Appendix B – Rappel Spotter Training Syllabus

I. Introduction

The rappel spotter is the key position for ensuring the safe deployment of rappellers. Decisions made by spotters can determine the success or failure of the mission. It is therefore essential that a spotter is well-trained, proficient, and competent in his/her role.

II. Training Objectives

Provide a spotter trainee with the tools, training opportunities, understanding and experience to perform as a rappel spotter.

III. Training Aids

National Rappel Operations Guide

PowerPoint (optional)

Individual lesson aids and lesson materials

Student Workbook

Rappel Spotter Training Qualification Record, found in Appendix C, serves as a training guide and documentation for initial spotter training

Instructors should also incorporate personal experience wherever illustrative or appropriate to enhance the concepts and learning

IV. Lesson Agenda

Lesson 0 – Pre Work

Lesson 1 – Policy and Procedures

Lesson 2 – Documentation and Administration

Lesson 3 – Hazards and Limitations

Lesson 4 – Communication

Lesson 5 – Equipment
Lesson 6 – Cargo Letdown/Simulator

Lesson 7 – Simulator/Live Rappels

Lesson 8 – Simulated Mission
Lesson 1 – Standards and Procedures

I. Objectives

Discuss how to maintain compliance with all applicable agency and interagency standards and procedures

II. Training Aids

NROG

Applicable agency manuals, guides and handbooks

Management plans, e.g. local fire, aviation, base, and mishap response plans

Rappel Spotter Training Qualification Record

III. Outline

A. Policy

1. National Rappel Operations Guide contains standards for:
   a. Spotter prerequisites
   b. Spotter training
   c. Fitness
   d. Proficiency

2. Agency specific regulations and policy

B. Procedure

1. Applicable portions of unit fire management plans
2. Base rappel operations plan
3. Initial attack dispatch procedures
4. Off-forest rappel procedures
5. Large incident operations
6. Standard initial attack loads (numbers and equipment)
7. Training and proficiency schedule
8. Booster rappellers plan (if applicable)
Lesson 2 – Documentation and Administration

I. Objectives

Review spotter documentation forms.

Discuss the importance of timely and accurate rappel documentation as outlined in NROG Chapter 7.

II. Training Aids

NROG Chapter 7 and Appendix C

III. Outline

Instructor should review all appropriate forms and stress the importance of keeping thorough and up-to-date equipment, training and Spotter Qualification Record.
Lesson 3 – Hazards and Limitation

I. Objectives

Discuss and interpret potential hazards encountered during rappel operations

Demonstrate risk management evaluation skills

II. Training Aids

NROG

SafeCom, SafeRap reports

Operational Risk Management Guide (current edition), Risk Assessment Matrix

Risk Assessment Tool (NROG, Appendix G, GAR)

Photos and video footage of past rappel fires to simulate size-up exercise

IRPG (aviation pages 45-63, specific hazards pages 19-33)

IHOG (Ch. 3-1, IHOG Ch. 6-1)

Pilot (perspective, aircraft limitations, flight manual overview)

III. Outline

A. Hazards

Discuss hazards that could have an impact on rappel operations. These include, but are not limited to:

1. Weather Conditions

   a. Winds and instability: Pilot and spotter should look for weather and wind signs that could indicate turbulence or downward movement of air at destination. Any of the following conditions may be an indicator of hazardous landing, rappelling, or firefighting conditions:
i. A good indicator on fires is the smoke column. Is it shifting direction, laying horizontal or blowing downhill? Is it plume dominated?
ii. Are there thunderstorms in the area?
iii. Is there increased turbulence when flying on the lee side of ridges or geographical prominences?

