APPENDIX H: HELIBASE MANAGER’S REMINDERS LIST (HJA-2).

I. Purpose.

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

II. Applicability.

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

III. Responsibility and Instructions for Completion.

The Helibase Manager should review the Helibase Manager’s Reminders List upon arrival at multiple-aircraft operations and should review all or parts of the list on a daily basis thereafter.

The list has been reduced in size to allow for insertion into the Fireline Handbook.

One-time “start-up” items, such as helibase location considerations, should be re-evaluated at appropriate times.

The items on the list are self-explanatory. If uncertain, further guidance can be found in the appropriate chapter of this guide.

IV. Posting.

None. However, the Helibase Manager may post a copy on the helibase display board.

V. Routing and Filing.

None.

VI. Related Forms.

All of the Helibase Management (HBM) forms and several of the Helicopter Management (HCM) forms are discussed. Appendix F, Daily Helicopter Operations Briefing/Debriefing Checklist, covers some but not all of the items contained in the Reminders List.
<table>
<thead>
<tr>
<th>Initial date and time:</th>
<th>Helibase name:</th>
<th>Incident name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helibase geographic location:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AOBD and phone number:</td>
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<td>ASGS and phone number:</td>
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<tr>
<td>Finance Section contact and phone number:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Unit contact and phone number:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Resource Advisor contact and phone number:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Aviation Manager contact and phone number:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land owner (if private) contact and phone number:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HELIBASE MANAGERS REMINDER LIST

I. Helibase Site Selection and Layout

A. Land ownership

If private, Procurement Unit has been notified and a Land Use Agreement is in place.

If public, site does not conflict with land use policy and has been approved by local resource advisor.

Alternatives sites have been examined, selection factors in B & C below have been considered.

B. Relationship to Base Camp

Easy access for personnel and cargo movement.

Flight routes are away from base camp and effects of noise and dust on base camp have been considered.

Radio and phone communications can be established.

Road access for support personnel (fuel and chase trucks) is adequate. If site is unavoidably far from base camp, consider establishing a helispot nearby for recon flights.

C. Location Relative to Incident or Project Site

Turnaround times are economical; flight exposure of passengers and crews have been reduced to an acceptable level.

Fire spread will not affect helibase operations (smoke, potential overrun of helibase etc.).

Weather factors (wind, inversion, fog etc.) have been considered and discussed.

D. Site

Site is adequate for current and projected number and types of helicopters. Landing pads and safety circles can be established with adequate separation for types of helicopters being used.

Pads accessible by fuel trucks; if not, consider separate fuel site or pads.
Safe hover lanes and approach-departure paths can be established, given current and expected numbers of helicopters.

Separation of cargo and personnel pads.

If applicable, separation (300 feet) can be provided for helitorch operations.

Cargo and crew manifesting area size is adequate.

Adequate parking for fuel and support vehicles.

Communications can be established with aircraft, Incident Command post, and local Dispatch.

Helibase security needs are identified.

E. Hazard Map

A flight hazard map covering the entire incident area has been acquired from the local unit and has been posted on the display board. Pilots and other personnel have been instructed to provide additional information as observed.

F. Helibase Operations and Communications Area

Helibase operations and communications area has been established and deck can be monitored from this area.

G. Helibase Facility Needs (See Appendix K)

Helibase display board set up.

Operations area shelter set up.

Sanitary facilities available.

Garbage cans and/or dumpsters available.

Sleeping area established.

Air Operations Branch Kit available.

Helibase Support Kit available.

H. FAA Portable Tower

Need for takeoff and landing coordination considered and ordered if needed.
I. Environment

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

II. Helispot Site Selection and Layout

A. Land Ownership

     If site is public, the Procurement Unit has been notified.

     If the site is public, the site does not conflict with land use policy, and the Resource Advisor has been notified.

B. Location and Site Selection

     Location is appropriate relative to incident or project site.

     Smoke/inversion, potential for fire overrunning helispot, winds, etc., have been considered and input received from pilots.

     Helispot is adequate for current and projected number and types of helicopters using it.

     Helispot is adequate for current and projected number of personnel who may be transported to and from the site.

C. Construction and Inspection

     Helispot has been built to IHOG standards, and appropriate environmental considerations have been considered for helispot construction, while still maintaining safety.

     Helispot has been inspected and approved by the AOBD or designee.

     Helispot is numbered and marked, location has been taken from GPS, recorded on HBM-2 Aviation Locations, and relayed to Plans Section.

     Hazards identified, recorded and discussed with Pilots. Approach and departure paths discussed and established.

     Helispot furnished with wind indicators.

     Helispot furnished with adequate number of fire extinguishers.
III. Personnel and Organization

_______ Helibase positions have been assigned to and are filled with qualified persons.
_______ Trainee positions have been identified and assigned. See HCM-7 Helicopter Crew Information Sheet.
_______ Personnel job descriptions have been reviewed and assigned personnel understand the position requirements.
_______ Form HBM-1, Helibase Organization Chart, has been updated and posted on the display board.
_______ Additional helibase personnel needs have been identified and submitted to ASGS for ordering.
_______ Helibase personnel length of assignment and rotation schedule established.
_______ Camps staffed with appropriate personnel.

IV. Communications

_______ ICS-205 (Communications Plan) received and posted on the display board, and updated as necessary. Frequency changes known to everyone, and changes have been put in the ICS-220 Air Operations Summary and HBM-1 Helibase Organization Chart.
_______ Flight following and TOLC procedures known and discussed. Form HBM-5, Helibase Flight Following Log, established.
_______ Communications within the helibase, to helispots and ICP adequate.
_______ Adequate number and types of radios available for personnel and helispots.
_______ All radios tested prior to commencement of operations. Spare batteries available.
_______ Frequencies not overloaded. Frequency discipline has been discussed with pilots and helibase personnel.
_______ If problems persist, discuss with ASGS or Project Aviation Manager

V. General Planning, Information, and Organizational needs

_______ HCM-6, Helicopter Information Sheet, and HCM-7, Helicopter Crew Information Sheet, are completed and submitted to Helibase Manager on arrival of helicopter crews.
_______ Form HCM-8, Interagency Helicopter Load Calculations, is being completed and posted on a daily basis.

Appendix H-6
The Aircraft Base Radio Operator and Aircraft Timekeeper are completing HBM-5, Flight Following Log, HBM-6, Mission Request Log, and HBM-7, Helibase Daily Use and Cost Summary.

Medevac/Medical Transport Request available as needed.

Helitorch Operations and Plastic Sphere Dispenser Operations Checklists are being completed as necessary.

A helibase file has been established and all required documentation is being filed appropriately.

Weather updates are being requested if there is a change in weather from the Incident Action Plan.

A helibase evacuation plan has been established in the event the helibase is overrun by fire. Adequate measures are in place to provide ground fire protection at the helibase.

VI. Operations

Parking Tenders are providing proper hand signals and are maintaining control and access to the pads.

Proper wind direction is being given.

Parking areas, travel routes, and procedures for fuel trucks have been established and posted.

Adequate fuel supply is available or ordered.

Appropriate fire extinguishers have been supplied for each fueling pad.

