

AIR RESCUE REPORT

International Commission for Alpine Rescue

Kommission für Luftrettung • Commission pour le Sauvetage Aérien • Commission for Air Rescue



IKAR-CISA

October 11-15, 2006 - Kranjska Gora, Slovenia

PREPARED BY:

Marc Ledwidge
Mountain Safety Specialist
Parks Canada
Box 900, Banff, AB
Canada T1L 1K2
marc.ledwidge@pc.gc.ca



Ken Phillips
Chief Emergency Services
Grand Canyon National Park
Box 129, Grand Canyon, AZ
USA 86023
ken_phillips@nps.gov

INTRODUCTION:

This year's congress was hosted by the mountain rescue organization of Slovenia. The Air-Rescue Sub-commission met with participants representing 16 countries. They were Austria, Bulgaria, Canada, Croatia, Czech Republic, France, Germany, Greece, Italy, Norway, Poland, Slovenia, Sweden, Switzerland, United Kingdom, and United States of America.

ACCIDENTS & INCIDENT REVIEWS FROM MEMBER COUNTRIES:

This year there were a number of accidents and incidents reported with tail-rotors being implicated. A number of these incidents are still under investigation but there was considerable discussion regarding some unexplained, apparent loss of tail rotor effectiveness with some of the newer generation aircraft. Many of the experienced rescue pilots expressed the opinion that since some of these newer aircraft may not have the tail rotor authority of older machines, care must be exercised to not approach the limits of the tail rotor.

UNITED STATES

Crash -U.S. Coast – Humboldt Coast, California

On February 11, 2006 U.S. Coast Guard personnel from Air Station Humboldt Bay responded a HH-65A Dauphin with crew of four to a report of an 18-foot boat with an outboard motor capsized in the surf with four PIW (*Persons In Water*). The rescue swimmer deployed from the helicopter to an 82 year-old female who was in cardiac arrest. The swimmer attempted CPR on the



beach shore without successful resuscitation. Subsequently, according to the official Coast Guard synopsis, “the *number one engine shut down resulting in a rapid power loss.*” The aircraft crashed in shallow water 40 yards off shore. All three remaining Coast Guard crew members aboard were uninjured and reached the beach safely. Two of the original rescue victims made it to shore safely. The other victim, the 59 year-old son of the elderly female, was hoisted from the surf by another Coast Guard helicopter, which responded to the scene following the accident. He was later pronounced dead in the hospital. The USCG investigative report is “pending”

Update US Coast Guard Rescue Accident- Alaska

The US Coast Guard has completed their investigative report of the crash of a HH-60 Jayhawk helicopter, which occurred during a December 8, 2004 rescue operation in the Aleutian Islands of Alaska (see 2005 IKAR Air Rescue Report). During the hoist extraction of personnel from the disabled Malaysian freighter *Selendang Ayu*, a large ocean swell struck the freighter and then the helicopter overhead. The helicopter hit the freighter as it crashed in the ocean. The crash resulted in six fatalities, which were all victims that had been hoisted aboard the stricken helicopter.

- According to the USCG Aviation Safety Office, the final USCG report has been completed and is “awaiting approval”. *Source: Miss Cathie Zimmerman- Deputy Chief, USCG Aviation Safety Division*

Crash - U.S. Forest Service – Payette National Forest, Idaho

A Eurocopter AS-350-B3, on contract to the Payette National Forest (USFS) crashed on August 13, 2006 tragically killing all four personnel. The crash occurred on the South Fork Salmon River Road about 18 miles west of the town of Yellow Pine, Idaho. Fire crew personnel were being shuttled four nautical miles from the top of Williams Peak to Krassel USFS Helibase. The aircraft was completely destroyed on impact with an immediate post-crash fire. The accident investigation discovered six five-gallon “cubies” (potable water containers) and other refuse along the original flight path. This aircraft was equipped with open-top cargo baskets on both sides of the fuselage. Cargo was retained in the baskets with elastic straps. Although the investigation is still pending, there is the theory that material came loose in flight from the cargo basket and contacted the tail rotor causing a catastrophic failure.



The post-crash response by personnel on the ground was very organized and followed a local established written crash rescue plan. An operational deficiency that occurred was the decision to have two lifeflight (HEMS) helicopters respond without an adequate communication plan in place or incident coordinates provided to them. Although a safe incident helispot had been established at a nearby ranch, the lifeflight aircraft failed to utilize this site and selected a more hazardous site directly on the road adjacent to the crash site. There was no actual operational need for the lifeflight helicopters at the scene, since it was immediately obvious that all involved had suffered fatal injuries.

Crash - Grand Staircase-Escalante National Monument, Utah

An Aerospatiale SA-319B, Alouette III crashed on December 14, 2005 during a landing on slickrock terrain. As the pilot touched down in a “bowl shaped” landing site, the tricycle landing gear contacted unevenly with the right landing wheel upslope and the nose wheel low. Initially the pilot stated the landing felt normal, but as he reduced the collective a violent side-to-side motion of the helicopter commenced. The pilot said that he pulled the collective up to lift the helicopter off the ground and “suddenly it self-destructed.” This “ground resonance” event completely separated the aircraft transmission and rotor system. Five of the personnel aboard exited the aircraft under their own power however; an occupant struck by a rotor blade was unconscious and remained buckled in his seat. The Pilot and three passengers were uninjured, but two passengers had sustained serious injuries.



