



**IKAR/CISA 2003**  
**Coylumbridge - Scotland**  
**Kommission für Luftrettung**  
**Commission pour le Sauvetage Aérien**  
**Commission for Air Rescue**

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**INTRODUCTION:**

The air-Rescue Sub-commission met with thirty participants representing 14 countries. They were Austria, Canada, Croatia, Czech Republic, France, Germany, Italy, Norway, Poland, Slovenia, Sweden, Switzerland, United Kingdom, and United States of America. The Chairman, Mr. Gilbert Habringer of Austria, directed the proceedings held on September 30 to October 5, 2003.

**ACCIDENTS/INCIDENTS FROM MEMBER COUNTRIES:**

**Water Rescue Training Accident, Bay County Sheriff's Department, Florida, USA**

While performing "helocasting" training, a participant trainee was injured during an aerial deployment into the water. This technique is frequently referred to as "*ten & ten*", due to the jump being made from the helicopter at ten feet and ten knots forward airspeed. The Bay County Sheriff's Department in Panama City, Florida was employing a military surplus OH-58 (Bell Jet Ranger) during the training exercise.



Helocasting Training,  
Bay County Sheriff's Dept.

This water deployment technique has its origin with the military for tactical insertions. At the time of the accident two new jumpers were seated in the aft cabin along with a pilot and observer up front. When the aircraft was at the proper altitude, the pilot turned

backwards to signal a “thumbs up” to the jumpers. In doing so, the pilot inadvertently pulled back on the flight controls and the helicopter climbed to an altitude of 35 feet, at which point the jumpers exited the aircraft. The injured jumper rotated sideways and on to his back, fracturing vertebrae and three ribs.

#### LESSONS LEARNED:

- No new jumpers are to be paired together during future training jumps.
- Static jumps are to first be accomplished on a swimming pool high board.
- Instructors must be comfortable with individual rescuer proficiency prior to approving them for advancement to helicopter jumps.
- Complacency during training was cited as an additional human factor.

#### **Fatal Crashes, IHC Lifeflight, Utah. USA**

IHC Lifeflight based in Salt Lake City, UT suffered two very tragic fatal crashes during the past year. The first accident occurred on January 10, 2003, when an Augusta 109 K2 (N601RX) crashed in foggy conditions near the Salt Lake City Airport. The crew was responding to an accident near the Utah-Nevada border, when they encountered IMC (Inadvertent Meteorological Conditions). They aborted the mission and attempted to return to their hospital base, when the aircraft crashed in thick fog near the Salt Lake City Airport.



On June 7, 2003 a second crash occurred following a rescue on Mount Olympus near Ogden, UT. The aircrew had just completed the hoist rescue of a dehydrated female hiker, who had become “ledged out”. The patient was then dropped off at the incident command post and the crew was returning to their home base. Shortly after lifting off at 8:15 p.m. the aircraft (Augusta A109 K2, N123RX) dropped from 600 ft AGL and crashed. The pilot was fatally injured and a flight paramedic on board sustained minor injuries. Investigation found the accident related to a material failure of the tail rotor trunion.

#### LESSONS LEARNED:

- Several air ambulance programs have contacted Lifeflight personnel to offer emotional survival advice relating to fatal incidents.
- A strong personnel support system within the culture of the parent corporation has contributed to a very low turnover of Lifeflight personnel following these accidents.

#### **Heli-Rappel Accident, Cramer Fire, Idaho. USA**

Although not specifically a helicopter rescue accident, this accident is worth reviewing due to the use of heli-rappel technique. During the Cramer Fire on the Salmon-Challis Forest, two helitack firefighters were fatally injured on July 22, 2003 following a heli-rappel insertion. Following deployment to the ground, they were in the process of constructing a helispot, when the fire blew up and overran them. The accident occurred in rugged terrain of the Bitterroot Mountains about thirty miles north of Salmon, Idaho.

On the day of the accident, the fire grew from 220 acres to more than 5,000 acres in hot, dry and windy conditions. The accident highlights the importance of situational awareness and the need to not let mission focus dictate emergency decision-making.

### **Fatal Crash, FEMA- Space Shuttle Recovery, Texas**

During the aerial search operations to locate Columbia Space Shuttle debris, a Bell 407 helicopter crashed in wooded terrain near Broadus, Texas on March 27, 2003. Five personnel were on board at the time of the accident, which resulted in fatal injuries to the pilot and helicopter manager. The helicopter was completing its second search mission of the day, while hovering about 125 feet above the ground. The aircraft lost power and descended rapidly into the 80-foot tall trees with no warning. The interagency effort to locate Columbia Space Shuttle debris, which involved a search area that stretched for 380 miles, was being managed by FEMA. The investigation determined the accident cause was related to an inherent flaw in the fuel Potentiometer, which leads to a sudden failure in fuel control.



Broadus, Texas Crash Site  
Recovery Operations

According to the NTSB; “During the test cell run, it was discovered that the power lever angle (PLA) indicator on the Hydro Mechanical Unit (HMU) responded erratically to normal throttle input when the engine was operated in the electromechanical mode. The engine operated normally in the manual mode. Further testing and evaluation of the HMU revealed anomalies with the potentiometer component of the system.”