Foreign object damage (FOD) control measures have been taken.

Cargo area is clean and organized. Cargo is secured appropriately.

Crew cleaning and eating areas are clean and maintained. All material secured.

Deck has perimeter fencing to prevent drive through and walk through traffic, and is signed appropriately.

Measures continue to be effective.

Helibase entrance is controlled and has appropriate signage.

Night security of aircraft and equipment is provided.
VII. Demobilization

Form HBM-9, Helicopter Demob Information Sheet, and HBM-9a, Helicopter Flight Request, are being completed for helicopters and crew being demobed, and copies are being forwarded to Demobilization Unit and Dispatch.

Both modules and individuals are or will be sent through the demobilization process.

Copies of OAS-23, Aircraft Use Reports, or FS-122, Flight Use Reports, for CWN aircraft, are being given to the local unit as requested.

HBM-12, Helitack Crew Performance Rating, and HBM-13, Helibase Personnel Performance Rating, are being completed as needed.

VIII. Helibase and Helispot Rehabilitation

Coordinate with Plans Section, Finance Section, and local Resource Advisor concerning any rehabilitation requirements for the helibase and helispots.
APPENDIX I: REMOTE FUEL SITE REMINDERS LIST (HJA-3).

I. Purpose.

The purpose of the Remote Fuel Site Reminders List is to provide the Helibase Manager and/ or Fueling Specialist with a comprehensive list of items, procedures and systems pertaining to remote site fueling operations.

II. Applicability.

Use of the Remote Fuel Site Reminders List is optional but highly recommended for Government-operated fueling operations.

III. Responsibility and Instructions for Completion.

The Helibase Manager should review the list upon arrival at remote site fueling operations and on a daily basis thereafter. The list can be inserted into the Fireline Handbook.

IV. Posting.

None. However, the Helibase Manager may post a copy on the helibase display board.

V. Routing and Filing.

None.

VI. Related Forms.

Appendix F, Daily Helicopter Operations Briefing/Debriefing Checklist, requires that fueling operations be conducted safely. Use of this appendix will help meet this objective.
I. SITE SELECTION AND LAYOUT

- Site is adequate for size of operation. See Chapter 13.
- Fueling sites are separate from the main area of helicopter operations.
- Minimum of 90’ separation exists between aircraft for Type 2 and Type 3 helicopters.
- Fueling equipment (pump, fuel source) is at least 25’ outside the rotor disk of the nearest helicopter.
- Fuel source is downwind of aircraft exhaust and is located so the prevailing wind disperses vapors.
- Site is located so that aircraft can approach/land/depart into the wind.
- Parking area for each fuel dispensing point clearly marked.

II. ORGANIZATION AND PERSONNEL

- Trained, qualified personnel are assigned to the operation. Agency Fueling Specialist is managing government-operated fueling sites. Fueling Specialists are approved and meet agency-specific requirements for training.
- All personnel, including Air Crews and other vendor personnel, are aware of duties and responsibilities as well as refueling, fire protection, and crash rescue procedures.
- At least two persons are assigned to site (one may be the Fueling Specialist). One operates fuel nozzle; the other is staffs emergency fuel shutoff valve.
- For large fueling operations, an Aircraft Base Radio Operator and/or Parking Tender may be required.
III. COMMUNICATIONS.

_______ Site has positive radio communications with aircraft before and immediately after refueling.
_______ Fueling personnel ensure radios are off (intercom may be left open).
_______ Helicopter hand signals understood.

IV. EQUIPMENT.

_______ Fuel source (drums, tanks, bladder, or mobile tanker) has been set up and checked for leaks, etc.
_______ Each nozzle has correct bonding cable attached.
_______ Shutoff valves are serviceable and properly in place.
_______ Both closed circuit and open port nozzles are available for use (recommended).
_______ Dust covers are attached to nozzle and being used.
_______ Pump assembly and filter separator are properly grounded and checked for leaks before operation.
_______ Each hose has been hydrostatically tested and inspected for blistering, saturation, nicks, and cuts.
_______ Fittings are properly sealed and free of cracks.
_______ Hose nozzles are being cleaned daily.
_______ Entire system (pump, differential pressure indicator, hoses, couplings) has been checked for proper operation.
V. SAFETY.

______ Area has been cleared of loose sticks, stones and other debris.

______ Fuel containment system or berm has been constructed around fuel bladder to contain fuel in case both temporary and semi-permanent systems rupture.

______ Fire extinguishers meeting minimum requirements are located correctly: one for pump/filter separator and one for each nozzle.

______ Sufficient water is available to wash fuel spills from personnel or wet fuel-soaked clothing prior to removal.

______ Fuel Handlers are wearing protective clothing according to requirements. See Chapter 9.

______ Warning signs (NO SMOKING, DANGER, RESTRICTED AREA, and EMERGENCY SHUTOFF) are posted.

______ Fuel sample has been taken from each dispensing nozzle and checked for contamination daily.

______ Fuel sample has been taken from each fuel source and checked for contamination daily.

______ Passengers, Pilot, and Helicopter Manager are disembarking before refueling. (Exception: Pilot at controls when hot refueling.)

______ Correct bonding procedures are followed. See Chapter 13.

VI. OPERATIONS.

______ Dust cap is being replaced on nozzle after each refuel.

______ Nozzles are being placed on a nozzle hanger (or grounding rod) after each refuel.

______ Nozzle ground cable is attached to grounding rod when not in use.

______ Blowing dust is not a problem at the refueling site.

______ Provisions are made for resupply of fuel source.
VII. OPEN PORT (HOT) REFUELING - SPECIFIC PROCEDURES.

Safe refueling with engines running is the sole responsibility of the vendor.
Government personnel shall not participate in any manner, unless the government is operating the fueling site.

Vendor-supplied written emergency shutdown and evacuation checklist for the Pilot, Service Truck Operator, and other fueling personnel are at the refueling site.

Pilot and/or co-pilot shall remain at aircraft.

Loading of cargo, retardant tank, etc., shall not be accomplished while refueling.

Strobe lights, rotating beacon lights, radios, and other non-essential electrical systems shall be turned off.

Position lights shall be left on during night operations.

Doors and windows adjacent to the fuel port shall be closed. Doors and windows on opposite side shall be left open as escape route.

Helicopter will be stable with collective at flat pitch and appropriate RPM during hot refueling.

The fuel servicing vehicle shall be parked outside the safety circle.

Upon completion of the fueling operation, the fuel nozzle shall be returned to the service truck, and the refueling hose cleared from the landing pad. The hose need not be rolled up each time.
Appendix J: Risk Management Tools

I. Risk Management Process

The Risk Management Process

A. Identify Hazards.

The first step in risk management is to identify hazards. The hazards are the potential sources of danger that could be encountered while performing a task or mission. Hazards include weather, time of flight, terrain, equipment, training, and proficiency level of personnel.

Less obvious hazards may become apparent during planning. The Helicopter Manager, the Pilot, others involved or reliant on the flight (Operations Section Chief, Crewboss on the fireline, etc.) and the Helibase Manager, should all identify potential hazards before the operation.