The accident occurred at 1550 Hours and the injured patients were promptly evacuated in the remaining daylight by two lifeflight helicopters responding from Page, AZ (30 minutes flight-time). However, the remaining uninjured personnel were then transported by the two lifeflight helicopters at night using night vision goggles (NVG). This high-risk transport from a hazardous landing zone, which was not imperative, was a deficiency in operational decision-making. Originally the helicopter was manufactured in France in 1972, under contract for the French Army Air Force, and after it was decommissioned, it was sold to a company in the United States in 2002. The investigation has identified several maintenance deficiencies including: improper tire inflations, improper main landing gear hydraulic shock strut pressures and differential functioning of the main rotor blade drag dampers.

Hoist Rescue Incident Review- Maryland State Police



On March 4, 2006 a fire broke at the top of the 1,000 foot (367.6 meters) chimney, at the coal-fire American Electric Krammer-Mitchell Plant, south of Moundsville, West Virginia. This chimney, once the tallest in the world, is the fifth tallest today. The fire trapped four workers, who were installing fibreglass liners (scrubbers) in the concrete stack. Ground crews communicated with the men above by radio as they huddled in a 10-square-foot space on the platform, which was the only section not ablaze. The victims were forced to tether themselves to a portion of the smoke stack structure on the upwind side of the fire/smoke. They battled

smouldering fires on their clothing, wind and cold temperatures while awaiting rescue.

A request for assistance was made to the Maryland State Police Aviation Command. They staffed the closest hoist-equipped helicopter, that responded "*Trooper Five*" (Eurocopter 365N Dauphin). Although the Maryland unit conducts 15 to 20 aerial hoisting rescues a year, this rescue provided unique challenges. The temporary wooden and corrugated metal construction platform at the top of the chimney created a large fire load with burning debris and oxygen-acetylene tanks that might explode, which caused the aircrew to rethink their original rescue plan. A decision was made to not deploy two HEAT (Helicopter Emergency Aerial Team) Cumberland Firefighters who had responded aboard Trooper Five. Rapid removal of the workers was considered the primary goal. A hoist rescue commenced following a face-to-face briefing with incident command on the ground and communicating their rescue plan to the stricken workers by radio. During the third and final hoist evolution, without anyone to steady the basket, it slipped off the edge of the platform as the subject got it. It fell out of sight into the darkness and smoke. After a very long moment, the basket reappeared. The third man had fallen into it and was safe. According to the aircrew, "*that was the heart-stopper of the night.*" The fourth worker was later found dead inside the giant chimney



The Maryland State Police Aviation Command after-action report identified the following points:

Positive Aspects:

- Good decision making not to deploy High Rise Emergency Aerial Team (HEAT) Team members.
- Face to face brief with incident command- enabled briefing the victims that expedited the rescue effort.
- Crew managed useful load by off-loading all unnecessary equipment.
- Crew confidence in their respective training, the aircraft and aircraft maintenance enabled total concentration on the mission.
- Realistic training in aerial rescue skills is critical. Basic hoist procedures like locating a point of reference in a dark, unknown area and deployment to an elevated, confined space cannot be realistically experienced in an airport environment near a hangar.
- Deployment of newly acquired Lifesaving Systems Rescue Basket.

Negative Aspects:

- Aircraft non-Skid flooring made it difficult to get rescue basket inside aircraft to offload victims.
- Hook assembly striking the top of the doorway necessitated two providers to manipulate the basket into the aircraft far enough to remove the victim.
- Hover time would have been increased with a smaller aircrew.
- Radar altimeter not particularly useful due to extreme elevation. A small crane boom on top of the stack served as a visual of reference.

SWITZERLAND

Lake Rescue Incident - Air Glaciers

Initially a rescue request was received at 7pm for a cardiac emergency at the cabane De Panossiere located at 3000 meters. Upon arrival it was determined that the patient was dead, when a second rescue request was received from the rescue center for a water rescue at nearby Louvie Lake. Although the helicopter personnel were not properly equipped for a water rescue they immediately responded via a five-minute flight to the lake, where a small boat with three subjects aboard had capsized. Two individuals had reached the shore, while the third was still hanging on to the overturned boat.



Initially a helicopter “skid rescue” was attempted, which caused the small boat to sink from the rotor wash. A second rescue attempt involved delivering a fixed rope to the victim in the water. Absolutely no effort was made by the victim to reach for the rope. Finally a third rescue attempt was made with the mountain guide from the aircraft being lowered on the hoist cable to the water as the aircraft remained 25 meters above the water. The unequipped rescuer simply grabbed the victim with one hand and the aircraft started to tow the pair toward shore. The pilot was not flying vertical reference with the door off and was relying on a shore-based reference point as well as the instructions of the hoist operator. During the flight the aircraft gained altitude and the rescuer lost control of the victim. The victim was quickly recovered again and the same scenario repeated itself with the aircraft gaining and losing altitude as they moved toward shore. Fortunately this “tea-bagging” rescue technique with the victim was finally successful in getting the victim to shore. The victim was later found to be highly intoxicated and hypothermic.

Discussion: During water rescue it is essential to have a pick-up sling (rescue strop) available. Having such minimal equipment on board at all times eliminates the need to improvise and thereby create a desperate situation. Vertical reference technique would have provided a more level flight profile during the rescue.

AUSTRIA

Water Rescue/Recovery Incident

An OAMTC Christophorus EC-135 responded to a water rescue incident on the 6th of July 2006 at Möserer see near Seefeld in the Tyrol. The flight crew found the victim in the water, along with three bystander rescuers. Upon arrival, the Christophorus crew attempted a helicopter “skid rescue.” When the flight doctor could not pull the victim from the water he jumped fully clothed into the lake. The victim, who was a fisherman, had gotten his fishing line stuck below the water surface and he waded out into the water in an attempt to disentangle the line. He drowned as he became entangled in vegetation under the water. The fully clothed flight doctor was unable to conduct a recovery and struggled to shore. The HEMS (Helicopter EMS) crewmember and the flight doctor then stripped down completely on shore and jumped into the water to complete the recovery.