*[Editor’s Note: This aircraft N175PA was registered to Papillion Helicopters, Grand Canyon, AZ and frequently utilised as a backup aircraft at Grand Canyon National Park for SAR missions.]*

### **Crash, Mechanical Failure, Grand Canyon National Park, AZ, USA**

During a fire reconnaissance flight on October 16, 2003, the National Park Service contract MD 900 Explorer (N179PA) experienced a loss of control while landing at a remote helispot. The aircraft impacted the ground and rolled over. In spite of substantial damage to the aircraft, none of the five personnel on board received any injuries. The accident occurred just north of the park boundary on the Kaibab National Forest.



NPS Helicopter Wreckage

According to the NTSB; “Thirty feet above ground level (agl), fifty feet away from the

*landing zone (LZ), the helicopter began an uncommanded right yaw. The pilot applied full left pedal; however, there was no response. He stated that it felt as if the flight controls were disconnected. He lowered the collective, with the helicopter still turning, and landed hard. Post accident examination of the helicopter control systems revealed that a failed force limiting control rod assembly had broken internally in the spring capsule assembly. This control rod assembly controls the pitch of the NOTAR fan blades through pedal inputs.”*

#### LESSONS LEARNED:

- This accident is the first operational crash of any MD 900 Explorer.
- A satellite phone kept on board the helicopter was invaluable for post crash communication.
- Four-point restraints on every seat as well as flight helmets were effective in preventing any occupant injuries.
- The integrity of the composite fuselage prevented intrusion into the passenger cabin and increased survivability.

#### **Dynamic Rollover, Switzerland**

Although, this was not an incident involving rescue, it was mentioned because of the involvement of a longline. While flying a cargo load on a 20-meter longline with a Lama, a pilot tried to land beside the load without releasing the longline. The line snagged and a dynamic rollover ensued damaging the helicopter. There were no injuries.

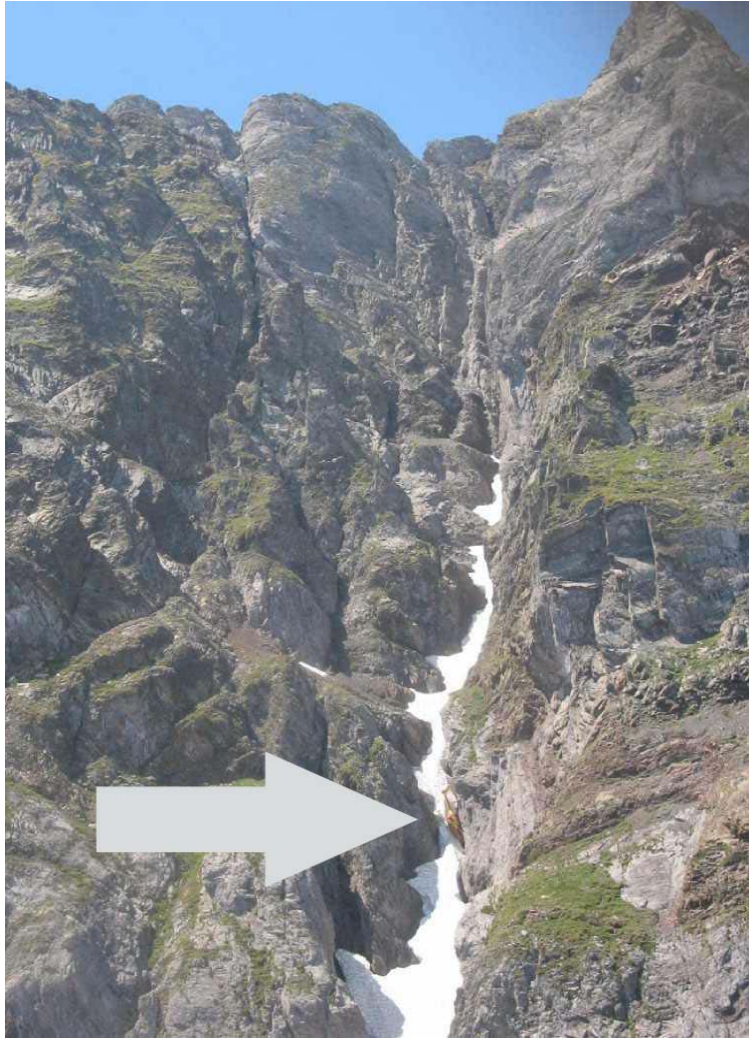


#### **Crash, Switzerland**

Although, this was not an incident involving rescue, it was mentioned as the incident happened immediately following a hoist rescue with that aircraft. A Lama with five people on board was on a sightseeing flight. The weather was overcast. During the flight, the pilot heard a bang and immediately noticed an increase in rotor RPM. The pilot pulled on the collective but found no response whatsoever. He immediately began an autorotation down to the glacier below. The helicopter rolled once it landed and sustained severe damage. A number of the occupants were injured during the

crash. The subsequent investigation revealed a failure in the collective linkage (the “combinator” became unthreaded). It appears that the collective was not functioning when the pilot performed his emergency landing.





### **Crash, France**

A Eurocopter EC145 crashed during July, while on a rescue mission in the Pyrenees. The aircraft belonged to the Sécurité Civile, which is a civil defence organisation, involved in coast guard, SAR, ambulance and fire-fighting duties. There were five people on board at the time of the crash. One rescuer died and the pilot and hoist operator were seriously injured. The doctor and patient were not injured. The accident occurred at 2400 meters elevation (7,874 feet). The crew remembers a bang and some vibrations followed by an apparent loss of control of the aircraft. One of the engines was still running when a rescue team arrived. The first rescuer at the crash site had to shut the engine down. The wreckage could not be recovered until later in the summer once enough snowmelt had occurred. The accident is still under investigation and the cause has not been determined.