(Stress to trainee that even through the pilot has the ultimate responsibility for the mission’s safety, the spotter must use sound judgment and abort the mission if conditions exist that he/she deems unacceptable or unsafe)

2. Terrain
   a. Shadows
   b. Fire behavior

3. Equipment
   a. Equipment malfunctions (rappeller/spotter)
   b. Equipment malfunctions (helicopter)

Review weather and environment-related SAFECOMs/SafeRaps

B. Mission Limitations

Discuss the effects the following can have on mission success:

1. Aircraft Performance
   a. Altitude
   b. Temperature
   c. Payload
   d. Center of gravity (weight and balance)
   e. Fuel load

2. Crew limitations
   a. Fatigue
   b. “Can-do” attitude

C. Risk Management

1. Review the rappel risk assessment for fire missions

2. Stress the importance of following a procedure for sound risk management in all aspects of a mission
3. Perform pre-flight risk assessment and mitigation to include manifests, load calculation, weather, fuel quantity, flight hazards and communications

4. The GAR Risk Assessment model should be used as the standard risk assessment tool for mission planning purposes

5. After Action Reviews (AAR) – stress the value of utilizing AAR as part of good risk management.

6. Additional keys point to discuss
   a. Emergency challenge and response, risk management
   b. Discuss mission options (off-loading some personal and cargo, site selection to achieve better helicopter performance)
   c. Refuse assignment if necessary and alternatives.
   d. Address risks and hazards that may be present during site selection
Lesson 4 – Communications

I. Objectives

Demonstrate proper hand signals for communications to rappeller without error.

Discuss guidelines for proper communications with area dispatch.

Demonstrate ability to effectively communicate verbally between pilot/spotter and non-verbally between rappeller/spotter.

II. Training Aids

NROG Chapter 5 and 6, hand signals, current challenge and response language, simulation cards, etc.

Trainer will use current challenge and response language

III. Outline

A. Pre and Post-Mission Briefings

Pre and post mission briefings between the pilot, rappellers and spotter are essential. Items to be identified in the briefing include:

1. What is the mission
2. Where is the mission
3. Potential hazards
4. Pre-flight and in-flight checks
5. Trigger points for aborting the mission
6. Emergency procedures
7. AAR with crew/pilot/spotter

B. Pilot and Spotter Communications

“Challenge and response” is a required communication procedure between the pilot and spotter. Throughout the rappel process, “go” or “no-go” decisions must be relayed before proceeding to the next step.
Challenge and response requires a simple response from the pilot before the spotter can complete a step in the rappel sequence.

During the rappel sequence, there are critical times when the spotter needs specific information from the pilot, e.g. prior to sending rappellers, the spotter and pilot must communicate that power settings are within limits. It is important the trainee understands the meaning of “power is good.” Brief trainee on limitations such as, max temps, max torque, etc.

It is essential that the spotters and pilots use standard communications for all rappel operations. All communications must be clear, concise and understood. The following standardized terminology is to be used during normal rappel operations:

1. **Directional Movement**
   a. Aircraft must be visually and verbally cleared before moving
   b. Stating a directional distance or hover status will assist the pilot in moving and settling over the rappel spot e.g., spotter may state “we are drifting, hold, main/tail are clear, move right 50 feet”
   c. Directions must be relative to the pilot’s perspective, e.g., left, right, forward, back, up, and down

2. **Procedural Communications**
   a. “Power is good.”
   b. “One minute out, airspeed below 40 knots.”
   c. “Opening aircraft door(s).”
   d. “Reset master caution.”
   e. “Ready to drop ropes, how is the power?”
   f. “Rappellers hooking up.”
   g. “Rappeller(s) to the skids.”
   h. “Ready to send rappellers(s), how is the power?”
   i. “Sending rappeller(s).”
   j. “Rappellers(s) off the skid... half way... on the ground.”
   k. “Derigging ropes.”
   l. “Right side/left side rope away, right side/left side door shut.”
   m. “Clear to depart.”
C. Spotter and Rappeller Communications

Communications between the spotter and rappeller are non-verbal. Hand signals are used in place of words. Therefore, the first step in establishing spotter and rappeller communication is to ensure the rappeller’s attention stays focused on the spotter (instructor demonstrates standard hand signals).

D. Flight Following Communications

E. Review standard flight-following procedures

F. Operational Communications

Instruct trainee in pre/post rappel communications with dispatch, helibase, etc.