The following is a good example of a mission that contains both hazards to a flight operation and hazards to ground personnel should the flight not be performed.
EXAMPLE: The Helibase Manager receives a mission request to transport food, water, and shelter to crews that have been working the first day of a fire and will remain overnight in a remote camp. Conditions are extremely windy from approaching thunderstorms, visibility is decreasing as sunset nears, and the drop point is less than optimal. The forecast is for severe weather (thunderstorms, hail, possible floods) throughout the night.

In order to provide a systematic approach to identifying threats, a useful memory aid is the 4 Ms. These are Method, Medium, Man, and Machine. There are other mnemonics, of course, but they all have the same goal of helping one recognize the threats that may exist under each category.

Risk or threat detection and identification are part of our daily lives. For example, when sleeping in a hotel, were you ever awakened by the fire alarm? Like many people you probably realized that there were a number of actions that were either immediate or could be delayed, based on the situation. Situation awareness is key to identifying threats and their effect. In our example you probably start by looking for the exit and supporting clues for the validity of the alarm simultaneously. Is there smoke? Do you smell anything unusual? Can you get to and open the door? In an instant you have answered these quick few questions and have triggered the 4 Ms without thinking about them (Medium – environment, condition of the room, presence of fire or smoke; Method – run, walk or crawl to the door, obstacles, shields; Man – what are your physical capabilities, are you panicking; Machine – false alarm or genuine, operation of the door mechanism, locks to clear, fire on the other side of the door).

A very short list of hazards may look like this for our helibase example above using the 4 Ms. The numbers on the left side of the 4M risk chart are the risk levels that are assigned according to Chart J-1: Risk Assessment Matrix on page J-12.

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>4 Ms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mission urgency and time available for planning.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Limited number of resources and alternatives available.</td>
<td></td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Thunderstorms create lightning, winds, turbulence, and restrictions to visibility.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Limited visibility, time, and maneuvering in low level environment.</td>
<td></td>
</tr>
<tr>
<td><strong>Man (Generic)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Pilot proficiency and training.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Communications.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Firefighters without water, food, and shelter overnight.</td>
<td></td>
</tr>
<tr>
<td><strong>Machine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Helicopter internal load capacity.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Helicopter external load capability.</td>
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</tr>
</tbody>
</table>
## Risk Analysis: The 4 M's

### METHOD
1. Is there an alternative method which would accomplish the mission more safely and/or efficiently (including accomplishment by ground methods)?  
   - **YES**  
   - **NO**

2. Is the method selected approved and do detailed instructions for safe accomplishment exist?  
   - **YES**  
   - **NO**

3. Have adequate flight following and communications methods been established?  
   - **YES**  
   - **NO**

### MEDIUM
1. Can factors of terrain, altitude, temperature, or weather which could adversely affect the mission's success be mitigated?  
   - **YES**  
   - **NO**

2. Will the mission be conducted at low (below 500' AGL) or high altitudes? Can the same objective be achieved by flying at a higher altitude AGL?  
   - **YES**  
   - **NO**

3. If low-level flight, have all known aerial hazards been identified during the planning process and are they known to all participants?  
   - **YES**  
   - **NO**

4. If there is a potential for an airspace conflict (military, media, or sightseeing aircraft), have mitigating measures been taken?  
   - **YES**  
   - **NO**

5. Have adequate landing areas been identified and/or improved to minimum requirements?  
   - **YES**  
   - **NO**

### MAN
1. Is the Pilot properly carded for the mission to be conducted?  
   - **YES**  
   - **NO**

2. Will the flight be conducted within the Pilot flight time/duty day requirements and limitations?  
   - **YES**  
   - **NO**

3. Have the minimum number of personnel necessary to accomplish the mission safely been assigned, and do they meet personnel qualifications and experience requirements?  
   - **YES**  
   - **NO**

4. Will adequate personnel (flight and ground crew) and Pilot briefings be conducted prior to the flight?  
   - **YES**  
   - **NO**

5. Are users aware that the Pilot-in-command has final authority over any operations conducted involving the aircraft or its occupants?  
   - **YES**  
   - **NO**

### MACHINE
1. Is the aircraft capable of performing the mission in the environment (altitude, temperature, terrain, weather) where the operation will be conducted?  
   - **YES**  
   - **NO**

2. Is the aircraft properly carded for the intended mission?  
   - **YES**  
   - **NO**
B. Assess Hazards/Risks.

Hazard or Risk assessment involves weighing the degree of risk associated with each threat against the objectives of the mission and organization.

An informed decision is best made by weighing the costs and benefits of an operation, while identifying and eliminating unnecessary risk. Two different methods to evaluate risk will be discussed later in this chapter. They differ in the way they look at the threats identified in Step 1.

Specific hazards, such as mission urgency and pilot proficiency, can be addressed by the Safety Management System model provided in this Appendix.

The Green Amber Red model can address more general risk concerns and is also included here.

The risk assessment for the aviation operation should be conducted by those individuals best qualified by training and experience to evaluate a proposed flight or operation. These personnel include the Helicopter or Resource/Project Flight Manager, the Dispatcher, the Unit Aviation Manager and Line Manager, and ultimately the Pilot, who has the authority to decline a mission which he or she considers excessively hazardous.

C. Develop Controls/Made Decisions.

Identify the control options for all those risks which exceed acceptable levels. Start with the highest risk and work down.

The STAAR model of risk management is:

- Spread the risk over time, distance or numbers of participants to reduce the effect of a single event.
- Transfer the risk away from critical system components or to those most reliable to decrease probability of a bad outcome.
- Avoid threats by establishing barriers and other controls to eliminate the probability of a bad outcome.
- Accept the level of threat and its probability, with every aspect of the system poised for success.
- Reduce the effect or exposure through safety devices (PPE, wire cutters, etc.) or limit the number of resources exposed.

1. Some of the control options we have for risk management include:

   - Engineer hazards out of the system. Use/design human operated machines that reduce, avoid, or spread the risk so that it becomes acceptable.
Appendix J

- Guard/Control. These controls affect the environment around the person(s) at risk. They limit exposure, which in effect spreads and reduces risk to an acceptable level.

- Distance. Can spread or reduce risk by inserting a linear or time dimension to the process.

- Time. Time is a critical dimension in risk control and is an outgrowth of the operations tempo. We have plenty of evidence that points to the effect of poor time management and mishaps. A direct relationship can be made between rushing and high risk, particularly in logistics-caused mishaps. Taking enough time to do the job right in the first time is one of the most effective risk controls we have.

- Training and Education. Training and education allows us to accept risk with the understanding that personnel can learn to manage risk.

2. Brainstorm a list of ways to reduce the risk levels that you considered unacceptable in the previous step.

3. Determine the consequences of each alternative on mission and/or team goals.

4. Select the best alternative or combination of alternatives. The mission priority and time criticality will often drive which option is chosen. A conservative response is always preferred to meet this objective.

   The risk management process and documentation discussed in this appendix will provide management an accurate picture of the flight operations system and the aviation risks involved. It allows people to make informed decisions regarding benefit and risk. Management can then set the standards of risk for the mission and determine the appropriate benefit ratio.

