Contents

AVIATION RESCUE CORP. TRAINING

1. Meaning

In the case of fire of skyscrapers, accident or fire of marine vessels and accident in mountain areas or when people are left at an area isolated by a flood, it may be difficult to rescue the victims from ground. Rescue by helicopter is effective for such cases when ground rescue cannot be available.

The purpose of this seminar is to acquire the rescue skill of aviation corp. members by means of a training using a helicopter.

2. Outline of rescue activity

1) Target disasters
   (1) Fire of skyscrapers
   Rescue activity at an elevated location such as victims left on the roof of a burning skyscraper
   (2) Fire and accident of marine vessels
   Rescue activity at sea such as victims on the ship or at sea.
   (3) Accident and acute sickness in mountain areas
   Rescue activity in mountain areas such as those injured or with acute sickness in mountain areas
   (4) Earthquakes, floods, hurricanes and typhoons, etc.
   Rescue of victims left on the roof of destroyed, washed away or flooded houses or at an isolated area

2) Rescue methods
   Optimal rescue method should be determined from those listed below based on the weather condition such as wind direction and velocity, situation of victims, disaster conditions and obstructions around the target rescue area.

   When a method other than rescue by helicopter landing is performed or when no assisting rescue worker is available at the rescue site, it is necessary to land the rescue worker(s) by means of a hoist or repelling.

(1) Rescue by helicopter landing

Rescue by landing helicopter at the rescue site is the safest and most efficient method. Victims can be accommodated to a helicopter to its maximum capacity in a prompt manner. However, this method cannot be available unless the condition of the rescue site is proper for the emergency landing of a helicopter.

(2) Rescue by hoist

This method is used when a helicopter cannot land but can hover above the disaster site. With this method, the rescue workers and equipment are supplied safely to the rescue site and victims protected by a survivor is lifted by a hoist (Fig. 1)

* Rescue hoist

A hoist used for rescue activity is a type of winch driven by an electric motor. A rescue worker must repel on a rope with a hook to access to the victim(s). The victim(s) and rescue workers are then lifted to the helicopter by winding up the cable.

Maximum load:	272kg
Cable length:	90m
Winding speed:	0 to 0.75m/sec.

(3) Rescue by pressure-reducing rescue litters

If a victim cannot wear survivor due to injury or weakness, the victim is accommodated on this litter and lifted to the helicopter with the hoist (Fig. 2).

(4) Rescue by rescue net, etc.

If there are may victims at a place, a rescue net (a net made by 20mm ropes and victims cling to the net) or rescue basket (a basket made of cloth containing Kepler fiber) is used.

In the case, a helicopter must once land on an emergency landing site close to the rescue site to mount the rescue net or basket. After accommodating the victims around the net or inside the basket, the helicopter flies to the nearest transition point to relay the victims to the rescue teams on ground.

Hoist and survivor

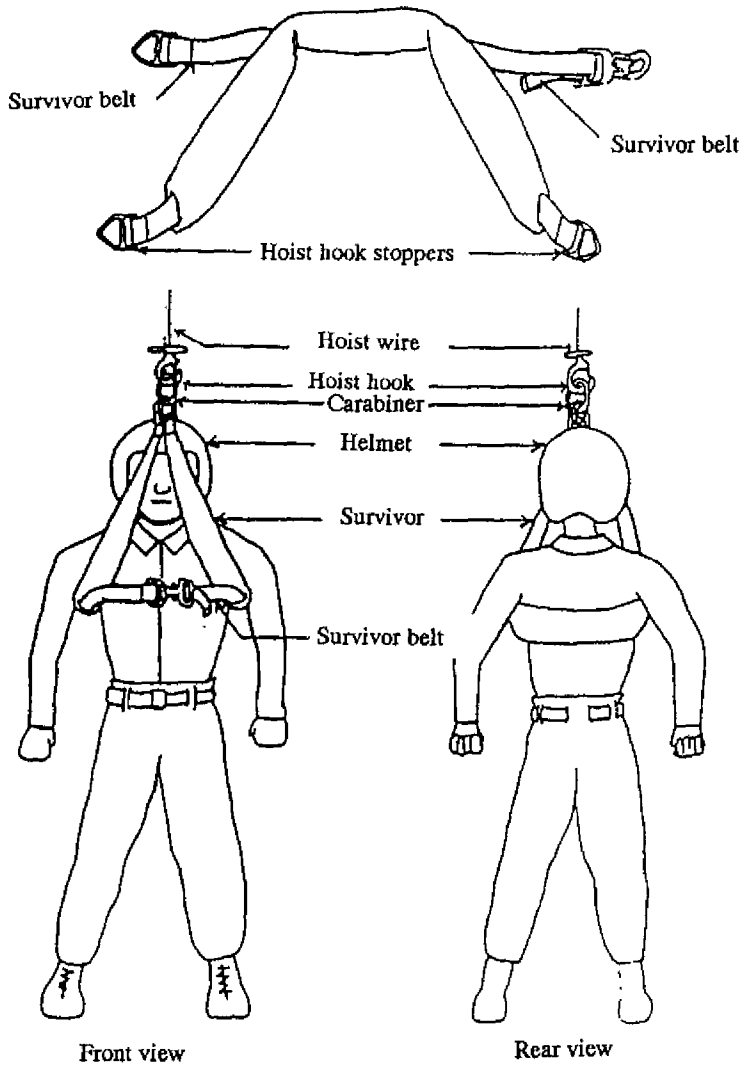
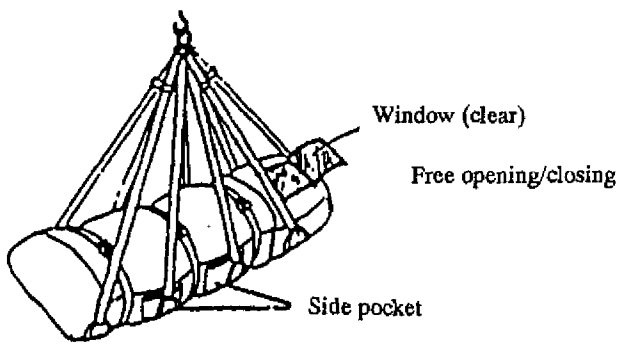