**EC145**

### **Hoist damage, France**

While performing a body recovery on the North Face of the Grandes Jorasses, the rescue crew experienced a close call. Due to very hazardous conditions at the site where the body was located it was decided, that the rescuer would not get off the hook to minimize his exposure. The helicopter was a hoist equipped Allouette 3. The hoist is only rated for

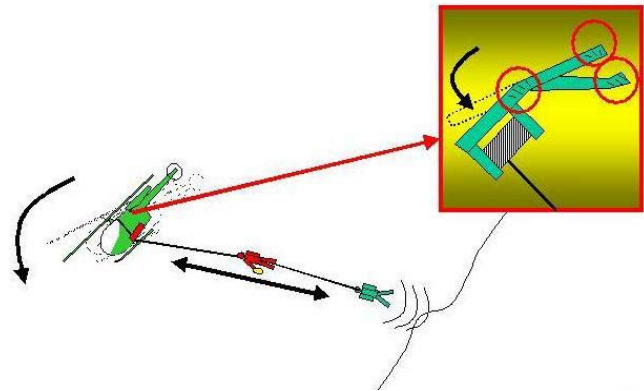


one person and consequently, the following technique was used. The rescuer was lowered to the site with the hoist cable. He did not detach from the hook and with a rope stored in a rope bag attached one end of it to the victim. The plan was to bring the rescuer back up into the cabin while he fed the rope out of the bag. Once in the cabin, the other end of the rope could be attached to a hard point on the

hoist and the victim could be long-lined to a safe location. In the event of a problem, the rescuer could simply let go of the rope and bag. To facilitate feeding out the rope, the rescuer clipped a carabiner to the rope bag. This carabiner was attached to a lead back to his harness that meant that the tied to him through the intermediary of While he was being hoisted back up, was hit by down flow and the pilot had from the face. Suddenly both rescuer were hanging on the hoist. The cut the rope to the victim and released or its cable did not fail but both substantial damage.



victim was now the rope bag. the helicopter to pull away and victim rescuer quickly him. The hoist sustained

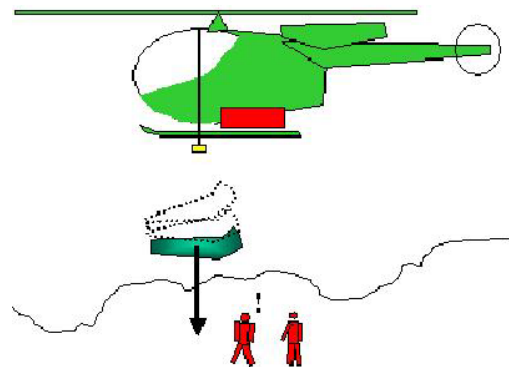


### **Hoisting accident, France**

While hoisting a patient in a stretcher with an Allouette 3, the stretcher came unattached to the hook after it was about 10 meters off the ground. The patient sustained further injuries. It is speculated that the swaged eye of the stretcher may have been cross-loaded and



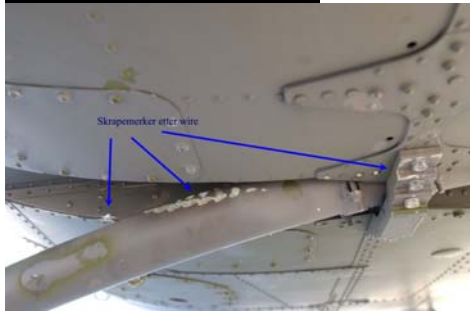
subsequently experienced "rollout" on the hook gate. The solution is to only use rings or eyes of a small enough diameter that preclude rolling out of hoist or cargo hooks.



### **Near miss, United Kingdom**

While on a long-range off shore mission, an RAF S-61 Sea King, 270 miles offshore stopped to refuel on an oilrig. After refuelling, the helicopter took off but after one hour began experiencing fuel filter problems and returned to home base in Scotland. Following some maintenance on the filter and an attempt to restart, the engine(s) quit. Another attempt to restart was done but the generators would not come on line. Further inspections revealed a fracture in the drive shaft and a seized gearbox.

### **Cable strike, Norway**



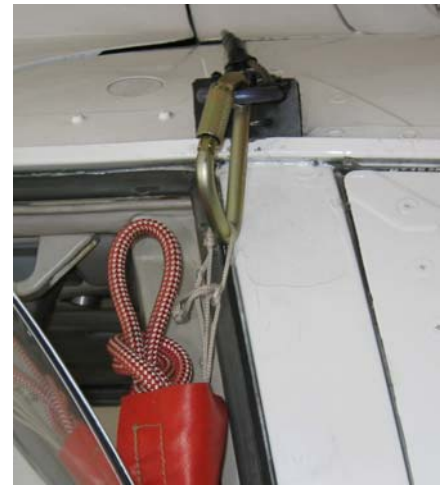
While flying at low level with 11 people on board, a BH412 hit a 24,000 volt high tension line. The helicopter was equipped with wire strike protection. The cables were cut on impact. The helicopter continued to a



safe landing and no one was injured. The helicopter sustained extensive burn damage.