D. Implement Controls/Execute and Monitor.

Implement the plan and ensure that the risk controls are in place. Ensure that people know and do what is expected of them. A high level of risk that cannot be effectively controlled should be reported to the operational supervisor. Continually evaluate the effectiveness of the controls and ensure that the risk and benefits remain in balance.

E. Supervise and Evaluate.

Note any changes to the operation, equipment, environment, and/or people and how they may affect your plan. Remember that risk management is a continuous process! Maintain your situational awareness so that you can identify and adjust to unexpected as well as expected threats. Track your progress by taking note of intermediate accomplishments that lead to your objective. Additionally, After Action Reviews are a good way to assure effective supervision and monitoring of the mission. It also allows lessons learned to be captured for the future.

Appendix J-5
II. Risk Assessment Tools

A. Green Amber Red (GAR) Risk Assessment Model.

Introduction

This model differs from the Safety Management System (SMS) model in several ways. First, it provides a more general analysis of the operational system. Second, it provides a qualitative rating scale for each of the categories that correspond to the identified areas of risk. It is important to remember that risk management is a process that continues throughout the mission. Each assessment model provides a method of evaluating risks as they apply to every mission. The following categories comprise the GAR model:

Supervision

A person designated to provide supervision acts as a control for the risk undertaken. This may be as simple as checking that operations are proceeding according to approved standards. Supervisory control considers the experience, training, proficiency, other qualifications of the supervisor; whether that person’s situational awareness, leadership, and communication are effective; and if the required supervision is actually taking place. To effectively provide control the supervisor must:

- Know the goals of the operation (planning),
- Be able to affect the system (leadership, communication, decision making),
- Have a model (plan) of the system and
- Be able to ascertain the state of the system (situational awareness).

The higher the degree of risk, the more the supervisor needs to focus on observing and the larger picture. A supervisor who is easily distracted by hands-on tasks is not an effective safety control in high-risk conditions.

Planning

Consider how informed you and other resources are, how accurate the information is, and the amount of time available to plan for and evaluate the existing and emerging conditions.

Team Selection

Evaluate the character and competence of the individuals to be used. If individuals must be replaced during the operation, assess new team members and how they will interact with those already engaged.
Team Fitness

Assess both the physical and mental state of the team. Consider the amount and quality of duty/rest a crewmember has had and their exposure to sources of stress. The stage of team development should also be scrutinized; it will impact the level of complexity the team is able to manage.

Communication

Evaluate the available communication systems according to: their technical capability, infrastructure, reliability, and the organization’s culture. Determine how any barriers to effective communication may be bridged, and identify how errors may be rectified.

Contingency Resources

Contingency planning should be a normal part of all operational planning. These resources are activated only under certain predetermined conditions and/or in emergencies. Consider their activation requirements, response time, and how they would be used.

Environment

Consider factors affecting the performance of people as well as the capabilities and limitations of other resources. These may include the time of day, temperature, humidity, precipitation, wind and other dynamic weather conditions. Terrain affects wind and weather patterns and can both provide benefits and hide other hazards from view.

People are affected by the organizational environment as well. The overt culture of an organization may appear to be one thing when below the surface it is actually something else. Be realistic and truthful regarding the culture of the organization; provide goals and expectations that are understood by all.

Event or Incident Complexity

Careful team selection is of key importance in bringing together individuals with the requisite character and competency. Newly developing teams are equipped with a variety of individual skills. Time is needed for them to develop, and leadership must adapt as the team evolves. Often, they must overcome barriers to successfully integrate. They might be capable of handling simple tasks without much preparation. However, the demands of more complex operations may require that time be set aside for training/team interaction, in order for them to develop the necessary trust and competency to function effectively.
Calculating Risk Using GAR Model

To compute the total risk level, assign a number from 0 (No Risk) to 10 (High Risk) for each of the eight previously identified categories. (An assessment form containing descriptions of risk levels can be developed, similar to Figure J-1.) The individual risk category scores are then totaled. This personal estimate is a starting point for the subsequent discussion, which should include as many of the participants as is practical. This discussion is more important than the actual numbers assigned.

<table>
<thead>
<tr>
<th>Category</th>
<th>Level of Risk</th>
</tr>
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<tbody>
<tr>
<td>Supervision</td>
<td></td>
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<tr>
<td>Planning</td>
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<tr>
<td>Team Selection</td>
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<td>Team Fitness</td>
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<tr>
<td>Communication</td>
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</tr>
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<td>Contingency Resources</td>
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<td>Environment</td>
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<td>Complexity</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

Color Coding Risk

The mission risk mirrors the colors of a traffic light. If the total risk value falls in the GREEN ZONE (1-35), risk is rated as low. A moderate level of risk is indicated when the total risk value falls in the AMBER ZONE (36-60), and should the total value fall in the RED ZONE (61-80), you should ensure that all effective control measures have been implemented prior to starting the operation. The Amber and Red risk levels must also be evaluated at a higher level in the organization than the helicopter/helibase manager, so that the organizational risk acceptance levels are aligned with the expected benefit of the operation.

The GAR Model provides a general assessment of operations and allows management to set the standard for risk. Any concern for elevated risk levels in one or more of the categories may require an in depth assessment using a more specific assessment.

Once again, assigning numerical values and colors to hazards using the GAR Model is not the most important part of this risk assessment. The importance lies in the team discussions, which lead to an understanding of the threats, how they will be controlled, and what standards management expects personnel to maintain. This allows decision making, and threat and error management, to be properly aligned with the organization.
The following is an example of the GAR Risk Assessment.

<table>
<thead>
<tr>
<th>Operation: Scheduled</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective(s):</strong></td>
<td></td>
</tr>
<tr>
<td>Supervision</td>
<td>Label the number as appropriate.</td>
</tr>
<tr>
<td>Supervisor has perfect knowledge about the mission, personnel, capabilities and limitations, and is able to apply the appropriate control to minimize risk.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>6 7 8 9 10 ☺ &gt;</td>
</tr>
<tr>
<td>Supervisor has little knowledge about the mission, personnel, capabilities and limitations, and lacks skill, knowledge or ability to apply the appropriate control to minimize risk.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td>There is a well designed plan that is reviewed and revised as needed to meet the demands for safety and efficiency and to account for adaptation. Time is well managed.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>6 7 8 9 10 ☺ &gt;</td>
</tr>
<tr>
<td>There is no plan or the plan doesn't address many current adaptations made in response of demands for efficiency. Time constraints have a strong effect on ability to plan.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td>Contingency Resources</td>
<td></td>
</tr>
<tr>
<td>Reliable alternative equipment and personnel are available, easily accessed and informed about the mission requirements.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>6 7 8 9 10 ☺ &gt;</td>
</tr>
<tr>
<td>The outcome depends on the equipment and personnel assigned completing the mission perfectly. Failure is not an option.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
</tr>
<tr>
<td>Interpersonal communications are clear and there is a high level of trust in the organization. Adequate personnel and technology are available to relay information accurately to those who make the decisions.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>6 7 8 9 10 ☺ &gt;</td>
</tr>
<tr>
<td>There is low trust in the organization or the personnel/communication equipment is unreliable based on the expected needs for the mission.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td>Team Selection</td>
<td></td>
</tr>
<tr>
<td>Multiple personnel with skill, knowledge and ability are available to fulfill the requirements of the mission. Selection and preparation are done well in advance so there is time to address personal and job related demands.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>6 7 8 9 10 ☺ &gt;</td>
</tr>
<tr>
<td>Only one person is available and the success of the mission depends on that person juggling many responsibilities to squeeze this mission into the work schedule. Additional time will be donated to keep up with the workload.</td>
<td>☺ 1 2 3 4 5</td>
</tr>
</tbody>
</table>
### Supervision

