

Special rescue techniques using a helicopter

General:

The following exercises are examples for rope rescue techniques performed by the fire service by using a helicopter to rescue people from heavily accessible objects.

These rescue exercises were carried out with winches. If no winch should be available one could also use a fixed rope. One has to take into account that difficulty of the exercise increases with the distance is between helicopter and rescuer at the rope. Therefore a very good communication is absolutely required.

For security reasons the appointed staff must have passed appropriate basic training as flight rescuer and wear the required personal protective equipment (PPE)

Before the execution of these intervention techniques feasibility studies must be carried out with stationed helicopter echelons and intervention plans be agreed on. The execution of the exercises or interventions always depends on the pilot. A continuously training and cooperation with the helicopter echelon is important. A close cooperation raises the confidence and therefore increases the success and the safety of the execution of these techniques.

Intervention technique 1:

Evacuation of several persons from the roof of a high house on fire

Intervention technique 2:

Evacuation of persons from the window or of the balcony

Intervention technique 3:

Technical aid at car accidents



Exercise1:

Evacuation of several persons of the roof of a high house fire

Helicopter: BK 117 with winch 270 kg and 90 m of rope

Task:

Several persons are on the roof of a high rise building. Only evacuation possibility over the roof. 2 fire fighters with breathing apparatus (BA) are flown on the roof to rescue people. In the scheme described hereafter an external winch is used. If only a smaller number of persons have to be evacuated these means are suitable. The winch can be charged to 270 kg at most and has a rope length of 90 m!

Equipment:

Personal protective equipment, 1 dynamic rope, descending device, additional evacuation triangles, breathing apparatus, escape hoods, head set

Personnel:

Pilot, winch technician, 3 flight rescuers

Anchorage:

Hook of the winch (use big opening) with trapezium clipped in and 2 carabiners. Safeguarding points must be available in the interior of the helicopter.

Note:

The persons are transported hanging at the winch, however must protect themselves at the safeguarding hook besides the winch. If in danger the pilot has the possibility to cut the winch cable. If rotation at the winch occurs the rescuer must counteract this (far extend a hand and a leg!!). For security reasons the appointed staff must have passed appropriate basic training as flight rescuer and wear the required PPE.

Take into account:

Beware that persons on the roof may have a feeling of panic. The place to land must be inaccessible to external persons. If enough place should be on the roof, the evacuation can be carried out also in floating flight (Hovering) as long as there isn't a panic on the roof.



Procedure:

- Prepare a place to land (25 * 25 m), take wind direction and any obstacles (lines, loose objects) into account!



- Briefing with helicopter crew necessary
- All 3 fire fighters equipped with rescue belts as well as turn out gear for fire fighting. 2 wearing BA and 1 carries a rescue rucksack with evacuation material (rescue triangle) approach on command of the crew to the front of the helicopter
- They carefully enter the cabin and clip themselves by means of a long lanyard (approx. 50 cm) to the internal anchorage points. The 1st fire fighter clips his short lanyard to the big winch hook, unclips his long lanyard and leans out of the helicopter.



- The rescuers are winched on the roof one by one
- The first rescuer calms down the persons and prepares them for the evacuation. The two BA protected fire fighters carry out a reconnaissance in the lower stories.



- Provided with rescue triangles the persons are rescued three at a time by means of the winch of the helicopter.



- The reconnaissance crew finds another person inside the building and secure him with an escape hood. The person being under shock is flown out – for safety reasons together with a fireman at the winch.
- The flights continue as long as all persons have been evacuated from the roof
- After completion of the rescue the remaining fire fighters are flown out
- A back up crew equipped with breathing apparatus is on stand by during the entire action

Exercise 2:

Evacuation of persons from a window or a balcony

Helicopter: BK 117 with winch 270 kg and 90 m of rope

Task:

One or several persons are showing at a window or a balcony at a height which cannot be accessed by means of an aerial ladder. Their escape route is cut off because of smoke and fire. There is high risk of persons jumping from panic. One or two rescuers must be approached to the object by means of the winch. In the scheme described hereafter an external winch is used. If only a smaller number of persons have to be evacuated these means are suitable. The winch can be charged to 270 kg at most and has a rope length of 90 m!

Equipment:

Personal protective equipment, 1 dynamic rope, descending device, evacuation triangles, breathing apparatus, head set, escape hoods

Personnel:

Pilot, winch technician, 2 flight rescuers

Anchorage:

Hook of the winch (use big opening) with trapezium clipped in and 2 carabiners. Safeguarding points must be available in the interior of the helicopter.

Note:

The persons cannot be transported hanging at the winch, they must either be brought into the cabin of the helicopter in floating flight (hovering) or be clipped to an additional fastening point at the helicopter.

If in danger the pilot has the possibility to cut the winch cable. If rotation at the winch occurs the rescuer must counteract this (far extend a hand and a leg!!). For security reasons the appointed staff must have passed appropriate basic training as flight rescuer and wear the required PPE.