### **Near miss, HEC training, Norway**

During a training session with an AS365 (Dauphin), the fixed rope on the helicopter came unattached. No one was attached at the time and there were no injuries. In this configuration, the rescue rope is attached to the roof of the helicopter and there is edge protection on the floor to protect the line. After hooking up the line the helicopter started to lift off. Before the line came taught, it came off the attachment point. It is speculated that only the protecting sheaf of the rope was connected and that the eye of the rope itself was not.



### **FIELD DEMONSTRATION, KINLOSS ROYAL AIR FORCE BASE:**

Members of the Air Rescue Sub-commission travelled to the RAF (Royal Air Force) Base at Kinloss for an orientation to aerial SAR operations in the United Kingdom. This was followed by an aerial cliff rescue demonstration in conjunction with the RAF Kinloss Mountain Rescue Team held at a local climbing crag south of Coylumbridge.

### **ARCC- Aeronautical Rescue Coordination Centre- Kinloss**

The RAF Search and Rescue organisation was established in 1941 to aid all military aircrew in trouble over land or sea while training or on operations, but the bulk of missions now involve civilians in trouble anywhere on the UK mainland and islands or out at sea. With direct





data and voice links to rescue assets across the United Kingdom, the RAF Aeronautical Rescue Centre (ARCC) at Kinloss, coordinates all aerial SAR efforts nationwide. The ARCC watches over an area extending from the Faeroes in the North, the English Channel in the South, about halfway across the Atlantic Ocean and halfway across the North Sea. The area generates around 2,000 “scrambles” a year, providing assistance to about 1,500 people. From 1941 until the end of 1997 there were two ARCC facilities, one at Plymouth and at Edinburgh. The two were combined in 1997 at RAF Kinloss.

- S-61 Sea King

The RAF operates the S-61 Sea King in the Search and Rescue (SAR) role, which is manufactured by Agusta Westland in the UK.

Development started in the late 1950's under license from Sikorsky (hence the “S” designation). Westland initially developed the S-61 as an anti-submarine warfare helicopter for the UK Royal Navy. The long fuselage has a characteristic boat-hull bottom (permitting water landings) and sponsons on either side of the cabin for storage of landing wheels.



**S-61 Sea King- Image Courtesy of Royal Air Force**

To assist in the SAR role the Sea King is fitted with all-weather search and navigation equipment and a computer to assist with fully automated positioning/hovering. In the hover, it can be “flown” by the winch operator, who can position the hoist cable with great accuracy. The Sea King can carry 18 passengers and has an operating radius of 280 miles. The SAR helicopters are equipped with a hydraulic hoist rated at 600lb.

- Rotor Diameter: 62ft 0in (18.90m)
- Length: 55ft 9.75in (17.01m)
- Max Speed: 143mph (230km/h) at sea level

During the operational tour, an RAF flight paramedic explained that they carry Cyclomorph as an analgesic. The nausea and vomiting associated with Morphine can be overcome with the use of an antiemetic drug, administered at the same time as the morphine. In this case the morphine is in a preparation with cyclizine. Another common field analgesic used within mountain rescue in Scotland is Entonox. This mixture of



**Royal Air Force Merlin HC3- RAF Web Image**



nitrous oxide and oxygen has an onset of action within 30 seconds. Although it is simple to use it does require transport in bulky compressed air cylinders.

The Merlin HC3, which next generation of medium support helicopters for the RAF, is replacing all the existing fleet of Sea Kings. The Merlin will be the first British military helicopter equipped with an air-to-air refuelling probe, which will greatly increase the aircraft's range and reduce deployment times. The EH101 is manufactured by Agusta Westlands, an Italian/ UK based company.

- Rotor Diameter: 61ft (18.59m)
- Length: 74ft 10in (22.81m)
- Max Speed: 192 mph (309km/h)

- Nimrod MR2

The Nimrod MR2, is a maritime patrol aircraft, which is utilized to support the RAF search and rescue role. The Nimrod aircraft assists in search and rescue (SAR) operations through aerial searching, airborne guidance to rescue craft at the scene and dropping of survival equipment if required. The Nimrod is capable of a maximum speed of 575 mph (926km/h).



Royal Air Force Nimrod MR2- RAF Web Image

- RAF Mountain Rescue Service

The RAF has five Mountain Rescue Teams (MRT), including the team based at Kinloss. Each team consists of seven full-time personnel and up to thirty military volunteers. Each team trains regularly with its civilian counterparts for the best possible cooperation and effectiveness. The MRTs were originally formed during World War II to go to the aid of crashed aircrew and are routinely utilized throughout the UK to assist local volunteer civilian MRT personnel.



## **PRESENTATIONS:**

### **Human Factors, Jean-Marc Pourardier, Eurocopter**

Mr. Pourardier of Eurocopter gave a presentation on flight safety as it relates to both product design and human factors. Mr. Pourardier works in the design office at the Eurocopter Marignagne facility. He described the process adopted by Eurocopter for aircraft design based on safety as the main premise. He also discussed innovations such as crash seats, crash resistant landing gear and possible future innovations such as airbags.