<table>
<thead>
<tr>
<th>Team Fitness</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel are trained, proficient, healthy, and rested prior to starting the mission. Personal issues are addressed and little external stress is being exerted.</td>
<td>Personnel lack one or more critical component in their training. They have many additional duties or social pressures distracting them from their proficiency.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather and visibility are conducive to the best possible chance for success in the mission. Operational tempo is appropriate for the mission.</td>
<td>Winds are unpredictable, temperature is extreme, low ceilings and visibilities, precipitation, sun angle creates strong shadows, etc. Mission tempo is too low or high.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mission Complexity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A single agency is involved with personnel from the same unit who regularly work together. Mission is straight forward and covered by standard operating procedures.</td>
<td>Multiple agencies are involved in a novel or confusing mission. Personnel are new to each other and come from different operational cultures. Many leaders are emerging and working toward different objectives.</td>
</tr>
</tbody>
</table>

### Benefit Statement

Operation Approved by:  
Title: Date:

### Risk Level

- **GREEN ZONE (1-35)**
- **AMBER ZONE (36-60)**
- **RED ZONE (61-80)**
B. Safety Management System.

Several agencies use a Safety Management Systems (SMS) approach as their foundation to aviation safety. The four pillars of SMS are Safety Policy, Safety Risk Management, Safety Assurance and Safety Promotion. SMS is also the standard for safety set by the International Civil Aviation Organization (ICAO) and the Federal Aviation Administration (FAA).

SMS promotes the transition to an aviation safety approach that:

- Emphasizes proactive risk management.
- Promotes a “just” culture.
- Addresses systemic safety concerns.
- Holds the organization accountable.
- Identifies what occurred so we can manage the manageable.
- Communicates why it occurred so the culture can learn from mistakes.

The intent of SMS is to improve the aviation culture and reduce the number of aircraft accidents by identifying hazards inherent to the mission, recognizing human behaviors that result in error, and devising preventive measures to counter them. Much of this is done at management levels above the field user. However, some hazard and mitigation processes are operational in nature and thus apply to all levels of the organization.

Risk assessment and mitigation is a continual process. Common hazards associated with a helicopter mission – crew fitness, distractions, mission focus, communication, weather, takeoff or landing weights, landing areas, other aircraft, wire and other obstructions – are identified in the system safety analysis. Controls are provided for them. Preflight project planning is extensive for low-level flights and other special use activities, since these environments are especially unforgiving. They require a system of standards and alternatives that crewmembers can use to maintain situational awareness and develop a better foundation for decision making.

According to these standards, crewmembers should plan, and train, for worst-case scenario events. This encourages them to develop contingencies ahead of time, rather than reacting to rare but dangerous events (e.g. tail rotor compromise, ground resonance) as they unfold. This anticipation of worst-case events should continue throughout all phases of the operation.

In order to anticipate specific threats/hazards, this model helps determine (1) the severity of impact on the mission, environment, personnel, and equipment should the hazard be encountered, and (2) the likelihood that the hazard will be encountered.

1. Severity. If the threat/hazard is encountered during an aviation operation, the effect may be:
• Catastrophic: Results in fatalities and/or system loss.
• Critical: Severe injury and/or major system damage.
• Marginal: Minor injury and/or minor system damage.
• Negligible: Less than minor injury and/or less than minor system damage.

Controls include protective devices, engineering controls, personal protective equipment, a reduction in the number of people involved, and limiting exposure time.

2. Likelihood. The probability of encountering the threat/hazard during the flight mission or operation may be:
• Frequent: continuously or often encountered during each mission.
• Probable: encountered several times during the course of many missions.
• Occasional: encountered sporadically during the course of many missions.
• Remote: encountered infrequently, but chances are remote.
• Improbable: encountered only rarely; chances are possible, but unlikely.

Controls include training; awareness; a safe attitude; good information flow; flexibility and proper timing, location, separation, and routing.

It takes judgment and discretion to evaluate which controls will best reduce or mitigate the risks to an appropriate level for the benefit incurred. Use the Risk Assessment Matrix (Chart J-1) and the Risk Assessment Worksheet to document this process.

IMPORTANT NOTE: Be aware that the initial assessment of risk(s) may indicate an unacceptable level when compared to the expected benefit. However, once controls are determined, the risk assessment may indicate a lowered risk that may be acceptable when compared with the benefit of the operation.

<table>
<thead>
<tr>
<th>Chart J-1: Risk Assessment Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Risk Assessment Matrix Table]</td>
</tr>
</tbody>
</table>

Appendix J-12
3. Risk Levels. Refer again to Chart J-1. This step concludes the initial risk assessment that describes the risk associated with each of the threat/hazards individually. Each one is quantified as: High, Serious, Medium, or Low. Each assessment must be weighed on the variables of the operation, and benefits must always outweigh costs. The overall risk of the mission will never be less than the highest specific risk factor (example: one high, one serious, and two medium threats couldn't result in anything less than an overall risk level of high).

- **High**: The combination of severity and likelihood indicate that threat/ hazard has a greater than 50% chance of exceeding control measures and the result will be critical or worse. Benefit to risk must be carefully weighed and planners ensure that; 1) emergency response resources are positioned for immediate use, 2) approval is made by the highest official in the local organization, and 3) crewmembers are well rested, briefed and aware of the known threats and their controls.

- **Serious**: Risk is high enough that there is uncertainty as to whether the mission can be accomplished without an accident and/or loss of life or serious injury. Hazards may or may not be mitigable.

- **Medium**: Degree of risk is such that the mission can almost certainly be accomplished safely. Hazards exist, but can be mitigated.

- **Low**: The risk involves little or no impact on mission accomplishment. Hazards are those normally associated with flight (possibility of bird strike, mechanical malfunction, etc.).
### Risk Assessment and Mitigation (Example):

<table>
<thead>
<tr>
<th>Sub-system</th>
<th>System</th>
<th>Pre-Mitigation</th>
<th>Post-Mitigation</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood</td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
</tr>
<tr>
<td>Severity</td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
</tr>
<tr>
<td>Outcome</td>
<td>Serious 3</td>
<td>High 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Additional Local Mitigation

For Helispot H 43 and H 64 will only use Helicopter NH90 A Star.