1. Size up (IRPG, IHOG Ch. 8)
2. Landing to configure (latitude/longitude)
3. Over rappel site; Adjust radios to reduce external distraction
4. Rappel complete, establish communication with inserted rappellers, and ensure they have positive communications with dispatch, helibase, etc
5. Reference and review flight following procedures:
   a. AFF
   b. 15-minute check ins
   c. Contact with air attack
Lesson 5 – Equipment

I. Objectives

Identify rappeller/spotter equipment and demonstrate inspection and care of that equipment

Recognize proper utilization and care of rappel equipment, including PPE

II. Training Aids

NROG Chapter 4

NTDP website

Spotter harness with tether, rappel and letdown equipment

Review anchor inspection requirements from the STC installation instructions

III. Outline

A. Inspection

1. Review equipment requirements and standards in NROG

2. Instruct trainee in the proper methods of equipment inspection:

   a. If the helicopter is available, instruct trainee in the proper methods of anchor and attachment point inspection. If the helicopter is not available at this portion of the training, this must be covered prior to mock-ups.

   b. Stress to the trainee that even though the rappeller is responsible for inspection and maintenance of their equipment, the spotter is ultimately responsible for monitoring the use and care of all rappeller and spotter equipment. All equipment requirements and standards can be found in the NROG or the NTDP website.
Lesson 6 – Cargo Letdown

I. Objectives

Describe the function of all cargo letdown equipment

Demonstrate proper cargo letdown configuration

Demonstrate proper cargo letdown procedures without error

Demonstrate effective communications with pilot

II. Training Aids

NROG Chapters 4, 5 and 6

Gather all cargo letdown equipment

Pilot should be present during this phase of the training

III. Outline

A. Ground Training

1. Review cargo letdown procedures
   a. Familiarize trainee with cargo equipment
   b. Review applicable portions of NROG
   c. Reference challenge and response in Ch. 5 and emergency challenge and response in Ch. 6 of the NROG

2. Familiarize trainee with spotter equipment checks
   a. Stress that the spotter is responsible to ensure all equipment is in good condition and properly fitted

3. Cargo letdown training should be accomplished utilizing a rappel tower in addition to helicopter mock-ups, but utilizing helicopter mock-ups as the sole means of ground training is acceptable

4. Demonstrate anchor inspection

5. Demonstrate placement and securing of cargo

6. Demonstrate pre-flight checks, e.g. spotter equipment checks, hook check etc.
7. Demonstrate cargo configuration procedures.

8. Demonstrate cargo letdown procedures, including spotter and pilot communications, and emergency procedures.

B. Elevated Platform/Mock-up Training

Under the supervision of a qualified spotter, trainee will perform the following:

1. Install and secure cargo and cargo letdown equipment

2. Inspection of rappel bracket and spotter anchor

3. Simulate aircraft pre-flight check (walk-around)

4. Complete a minimum of 12 mockups and 12 elevated platform cargo spots including emergency procedures prior to spotting live

5. Demonstrate deployment of various cargo configurations, e.g. single box, two boxes, single box and cubee

6. Complete last four cargo mockups without procedural error to include challenge and response communications

7. Demonstrate split loads of rappellers and/or cargo

C. Helicopter Deployment

Under the supervision of a qualified spotter, trainee will perform the following:

1. Install and secure cargo and cargo letdown equipment

2. Complete inspection of rappel bracket and spotter anchor

3. Perform aircraft pre-flight check (walk-around)

4. Complete 8 cycles without procedural error at low, medium and high heights, 4 cycles shall be in typical terrain

5. Maintain Rappel Spotter Initial Training Qualification Record

The instructor will return the trainee to the appropriate level of training for review if he/she makes repetitive procedural errors during live cargo deployment.
Lesson 7 – Simulator/Live Rappels

I. Objectives

A. Performance Criteria

1. Demonstrate proficiency in spotting rappels from an elevated platform

2. Spot 12 complete rappel cycles from the elevated platform
   a. Four cycles shall include emergency procedures
   b. Final four cycles shall be accomplished without procedural error to include one cargo letdown

3. Demonstrate ability to effectively communicate verbally and non-verbally

4. Spot a minimum of 12 mock-up cycles
   a. Four cycles shall include emergency procedures
   b. Final four cycles shall be accomplished without procedural error to include one cargo letdown

