IKAR/CISA 2004
Zakopane - Poland
Kommission für Luftrettung
Commission pour le Sauvetage Aérien
Commission for Air Rescue

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INTRODUCTION:

The host organization in Zakopane, TOPR *(Tatrzańskie Ochotnicze Pogotowie Ratunkowe)*, was established 1909 and at the time was the fourth mountain rescue organization in the world. TOPR officials mentioned how in their 95 years history eight rescuers have been killed, which have included two pilots

The Air-Rescue Sub-commission met with participants representing 15 countries. They were Austria, Canada, Croatia, Czech Republic, France, Germany, Italy, Norway, Poland, Slovakia, Slovenia, Sweden, Switzerland, United Kingdom, and United States of America. Patrick Fauchère of Switzerland and Marc Ledwidge of Canada were appointed as Vice-Chairmen of the Commission. The Chairman, Mr. Gilbert Habringer of Austria, directed the proceedings.

ACCIDENTS/INCIDENTS FROM MEMBER COUNTRIES:

As in many years, a number of incidents occurred. Although, not all were related to rescue operations, these often highlight recurring themes in decision-making. The presentation from the United States looked at a number of incidents across a large and diverse country and the human factors involved. Over the past two years, one of the focuses of the Air-Rescue Commission has been emergency procedures with Class D loads (see 2003 report and presentation from Austria 2004). There were four reported emergencies this past year during hoist operations that required severing of the hoist cable or long -line while live loads were attached. This highlights the necessity for clear emergency procedures in SOP's.

Switzerland

Switzerland reported that although there was approximately 30% less hours flown this past year, there was a higher accident rate. All of the accidents involved high time pilots.

AS350B3, aircraft damage

While flying explosives on a 20-meter long line, the charge went off at the end of the long- line. The helicopter was damaged but the aircraft was able to land safely.

SA315B, crash

A long line is caught in a power line. The Lama helicopter crashes and the pilot sustains severe injuries.

SA315B, crash

During poor weather, the Lama crashes on landing. All of the occupants are injured.

AS350B3, tail rotor strike

During landing, the tail rotor strikes a fence. There are no injuries.

BH407, crash

During take-off with a long line, the pilot loses control of the aircraft and crashes. The pilot is slightly injured.

AS350B3, crash, long-line entanglement

After dropping off passengers with a long-line attached, the pilot lifts off. It appears he may have forgotten about the long-line. During take-off, the line bounces on the ground and strikes the tail rotor. The helicopter crashes and the pilot is killed.

Kmax 1200, crash

At 50 meters AGL, the aircraft settles and crashes into trees. The pilot is injured.

Croatia

MI8, crash

During a night flight for a medevac operation, the helicopter is returning to base after dropping off the patient at a hospital. During taxi on the apron, the aircraft begins to bounce from left to right. The pilot pulls collective without applying pedal. This aircraft is reportedly unforgiving in this situation. The helicopter lifts about 6 meters off the ground, begins to spin and then crashes. The helicopter is carrying two tons of fuel. Both pilots and one passenger are badly injured.

United Kingdom

Sea King, rotor strike, Class D release

During a mountain rescue operation for a fallen climber in the Lake District, the aircraft main rotor strikes the cliff during the hoisting operation. The pilot calls for hoist cable release but the co-pilot hits the wrong switch on the overhead panel. The rescuer realizes that the aircraft is in difficulty and intentionally releases from the strop that he is riding in. He falls about 10 meters and is slightly injured. The Sea King is able to land safely after losing approximately 2.5 meters from the main rotor.

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

Germany

BO105, crash (2003)

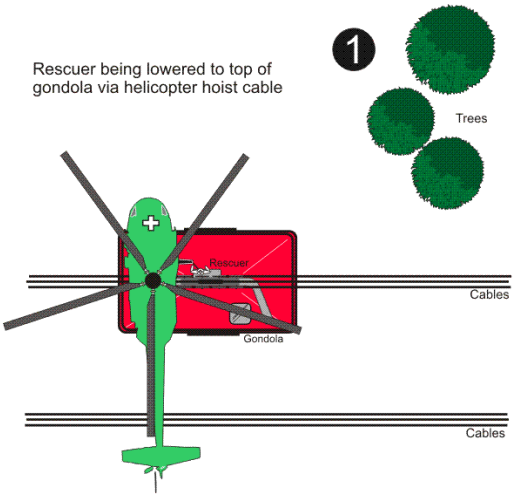
While attempting a landing on a glacier in the Garmisch region, the military helicopter crashes. The pilot loses reference on final in self-imposed "whiteout" and attempts to land without reference on sloping ground. The main rotor strikes the ground and the helicopter rolls. The helicopter is destroyed. There are minor injuries.