<table>
<thead>
<tr>
<th>Title:</th>
<th>Medium 2</th>
<th>Serious 3</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Mitigation Achieved?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date:</th>
<th>Medium 2</th>
<th>Serious 3</th>
<th>Post Mitigation Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Risk Level Appropriate Management Level for Risk Decision

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Fire</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Incident Commander or Operations Section Chief</td>
<td>Line Manager</td>
</tr>
<tr>
<td>Serious</td>
<td>Incident Commander or Operations Section Chief</td>
<td>Line Manager</td>
</tr>
<tr>
<td>Medium</td>
<td>Air Operations Branch Director</td>
<td>Project Aviation Manager</td>
</tr>
<tr>
<td>Low</td>
<td>Helibase Manager</td>
<td>Helicopter or Flight Manager</td>
</tr>
</tbody>
</table>

Additional Aviation Risk Management information can be found on the BLM and USFS Aviation websites, including Aviation Operational Risk Assessments specific to helicopter programs, with fillable Risk Assessment Worksheets in Word and Excel format.


http://www.fs.fed.us/fire/av_safety/index.html
### Aviation Risk Assessment Worksheet

Assess the risks involved with the proposed operation. Use additional sheets if necessary.

<table>
<thead>
<tr>
<th>Assignment:</th>
<th>Date:</th>
</tr>
</thead>
</table>

#### Pre-Mitigation Hazard Assessment

<table>
<thead>
<tr>
<th>Describe the Hazard:</th>
<th>Pre-Mitigation Hazard Rate Out</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Risk Level</th>
</tr>
</thead>
</table>

#### Mitigation Controls

<table>
<thead>
<tr>
<th>Mitigation Controls:</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Risk Level</th>
</tr>
</thead>
</table>

#### Post-Mitigation Hazard Assessment

<table>
<thead>
<tr>
<th>Post-Mitigation Hazard Rate Out</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Risk Level</th>
</tr>
</thead>
</table>

#### Pre Mitigation Overall Rating:

<table>
<thead>
<tr>
<th>Pre Mitigation Overall Rating:</th>
</tr>
</thead>
</table>

#### Post Mitigation Overall Rating:

<table>
<thead>
<tr>
<th>Post Mitigation Overall Rating:</th>
</tr>
</thead>
</table>

Success Probability/Benefit Statement:

<table>
<thead>
<tr>
<th>Operation Approved by:</th>
<th>Title:</th>
<th>Date:</th>
</tr>
</thead>
</table>

Appendix J-16
## Aviation Risk Assessment Worksheet

<table>
<thead>
<tr>
<th>Risk Assessment and Mitigation of:</th>
<th>Pre Mitigation</th>
<th>Post Mitigation</th>
<th>Additional Local Mitigation</th>
<th>Achieved?</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Outcome</th>
<th>Mitigation</th>
<th>Final Assessment Value:</th>
<th>Prepared By:</th>
<th>Operation Approved by:</th>
<th>Date:</th>
<th>Title:</th>
</tr>
</thead>
<tbody>
<tr>
<td>System:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subsystem:</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Final Assessment Value:**

**Prepared By:**

**Operation Approved by:**

---

**Date:**

---

**Title:**
Appendix K Reserved
APPENDIX M: Crash rescue DIAGRAMS

This appendix provides typical diagrams of various makes and models of helicopters. The intent is to provide crash rescue personnel on helibases or other locations with general information concerning aircraft layout, emergency ingress and egress, and emergency procedures for fuel and electrical power shutoff.

It is essential that helibase and other personnel with crash rescue responsibilities, or who may be assigned such responsibilities, receive a briefing by the Pilot on the specific characteristics of the helicopter with which they are working.
LOCATION OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH

* IF CABIN OR CARGO-PASSENGER DOOR FAILS TO OPEN, BREAK WINDOWS OR WINDSHIELD

* ALL DOORS HAVE RECESSED HANDLES POINTING FORWARD, PULL OUT AND BACK OUTSIDE. INSIDE PULL 6 TY TFRT HANDLES UP.

BELL CRASH RESCUE

206B (OH-58)

SEE BACK SIDE FOR EMERGENCY SHUTDOWN PROCEDURE
**ENGINE SHUTDOWN & AIRCREW EXTRACTION**

**BELL 206B (OH-58)**

1. **ENGINE SHUTDOWN**
   - A. Rotate throttle, located on pilot's collective pitch stick, to off position.
   - B. Oh-58 pull fuel shutoff valve, located overhead in crew compartment, aft to off position. 206B turn fuel switch on panel to off position.
   - C. Place battery switch, located on overhead switch panel, to off position.

2. **AIRCREW EXTRACTION**
   - A. Unlatch lap belts and remove shoulder harness from crewmember(s).
LOCATION OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH

- TO GAIN ENTRANCE TO CABIN, SLIDE OR BREAK EITHER CABIN DOOR WINDOW.

- IF CABIN DOOR OR CARGO PASSENGER DOOR FAILS TO OPEN, BREAK WINDOWS OR WINDSHIELD

- PILOT AND PASSENGER DOORS HAVE RECESSED HANDLES POINTING FORWARD. OUTSIDE—PULL OUT AND BACK INSIDE—PULL UP

SEE BACK SIDE FOR EMERGENCY SHUTDOWN PROCEDURES
Emergency Procedure:

1. \textit{Wait until all rotors have stopped.}

2. \textit{Shut off fuel switch} located in the instrument panel. It's usually covered by a metal red cover.

3. \textit{Disconnect battery} located on nose of helicopter. Remove front panel, and rotate knob counterclockwise, and disconnect cable from battery.

4. \textit{Evacuate personnel} if necessary.

5. \textit{Make sure ELT is in the on position, and remove from helicopter.} ELT is located in the chin bubble area on the pilots side.

6. \textit{Remove fire extinguisher.} It's located between the two front seats at shoulder level.

7. \textit{Remove first aid kit.} It's located between the two aft facing seats in the rear passenger area.

8. If possible, \textit{secure the area from outside interference.}
LOCATION OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH

- TO GAIN ENTRANCE TO CABIN, SLIDE OR BREAK EITHER CABIN DOOR WINDOW AND PULL JETTISON HANDLE.

- IF CABIN DOOR FAILS TO JETTISON OR CARGO-PASSENGER DOOR FAILS TO OPEN, BREAK WINDOWS OR WINDSHIELD.
Appendix M-9
LOCATION OF SWITCHES AND EQUIPMENT
AND EMERGENCY SHUTDOWN PROCEDURES
MAY VARY FOR INDIVIDUAL AIRCRAFT.
CREWS SHOULD BE BRIEFED PRIOR TO
HELICOPTER DISPATCH

- TO GAIN ENTRANCE TO CABIN USE EXTERNAL
  JETTISON HANDLE. IF THIS FAILS, SLIDE OR
  BREAK EITHER CABIN DOOR WINDOW.

- IF CABIN DOOR OR CARGO PASSENGER
  DOOR FAILS TO OPEN, BREAK WINDOWS
  OR WINDSHIELD.
LOCATION OF SWITCHES AND EQUIPMENT
AND EMERGENCY SHUTDOWN PROCEDURES
MAY VARY FOR INDIVIDUAL AIRCRAFT.
CREWS SHOULD BE BRIEFED PRIOR TO
HELICOPTER DISPATCH

- IF CABIN OR CARGO-PASSENGER
  DOOR FAILS TO OPEN, BREAK
  WINDOWS OR WINDSHIELD

HYDRAULIC
RESERVOIRS (2)

ENGINE OIL TANKS (2)

FUEL TANKS

CARGO-PASSENGER DOOR
2 PLACES

CABIN DOOR
2 PLACES

BATTERY
Appendix M-12

LOCATION OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH.

