

DGA Toulouse 2018

« Entanglement »



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Entanglement

Entanglement : to be avoided

Interface :

Rescuer to/from the ground

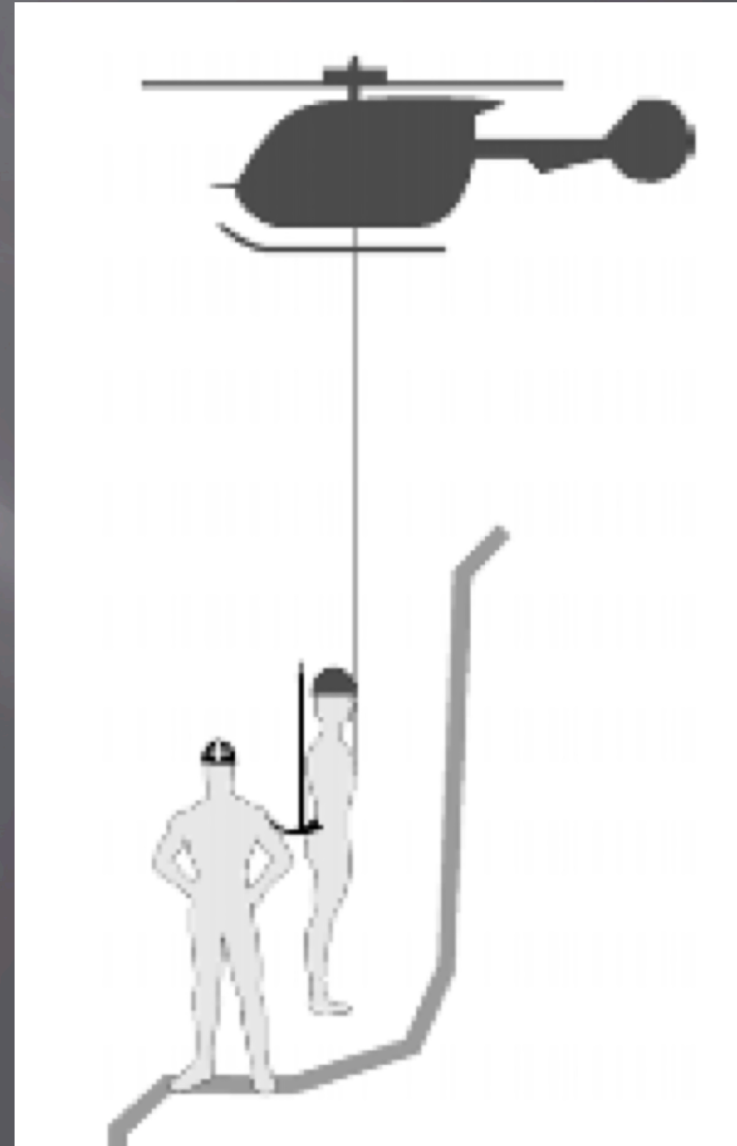
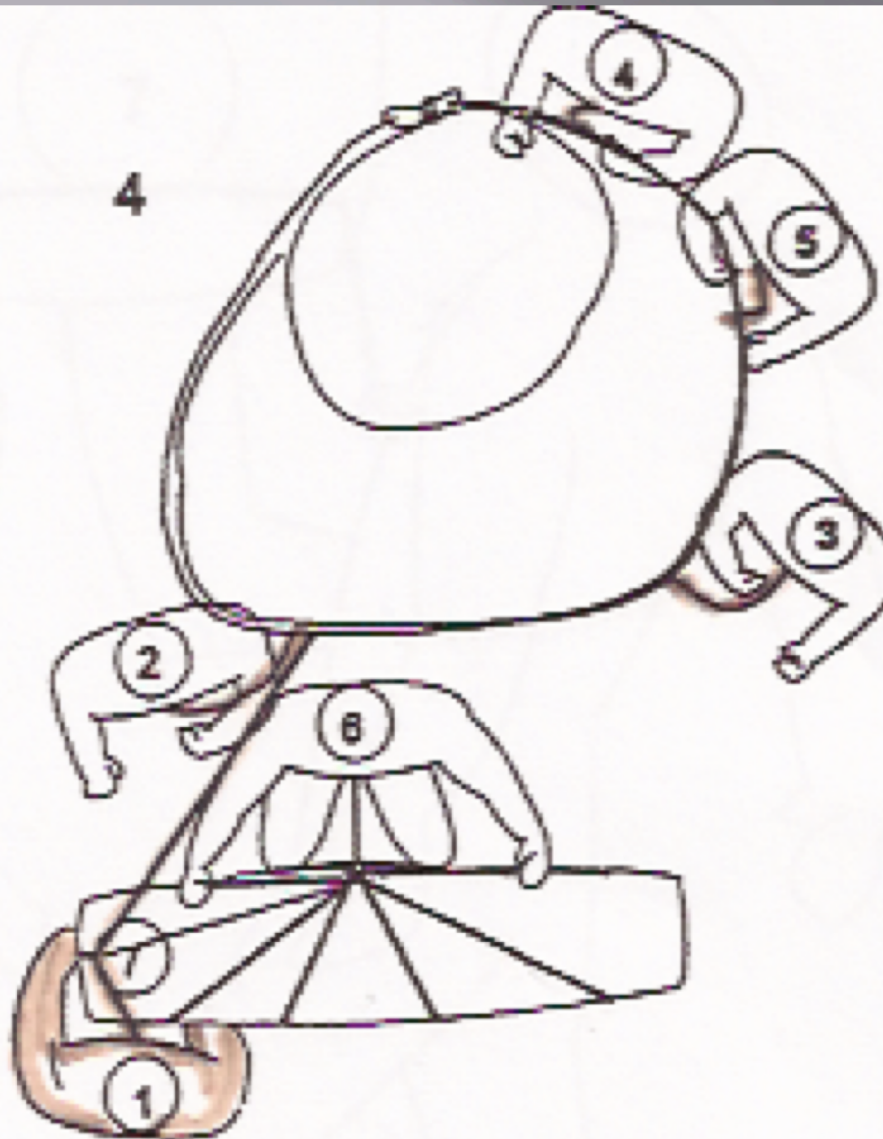
Helicopter free / attached to the ground