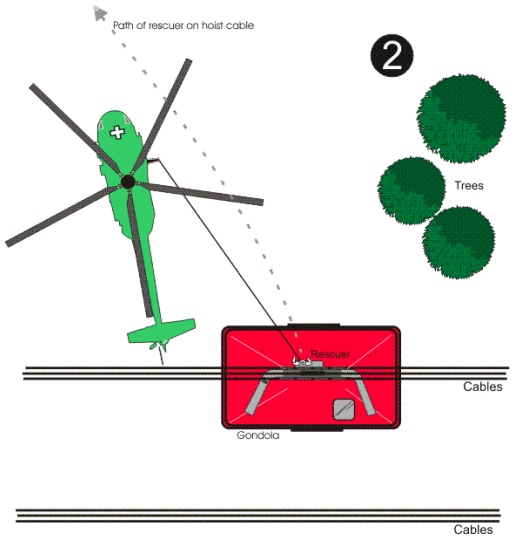
BO105, crash (2004)

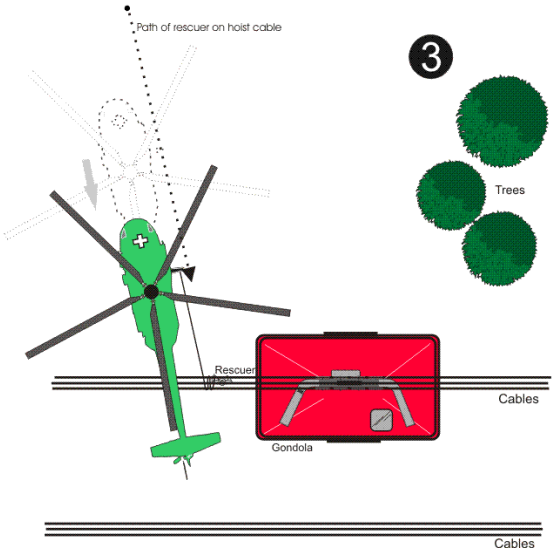
While attempting a landing on a snow covered high altitude shoulder in the Allgau region, the helicopter crashes. The landing spot is not flat and there is little reference. The helicopter rolls and slides to the edge of a very large cliff. There are minor injuries.

BH205, class D release

This accident occurred during a training mission for a cable car evacuation at the Fellhorn Ski Area in the Allgau region. A rescuer is hoisted down towards the roof of the cable car. In order to keep the aircraft into wind, the pilot keeps the helicopter and rescuer upwind of the cable car cable. There is 30 meters of hoist cable out. Since he cannot see the cable car, he uses trees in the distance for reference. There is no communication between the rescuer and the aircraft. At one point, a gust of wind makes him apply forward cyclic and the rescuer swings violently forward. When trying to recover, the rescuer swings back and wraps around the sloping cable car cable twice. He is injured but is within reach of the cable car cable. He manages to climb onto it before the hoist operator severs the hoist cable. He is then able to climb down to the cable car safely with the assistance of other rescuers in the cable car.







Drawings Ken Phillips

Austria

EC135, rotor strike
During a low level flight, a HEMS crewmember was working the moving map display in the cockpit. As the pilot was trying to assist with display operation, he noticed wires in front of him. He pulled back on cyclic and cut three 11 mm lines with the main rotor. He landed safely. After inspection, although, there were marks on the main rotor, there waswas no damage and the helicopter was put back in operation.

BH205, crash
While carrying a one-ton load on a long-line, during a commercial operation, the pilot experienced difficulty during a steep climb. He dropped the load and turned around but crashed into the forest. The pilot was killed.

AS355
After a partial landing for an injured skier, the helicopter lifted off and then entered a steep dive and crashed into the ski slope. The pilot experienced a loss of power. It is unknown if one or both engines failed. The patient was killed and the doctor and rescuer were injured.

Canada

EH101, hoist problems
An incident occurred during a nighttime rescue in the North Atlantic for the crew of a capsized fishing vessel. The crew of six was floating in a life raft. Due to the very heavy seas with 15 metre waves, the lowering of the rescuer on the hoist was problematic. The rescuer lost his swim gear in the water and the hoist operator was having difficulty keeping him near the surface. The rescuer was brought back on board and it appears that with the constant up and down motion on the hoist, it overheated and was no longer operational.

EH-101 courtesy DND

The operation was transferred to the second hoist (this aircraft is equipped with two hoists) and a rescuer was lowered to the water. He recovered one of the fishermen. He returned to the water and for some reason, at some point, the hoist cable was jettisoned. The helicopter no longer had any hoist capability. The rescuer was recovered with a stretcher on a rope tied to the hoist arm and was subsequently long-lined to the top of the cliff above the shore. At that point, the rest of the fishing vessel crew had drifted onto the rocky shore. The helicopter rescue crew along with the help of ground rescue crews recovered two more fishermen with rope work. One other person managed to scramble to the top unaided. Two fishermen died in the incident.

PRESENTATIONS:

2004 usa helicopter rescue accidents & incidents

This presentation by Ken Phillips focused on selected helicopter rescue incidents and accidents during the last year, with particular emphasis on lessons learned. Also included were two significant accidents outside of the United States.