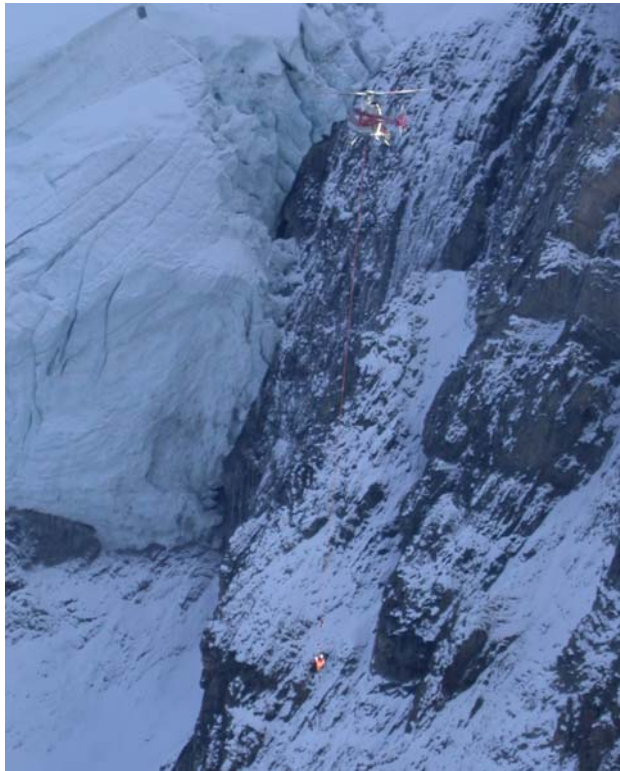
Statistics were presented on accident analysis looking at primary cause. These were divided into technical, operational and maintenance. Statistics presented showed that accidents that could be attributed to technical or maintenance problems were on a slow decrease. Accidents that could be attributed to operational reasons were on a relative increase. There was some discussion on increasing expectations with new technologies. According to the numbers presented, it is estimated that, for every accident, there are 30 incidents; and for every incident, there are 30 unreported occurrences. Since it appears that operational and maintenance causes are relatively high on the list, it was suggested that it is worth intervening at that level. A considerable amount of discussion ensued following this. Final discussions centred on an incident reporting method to keep all members abreast of the most recent incidents in neighbouring countries and operations.

### **Flight Safety Program, Thomas Bärffuss-Rega**

Thomas Barfuss of Switzerland presented the flight safety program developed by Rega in Switzerland. Having such a program is a requirement of JAR OPS3. Although JAR OPS3 does not bind Switzerland, Rega has developed this nonetheless.



Rega considers its program a success. The program delineates safety responsibilities in the crews and the company, risk analysis and flight safety goals. One of the highlights of the program is an incident reporting system using the company intranet. With many bases across the country, this has proven effective in notifying all staff of incidents immediately and in proposing solutions to prevent future incidents. Conditions for an effective reporting system include a simple and user-friendly system (Intranet), a feedback system, and a conclusion. Confidentiality is key to ensure success of the system. Over the past year, Rega had 68 air safety reports filed by crews. From these, twelve received immediate action. It appears that the system is working and that crews are not concerned with filing reports. The conclusion was that a flight safety program could be effective if it received complete support from all levels in the organization.



### **Emergency procedures HEC, Marc Ledwidge-Parks Canada & Gerold Biner-Air Zermatt**

Marc Ledwidge of Canada made a presentation on emergency procedures while conducting human external cargo (HEC) operations. Emergencies during HEC operations are more of a concern with fixed line operations. With hoisting operations, if time permits and the aircraft is able to fly away, it may be possible to bring the load back into the cabin prior to performing an emergency landing. Various in flight emergencies were outlined including tail rotor failures, transmission failures and engine failures. Dave Ruhlman of the U.S. brought up that with newer aircraft, FADEC (Full Authority Digital Electronic Control) failures are becoming the latest in potential mechanical failures that can lead to an emergency landing.

Past accidents with both fixed line and hoisting operations were presented as case studies. Options for emergency landings with HEC were discussed. There was agreement that releasing of the rescue line is not to be considered while HEC is attached. The pilot must attempt an emergency landing with the load attached. Once the rescuer(s) has confirmed that the load is clear, releasing of the line may be considered if the emergency warrants this. Again, the premise is that releasing rescuers or patients is not an option. Consequently, an attempt at an autorotation may need to take place with human cargo on the line.

Gerold Biner of Switzerland subsequently showed a video of tests that Air Zermatt had done of autorotation with a 30Kg dummy on a 30-meter line using a Lama. Conventional autorotation were performed as well as low speed (30-40 knots) autorotation. It appears that with the low speed method, it may be possible to get the load and the aircraft safely to the ground. When the load is about ten meters AGL, a slow increase in pitch was applied to dampen the impact of the load to reasonable speed. Once the load is on the ground, the remaining pitch is applied. There was considerable discussion on whether enough RPM would remain to do this effectively. The method required clear communication and coordination between the pilot and rescuer. After some discussion, it was agreed that the initial tests were encouraging and that a number of other operations would do further testing. More results can be expected in the future.