Can be disastrous

Entanglement

- 1997 / Hoist / exercise,
- 6 rescuers and one patient are on a belay all secured by one 8mm safety line,
- 1 rescuer and the patient are hooked on the hoist,
- The helicopter being not exactly centered over the patient, the stretcher moved and the safety line of the other rescuers got caught,
- No communication occurred and the hoist operator continued to pull up,
- The safety line finally broke and all 7 rescuers fall and sustain fatalities.

Picture slide 3 (left) and 5 (right)



Entanglement

- 2001 / Fixed rope / mission,
- The friend of the patient went down to see if every thing was all right and his pickle got caught in the harness of the rescuer. The rescuer did not see or feel anything and the friend flew attached only by the pickle,
- 4 persons are on the hook instead of the 3 planned.

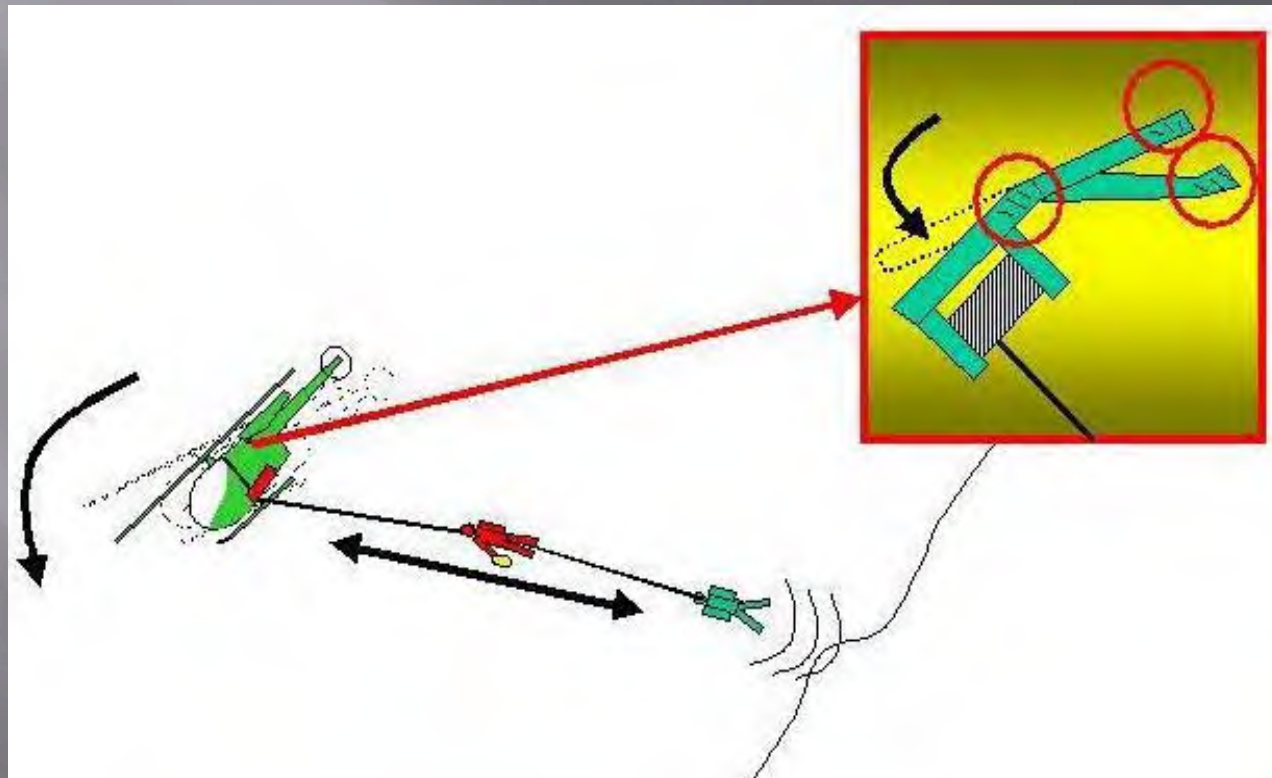
Entanglement

- 2002 / Fixed rope / mission,
- A rescuer got caught by a loose strap. He managed to secure himself on the hook,
- No communication,
- Overtorque of the aircraft.

Entanglement

- 2003 / Hoist. Body recovery, hazardous conditions / mission,
- Goal was to hoist rescuer to victim, then hook the person while staying on the hook. Pull the rescuer up again and then hook the victim in the hoist hard point with a rope kept by the rescuer.
- While hoisting back the rescuer, the pilot had to fly away and both victim and rescuer were on the hoist (rated for 1 person only). The rescuer cut the rope.
- Hoist sustained damage.