MOUNT RAINIER NATIONAL PARK- INCIDENT MANAGEMENT

Following last year's non-fatal crash of a Bell Jet Ranger B-3 on Mount Rainier during a rescue operation, the park staff this year handled a very deadly season for climbers on the Liberty Ridge Route. This route is climbed by 200 of the 11,000 people who attempt to reach the 14,411 foot summit annually. Three deadly accidents included;

- **MAY 17-** Peter Cooley, 39, of Cape Elizabeth, Maine, died two days after he tumbled down a steep icy slope and hit his head on a rock spur.
- **JUNE 3**- Jon Cahill, 40, died after a 200 feet fall. A Black Hawk helicopter hoists his partner Mark H. Anderson, 33.
- **JUNE 17-** Ansel Vizcaya, 29, and Luke Casady, 29, are swept to their deaths by an avalanche during ascent.

Of these three incidents, the May 17th accident was a significant challenge from the standpoint of rescue incident management. Peter Cooley, climbing with partner Scott Richards, fell 30 feet at the 12,300-foot elevation suffering a severe head injury. Richards called on a cell phone dug a tent platform on 45° slope. Over the next two days he sustains his friend, while rescuers tried to reach them. Heavy clouds grounded helicopters and slowed ground rescue efforts. Following two days of hard climbing, rangers reached Cooley and Richards. Additional climbers with the National Park Service, Tacoma Mountain Rescue and Rainier Mountaineering, Inc. establish support camps. A technical lowering is considered too dangerous due to steep ice, fresh snow and rock outcrops. Cooley is in poor condition- in and out of consciousness, incoherent and combative- with head, leg and shoulder injuries. Cooley wouldn't drink and Richards dripped water into his mouth. Ranger Dave Gottlieb stated- *"His situation would be nothing less than desperate and yet he was stoic, strong. Literally, when I arrived he had water melting in the pot. He was doing everything he could to keep his friend stable and alive,"* During a brief weather clearing, Cooley is secured in a plastic basket stretcher and hoisted vertically from the site by an Oregon Army National Guard C-47 Chinook helicopter. He dies before reaching a hospital.

It is obvious that many hard lessons were learned from the helicopter crash in 2003. Park rescue personnel were cautious in their decision-making and affected what was an extraordinary rescue effort.

BIG CYPRESS NATIONAL PRESERVE, FLORIDA- INCIDENT MANAGEMENT

On August 19, 2004 a McDonnell Douglas 500E, piloted by a physician/owner, crashed within Big Cypress National Preserve. He lost navigational control of the private aircraft at 500 feet, which is occasionally leased by a local TV station (hence the markings). The pilot calls his wife via cell phone stating he'd crashed, suffered a back injury and possibly some broken ribs, after which the cell signal was lost. Crash site is estimated to be either 60 miles southeast or 60 miles east of Fort Meyers airport. Searchers from Lee County initially looked to the east of the airport, and NPS personnel were not involved.

However, just before 8 a.m, the Broward County Sheriff's Office notifies Big Cypress National Preserve, who requests joint assistance from Collier County Sheriff's Department and ICS is established. Immediately after launching, the NPS Helicopter discovers eight aircraft searching area. None of the aircraft have contacted incident command and IC is unable to establish command and control. Collier County Sheriff's Department helicopter locates the downed helicopter around noon. NPS helicopter lands and finds that the pilot is not with the helicopter. Utilizing radio relays, helicopters in the area are asked by the IC to spiral out from crash site. Pilot is located two miles north of the crash site. Following the incident… it is learned that a Miami-Dade Helicopter heli-rappelled rescuers to the scene, prior to arrival of NPS helicopter. Not finding the pilot, they left the area, without contacting the incident management team.

LESSONS LEARNED:
The most critical points were ….. ***COMMUNICATIONS & ICS***

- Incident Commander from Collier County Sheriff's Dept. was not able to communicate with his own aviation unit.
- Obvious radio inter-operability issues plagued personnel.
- Everglades Natl Park Dispatch had no access to aviation frequencies at the time.
- Existing old animosity between agencies had stymied previous pre-planning, but currently inter-agency relationships are considered much better.
- Area personnel are trained in ICS, but don't readily implement it…..
  How do you affect positive changes for the future?
  - ✓ Build trust and personal relationships over time.
  - ✓ Honesty between agencies- Offer/conduct joint training.
  - ✓ During inter-agency operations- place agency reps in key positions.
  - ✓ Commitment to "not let it happen again."

NEWBERRY, SOUTH CAROLINA- AIR AMBULANCE CRASH

On July 13, 2004 Spartanburg *Regional One* (Spartanburg, SC) Air Ambulance Bell 407 helicopter crashed during a patient transport. Pilot, flight nurse, flight paramedic, and patient were killed. The aircraft crashed at 5:36 a.m., seconds after it took off from an accident near an Interstate 26 rest area. This aircraft had been operated by the Med-Trans Corporation for Spartanburg Regional Healthcare since May 2003. There were two other fatal USA air ambulance accidents during 2004 (as of October 2004), but the circumstances behind this tragedy are worth reviewing. Spartanburg Regional One was contacted after three other air ambulance units had declined the mission based on weather conditions.