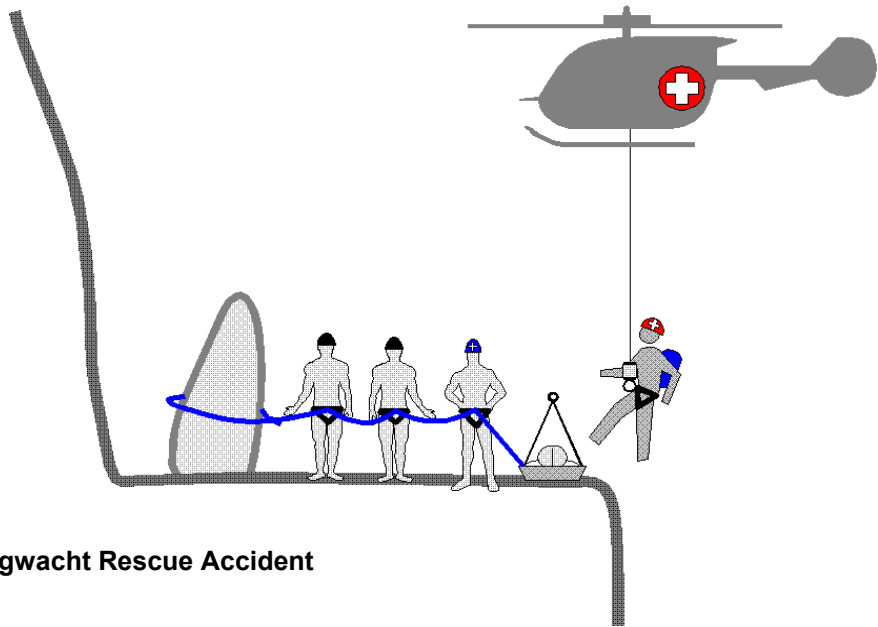




### **Line Entanglement - HEC**

Participants discussed the critical hazard associated with line entanglement during helicopter rescue operations. Several such accidents were mentioned to stress this point ([see Slovenia accident- 2002 IKAR Air Rescue Report](#)). An accident was mentioned that involved the German Bergwacht, which had occurred ten years ago.

**Bergwacht Rescue Accident**



Working at a cliff edge, during a night rescue, two rescuers and a physician were tethered by a safety line to single large anchor. The physician had tethered the litter with the patient to his harness for security. No radio communications with the aircraft were in place. When the helicopter lowered a rescuer on a hoist and began raising the litter, the safety tether was inadvertently left attached to the litter. The helicopter lifted all the rescuers clear of the cliff and suddenly had the weight of five persons and two rucksacks. However, a crash was averted as the pilot managed to perform a running landing at a nearby German soccer field.

### **Entanglement Discussion Points:**

- Preventing line entanglement is paramount.
- Brief in advance on emergency procedures.
- Minimise attachment of the helicopter directly to the ground.
- Keep the rigging at the bottom end of the rescue line/hoist cable simple.
- Always double check attachment points with a safety check.
- Clear radio communication is vital for an effective rescue evolution.
- Recognise that lifting during a rescue extraction is a “critical phase” of flight.

### **Meteorological changes in the Western Alps, Michel Pierre- Sécurité Civile**

Michel Pierre of France presented statistics on changes in prevailing winds at the 2400 meter level over the past few years in the Mont-Blanc massif. Pilots were beginning to encounter more difficult flying conditions due to more frequent down-flowing winds from a southerly direction. In order try and explain this phenomena, they have checked weather statistics from a number of weather stations including, the Aiguille du Midi and the Chambéry stations. They were looking for changes in average wind direction. Over the past 5 years, they have noticed a decrease in 30 degrees in average direction at the Chambéry station. They are interested to find out if anyone else in Western Europe has observed this change.

### **Certification of personnel carrying devices, Patrick Fauchère-AirGlaciers**

Patrick Fauchère of Switzerland presented Switzerland's approach to certification of personnel carrying devices, long lines and other equipment related to Human External Cargo (HEC). Switzerland also has a formalized training approach for flight assistants related to all types of flight operations. A detailed marshaller syllabus has been developed to provide guidance for this. Details on this can be obtained at [www.heli-syllabus.com](http://www.heli-syllabus.com)

### **Personnel carrying devices, Joe Redolfi and Helmut Mittermayr, OAMTC**

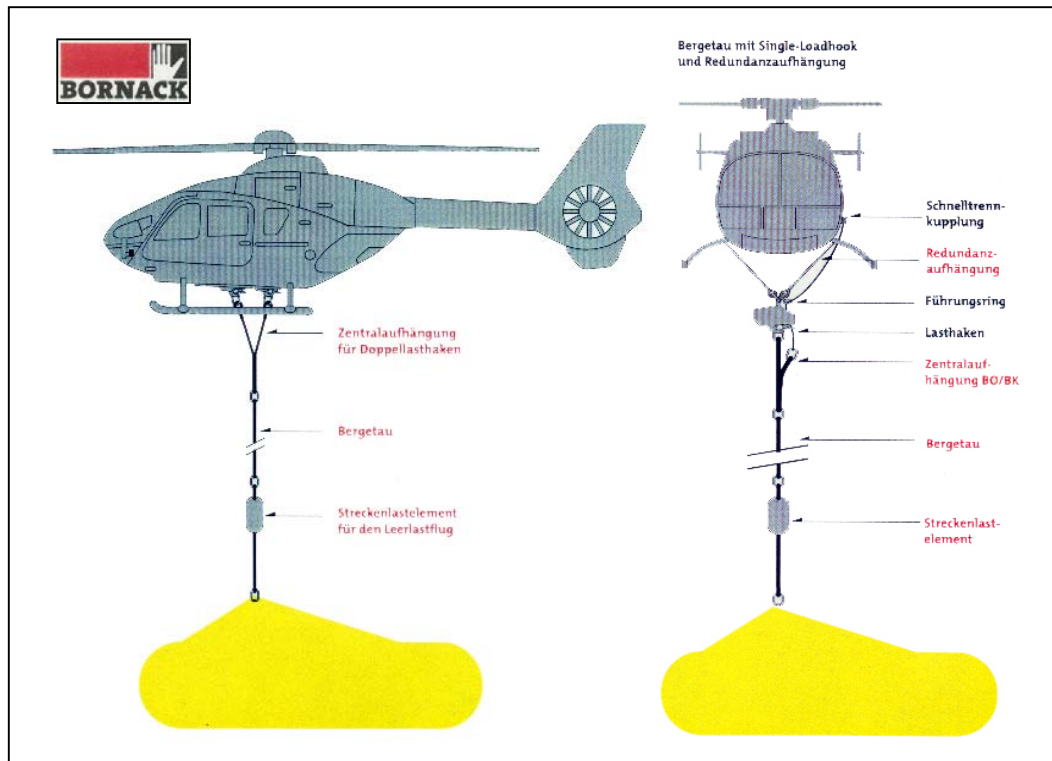
Joe Redolfi and Helmut Mittermayr of Austria demonstrated the personnel carrying devices they use for human External cargo in their operation in Austria. They showed the Tyromont flight stretcher with vacuum mattress incorporated into the design, and the rescuer harness made by Bornack. Additionally Bornack is commercially manufacturing a full line of helicopter short haul rescue components, including line weights, short haul lines, rescuer attachments and helicopter anchor systems. (see [www.Bornack.de](http://www.Bornack.de))