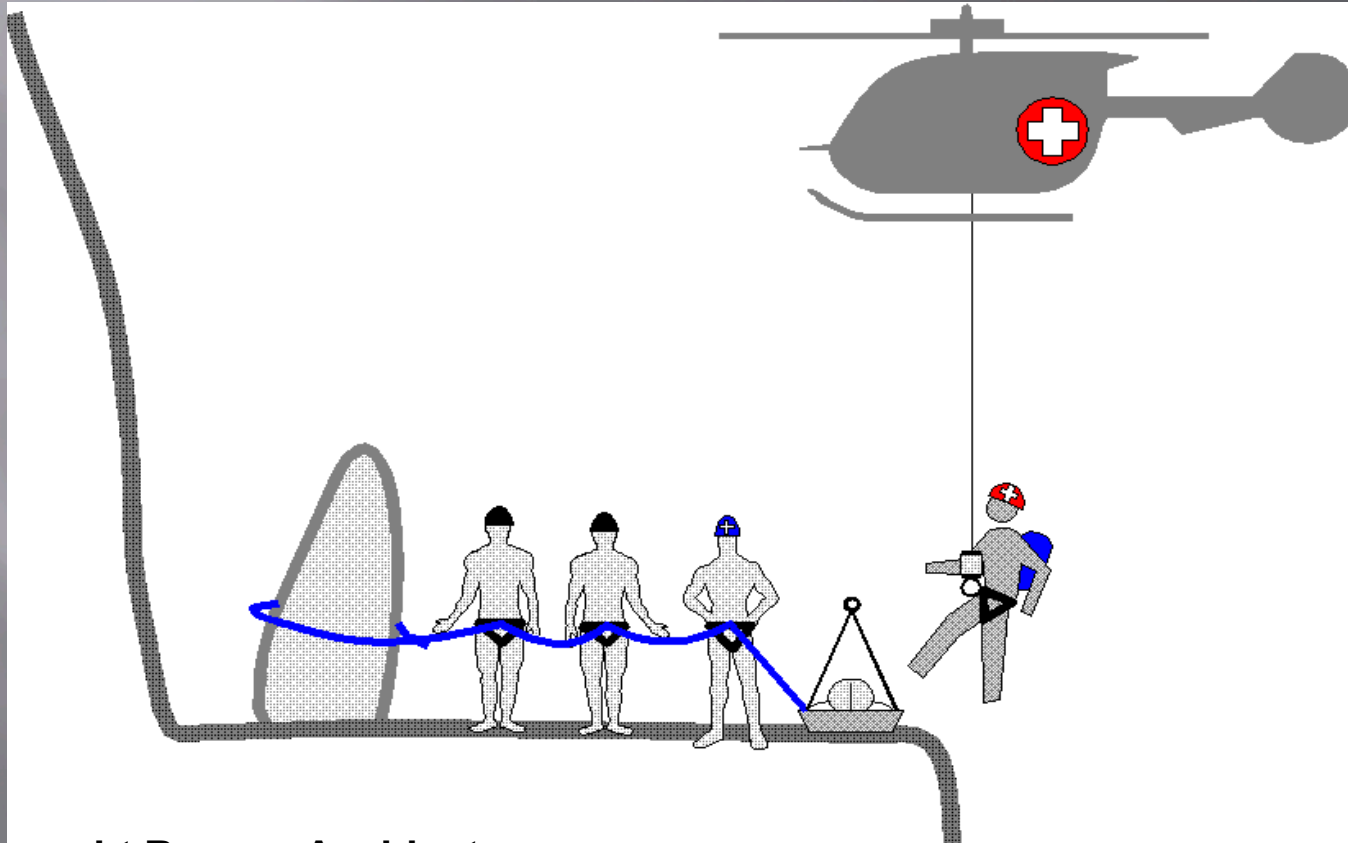
Picture slide 7



Entanglement

- 2002 / Hoist / mission,
- Night rescue / 2 rescuers and 1 physician were tethered by a safety line to a large anchor,
- Patient was in stretcher and hooked to physician,
- No communication,
- The safety line was not removed and while lifting, all were inadvertently lifted,
- 5 persons are now on the hoist,
- Pilot managed to perform a running landing.