Chronology of accident:

- 0420 hours report is received of a woman with a broken leg along Interstate-26.
- Newberry County ambulance crew at the scene decides her injuries require air transport. They based their transport decision on standard trauma criteria issued by the state Department of Health.
- Newberry County EMS initially contacts Palmetto Health Richland and Providence Hospital in Columbia, as well as Greenville Hospital System.
- Palmetto Health's *CareForce* lifts off at 4:40 a.m. - four minutes later the aircrew aborts because of fog.
- Minutes later, Providence Hospital's *Life Reach* declines the call because it knew of the CareForce decision.
- Greenville is contacted and cites weather concerns and the no-fly decision by *CareForce.*
- Spartanburg Regional Healthcare System is contacted, which agrees to send a helicopter…….
- Before lifting off from Spartanburg, the pilot checked weather radar. Aviation Weather Center in Kansas City, Mo., issued a visibility advisory two hours before the crash. This was for a four-state region of the Southeast, including where the helicopter went down.

LEAVENWORTH, WASHINGTON- EXTERNAL SLING ACCIDENT

On August 11, 2004 a Bell 205 crashed during an external load mission to deliver cargo to smokejumpers on an initial attack fire. The accident occurred 20 miles northwest of Leavenworth, WA in the Alpine Lakes Wilderness (Okanogan and Wenatchee National Forest). The helicopter crashed just after delivering it's first load of two, as it began to depart the first helispot for the next one. The tail rotor of helicopter N205XP struck a dead snag on departure from the helispot. Helicopter came to rest on it's left side. A post crash fire consumed approximately 75% of the aircraft including the cockpit and main cabin. Pilot Mike Ward was killed during the crash. Ward had been stationed at Grand Canyon National Park earlier in the summer and flown several rescue missions with park personnel. Ward's friendly personality will be missed.

CAMANCHE, IOWA- MISMARKED RESCUE HELICOPTER

On July 28, 2004 Clinton County Sheriff's Department personnel were conducting a search for a drowning victim on the Mississippi River employing deputies and a cadaver dog. Suddenly a helicopter begins hovering very close over the river disturbing the wind and affecting the search dog. The helicopter is marked "United States Coast Guard". The U.S. Coast Guard in Rock Island, Ill. is contacted, who states they don't have a helicopter in the area. The pilot later lands at a nearby airport, where he states he simply decided to help in the search for the man on his own. When questioned about the markings on the helicopter, the pilot said he had seen other private aircraft painted to resemble U.S. Army and U.S. Air Force markings and he "liked the Coast Guard." Considering homeland security issues this is a lesson to all rescue personnel. The pilot was within ten miles of the Quad Cities Nuclear Generating Station at the time.

Jerry Dahl/Clinton Herald

BEAUMONT, TEXAS- SHERIFF'S DEPARTMENT HELICOPTER CRASH

On September 15, 2004 a Bell OH-58C (military BH-206) crashed during a search & rescue mission. 54 year-old Jefferson County Sheriff's Sergeant, Mike Lane was killed when a helicopter owned by the Sheriff's Department crashed into Sabine Lake. Sabine Lake is connected to the Gulf of Mexico. The pilot and Mike Lane, a pilot-rated sheriff's deputy spotter, were looking for a victim of a reported boat fire. After locating the fire, which turned out to be burning garbage on shore, they continued to search the area for any boat fire "survivors". The aircraft descended from an altitude of 500 feet to better locate objects in the water. Mike Lane was operating the Night Sun spotlight. The pilot, who was an instrument rated instructor, was flying IFR relying on his radar altimeter. As he made a sharp turn to the right, while trying to identify something in the water, the front skid made contact with the water. The helicopter plunged into the lake.

EQUIPMENT SAFETY NOTICE- The following Safety Alert was issued by the Department of Interior relating to Omni-Sling straps employed by units conducting helicopter short haul operations.
NOTE: It is important to understand that although Omni-Sling™ brand straps are sold by Rescue Systems, Inc (Lake Powell, UT), the problem noted in this safety alert is associated with straps produced by another vendor, sold under a label other than RSI.

UNITED STATES DEPARTMENT OF THE INTERIOR
AVIATION MANAGEMENT

Safety Alert

No. 04-05 ***Ju***
Subject: ***Short-haul and Rescue Equipment***
Area of Concern: ***Helicopter Operations/Rescue Operations***
Distribution: ***All Fire and Aviation Personnel***

Discussion*:*
During annual short-haul training, a check spotter observed an Omni-Sling™ brand webbing multi-loop strap being used incorrectly to connect a short-hauler to the main short-haul line.

The Omni-Sling multi-loop strap features an interwoven design which allows the user to safely attach a carabiner to multiple rigging loops along the length of the strap (see detailed blow-up for correct attachment of carabiner).

Do not attach a carabiner to the end of the strap (see detailed blow-up of incorrect attachment of carabiner). The sewn stitching at the end of the strap (used to attach a manufacturer's label) is not intended to be load bearing.

