter Spotter Training Record for returning spotters and Qualification Record for initial training shall document each individual step in the training.

Competency at each level of the training must be demonstrated by the trainee before the spotter shall permit advancement to the next step (see Appendix C – Forms, C-8 and C-9). Each spotter will maintain a record of training, proficiency and operational spots of rappellers and cargo in the Rappel/Spotter Log and RapRec.

III. Equipment Master Records

All equipment requiring documentation will be assigned a unique identification number. The number will be retired with the piece of equipment. The following equipment shall have a Rappel Equipment Inspection Form assigned (see Appendix C - Forms).

A. Cargo Letdown Line

All cargo letdown line use shall be documented. After inspection, any irregularities will be noted. Use the Rappel Equipment Inspection Form (C1) to document inspection and RapRec to document use.

B. Harness

Harness and knife will be inspected annually, and harness will be inspected after each use. Inspections shall be documented in the Rappel Equipment Inspection Form. Pre-use inspection and buddy checks do not need to be documented. Any deficiencies during inspections, repairs and/or component replacement will be noted. The Rappel Equipment Inspection Form (C1) or electronic equivalent must be used for harness documentation.

C. Descender

Use and inspection of any descender shall be documented on a Rappel Equipment Inspection Form. Numbers shall be engraved according to Chapter 4, Rappel and Cargo Letdown Equipment. After each rappel, the descender shall be inspected for wear or deformity and remarks noted. After inspection, any irregularities will be noted and brought to the attention of a spotter. When a descender is retired, it shall be destroyed to eliminate further use. Use the Rappel Equipment Inspection Form (C1) to document inspection and RapRec to document use.

D. Rappel Rope

Documentation must be maintained for all rappel ropes. A Rappel Equipment Inspection Form shall be maintained from the time the rope is placed in service until the rope is removed from service. The form shall be readily available for review. Each rope must have an identification number and be marked at both ends, one end marked "A" and the other end marked "B" (reference Chapter 4, Rappel Equipment).

All rope uses shall be documented. After inspection, any irregularities will be noted and brought to the attention of a spotter. Documented information will dictate when to retire a rope from service. Use the Rappel Equipment Inspection Form (C1) to document inspection and RapRec to document use.

E. Rappeller Tether

Documentation must be maintained for all rappeller tethers. A Rappel Equipment Inspection Form shall be maintained from the time the rappeller tether is placed in service until the tether is removed from service. At a minimum, annual pre-use inspections must be documented in the Rappel Equipment Form. Inspection should follow guidelines in Chapter 4, III, L, 2. Use the Rappel Equipment Inspection Form (C1).

F. Rappel Tower

Inspection of rappel tower shall be documented annually and daily before each use. The form is located in Appendix C - Forms (Form C-11).

Appendix A

Appendix B

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H

Appendix I

Appendix J

Appendix K

Appendix L

Appendix M