- EMERGENCY ENTRANCE TO COCKPIT IS GAINED THROUGH JETTISON DOORS BY ACTUATING HANDLE LABELED "DOOR JETTISON PUSH TRIGGER," TURN HANDLE. IF DOOR DOES NOT FALL AWAY, PULL AWAY.

- EMERGENCY ENTRANCE TO CARGO COMPARTMENT IS GAINED THROUGH CABIN DOOR OR UPPER DOOR ESCAPE HATCH, CABIN ESCAPE HATCH, RAMP ESCAPE HATCH, AND CUTOUT PANELS. ALL ESCAPE HATCHES CAN BE OPENED BY PULLING THE YELLOW TAB OUT AND PUSHING THE PANEL IN.

- AN ACCESS DOOR TO THE CARGO RAMP CONTROL LEVER IS LOCATED ON RIGHT SIDE OF AIRCRAFT BELOW THE RIGHT ENGINE. RAMP MAY BE LOWERED, PROVIDING EMERGENCY ENTRANCE, BY PLACING THE CONTROL LEVER IN THE DOWN POSITION.

- A RESCUE HATCH LOCATED IN FLOOR OF CARGO COMPARTMENT MAY BE USED FOR EMERGENCY EXIT IF LOWER RESCUE DOOR HAS BEEN PREVIOUSLY OPENED.

CH-47

HAND FIRE EXTINGUISHER (THREE ARE PROVIDED. ONE IS LOCATED IN COCKPIT ON FLOOR TO RIGHT OF PILOT'S SEAT. ANOTHER IS LOCATED ON FORWARD BULKHEAD IN CARGO COMPARTMENT. ONE IS LOCATED JUST FORWARD OF CARGO RAMP ON LH SIDE)

CABIN DOOR AND UPPER CABIN DOOR ESCAPE HATCH

FIRST AID KIT (SEVEN ARE PROVIDED. ONE IS LOCATED IN PASSAGeway BETWEEN COCKPIT AND CARGO COMPARTMENT. SIX ARE LOCATED IN CARGO COMPARTMENT, THREE ON EACH SIDE.)

RAMP CONTROL LEVER (ACCESS DOOR LOCATED BELOW RIGHT ENGINE)

FLIGHT CONTROL HYDRAULIC RESERVOIRS

UTILITY HYDRAULIC RESERVOIR

CARGO DOOR ESCAPE HATCH

JETTISON CARGO DOOR-SOME A/C (JETTISON FROM INSIDE AIRCRAFT BY ROTATING RELEASE HANDLE TO THE LEFT)

AUXILIARY FUEL TANK-SOME A/C (2 ON EACH SIDE)

BATTERY

FUEL TANK (EITHER SIDE)

PORTS CAN BE KNOWN OUT/IN FOR EMERGENCY EXIT OR ENTRY

CUT HERE FOR EMERGENCY RESCUE (1 ON EACH SIDE)

TYPE: TWIN-TURBINE ENGINE TANDEM ROTOR
CREW: NORMAL CONDITIONS 2-4
PASSENGERS: 33 FULLY EQUIPPED GROUND TROOPS
LITTERS: 26 W/3 MEDICAL ATTENDANT'S SEATS

SEE BACK SIDE FOR EMERGENCY SHUTDOWN PROCEDURES
1. NORMAL SHUTDOWN

A. POSITION ENGINE CONDITION LEVERS, LOCATED ON CONTROL PEDESTAL, TO STOP.

B. POSITION FUEL VALVE SWITCHES, LOCATED ON OVERHEAD FUEL CONTROL PANEL, TO CLOSE.

C. POSITION BATTERY SWITCH, LOCATED ON OVERHEAD ELECTRICAL CONTROL PANEL, TO OFF.

NOTE:
IF ENGINES FAIL TO SHUTDOWN, PULL FUEL SHUTOFF T-HANDLE, LOCATED AT TOP OF INSTRUMENT PANEL, OUT.

2. AIRCREW EXTRACTION

A. UNLATCH SEAT BELTS AND REMOVE SHOULDER HARNESS FROM CREWMEMBER(S).
LOCATION OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH.

1. PILOT/COPILOT BUBBLE AND JETTISON WINDOWS
2. MAIN CABIN DOOR
3. ESCAPE PANELS
4. FORWARD EMERGENCY DOOR

SEE BACK SIDE FOR EMERGENCY SHUTDOWN PROCEDURES
THE FOLLOWING PROCEDURES WILL BE FOLLOWED IN THE EVENT OF FIRE OR OTHER EMERGENCY DURING HOT REFUELING:

1. FUEL VALVES — CLOSED
2. BOOST PUMPS — OFF
3. ENGINE CONDITION LEVERS (ECLs) — STOP
4. PILOT & COPILOT EMERGENCY DOORS/BUBBLES — JETTISON

(CONSIDER LOCATION OF FIRE DUE TO LOCATION OF REFUELING POINT BEFORE JETTISONING COCKPIT DOORS.)

5. AIRCRAFT — EVACUATE
6. FIRE EXTINGUISHER — DIRECT ON FIRE
EMERGENCY SHUTDOWN PROCEDURE

THE FOLLOWING PROCEDURES WILL BE FOLLOWED IN THE EVENT OF FIRE OR OTHER EMERGENCY DURING HOT REFUELING:

1. ENGINE CONDITION LEVERS (ECLs) — STOP
2. T-HANDLES — PULL
3. BOOST PUMPS — OFF
4. PILOT & COPILOT EMERGENCY DOORS/BUBBLES — JETTISON
5. AIRCRAFT — EVACUATE
6. FIRE EXTINGUISHER — DIRECT ON FIRE

(CONSIDER LOCATION OF FIRE DUE TO LOCATION OF REFUELING POINT BEFORE JETTISONING COCKPIT DOORS.)
LOCATIONS OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH.

SEE BACK SIDE FOR EMERGENCY SHUTDOWN PROCEDURES
EUROCOPTER
EMERGENCY PROCEDURE/ENGINE FIRE ON GROUND

BK-117

1. PASSENGERS — ALERT/EVACUATE
2. BOTH EMERGENCY FUEL VALVES — CLOSE
3. BOTH FUEL SUPPLY PUMPS — OFF
4. BOTH POWER LEVERS — OFF
5. BATTERY AND GENERATORS — OFF

EXTINGUISH FIRE WITH HAND FIRE EXTINGUISHER
Interagency Helicopter Operations Guide - February 2013
Appendix M

Appendix M-20
1. PASSENGERS — ALERT/EVACUATE
2. BOTH EMERGENCY FUEL VALVES — CLOSE
3. BOTH FUEL SUPPLY PUMPS — OFF
4. BOTH POWER LEVERS — OFF
5. BATTERY AND GENERATORS — OFF

EXTINGUISH FIRE WITH HAND FIRE EXTINGUISHER
1. ENGINE SHUTDOWN
   A. ROTATE THROTTLE CONTROL, LOCATED ON PILOT AND COPILOT COLLECTIVE LEVERS, TO FUEL CUT-OFF POSITION.