For additional information contact
Les Herman, DOI-AM, (208) 433-5092
or Jeff Kracht, Hawaii Volcanoes National Park (808) 985-6034

INDONESIA- SHORT HAUL ACCIDENT

On October 4, 2003 eight Indonesian Kopassus soldiers plunged 180 meters to their death, after being suspended below a military helicopter during a training exercise for a ceremony. Inhabitants of the coastal village of Lhokseumawe watched the accident, which occurred 300 meters offshore. According to Army spokesman, Col. Yani Basuki *"A blast of wind rocked the Bell helicopter making it highly unstable",* and the crew *"had no option but to cut the rope to which the men were attached."* Basuki said cutting the rope was *"normal operating procedure"* and done to save those on board the helicopter. No trace of the soldiers in full battle gear was ever found after they hit the water.

SOUTH AFRICA- HELICOPTER RESCUE TRAINING FATALITY

The South African SAR community was stunned by the death of a member during a training mission on July 15, 2004. Clive Carr, a member of the *Off-Road Rescue Unit* (4 Wheel Drive Club of South Africa), died during an inter-agency helicopter training exercise. The accident occurred on Blouberg (±1200m relief), which is located in the Northern Province of South Africa.

The accident occurred during a refresher training, when two teams were conducting hoisting evolutions and one-wheel loads/unloads. The helicopter involved was **Aerospatiale Oryx**, which is the local South African modified version of the SA 330 Puma and is fitted with wheeled tricycle landing gear. This was a South Africa Air Force aircraft piloted by a colonel and lieutenant.

Seven members of the team had boarded the aircraft. The eighth member (Carr) was placing his pack into the aircraft, when the aircraft wheel on the ground slipped, and the pilot pulled power lifting the aircraft into the air. Clive was placing his pack into the aircraft, his balance was forward at the time and he was caught off guard- he appeared to lunge at the aircraft. He momentarily grabbed the aircraft, pulling the pack out in the process before apparently losing his grip and dropping back to the ground, tumbling about 15 meters down a very steep slope. Clive was declared dead at the scene….

POST-INCIDENT ACTIONS & FOLLOW-UP:

The three primary SAR organizations involved:

- Mountain Club of South Africa SAR Team (MCSA SAR),
- Off-Road Rescue Unit (ORRU)
- K9 Search And Rescue Association (K9SARA).

- **Formalize introductory helicopter training.**
- **Development of a series of ratings of helicopter competence**.
- **Rescue Officer (RO) / Team Leader / Dispatcher has the discretionary rights to select an appropriate team for a job.** *(Dispatcher is a position on the ground SAR team like a loadmaster, who is a liaison to the helicopter crew chief)*
- **Formalize the Team Leader /Assistant Team Leader's training program.**
- "**Height-safety equipment", MUST have a standards rating for work at height.** *(e.g. No bicycle helmets, swift-water helmets, etc.)*
- **All carabiners used in helicopter work must be twist-lock**. *(To overcome aircraft vibration)*
- **Dog-handlers are excluded from one-wheel landing situations**. *MUST be hoisted.*
- **No excess equipment suspended from harness.** *This is due to the snag potential.*
- **Stretchered patients are not to be loaded in a one-wheel landing**. *They must be loaded by short hoisting evolution instead.*
- **A crash kit** *[comprising medical and basic technical rescue kit]* **will be pre-assembled for all helicopter training.**
- **No sharing of daisy-chain slings on the hoist**. *Each person is to use his/her own hoist sling to a common attachment.*
- **A dedicated "dispatcher" is highly recommended**, otherwise the RO or Assistant Team Leader of last team out of the aircraft assumes this role.
- **Because of attention-deficit problems, no person may take photographs during helicopter training** unless they have obtained permission from the RO / Dispatcher.
- **Team leaders MUST have radios in their physical possession**. *Permits communications if they are stranded. Team Leader is first out and last in aircraft.*
- **The dispatcher (un)clips K9 handlers from/to the safety rig during hoisting and trooping.** *Handler checks that this is satisfactorily done.*
- **All packs are marked with rescuer's name visible on it**.
- **A patient must be hoisted into the aircraft as soon as there are sufficient hands aboard to handle the stretcher.**
- **The decision as to whether or not a patient is to be "stretchered" will rest with the senior medic**. *Decision accounts for both injuries and practical restrictions.*

ADDITIONAL LESSONS LEARNED -

- Helicopter rescuers need to have physical "agility and mobility". A rescuer may be excluded by the "dispatcher" if they perceive a risk due to physical limitations.
- Process of emplaning and deplaning in a one-wheel ops is more clearly defined. *Backpack is only pulled out once team member is stable on mountain*.
- Emphasis on being aware of the potential for breakaway. Consideration for not committing (psychologically) to being on the aircraft, until you have a firm grip.
- Emphasis on watching the flight-engineer for hand signals and importance of "situational awareness".
- Aircrew formalized the *"moment of decision"* for emplaning or deplaning with a more conservative approach. Stop before an unstable situation degenerates.