Crash- Hospital Landing- Salzburg

During a landing approach to a rooftop heliport on May 1, 2006 at UKH Salzburg (Accident Trauma Center, Salzburg, Austria) an OAMTC EC-135 crashed and was completely destroyed on impact. The aircraft with a crew of four (typical crew staffing for an OAMTC EC-135 is three personnel) was transporting



a motorcycle accident victim to the six-story hospital for treatment. While on short final approach to the rooftop, and five meters above the pad, the aircraft suddenly made a 120° turn to tail left (nose veered right). At the time the aircraft was at a relatively low speed and the area winds were three knots. The pilot, thinking there was a tail rotor failure, reduced pitch to react to the emergency as trained. The aircraft tail boom hooked part of the helipad perimeter safety mesh, causing the aircraft to drop off the side of the building. The aircraft fell 25 meters to the ground below. In spite of the severe impact to the carbon-fibre fuselage, the cabin remained relatively intact. All personnel survived the crash. The pilot suffered a crushed leg and windshield shards in the eye. The flight doctor, who was wearing a flight helmet, sustained a concussion. The original patient sustained no additional injuries.

The accident review required that outside personnel not associated with the OAMTC organization lead the investigation. A lead investigator was selected from the military, who's only experience is with flying the Bell 205. Findings of the investigation included:

- Weight and balance within operating limits.
- Pilot was proficient- reacted properly as trained on simulator
- No evidence of technical defect to engine, rotor or transmission.
- The cause of the erratic behaviour of the aircraft is still unknown.

Discussion: There have been previous reports of possible phenomenon where “vortices” created by the main rotor tips then get transferred back to the tail rotor system. There is the conclusion that this could lead to a loss in tail rotor effectiveness.

Tail-boom strike- snow landing

After shutting down the helicopter during a snow landing to pick up an injured skier, an OAMTC EC-135 broke through the hard snow below the back of the skids. The aircraft including the tail-rotor were not damaged from this settling. The pilot was able to restart the helicopter, level the helicopter and take off normally.



CANADA

EH-101 Hoist training Accident

A Canadian Forces EH 1001 crashed into the sea during a training exercise on Canada's east Atlantic coast. The incident occurred while the helicopter was conducting a hoist operation onto a Coast Guard vessel. Three crewmembers died and four others were injured in the incident. The crewmembers in the back of the helicopter that died were tethered to the aircraft with their harnesses and a lanyard. They were also wearing Mustang flotation suits. Once the aircraft was in the water, the increased buoyancy from the flotation suits may have contributed to their failed egress of the sinking helicopter. Following this incident crewmembers in the back no longer wear flotation suits during hoist training. At this point, it does not appear that there were any mechanical malfunctions. The incident is still under investigation by the Canadian Forces.



GREECE

Greece just recently joined the IKAR-CISA. The Hellenic Rescue Team (Greece) works jointly with the Greek military, which fly Super Puma helicopters for rescue work at high altitude.

Visibility issue – Super Puma

In 2004 rescuers were delivered to a rescue scene for an injured climber. Rescuers deployed out of the aircraft upon landing and off to the left hand side of the rotor disk, while the aircraft remained running. The aircraft remained in place for a considerable period without leaving. Finally the rescuers radioed the pilot and asked why he would not leave. He replied that he could not see them. There was a visual dead spot caused by the structural design of the windshield of the Super Puma, which has a large vertical metal bar that hampers the pilot's visibility of a landing zone.



Rotor Wash Incident – Super Puma

The rotor wash of the Super Puma, which can reach 100 km/hour, caused a near-miss incident during a 2006 rescue. A mountain rescuer, who was wearing a bulky but lightweight vacuum mattress pack on his back, was deployed on to a snowfield from a hover. The aircraft remained two meters above



the deep soft snow and the rescuer jumped to the ground. As he struggled in the fresh snow and started to move out away from the aircraft, the powerful rotor wash caused the vacuum mattress pack to act as a “sail” from behind. The rotor wash pinned the rescuer out in a prone position and lifted the bottom edge of the pack literally dragging the stout rescuer across the surface of the snowfield. This incident highlights one of the limitations of using heavy lift helicopters in rescue work. The rotor wash must be considered when working around or under the aircraft. Rescue equipment is much more difficult to control than around a lighter machine.

NORWAY

Tail boom strike - Snow Landing Incident

On April 13, 2006 a Norsk Luftambulans EC-135 responded to a “snow scooter” (snowmobile) accident. The flight doctor had already been deployed at the scene initially and the helicopter was returning for the patient pick-up. On approach the pilot decided he would attempt to use a closer helispot. The landing was attempted with a fast approach as the aircraft crabbed sideways. During the landing the tail boom “stinger” made contact with the snow and dragged along for a distance. Unknown to the pilot, during this landing, snow was sucked into the fenestron tail rotor system causing considerable damage. It was only during a walk around by the pilot, following shutdown, that the damage was discovered. No personnel were injured. The aircraft repairs took three months.