Take into account:

Beware that persons at the window may have a feeling of panic.

If enough place should be on the roof, the evacuation can be carried out also in floating flight (Hovering) as long as there isn't a panic on the roof. Because of the smoke and heat full turn out gear for fire fighting has to be worn – additional breathing apparatus depending on the situation. Furthermore a rope and a descending device must be taken along.

Another problem for the pilot will arise from the missing reference point (to keep the right height). Therefore a good radio-communication with the winch man is of utmost importance.



Procedure:

- Prepare a place to land (25 * 25 m), take wind direction and any obstacles (lines, loose objects) into account!



- Briefing with helicopter crew necessary
- 2 fire fighters with appropriate training equip themselves with personal protective equipment, dynamic rope, descending device, evacuation triangle, radio set and breathing apparatus incl. escape hood and on command of the crew approach to the front of the helicopter



- They carefully enter the cabin and clip themselves by means of a long lanyard (approx. 50 cm) to the internal anchorage points.
- A trapezium with 2 carabiners is clipped to the hook of the winch. The 1st fire fighter clips himself to one of these carabiners and disconnects the safety lanyard. He goes outside the cabin on the runner and the 2nd man clips himself to the 2nd carabiner, disconnects his safeguarding and goes also on the runner.
- The helicopter is placed high above the building (approx.30 meters because wind may increase fire). The fire fighters are lowered to the roof or directly to the

window, where they immediately disconnect from the winch. After that the helicopter can leave his position over the building.

- The rescuers descend from the roof to the persons.
- They calm the persons (explain the rescue procedure) and prepare the evacuation with escape hood (if necessary) and rescue triangle.
- The first rescuer and the first person sit face to face on the window sill with one leg to the outside.
- The helicopter is called and the rope of the winch is lowered.
- The rescuer grips the hook of the winch with the trapezium and clips the rescue triangle to the first carabiner of the trapezium. After having controlled the proper status he gives the winch technician the instruction to haul.



- The rescuer and the person are now hauled from the window or the balcony, enter the helicopter and immediately secure themselves in the cabin.
- This procedure is repeated until all persons have been rescued.

Crash-Rescue:

If several persons have to be rescued very quick it is possible that one rescuer prepares the persons for the take-off and the 2nd rescuer takes them over while hanging at the winch permanently (no unhooking)

Exercise 3

Technical aid at car accidents

Helicopter: BK 117 with winch 270 kg and 90 m of rope

Task:

Rescue at a car accident, where it is difficult to access the site, e.g. off-road, ravine/canyon or in a traffic jam.

There is no chance for a fast response and a suitable rescue of casualties. Several rescuers have to be lowered to the accident site by means of a winch. In the scheme described hereafter an external winch is used. The winch can be charged to 270 kg at most and has a rope length of 90 m!

Equipment:

1 rescue bag, first help rucksack, helmet head set, if needed extrication tools (spreaders and cutters)

Personnel:

Pilot, winch technician, 4 flight rescuers (emergency doctor, first-aid attendant, 2 fire fighters)

Anchorage:

Safeguarding points must be available in the helicopter.

Note:

The flight must be carried out in 2 phases. First the transport of the emergency doctor and the paramedic. The transport saves the persons for the technical aid for this after this. If in danger the pilot has the possibility to cut the winch cable. If rotation at the winch occurs the rescuer must counteract this (far extend a hand and a leg!!). For security reasons the appointed staff must have passed appropriate basic training as flight rescuer and wear the required PPE.

Take into account:

Special risk may be the narrowness of the intervention site (ravine, rockfall, trees)



Procedure:

- Prepare a place to land (25 * 25 m), take wind direction and any obstacles (lines, loose objects) into account!
- Briefing with helicopter crew necessary
- Emergency doctor and paramedic are first brought to the scene.
- 2 fire fighters with appropriate training equip themselves with personal protective equipment, radio set, fire extinguisher and extrication tools and on command of the crew approach to the front of the helicopter.
- They carefully enter the cabin and clip themselves by means of a long lanyard (approx. 50 cm) to the internal anchorage points.
- A trapezium with 2 carabiners is clipped to the hook of the winch. The 1st fire fighter clips himself to one of these carabiners and disconnects the safety lanyard. He goes outside the cabin on the runner and the 2nd man clips himself to the 2nd carabiner disconnects his safeguarding and goes also on the runner.



- The helicopter is placed high above the site. The fire fighters are lowered to the vicinity of the accident where they immediately disconnect from the winch.



- After that the winch technician clips the rescue tools to the hook and lowers them.
- The fire fighters unhook them and take them over. The helicopter can clear the winch and take additional staff on board if necessary.



- The fire fighters support the emergency doctor and prepare the extrication tools (spreaders and cutters).
- After the rescue of the casualties they are prepared for the evacuation.
- The helicopter is called and the rope of the winch is lowered.
- The casualties are hauled with the winch together with the emergency doctor and transported, e.g. to hospital