Picture slide 9



Entanglement

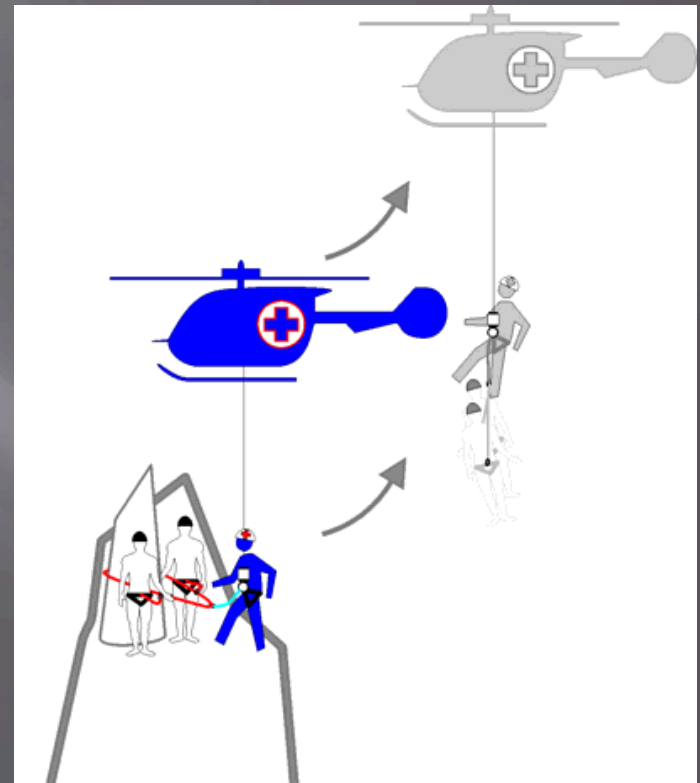
- 2004 / Hoist / exercise,
- Following a wind turbulence, the pilot loss the position and the rescuer is pulled out of the cabin rooftop,
- The pilot try to set the rescuer back,
- The rescuer hit the wire of the cabin car and get entengled on them,
- The winch operator has to cut the hoist cable when the rescuer is on the wire.

Entanglement

- 2005 / Fixed rope / mission,
- Evacuation at high altitude / one person not injured,
- No communication,
- The person could hook himself on the line but could not remove the safety ice screw,
- Crew had to pull out due to performance and fortunately the screw let go,
- Climber fly up to the helicopter skid (dynamic rope).

Entanglement

- 2005 / Hoist / mission,
- Rescuer was hoisted down to 2 climbers,
- Rescuer secured himself to the anchor used by the 2 persons,
- Pilot experienced high updraft and the rescuer plus the 2 climbers were lifted up. The webbing fortunately came off the anchor.



Entanglement

- 2006 / Hoist / exercice,
- The hoist cable get entangled on the boat,
- The cable broke and the rescuer fall on the ground (10 meters),
- The cable hit also the hoist operator in the cabin.

Entanglement

- 2009 / Fixed rope / mission,
- A mountain guide is anchored on a rock and his 2 clients are tied in succession down a few meters,
- The person to be evacuate is the middle one,
- The rescuer and the patient are on the hook to get lifted,
- The guide noticed that his rope was laying over one of the packs hanging from the rescue load,
- He tried to flip the rope off but lost his balance and fell (fatal).