Deployment of the Gendarmerie Nationale EC145, France

Hervé Fabry presented the operational deployment and considerations of this new aircraft in France. This new helicopter, compared to the aging Allouette III and the older Squirrels offers a greater capability for most of the detachments. It has a higher overall performance, a larger cabin, greater airspeed and twin-engine capability. This helicopter was also chosen because it meets new European standards for flying over urban areas as well as hostile areas. The deployment of this new aircraft in the French Alps along with the concurrent deployment of the same aircraft in the Sécurité Civile, has and will provide a faster and more efficient response capability for the areas that are located farther away from the rescue bases.

Certification of pilots, Switzerland

Gerold Biner presented the process for drafting approved pilot ratings (e.g. mountain, HEC, Multi-Engine) for Swiss pilots is being undertaken by the *Helicopter Training Study Group* (HTSG).

The Swiss HTSG operates in association with the Federal Office for Civil Aviation (FOCA) The goal is to develop these ratings in harmonization with JAA (Joint Aviation Authority) as appropriate. Documents produced by the HTSG are forwarded to FOCA, who then publish them. These requirement have been implemented in Switzerland and are mandatory for Swiss helicopter pilots.

HELICOPTER EXTERNAL LOAD RATINGS- SWITZERLAND		
ECS	External Cargo Sling- *Level 1 thru Level 5*	Varies from minimal cable length and cargo weight to heavy lift operations
HHO	Helicopter Hoist Operations- *Level 1thru Level3*	Cable length and operating altitude vary by level. Hoist cable must be fully retractable.
HCS	Human Cargo Sling- *Level 1 thru Level 3*	Length of fixed rope or cable and operating altitude vary by rating level. Hoist cable extensions below the normal rescue hoist hook are considered HCS.
POLICE	Police- Rappelling	Police and SWAT team operations with fixed ropes.

HHO- HELICOPTER HOIST *(< 25 METERS)*	HCS- HUMAN CARGO SLING *(< 25 METERS)*
>500 hours Total Helicopter time.	> 1000 hours Total Helicopter time
>500 cycles External Cargo Sling (HCS)	> 1500 cycles External Cargo Sling (HCS)

INSTRUCTION CHECKLIST- HUMAN CARGO SLING (HCS)

FOM (Flight Operations Manual)

- □ Duty Time/ Human Factors/ CRM/ Safety Equipment/ Aircrew Responsibilities

Flight Manual

- □ Limitations/Performance- HOGE

Flight Procedures

- □ Airspeed selection with load
- □ Flight path selection
- □ Load factor
- □ Load stabilization techniques (in-flight & hover)
- □ Downwash/ Load Rotation (spinning)
- □ Visual Hover Reference- Vertical/ Horizontal
- □ Rotor Clearance
- □ Hand Signals
- □ Environmental/ Slope, Forest, Canyon
- □ Night Operations/ Lights, NVG Night-Sun Spotlight
- □ Off-Ground Operations- Ski Chairlift, etc.
- □ Decision/Exposure Time

Load & Person Preparation

- □ Vertical Loads
- □ Horizontal Loads

Special Equipment

- □ Rescue harness, etc

Emergency/ Limitations

- □ Flight Control Stops
- □ Engine Failure
- □ Height Velocity Diagram/ Exposure Time
- □ HEC Emergencies/ Malfunctions
- □ Review of HCS Accidents
- □ Emergency Load Jettison

Dangers

- □ Windshield Defogging
- □ Cold Temperature Operations/ Windchill
- □ Cables/ Wires
- □ Updrafts and Downdrafts/ Settling With Power/ Vortex
- □ Sun/ Shadow/ Snow/ Rain
- □ Light/ Twilight/ Night Ops
- □ Cliffs/ Falling Rock

NOTE: It is extremely important to note that although many agencies and organizations view human cargo sling (e.g. short haul) as "low tech" compared to hoist operations, these requirements mandate a human cargo sling pilot candidate have considerably more flight experience/proficiency than a pilot candidate who is planning to conduct a helicopter hoist operation.

For additional information:
www.aviation.admin.ch

High altitude flying considerations, India

Gerold Biner, Patrick Fauchère and Thomas Bärfuss presented the considerations and challenges of flying for a high altitude heli-ski operation in India over the past few years. The aircrafts used are the Bell BH407, the SA315 Lama and its Indian Cheetah version. There are technical as well as cultural challenges running such an operation in a remote part of India.

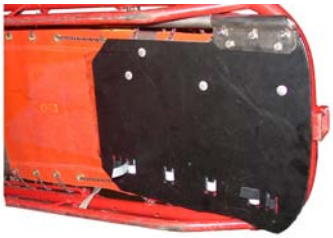
Emergency procedures with Class D loads, Austria

Gilbert Habringer provided a video demonstrating simulations of engine failure during missions with Class D loads using the EC 135 twin engine rescue helicopter. During the simulations, one engine was brought to idle to simulate one-engine inoperative (OEI) conditions. During all of the tests, the pilot was able to safely land the load and the aircraft safely using the performance of only one engine. It should be noted that the tests were carried out below the 2750 metre elevation.