**Bornack Heli-Rescue Bag**



**Helicopter  
Short Haul  
Rescue  
Components,  
including  
Rescuer  
Rigging Plate  
& Line**



### **Crevasse Rescue Incidents, Gilbert Habringer, OAMTC**

Gilbert Habringer of Austria presented a number of case studies of incidents involving falls into crevasses and one during a canyoneering accident. The crevasse incidents highlighted the potential severity of injuries that can be sustained with unroped falls. A number of the incidents presented resulted in multiple fatalities even with rapid rescue response.





### Short Haul rescue operations, Ken Phillips-Grand Canyon National Park

Ken Phillips of the United States provided an overview of the short haul anchor system employed by Grand Canyon National Park. This involves the use of two identical yoke bands, which are fitted around the fuselage. These are rigged through the aft cabin doors of the helicopter.

The short haul line is attached to one yoke band and a screw link connects the two yoke bands providing a redundant anchor system. A key component is the emergency release on the yoke bands, which utilises a “three-ring release” mechanism that is commonly used in the parachuting industry. The

standard procedure for Grand Canyon National Park is to only release the yoke bands in the event of line entanglement. In the event of an in-flight emergency with personnel suspended beneath the aircraft, the procedure is for the load to go the ground with the aircraft.



Yoke Bands With Three-Ring Release Mechanism

### HEC rescue operations, Oskar Piazza Italian Alpine rescue

Oskar Piazza of Italy presented their system of redundancy for rescuer attachments while performing hoisting operations. The rescuer attachment consisted of a multiple daisy chain system that ensured that rescuer and or patients were always secured while hooking and unhooking from the hoist.



He also outlined an incident where HEC was used in difficult high angle terrain on waterfall ice. The patient was in a cave and required removal from a hanging situation as well as packaging for lowering and subsequent extraction by helicopter with a fixed line system. Due to transferring from ground anchors to a helicopter long line, the incident required good radio communication between ground teams and flight crews.



### **Evaluation of the EC 145, Hervé Fabri, Gendarmerie Nationale**

Hervé Fabri of France presented the field-testing done to date on the suitability of the Eurocopter EC 145 for mountain rescue applications. He outlined the methodology and application of testing. The testing was done in the Mont-Blanc massif due to the demanding nature of the rescue flying requirements there. The testing and subsequent results are as

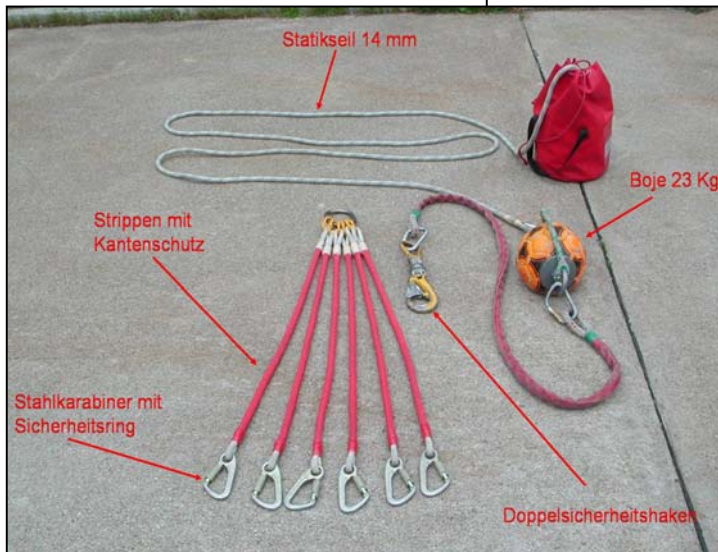
of June 13, 2003. Due to a crash with a similar aircraft in the Pyrenees, further testing is awaiting the outcome of the accident investigation. Each flight had specific objectives (high elevation landings, partial landings, hover out of ground effect at high elevations, snow landings etc.) Two pilots and one flight engineer were on board for all flights. Whenever necessary, two rescuers from the PGHM were on the flight crew. Performance characteristics such as power availability, approaches and hovering in favourable winds and turbulent conditions were evaluated. The capability of the Vartoms that controls synchronizing the engines was also evaluated. Finally, hoisting operations were evaluated. Unlike the helicopter currently in use (Allouette3), the hoist is located on the right side of the aircraft. This may present problems in confined terrain and when the helicopter is approaching its power limits. As with any new aircraft a number of problems were encountered. Possible operational and/or design modification solutions are being proposed. As results are only preliminary, they are not presented here. Further testing and evaluation is expected to continue.