5. Under direct supervision of qualified spotter and prior to a final check ride, a spotter shall:
   a. Spot a minimum of 20 live cycles, (10 without procedural error), at low, medium and high height as outlined below
      i. Fifteen cycles in typical terrain
      ii. Six cycles including the deployment of cargo.
      iii. Four operational
      iv. One split load (rappellers and cargo)
      v. One ETO

II. Training Aids

   NROG Chapters 4, 5 and 6

III. Outline

A. Elevated Simulator

1. Trainee will demonstrate:
   a. Anchor inspection
   b. Proper configuration of cargo for deployment (as appropriate by specific simulator)
c. Proper attachment of carabiners and ropes to anchor points

d. Proper sequence for loading rappellers including:
   i. Attaching equipment
   ii. Completed buddy checks
   iii. Spotter check
   iv. Final checks prior to launch

e. In-flight procedures

f. Fire/rappel spot size up and evaluation

g. Selection of emergency site

h. Contact with dispatch

i. Proper sequences for deploying rappellers and cargo
   i. Offsite power check
   ii. Confirming mission is a go
   iii. Setting up over rappel site
   iv. Deployment of ropes
   v. Use of hand signals to remove seat belts
   vi. Use of knot in rope signal and acknowledgement (if applicable)
   vii. Use of hand signals to send rappellers to skids
   viii. Final checks
   ix. Use of hand signals to send rappellers
   x. Deringing and dropping ropes
   xi. Cargo deployment
   xii. Departing rappel site and reestablishing communications

B. Emergency Procedures

1. A spotter must be thoroughly familiar with and able to accomplish emergency procedures. The instructor will demonstrate, using equipped rappellers, all established emergency procedures. Instructor will stress the importance of dialog between the pilot and spotter during emergency situations. It is imperative that the spotter retain control and composure during an emergency.

2. The trainee will demonstrate, using equipped rappellers, all established emergency procedures. At a minimum, the NROG requirements pertaining to this portion of the training shall be accomplished. It is important that the trainee verbalize all actions including spotter/pilot communications during this phase of training.
C. **Mock-Ups**

1. Instructor will demonstrate anchor inspection, aircraft configuration, loading of rappellers, preflight check, in-flight procedures, and the deployment of rappellers and cargo. Instructor will verbalize standard spotter/pilot communications (including emergency procedures) throughout the demonstration.

2. Trainee will complete a minimum of 12 cycles, utilizing a standard load of two or four rappellers and cargo. Four cycles shall be without procedural error.

3. Scenarios should be incorporated to enhance spotter training.

D. **Helicopter Deployment**

1. Under the supervision of a rappel spotter, the trainee will perform the following:

2. Configure the aircraft for a rappel mission (inspect rappel equipment, secure cargo load), and complete a minimum of 20 rappel cycles at low, medium and high heights. Fifteen of these deployments will be in typical terrain, six shall include cargo. One ETO and one split load shall be completed before final evaluation.

3. The instructor will return the trainee to the appropriate level of training for review if he/she makes repetitive procedural errors during live helicopter deployment.
Lesson 8 – Incident Simulation

I. Objectives

Successful demonstration of spotter competency and knowledge from an elevated platform or helicopter during training

II. Training Aids

SafeRap

Spotter Qualification Record

Relevant operating plans

Photos or video footage of past fires and fuel type

Sand table

III. Outline

A. Simulation Logistics

1. Instructor will preselect a location for a simulated fire

2. Instructor will coordinate with local dispatch center, FMO and other necessary personnel to facilitate live training scenarios

B. Tasks to be completed

1. Trainee will ensure that the helicopter and initial attack personnel are prepared for an IA mission

2. Trainee will demonstrate the correct operational procedures to respond to an IA dispatch call

3. Trainee will assist pilot with navigation and communications while enroute to simulated fire

4. Trainee will provide a fire size-up and other applicable information to dispatch

5. Trainee will demonstrate the appropriate procedure to prepare for a rappel

6. Trainee will successfully deploy a minimum of one stick of rappellers and perform all operational procedures
7. Trainee will ensure deployed rappellers have established communications, will reconfigure helicopter and return to base

C. Post Mission

1. Trainee will complete mission documentation forms and conduct AAR

2. Successful completion of the scenario does not replace a final evaluation by a check spotter