Fig.1 Name of each part of survivor and how to wear a survivor



* The position of the strap ring can be changed to adjust the strap length according to the condition of the victim such as shock or head-up posture.

Fig. 2 Pressure-reducing fixation rescue litter

3) Procedure for landing

The number of the rescue workers to access to the victims must be proper to the planned rescue method and the access method should be determined by the pilot-in-command. In addition to the access by hoist, repelling can also be used when it is necessary to supply rescue workers urgently and continuously.

(1) Landing by a hoist

a. Securely wear life-safety-harness or survivor and confirm the interlocking condition of carabiner and hoist hook.
b. When going out of the helicopter under the direction of an operator, allow some margin to the hoist wire to prevent unnecessary impact on the wire and be ready to go down.
c. During going down, always focus on the landing point, open the legs to your shoulder width and gently stand on the ground from your tows.
d. After successful landing, give sign to the operator.

(2) Repelling

Hung a rope from the helicopter to the target point by giving a margin to the length of the rope by 2 to 3 meters.

<1> Preparation of repelling

a. Securely wear the belt and confirm the conditions of the supporting point of the rope, and belt-to-carabiner and figure-of-eight ring-to-rope joints.
b. When going out of the helicopter under the direction of an operator, hold the brake with your left hand and apply your body weight to the rope.
c. Raise your left hand and grasp the rope lightly. Put you right hand on your thigh and grasp the rope for braking.
d. Gently stretch your knees so that the angle between your upper body and the legs is approximately 75 degrees. Stretch your back and hold the rope close to your chest and see the operator.

<2> Repelling

a. Start repelling by moving your foot away from the step when the sign is given by the operator.
b. Control braking with your right hand so that you can repel down at a constant rate (your body must not turn).
c. During repelling, focus on the target landing point and maintain proper posture.

<3> Landing

a. Apply braking force gradually from a point 3 to 4 meters above the ground, open your legs to your shoulder width and gently land so that your both tows touch the ground simultaneously.
b. Immediately after landing, disconnect the rope from the carabiner and figure-of-eight-ring and give sign to the operator.
c. If another worker is repelling after you, untwist the rope and hold the end of the rope until the next worker comes down to 2/3 the height. You must not pull the rope at this time.

4) Procedure for lifting victims

(1) Lifting victims by a hoist

a. Put survivor on the victim. Be careful so that the hoist hook and/or wire does not hit the victim on his or her face.
b. Give a sign to the operator when the victim is ready to be lifted.
c. To prevent swing of wire during lifting, stand right below the hoist and hold the hoist hook until the proper tension of hoist wire is confirmed.

(2) Use of pressure-reducing fixation litters

a. Prepare the litter and adjust the height of the portion where the victim's head is placed according to the condition of the victim. Move the litter to the position right below the hoist.
b. Mount the guide rope to the litter and give a sign to the operator when the litter is ready for lifting.
c. During the lifting of litter, control the litter in parallel to the helicopter using the guide rope.

d. When the litter is caught by the operator, control the guide rope as far as possible so that the litter is at right angles to the helicopter. Loosen the rope when the litter is accommodated into the helicopter.

5) Precautions
   (1) During rescue activity around a landed helicopter, extreme care must be exercised to prevent injury of victims by down-wash and/or the tail rotor of the helicopter.
   (2) The victims should be accommodated to the helicopter in the order of significance of the symptom or condition. The number of victims to be accommodated to a helicopter must be determined by the pilot-in-command.
   (3) When repeated rescue flight is required due to a large number of victims, rescue worker(s) should stay with the victims left behind to encourage and prevent them from becoming panicky conditions. These rescue workers are also responsible to ensure the safety when the next helicopter lands.