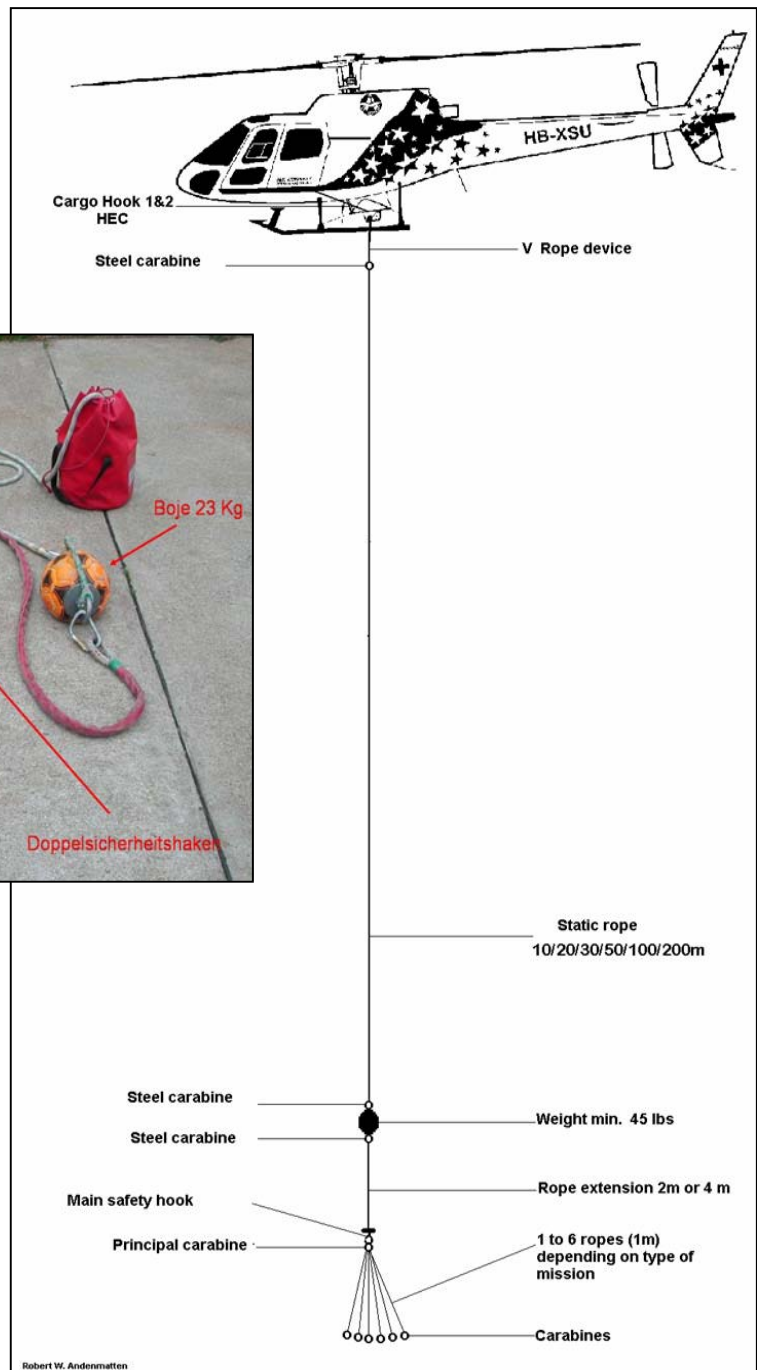
## Gondola Evacuations, Bruno Jelk, Mountain Rescue, Zermatt

Bruno Jelk of Switzerland presented the *Multi Evacuation Rescue System* (MERS) used in Zermatt for Gondola and cable car evacuations. This system allows a rescuer to enter a cabin or lift using a fixed line system. The rescuer can then use a lanyard that has multiple hook-ups so that up to six people can be evacuated in one load. The rigging

### **Multi Evacuation Rescue System (MERS) Equipment**



utilises a 14mm rope in variable lengths from 10-200 meters with a 45 pound line weight and a short rope extension beneath that which has a Kevlar sheath to protect against abrasion. Bruno gave examples on the speed of the system. In one instance, with 24 cabins that had 64 people, they evacuated them all in 70 minutes using two helicopters and six rescuers.





## **IKAR RECOMMENDATIONS:**

A number of incidents in the past have been linked to communications, entanglement and a lack of awareness by crewmembers. After some discussion, it was agreed to make recommendations to address these.

- **Human external cargo (HEC) Operations- Communication Systems**

Every HEC operation should be conducted with a proper two-way radio communication system.

- **Human external cargo (HEC) – Safety Checks**

A safety check should be performed during the extraction of HEC. The aim of the safety check is to prevent entanglement by ensuring that the rigging and equipment has been checked and that the load is clear of obstructions. Once the pilot is satisfied that the check is complete, he is clear to depart the scene.

- **Rescue Operations – Briefing**

Prior to any rescue operation, a briefing will be conducted with all participants. This briefing should cover the role of all participants; safety checks of all equipment, emergency procedures and will include radio checks to ensure communication between all participants.