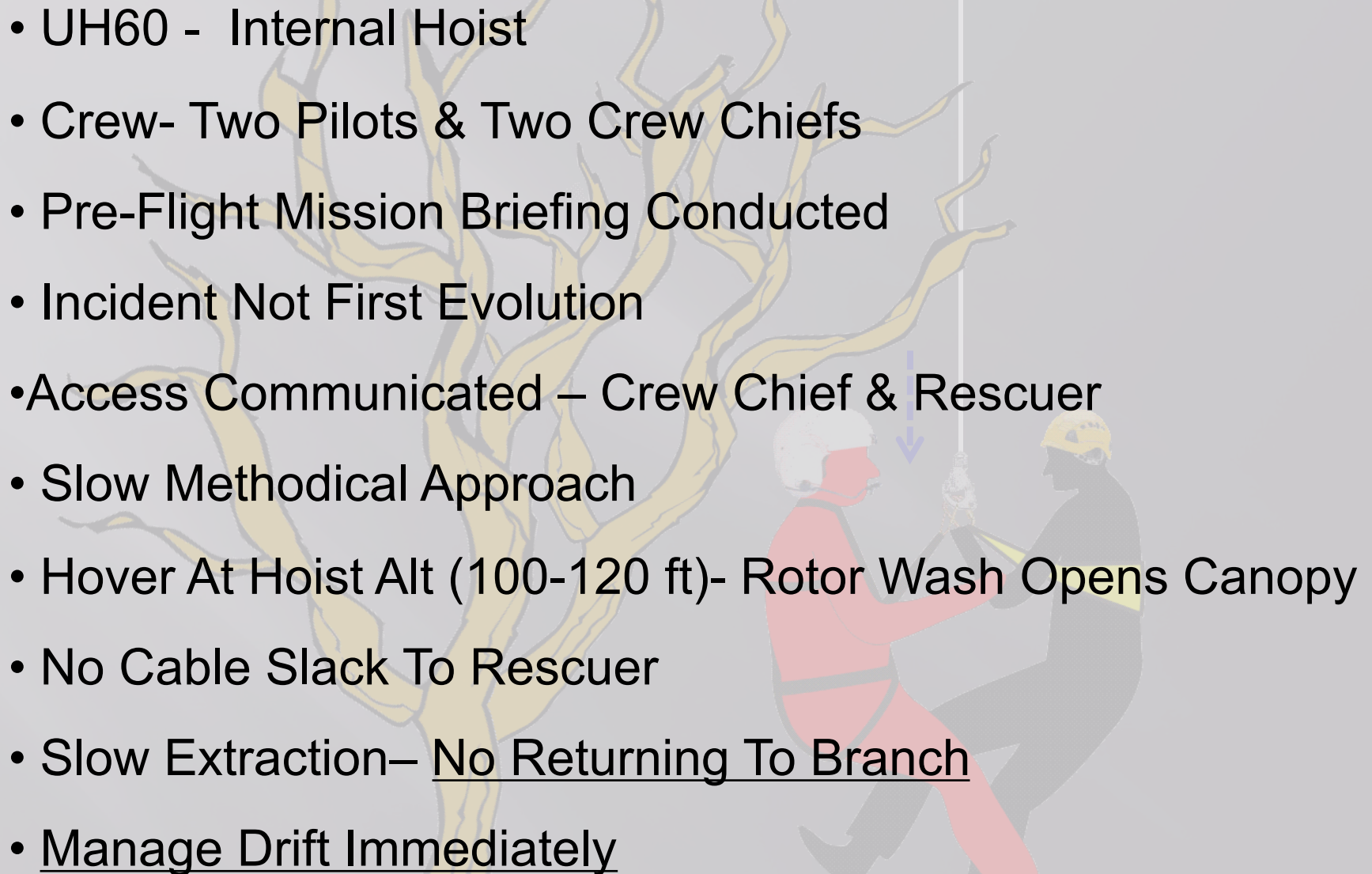
Entanglement

- 2010 / Hoist / exercise,
- Extraction of 2 rescuers on a hanging belay,
- During the hoist extraction, 2 non-locking carabiners on the rescuers's shoulder gear sling became connected to the belay line,
- The hoist operator recognized the situation and the rescuer managed to free himself from the belay line.



Entanglement

- 2009 / Hoist / mission,
- The hoist operation was on the bow of the vessel near the forecastle mast,
- The pilot lost sight of the ship and the helicopter drifted back towards a mast located on the forecastle,
- The pilot was unable to re-establish the hover and the cable became fouled,
- Entanglement on ship, rebound in main and tail rotor
- The cable failed and the 2 rescuers fell on the deck (2 serious injuries).