Stretcher spinning considerations, France

Mr. Calvat of the Police Nationale demonstrated a prototype for an anti-spinning device for stretchers subjected to rotor wash. Stretcher spinning is more of an issue in hoisting operations than long-line operations due to longer hover times. In France, with the EC145 replacing the Allouette III, the stretcher is now hoisted in a horizontal position instead of a semi-vertical position. This has resulted in spinning problems. He has designed a retractable rudder that uses the effects of the rotor wash to stabilize the stretcher. A video presentation showed the effectiveness of this simple but ingenious solution. The Air-Rescue commission is planning to investigate the possibility of this for soft bag stretchers.

Anti-Rotation Litter Rudder- Deployed Mode

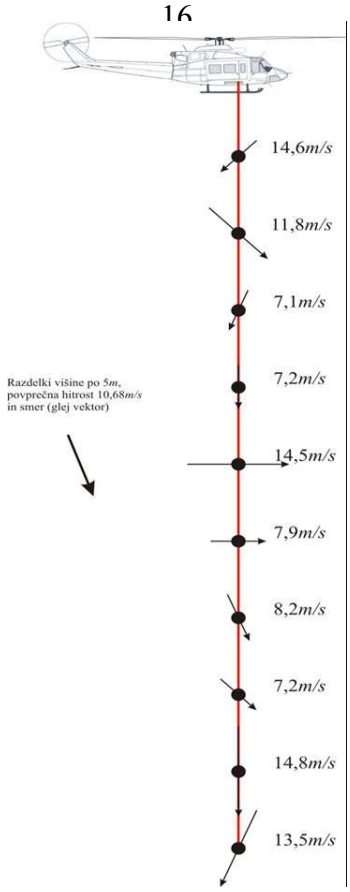


Bottom View- Rudder In Stowed Position

Stretcher spinning considerations, Slovenia

Presented by Miha Avbelj, Slovenia Police- Aviation Unit.

Conducted research to address the problem of spinning occurring during helicopter hoist operations. The most common antirotation device is an auxilliary tail rope connected to the litter with a weak link. This is not perfect solution, as it always requires a person on the ground to tend the line. This testing was focused on understanding the airflow below helicopter and its effect on hoist load.



Conducted twenty test helicopter hoist spinning simulations with the following aircraft; A109K2, BH212, BH412 and AS350. These involved rescue load configurations that varied between one to four rescuers as well as a rescuer and heli-rescue bag on the hoist cable. It was noted that in 65% of the tests, spinning occurred in the same direction as the rotors.

Airflow was measured every five meters directly beneath the Bell 412 on a hoist cable to determine speed and direction. As shown in the illustration to the right, it was noted that the least impactful airflow to litter spinning was 25-30 meters below the aircraft (obviously varies between model of aircraft).
Although the initial information gathered so far is inconclusive, additional information is required relating to rotation and helicopter type as well as airflow visualisation (smoke generator). Recommendations included: improving shape of the load (rescue bag), avoiding typical situations (heights, etc. when rotation is most likely or most adverse) and direct design changes or improvements (even passive or active stabilisation devices). Finally, it is recommended until then, that an auxilliary tail rope be used whenever possible!

Hoist design considerations, Breeze Eastern

Geoff Dinsdale, a United Kingdom distributor for Breeze-Eastern (rescue hoist manufacturer), discussed current helicopter hoist rescue technology and design.

Review of rescue hoist components:

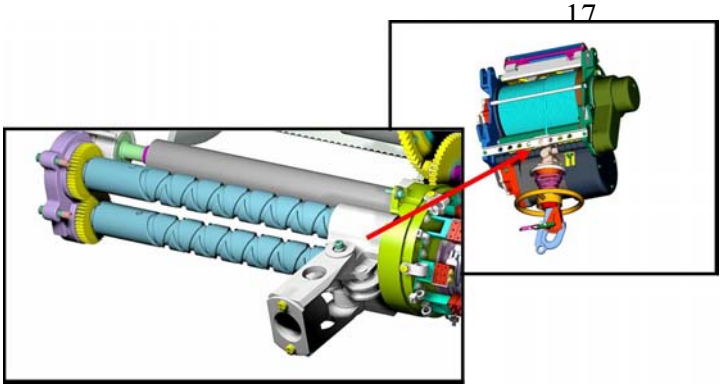
- *Hook*
- *Cable*
- *Drum*
- *Geartrain*
- *Load Absorber*
- *Motor*
- *Motor Controller*
- *Cable Tensioner*
- *Levelwind*
- *Cableguide*
- *Cable Cut Mechanism*
- *Limit Switch Assembly*
- *Operator's Control*
- *Mechanical Interface*

Lessons learned applied to current hoist technology includes;

- Rescue hoist hook design to prevent "dynamic rollout".
- Ergonomic design of pendant controls. Orientation of control to prevent errors by the hoist operator-- includes up-down controls and the cable cutter controls
- Danger of several cycles of rappelling directly on the hoist hook rather than hoist arm – could force the cable down to the under lay (lower course of cable).
- Cable Cutter utilizes an electro explosive device (EED) in conjunction with a mechanical cutter and an actuating circuit. The energy dissipated from aircraft radar could generate false discharge of the cable cutter circuit and hence the design isolates the circuit from any electro-mechanical interference (EMI).