2. AIRCrew EXTRACTION
   A. UNLATCH LAP BELT AND REMOVE SHOULDER HARNESS FROM CREWMEMBER(S).

B. PLACE BATTERY SWITCH, LOCATED ON ELECTRICAL CONTROL CONSOLE, TO OFF POSITION.
EMERGENCY PROCEDURE:

- If cabin doors fail to open, break windows or windshield.
- Shut off fuel.
- Turn off master battery switch.

ROBINSON MODEL R44 & R44 II CRASH RESCUE DIAGRAM

- Optional tailcone battery location
- Master battery switch
- Optional ELT remote switch
- Optional access through right upper aft cowl door
- Optional battery location
- Optional underseat battery location
- Optional nose battery location
- Fuel tanks
- Fuel shut-off valve
- Fire extinguisher locations

Appendix M-24
EMERGENCY SHUTDOWN PROCEDURE

S-58T

1. THROTTLE TWIST GRIP—OFF  (CONTROL STICK RIGHT OF CENTER CONSOLE)
2. FUEL SHUTOFF VALVE SWITCHES—CLOSED  (CENTER CONSOLE)
3. FUEL BOOST PUMP SWITCHES—OFF (CENTER CONSOLE)
4. BATTERY & GENERATOR SWITCHES—OFF (CENTER CONSOLE)
5. ROTOR BRAKE—ON
   IF ROTOR BLADES ARE TURNING
   (RIGHT OF OVERHEAD SWITCH PANEL)
   RED HANDLE—PULL DOWN & FORWARD

FUEL VALVE SWITCHES
FUEL BOOST PUMP SWITCHES
BATTERY & GENERATOR SWITCHES

ROTOR BRAKE
FIRE EXTINGUISHER
H-HANDLES

THROTTLE TWIST GRIP
LOCATION OF SWITCHES AND EQUIPMENT AND EMERGENCY SHUTDOWN PROCEDURES MAY VARY FOR INDIVIDUAL AIRCRAFT. CREWS SHOULD BE BRIEFED PRIOR TO HELICOPTER DISPATCH.

S-61N

CABIN EMERGENCY ESCAPE HATCH

OIL TANK EMERGENCY EXIT

HYDRAULICS

FUEL TANK

BATTERY

EMERGENCY EXITS

FUEL TANKS

AUX. FUEL TANKS INSTALLED IN FLOATS

COCKPIT EMERGENCY ESCAPE HATCH

SEE BACKSIDE FOR EMERGENCY SHUTDOWN PROCEDURES
1. ENGINE CONTROL LEVERS—OFF
   (CENTER OVERHEAD—FORWARD)
   PULL AFT, THEN DOWN TO CLEAR
   DETENT AT END OF ARC.

2. FUEL SHUT OFF VALVE SWITCHES—CLOSED
   (CENTER OF INSTRUMENT PANEL)

3. FUEL BOOST PUMP SWITCHES—OFF
   (CENTER OF INSTRUMENT PANEL)

4. BATTERY & GENERATOR SWITCHES—OFF
   (OVERHEAD SWITCH PANEL)

5. ROTOR BRAKE—ON
   IF ROTOR BLADES ARE TURNING
   (RIGHT OF OVERHEAD SWITCH PANEL)
   RED HANDLE—PULL DOWN & FORWARD.

   BATTERY & GENERATOR SWITCHES
   Rotor Brake
   Fire Extinguisher "Tee" Handles
   Engine Control Levers
   Fuel Shut Off Valve Switches
   Fuel Boost Pump Switches
S-64 (CH-54)

1. NORMAL ENTRY
   A. ROTATE ENTRANCE HANDLE, LOCATED ON AFT EDGE OF PILOT'S AND COPILOT'S ENTRANCE DOOR, SWING DOOR OUT.
   B. ROTATE ENTRANCE HANDLE, LOCATED ON AFT EDGE OF REAR COCKPIT ENTRANCE DOOR ON RIGHT SIDE OF CREW COMPARTMENT, SWING DOOR OUT.
   C. ROTATE ENTRANCE HANDLE, LOCATED ON AFT EDGE OF POD ACCESS DOORS, SWING DOOR OUT.

2. EMERGENCY ENTRY
   A. ROTATE EMERGENCY JETTISON RELEASE HANDLE, LOCATED AT FORWARD LOWER CORNER OF PILOT'S AND COPILOT'S ENTRANCE DOOR, PULL DOOR OUT.
   B. ROTATE EMERGENCY JETTISON RELEASE HANDLE, LOCATED AT FORWARD LOWER CORNER OF REAR COCKPIT ENTRANCE DOOR ON RIGHT SIDE OF CREW COMPARTMENT, PULL DOOR OUT.
   C. PULL EXIT RELEASE TAB, LOCATED LOWER AFT CORNER OF EACH POD WINDOW, OUT AND REMOVE WINDOW.

3. CUT-IN
   A. CUT AROUND WINDOWS AND ACCESS DOORS OF POD AS MARKED.
LOCATION OF SWITCHES AND EQUIPMENT
AND EMERGENCY SHUTDOWN PROCEDURES
MAY VARY FOR INDIVIDUAL AIRCRAFT.
CREWS SHOULD BE BRIEFED PRIOR TO
HELICOPTER DISPATCH.

AIRCRAFT ENTRY—ALL MODELS

1. NORMAL ENTRY
   A. TURN COCKPIT DOOR COUNTERCLOCKWISE
      TO THE OPEN POSITION TO OPEN DOOR.
   B. TURN CABIN DOOR COUNTERCLOCKWISE TO
      THE OPEN POSITION AND SLIDE DOOR AFT.

2. EMERGENCY ENTRY
   A. BREAK WINDOW IN COCKPIT DOOR AND PULL
      JETTISON LEVER AFT TO RELEASE DOOR
      HINGES.
   B. BREAK WINDOW IN CABIN DOOR AND ROTATE
      EMERGENCY HANDLE, LOCATED BELOW EACH
      WINDOW, TO THE AFT OPEN POSITION. ROTATE
      BOTTOM OF WINDOW OUT TO REMOVE WINDOW.

ORTH OF Yanks

SEE BACK SIDE FOR EMERGENCY SHUTDOWN PROCEDURES
1. ENGINE SHUTDOWN
   NOTE: TO ACTIVATE THE INSTALLED FIRE EXTINGUISHING SYSTEM, THE HANDLE MUST BE PULLED DOWN.
   A. PULL ENGINE EMERGENCY (T) HANDLE, FULL AFT.
   B. PULL APU (T) HANDLE ON UPPER CONSOLE, DOWN.
   C. PLACE BATTERY SWITCH, LOCATED ON UPPER CONSOLE, TO THE OFF POSITION.

2. AIRCREW - TROOP EXTRACTION
   NOTE: ALL AIRCREW SEATS HAVE A COMPLETE LAP BELT AND DUAL TORSO RESTRAINT SHOULDER HARNESS ATTACHED TO A ROTARY RELEASE BUCKLE.
   ALL TROOPER SEATS HAVE A LAP BELT AND SHOULDER HARNESS ATTACHED TO A ROTARY RELEASE BUCKLE.