UNITED KINGDOM

Sea King Hoisting Entanglement



An RAF Sea King Mark III assigned to RAF Valley Base was involved in small boat hoisting training off the UK Coast on August 12, 2005. A small fishing vessel, the "Sarah H", was incorporated in the training exercise. The rescue helicopter crew requested "parallel decks" with the fishing vessel underway. Typically the helicopter will crab along at an angle above the vessel, which permits better visualization of the vessel by the flight crew above. The "winchman" (rescuer) was lowered down over the water and then moved horizontal

toward the boat. Control of the aircraft movement was transferred to the hoist operator utilizing the *auxiliary hover trim* (AHT is horizontal flight control located at the hoist operator's door position). The boat below had begun to yaw. The aircrew lost sight of the winchman and vessel below. The winchman and hoist hook assembly became entangled in the foremast (A-frame rigging at the front of the vessel). A call of "cut, cut, cut!" was made, but this did not get executed. The hoist cable snapped and the winchman fell to the deck of the vessel. The winchman, who was wearing a back protector, sustained a fractured pelvis, fractured wrist and eye injury. The hoist cable snapped back at the hoist operator with a "face full of cable."

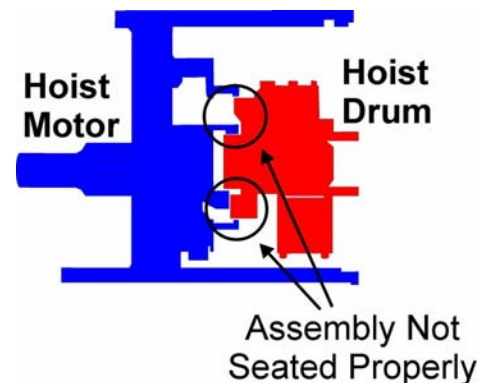


RAF Report: *"A relative movement between ZA105 and Sarah H developed very quickly, probably as a result of confused sea swell, leading to winch cable becoming trapped around vessel's foremast, such that when the boat and helicopter diverged the cable was strained beyond its ultimate load and snapped."*

The involved hoist was an older model that was not equipped with a slip clutch. Had this been a newer rescue hoist with a slip clutch it is likely the cable failure would not have occurred. The hoist cable has a rated strength of 3330lbf strength and was tested to 3923lbf. An operating recommendation was made for hoist operators to employ flight helmet safety visors.

Hoist Mechanical Failure- RAF Sea King

During a wet winching drill in the ocean for fixed wing pilots on February 14, 2006 a rescue hoist suddenly dropped personnel into the water. Two 50-foot hoisting evolutions had already been completed prior to the incident. During a raising a "slight jolt" was experienced with the load 15 feet above the water. The



hoisting was halted and an attachment carabiner was reset by the winchman. The hoisting resumed when a larger jolt was felt. The winchman signalled for a return to the water. The hoist operator selected down on the controls, when suddenly the hoist unspooled dropping the winchman and pilot trainee to the water below. The cable was recovered into the aircraft by hand. On shutdown the hoist cable could be off the drum by hand.

The involved rescue hoist was a hydraulic model hoist and its “limits and fits” were found to be out of tolerance. Due to improper installation (incorrect seating of brake assembly), following maintenance on November 8, 2005, a gap had developed where the hoist drum gears interfaced with the motor. Prior to the accident, 53 successful hoisting evolutions were conducted on this hoist following the maintenance work.

FRANCE

Crash- Sécurité Civile - June 9, 2006

A sécurité Civile EC145 crashed while hoisting on high angle terrain during a training operation in the Pyrenees. The crash happened close to the same location as the similar incident in 2003. Three crewmembers died in the accident. One crewmember survived but suffered severe injuries. The accident has been investigated but no definitive cause has been determined. The aircraft was destroyed in the crash and there was little left to investigate for conclusive findings. The investigators have come up with four possibilities as the cause of the accident.

- Tail rotor strike on cliff.
- Mechanical failure
- Rockfall hitting the tail rotor
- Loss of tail rotor authority with full left pedal.



EC 145 - Nîmes, 23.04.2002 - © Joachim BERTRAND / DDSC - Communication

In the 2003 crash, the investigators came up with three possible causes of the accident.

- Tail rotor strike on cliff
- Loss of tail rotor effectiveness
- Loss of tail rotor authority with full left pedal.

PRESENTATIONS:

SUPER LONG-LINE TECHNIQUES:

One of the themes for this year's meeting was to discuss the various techniques in use for super long lines. These are techniques used when “normal” operating lengths in fixed or hoist operations are insufficient to access a rescue site. Poland, Switzerland, Norway and Canada presented their operational procedures for this.

POLAND- TOPR Very Long Line Technique

180 Meters

PZL W3-A "Sokół" (Falcon).

PZL - Państwowe Zakłady Lotnicze (State Aviation Works) founded in Warsaw in 1928. The abbreviation was thereafter used as an aircraft brand and part of names of several Polish aerospace manufacturers referring to traditions of PZL. PZL-ŚWIDNIK SA was established in 1951

The PZL-Sokół (basic types W-3, W-3A) is a medium-light, twin engine, single main rotor, multipurpose helicopter with conventional design. Characteristics: two engines PZL-10W with 900hp power each, 14 seats (including 2 pilot seats), Max Takeoff Weight= 6400kg



- TOPR (Tatras Organization of Polish Rescue) personnel have developed this technique over the past five years to support their work in the steep Tatras Mountains of Poland.
- The aircraft is rigged with a continuous length of low-stretch rope, which involves a parallel or double strand for redundancy. The line has markings every five meters.
- As part of the risk management for the technique they require positive radio communication with the rescuer.
- The rescuer on the end of the fixed line is equipped with an extendable hooked pole that is five meters in length. This is used to snag an injured subject's line and allow the rescuer to pull themselves into the cliff.
- During the reconnaissance the pilot hovers off the cliff horizontal to the victim and check pressure altitude. The pilot then climbs upward and, utilizing the pressure altimeter reading, performs a reconnaissance of a hover location 180 meters above the victim.
- The extreme long-line technique requires increased hover on the part of the aircraft while attempting to insert a rescuer on a cliff face. Much of this is related to the pilot working to overcome the magnified swing, which develops with the long line.