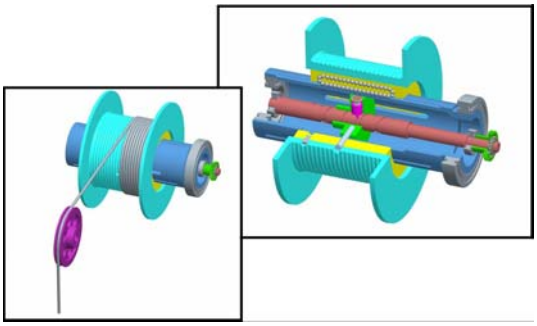
The problem of energy dissipation, occurring in the form of heat generation, is a design obstacle that continues to vex rescue hoist engineers.

Two Major Rescue Hoist Designs:



Translating Cable Design- The cable levelwind moves back and forth in front of a fixed position drum.

Translating Drum Design- The hoist cable drum moves back and forth in relation to a fixed position cable levelwind.



Images Breeze-Eastern, a division of TransTechnolgy Corporation.
Website: http://www.breeze-eastern.com

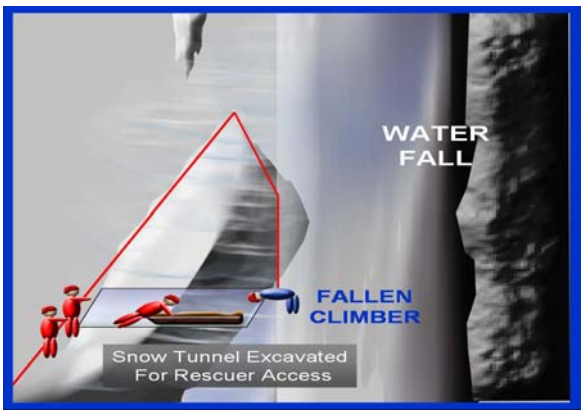
Wireless intercom, United Kingdom
During this past year, RAF rescue helicopters saw the introduction of a wireless ICS (intercom system) radio for the winchman. This wireless unit allows personnel in the aft cabin of the Sea King to move about within the aircraft without the need to be tethered to an intercom cable. Additionally when the winchman is working on a casualty on the ground they can still use the system to communicate with the aircraft overhead via the on-board intercom system. The radio unit itself is stored in a pouch in the lifejacket and is connected to the flight helmet. The unit incorporates NIVOX (non-interrupted voice operated transmission), which eliminates the deficiency of more traditional VOX technology that clips the first words of a transmission. Operating in the 443 MHz range this "radio" will transmit for 1.3 hours or receive for 8 hours on a fresh charge. The *Polycon* brand radio is manufactured by Helmet Integrated Systems, Ltd

Avalanche accident, Norway

Dan Halvorsen of Norway presented the rescue operation for a significant avalanche accident last winter near the coast of Norway. This was an amazing survival story with an 11-year-old child surviving after a two and hour burial at a depth of 2.3 meters. There were significant medical implications but the child recovered after two weeks of treatment. Dan discussed the significant operational challenges and risks of having seven different helicopters near the accident scene during the rescue operation. There were rescue helicopters, medevac helicopters and media helicopters all working in a relatively small airspace. He emphasized the need for control and efficient radio communications when so many aircraft are that closely together.

Waterfall ice rescue, Sweden

Frederik Götzmann presented an extensive rescue operation for a waterfall ice climbing accident early in the season. The leader had taken a fall during the collapse of an ice curtain and fallen behind the waterfall in running water. Although initially helicopters were used for the initial response, it quickly became evident that ground rescue techniques would be required to recover the climber. It became necessary to tunnel horizontally through the lower ice curtain to recover the victim.



Helicopter Rescue Incidents, Poland

Andrzej Blacha presented a video showing the helicopter rescue techniques in high angle terrain in the Tatras. The helicopters in use in Poland are both the hoist-equipped MI2 and the MI8. Training and actual rescue operations were shown. One rescue operation with an MI8 was shown where two injured climbers were stranded on a mixed rock face. Radio communications were established with the climbers and one rescuer was hoisted down to the accident site. Through radio communications, the weight of the climbers was calculated and it was determined that their weight plus the weight of the rescuer was less than the 275KG maximum working load of the hoist. Given the risks associated with the hoisting operation in this location, it was decided by the crew to limit the hoisting operation to one evolution. All three people were hoisted back aboard the helicopter successfully.

THEMES FOR 2005

- **Operational guidelines/restrictions and training employed for "partial landings" (e.g. one-skid, toe-in and hover landings)**
- **What is the dividing line between SAR and HEMS (Helicopter EMS)?**
- **Accident analysis, taking "lessons learned" farther.**