3. Riding on and getting off a helicopter

When the engine of the helicopter is running, the noise of the engine causes difficulty in conversation of people around the helicopter. Furthermore, the sight is also significantly affected by the down-wash and dusts caused by the rotation of main rotor and people around the helicopter tend to see downward, thus safety may be affected under these conditions.

When riding in or getting off the helicopter, the directions given by the pilot and mechanics of the helicopter must be strictly observed. The following precautions must also be observed.

1) You must ride in or get off the helicopter at a position within the sight of the pilot (from the side of the door to the front of helicopter) (Fig. 3)
2) Be careful to the main rotor and walk with your back bent (Fig. 4)
3) When the helicopter is on an inclined area, ride in or get off from the lower side.(Fig. 5)

4) Access to tail rotor is extremely dangerous. Do no access to the tail of a helicopter.
5) When carrying a long equipment such as a litter, do not carry by standing them.
6) Secure your helmet or cap by the belt or strand. When carrying paper, etc., be careful so that they are not carried away by the wind.

4. Precautions for rescue workers on board

In a helicopter, a rescue worker must observe the direction of the pilot-in-command, etc.. The following precautions must also be strictly observed.

1) Do not fail to wear seat belt.
2) Secure youself if there is no seat available.
3) Do not touch equipment in the helicopter unnecessarily.
4) Do not speak to the pilot-in-command unless it is necessary for your duty.
5) Before starting repelling or landing by hoist, you must confirm the conditions of equipment such as belt and carabiner and follow the directions of the operator.

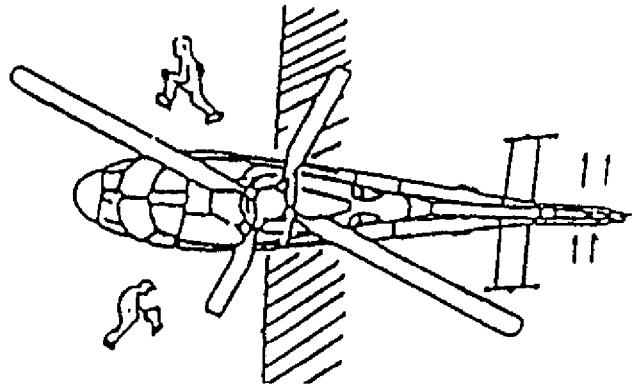


Fig. 3 Direction of access to and moving away from the helicopter

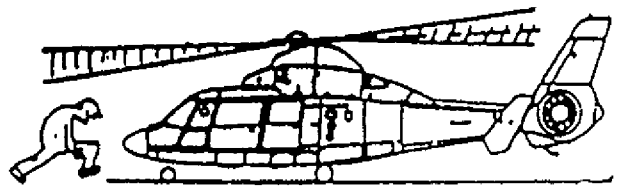


Fig. 4 Posture for access to and moving away from the helicopter

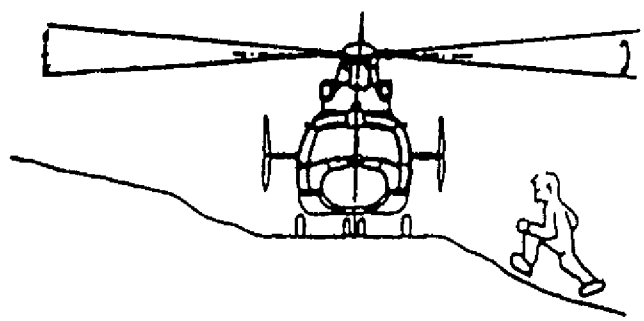


Fig. 5 Access to and moving away from the helicopter on an inclined area

Reference
Aviation Corp. of Fire Department of Osaka

1. System

a. The Aviation Corp. of Fire Department of Osaka has 2 helicopters and a TV transmission system for disaster information collection and rescue activity.
b. The helicopter can take off within 10 minutes after receiving a command and can arrive at the center of Osaka City in 5 minutes.
c. These 2 helicopters are subject to regular maintenance on a peridic basis and according to the flight hours. To avoid both of these 2 helicopters are under maintenance service at the same time, the maintenance schedule is adjusted so that at least one helicopter is always available.
d. There is a lodging house for rescue workers near the aviation base so that the workers are available within a few minutes.

2. Specifications of helicopter

	OSAKA	NANIWA
Number of seat	10	10 (7)
Weight of full equipment	4,000kg	4,250kg
Operation weight	2,427kg	2,570kg
Effective capacity	1,573kg	1,680kg
Fuel	915kg	915kg
Flight continuation	3 hours and 20 minutes	3 hours and 20 minutes
Flight speed	250km/h	254km/h
Hoist capacity	272kg	272kg
Lifting force	1,600kg	1,600kg
Cabin area	4.2m^2	4.2m^2
Max. non-stop flight distance	833.3km	846.7km
Start of service	April, 1987	April, 1993

Note: The number in ( ) is the number of seats available when a Video Data Transmission System is equippped.