Switzerland - Very Long Line Technique

Patrick Fauchère, Gerold Biner

- Deployment of the technique is ultimately based upon pilot ability. FOCA defines long lines as greater than 20 meters
- Swiss pilots are required to complete 500 external cargo cycles prior to conducting hoist operations (~ 25m). Swiss pilot must complete 1500 external cargo cycles prior to conducting external human cargo sling operations (~ 25 m).
- Human Cargo Sling Instruction program is outlined on a FOCA Form.
- Night human cargo sling operations are authorized for rescue missions only.
- Two times per year human cargo sling missions are conducted in the range of 120-240 meters in length. These are generally associated with base-jumping accidents.

Decision Points:

- Better CG than rescue hoist
- Greater payload is permitted (mass evacuation)
- Visibility of the load
- Power margin
- Vertical reference

Justification

- Avoid rotor wash
- Avoid rock fall or blade strike against cliff

Techniques:

- The line is deployed directly from a bag, using the aircraft to lift it out on takeoff.
- Both rope and steel cable are employed for this technique, however steel is actually used more frequently. Five-year retirement cycle on the equipment.
- Reliable two-way communications essential
- A good briefing is essential.
- Used for both insertion & extraction
- Exposure as short as possible



Canada - Super Long Line Technique

Marc Ledwidge-Parks Canada

Defined as “beyond normal operating lengths”. 30 metres to 60 metres are considered normal operating lengths with 30 metres as the most commonly used. Rescue lines are increased in increments of 15 meters. If lengths up to 60 metres are inadequate to access a rescue site, these additional techniques are considered. This involves using line extensions without committing a helicopter to long hover times.

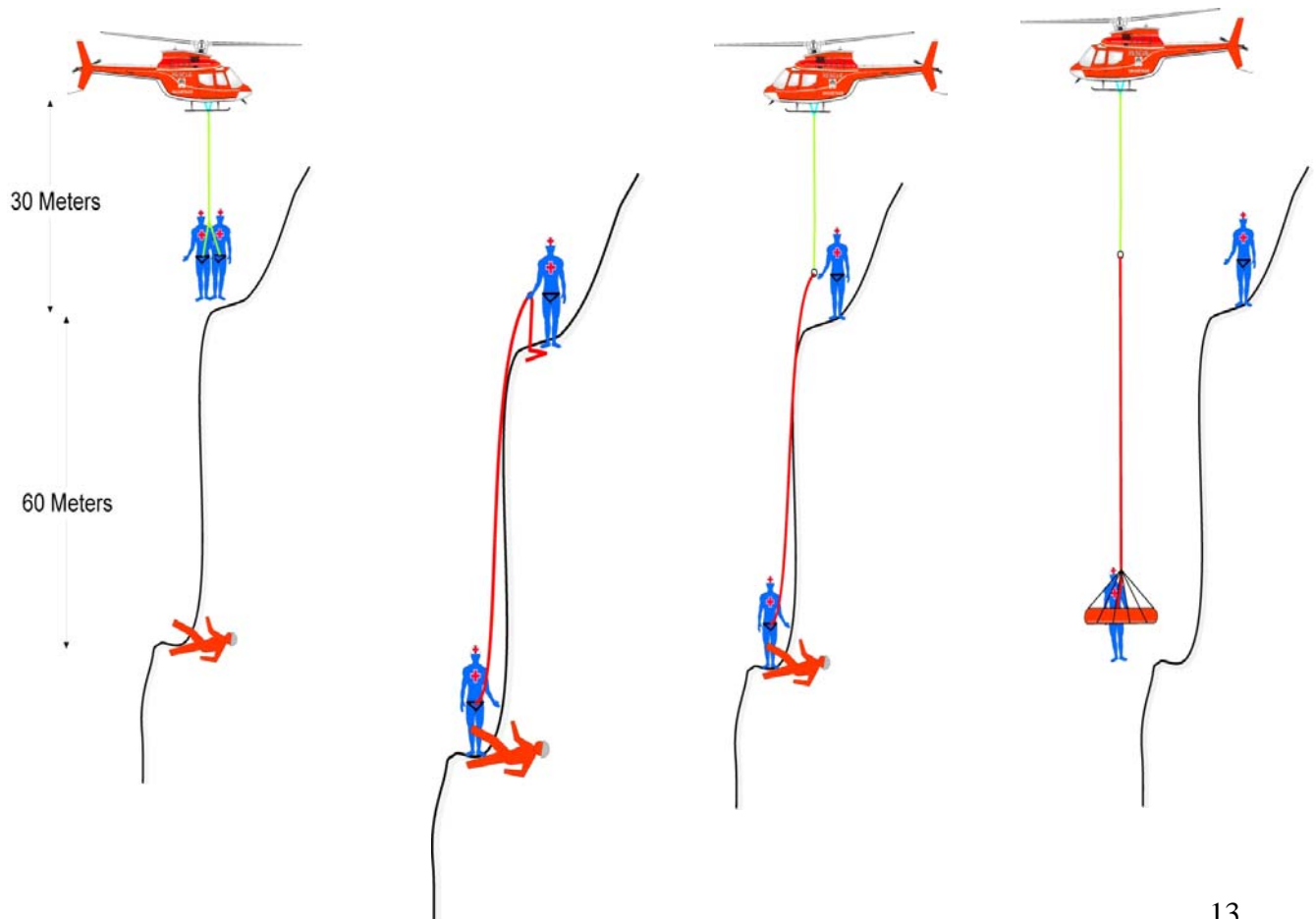
Criteria for extending long lines include:

- Insufficient rotor clearance
- Large steep cliffs
- Deep canyons
- Ground techniques too time consuming in urgent situations
- Ground techniques pose higher risk

Considerations:

- Vertical reference is difficult
- There is usually more than one ground anchor that must be managed
- There is a higher potential of swinging or bouncing of the load on the longer line.