- UH60 - Internal Hoist
 - Crew- Two Pilots & Two Crew Chiefs
 - Pre-Flight Mission Briefing Conducted
 - Incident Not First Evolution
 - Access Communicated – Crew Chief & Rescuer
 - Slow Methodical Approach
 - Hover At Hoist Alt (100-120 ft)- Rotor Wash Opens Canopy
 - No Cable Slack To Rescuer
 - Slow Extraction– No Returning To Branch
 - Manage Drift Immediately
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Entanglement

- 2012 / Fixed rope / mission,
- While evacuating a chairlift the bubble door of the pilot got fogged and iced due to the freezing (-25°) outside temperature,
- The pilot lost references and pulled the rescuer up,
- The rescuer was already secured on the chair,
- Thanks to proper radio communication the rescuer could advise the pilot and he was able to correct the situation.

Entanglement

- 2014 / Hoist cable - during training in heavy seas the cable became entangled on boat. Cable separated and became entangled in rotor system. Pilots did not detect any abnormalities flew to landing area.

Entanglement

- 2014 / During the extrication training, the rescuers harness became snagged on the bow of the boat. The helicopter and boat direction were no longer aligned resulting in significant downward pull being placed on the aircraft. The hoist operator was unable to deploy hoist cable and the aircraft was pulled downward and the Right. The hoist operator was attempting to reach the jettison button but aircraft movement impaired his ability to reach the button.
- A second crew member in the cabin reached the jettison button as the aircraft was in close proximity to the water surface. Both pilots indicated that they could not activate the emergency jettison as they were fully engaged in trying to fly the aircraft. It appears that at almost the same time the rescuer's harness becomes free from the snag. The rescuer and victim are pulled off the boat and into the water. They are pulled through the water at significant speed for a short distance. The rescuer was injured during this sequence and needed the victim to activate his manually inflated flotation.

Entanglement

- 2014 / Hoist rescue demonstration. The rescuer and litter were hoisted to the top of building. Police SWAT team members were at the hoist location and tasked with supporting the demonstration. The simulated victim was packaged in the litter and prepared for extrication. The tagline was packaged in a bag that was normally used for tactical rappel operations and the distal end was secured to the bag. The bag was attached to the harness and leg of the victim who was tasked with managing the tag line. The tag line was attached to the litter with a weak link of de-cored parachute cord.
- The extrication commenced but as the litter approached the skid of the aircraft the hoist malfunctioned. Under normal circumstances, the litter would be brought into the aircraft and tag line removed by the rescuer. As the aircraft commenced forward flight the tag line attendant was pulled off the top of the building. The aircraft crew was unaware that the attendant was still attached to the litter through the tag line. The victim fell when the bag failed resulting in a fatal fall.

Entanglement

- 2016 / Hoist mission,
- Hoist operations to evacuate 3 climbers,
- One rescuer was hoisted down to the climbers' anchor consisting of slings wrapped around a horn,
- Plan was to hoist 2 persons at a time,
- When the first 2 persons are hoisted, the leashes from the other 2 climbers got caught on the secondary hook of the hoist,
- All 4 persons ended up hanging on the hoist,
- Hoist and engine limits exceeded but no damage.

Entanglement

- Firefighter Falls 30 feet from Basket
Assisting hiker with a medical emergency,
- Loaded him into a rescue basket.
- The basket contacted a utility pole, causing the firefighter to fall 30 feet.

Entanglement

- Some thoughts,
- Communication is paramount,
- If possible take care not to have too many persons at the belay,
- If possible separate belay for rescuer and patient,
- If possible use other strope colour for the belay of the rescuer and the patient,
- Always have a cutting device ready,



- 19 HEC / HHO incidents or accidents (1992-)
 - 9 fatalities / 5 rescuers injured
- 10 cases during missions and 9 during exercises

ICAR

Human External Cargo (HEC) Safety Check

AIR-REC0011 / Air Rescue Commission / October 31st, 2016

Human External Cargo (HEC-HHO). Equipment

AIR-REC0014 / Air Rescue Commission / October 31st, 2016

Conclusions

- Safety check,
 - Assess the situation,
 - In doubt don't,
 - Happy landings and safe rescue,
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- Questions / Thank you