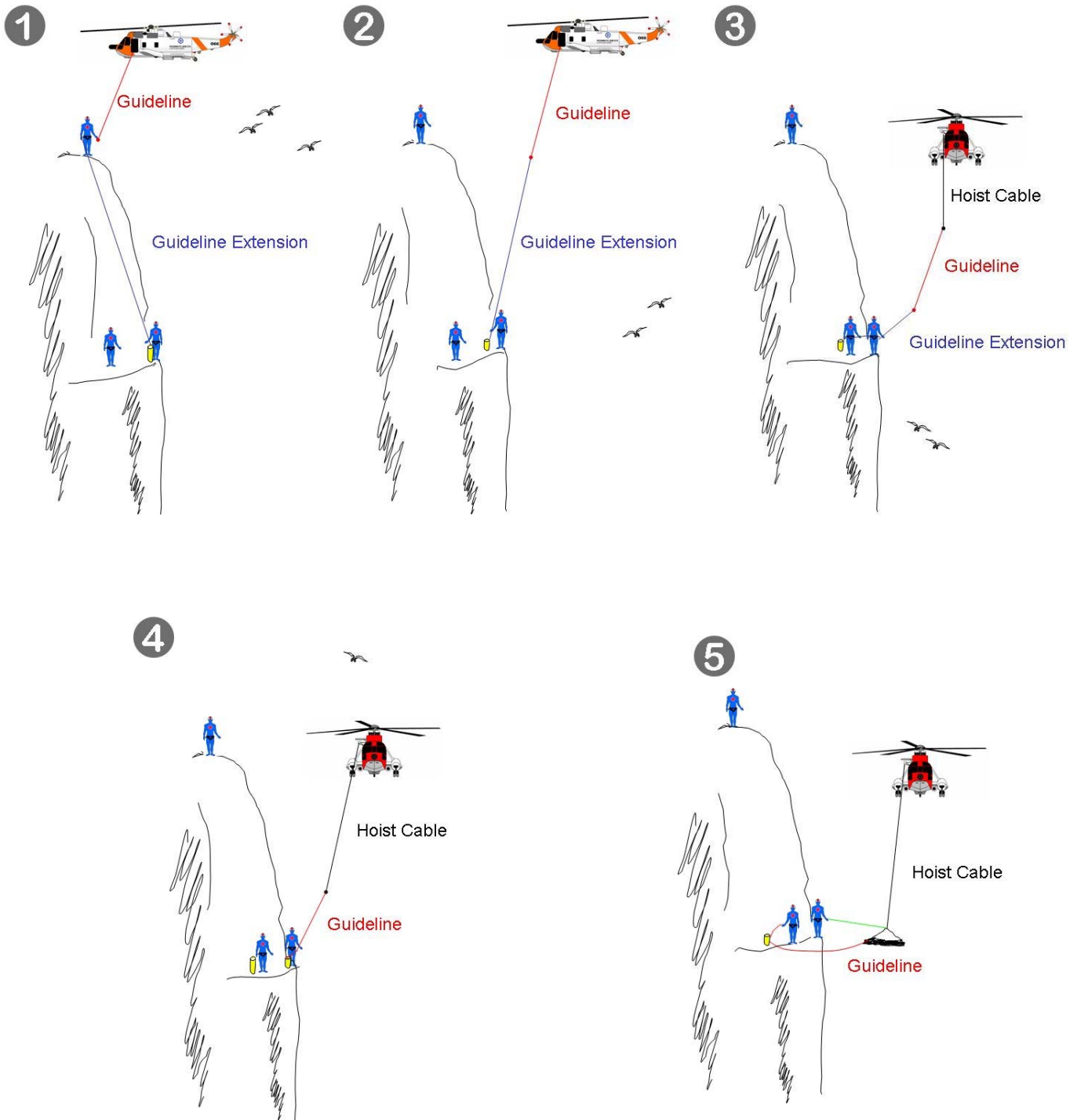
Detailed crew briefing is essential. The technique is used for extraction of rescue loads on extended lines. The following diagrams illustrate the general approach.



Norway- Long Line System

Dan Halvorsen, Norsk Luftambulanse (Norwegian Air Ambulance)

The Norwegian technique for accessing rescue sites that cannot be done with conventional hoist cable lengths on the Sea King was shown. All crews practice technique twice a year. The technique is employed nationwide approximately twice a year.



Accident & Near-Miss Reporting System- Switzerland

Patrick Fauchère - Air Glaciers

An overview was provided of the Swiss Federal Office of Civil Aviation (FOCA) reporting system for incidents. The system is intended to provide details on near miss incidents to aid in the prevention of future incidents. REGA and other operators have made their statistics available for this database. The International Helicopter safety Team (IHST) and the European Aviation safety Agency (EASA) participated in this project.

Evacuation By Alpine Rescue Team and Helicopter- Norway

Dan Halvorsen, Norsk Luftambulans (Norwegian Air Ambulance)

Base Jumping Accidents & Big Wall Rescues can prove to be challenging. Base jumpers have a tendency to get stuck on unclimbed or unclimbable rock faces necessitating a helicopter rescue. Most accidents are a result of the jumper with a deployed chute who then drifts into the rock face and crashes.

The massive 1100 meter Troll Wall (Trollveggen- Norwegian), which is located in the Romsdal region on Norway's west coast near the small fjord town of Andelsnes is the tallest rock face in Europe. At its steepest, the summit overhangs the base nearly fifty meters. The Troll Wall has been a prestigious goal for both climbers and BASE jumpers. In 1984 Carl Boenish, the "father" of BASE jumping, was killed on the Troll Wall shortly after setting the world record for the highest BASE jump in history. BASE jumping from the Troll Wall is now prohibited.

A recovery operation was conducted two years ago following a base jumping accident, where the subject appeared to have died on impact. The danger of rock fall was great. The recovery plan was to bring in the rescuer and lower on the hoist cable during approach, which would deliver the rescuer on the cliff balcony at the victim's location with minimal hover. Slack was given in the hoist cable allowing the rescuer to remain on belay and reach the victim. The rescuer was surprised to find the victim was still breathing and proceeded to secure the injured subject quickly with a rescue strop. The two were immediately extracted from the rock face. The rescuer had attached the rescue strop lower than normal and the victim wound up being suspended at an uncomfortable height below the rescuer. Although the rescue was completed with minimal exposure to the aircraft and rescuers, the haste of the operation appears to have created an awkward shortcut in the attachment of the victim. A few hours after the rescue was completed a large section of the rock face fell away.

Risk Management- Comparison of Two HEC LongLine Operations

Enrico Ragoni, CEO- Airwork Ragoni Services GmbH

A comparative analysis was made of two helicopter fixed line rescues to look at risk exposures. The objective was to look at the overall risk increase to both the rescue team and the patient(s). The idea was presented that there may be occasions where the overall risk, including the compounding of injuries, may be lower by minimizing the

amount of treatment at an accident site. At times, the “load and go” approach should be considered.

The factors that were looked at included:

- The number of evolutions into an accident site to bring rescuers and medical personnel
- The amount of time spent at a site to treat a patient.
- Increased exposure to hazards by increased time at an accident site

North Shore Helicopter Rescue- Canada

George Zilahi- North Shore Rescue

A video presentation on various HEC rescue operations was provided. The North Shore Rescue team operates in the Southwest corner of British Columbia near the city of Vancouver. For flight operations, they use commercially available helicopters, primarily the AS350 series. The helicopters are provided by Talon Helicopters and Blackcomb Helicopters.

Review of Hoist Operations With EC-145

Hervé Fabry – Gendarmerie Nationale

The Gendarmerie has now been operating the EC-145 in the high altitude bases such as Chamonix for four years. Hoisting with this aircraft is different than with the venerable Alouette 3 that it replaced. Operating procedures for hoisting with the EC-145 were presented with details on:

- Position of hoist operator- outside on skid for increased visibility
- Establishing of hover versus lowering the rescuer on approach. Risk exposure can be minimized by lowering rescuer on approach to rescue site.
- No vertical reference to the rescue load for the pilot. Communication and coordination between pilot and hoist operator is critical.
- Hoist operator provides vertical distance for pilot.



AIRCRAFT & PRODUCT UPDATES

REGA High Altitude Rescue Helicopter Selection- Switzerland

Although REGA had transitioned from the Augusta 109 K2 to the EC-145 at bases where high altitude work is not required, they have found the EC-145 inadequate at times for completing the more demanding high altitude mountain rescue missions.

REGA completed testing of a replacement aircraft this past summer. They requested a 140 kg equipped weight reduction from the involved manufacturers. Augusta Westland complied, however Eurocopter would not meet this requirement. Following the tests, REGA selected the **Agusta Grand** because of its performance in high altitude and hot temperature situations and has ordered eight of the new helicopters for their organization's aircraft fleet as high altitude mountain rescue aircraft.



Agusta Grand- OPERATING PERFORMANCE <i>Equipped Weight- 7000 lbs (3175 kg)</i>	
Hover Ceiling- In Ground Effect (IGE)	15,500 feet
Hover Ceiling- Out of ground effect (OGE)	10,000 feet
Maximum Service Ceiling	16,200 feet

Eurocopter UH-145 - U.S. Army for Light Utility Helicopter (LUH)

The military solicited a COTS (Commercial Off-The-Shelf) solution for the project to replace military light utility helicopters. The winning UH-145 design is the military version of civilian EC145. All aircraft will include an upgraded electronic suites package and a rescue hoist installation. The initial order is for 322 aircraft, which represents the largest order ever of a single aircraft type for Eurocopter. Production of the UH-145 helicopters is planned for a Eurocopter plant in Columbus, Mississippi.

UH-145 Specifications

- Main rotor diameter 36.1 ft.
- Maximum take-off weights 7,903 lb.
- Useful load 3,953 lb.
- Capacity: 10 persons
- Power by two Turbomeca Ariel turbine engines
- Maximum speed 145 kt.
- Hover ceiling IGE 11,300 ft.
- Hover ceiling OGE 9,000 ft.



Goodrich Rescue Hoist

Bob Strickland, Goodrich

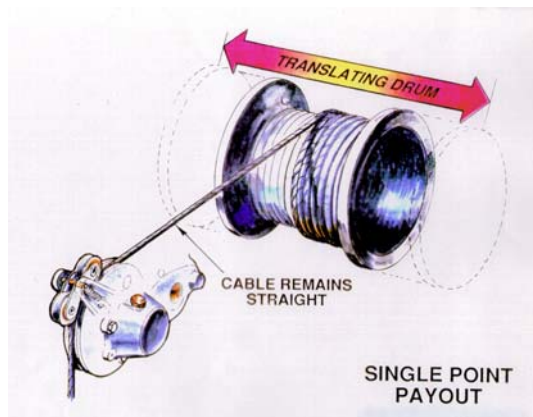
The presentation on Goodrich Hoist included a history of the company and its areas of operation throughout the world. Originally Western Gear in the 1970's, which became Lucas, followed by TRW and finally Goodrich. The company currently has two manufacturing sites, which are in Diamond Bar, CA (USA) and St. Ouen l'Aumone, France.



Terminology was clarified as the term *hoist* and *winch* are often incorrectly used interchangeably. For clarification “hoists” are used for lifting and “winches” are used for pulling. You could probably push or move your car, but you could never dead lift it. A *hoist* is geared differently and has locking brakes to hold a load. A *winch* is for pulling a load, which most of the time has dynamic brakes, but can slide.

There are two types of helicopter rescue hoists available:

- **Category One- Translating Drum**
Hoist drum moves back and forth during cable payout, resulting in cable entering and exiting from a single point. Considered the most reliable rescue hoist design. Ten years between overhauls (3,330 hoist cycles).
- **Category Two- Translating Cable**
The cable is unwound from a stationary drum during payout. Marketed as a lower cost and lower weight model rescue hoist.



Rescue Hoist Model 44301-10

- Currently installed on EC135, EC145 & BK117 C-2
- External Electric Powered Boom Mount
- 500 & 600 lbs rated load
- Variable speed up to 275 feet per minute
- 164 & 300 ft stainless steel cable options
- Lightest Weight Full Load Hoist Available: 83 / 92 lbs.



Unmanned Aerial Vehicle (UAV) In SAR

On May 18, 2006 the FAA issued a “*certificate of authorization*”, which allows the MQ-1 or MQ-9 Predator (UAV) to support disaster relief operations within specified flight restrictions. This development potentially represents a significant new development in the discipline of SAR aviation.

- No way to integrate UAV into National Airspace System, which requires “see & avoid” by all aircraft.
- Needs to be an equivalent level of safety prior to UAV deployment.
- Manufacturers already working to provide technological advances which could allow seamless integration of UAV into national airspace.
- UAV deployment will be approved on a case-by-case basis to specific agencies. This has already included the US Forest Service in support of wildfire operations.
- The UAV include sophisticated sensing systems that included EO (Electro Optical) for surveillance and reconnaissance.
- The updated terminology is now “UAS” (Unmanned Aircraft System).

Predator Capabilities:

- Transmits images from thermal and video cameras,
- Provide GPS coordinates to anything it views.
- Night missions- aircraft laser pointer can mark areas for rescuers, such as a helicopter crew, wearing night vision goggles.
- SOURCE: Debbie Trindle, FAA ATC Liaison to USAF

HELI-BASKET- Precision Lift

Precision Lift of Monarch, MT is finalizing flight-testing and FAA certification of their Heli-Basket. The product, originally designed in 2001, has been developed for mass rescue and evacuation situations. The dimensions of the larger basket (model HB2000) are 4.5 feet (137 cm)X 8.5 feet (259 cm), which has a maximum payload of 4500 lbs. and costs \$20,000 US. With an empty weight of 600 lbs, the Heli-Basket requires a helicopter with a large payload capacity. Precision Lift does manufacture a smaller basket.

www.precisionliftinc.com



Helicopter Voice & Data Recorder (VADR) Smiths Industries-

- New lightweight, crash survivable Voice and Data Recorder VADR®
- Meets European (EUROCAE ED-112) survivability requirements
- Records 25 hours of flight data and four hours of voice
- Selected for installation on U.S. Coast Guard and U.S. Army 160th Special Operations Helicopters.
- Installed on all **HH65C, HH60J & HH60T** Coast Guard Helicopters

FIELD RESCUE DEMONSTRATION

The Slovenia Police Aviation Unit provides the aircraft and crews to support the Slovenian volunteer mountain rescue groups. The Aviation Unit was established in 1967 operating an Agusta Bell 47-G2 at the time. In 1971, an AB Jet Ranger was put into service and HEC operations were begun. In 1979, a hoist equipped AB 212 followed by the AB 412FR in 1984 were acquired. These are the two aircraft currently in use by the Slovenian Police Aviation Unit for mountain rescue operations. They also operate an Agusta 109 Power and two AB 206B3s for police missions.

Most helicopter rescues occur in the Julian Alps of Slovenia during the months of July through to early September. Missions are not performed at night. Although the mountains extend across the borders of their European Union counterparts, Italy and Austria, the Slovenian Police have limitations with working across these borders for rescues.

The Slovenian Ministry of Defense operates the Rescue Coordination Center. It accessed by callers dialing the nationwide emergency number of 112 (used for Fire/Medical/Rescue emergencies). The call is then transferred to a local rescue team incident commander. There is good cell coverage throughout Slovenia in the mountains.

Although there are no commercial aeromedical helicopters currently operating in Slovenia there is a HEMS (Helicopter EMS) pilot project that involves the use of a military helicopter being staffed by medical personnel from the Slovenian health care system. This crew (hospital physician & ambulance technician) stage as the duty crew at the military hangar (Ljubljana Airport). This project is about to be transferred to the Slovenian commercial company Flycom.



An extensive field demonstration combining ground rescue techniques and helicopter rescue techniques took place near Kranjska Gora. The Police Aviation unit performed hoisting operations with the AB 412. The Air Force also brought in an AB412 and performed hover exit manoeuvres and rapelling in a simulated rescue scenario.