

Establishing a Helicopter Landing Zone

Emergency helicopter operations are a critically coordinated team effort involving emergency medical, fire, police and civilian professionals, as well as aeromedical crews. Helicopter crews need your assistance in selecting suitable landing zones, warning pilots of any potential hazards and securing landing zones during flight operations.

This report discusses some of the issues involved in selecting and preparing an emergency helicopter landing zone and with assisting the pilot in making a safe approach, landing and departure.

Selecting a Landing Zone

First, determine if the area is large enough to land a helicopter safely. The surface should be flat and firm. Try to avoid loose, powdery snow, sand or dirt. The area should be free of any loose materials that might be blown into the rotors or engines. Never use a frozen body of water for landing, no matter how solid it seems. Pilots want as much clearance as possible and usually prefer low grassy vegetation to a road. Pilots will avoid a dusty area where their draft will cause a blinding situation.

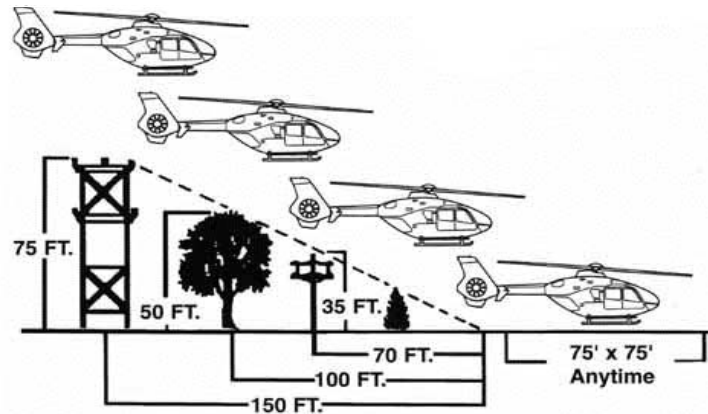
The surface should be as flat and level as possible having a less than 10-degree slope. The following *Walt (Walk And Look Triangle) Method* is a quick and easy way to determine the degree of slope:

- Place a marker in the center of the proposed landing zone.
- Walk downhill a distance of 6 times your height (about 12 normal strides).
- Keeping your line of sight level, look back at the landing zone center marker.
- If your line of sight is even or higher than the marker, the slope is less than 10 degrees, and it is safe for the helicopter to land.

Touchdown Area: The touchdown area should be at least a 60 ft. x 60 ft. area during the day and at least 100 ft. x 100 ft. at night. A good rule of thumb is to secure an area at least 100 ft. x 100 ft., which should be sufficient for either day or night and will allow even larger military helicopters to land. There should also be a non-emergency personnel clearance of 200 ft. from the edge of the landing zone.

The landing site must be clear of vehicles and obstructions such as trees, poles, and wires. The landing site must be free of stumps, brush, posts, and large rocks. Electric and telephone wires are

a special hazard to helicopters, as they are much easier to see from the ground looking up than from a helicopter looking down into the ground clutter.



Helicopter Landing Zone Preparation

Preparation of a landing site is an important function of the ground personnel. Proper preparation is essential to the safe operation of an emergency medical services (EMS) helicopter and should include the following:

- Clear the site of all loose objects (such as hats, paper, linen, etc.) that could be swept up in the prop wash and sucked into the engine intakes or into the rotors.
- Mark the four corners of the touchdown area with markers that are not easily blown away. Such markers might include:
 - Small weighted cones
 - Chem-lights at night secured to the ground
 - Flares secured to the ground
 - Auxiliary lighting pointed to the ground
- The landing area should be secured with enough ground personnel to keep all unauthorized personnel and vehicles away.
- Mark the direction of the wind to help the pilot land into the wind.

Avoid using things like the following to mark a landing zone:

- Open flames or hot coals
- Fire/police/public works barricades and/or plastic traffic cones
- Any other markers that could be blown up into the helicopter rotors or sucked into the engine intakes
- Multiple rotating flashing lights on vehicles
- Flashlights/spotlights aimed up at the helicopter
- Flares that might start brush fires and create additional hazards.

Also note that some pilots indicate that the intense light emitted by flares sometimes causes vision problems. Marking a landing zone with open flames evokes even stronger objections from pilots with liquid oxygen on board. Because constant venting of the oxygen pressure causes vapor to escape from the tank, these aircraft are especially vulnerable to fire hazard.

At Night: Be sensitive to the pilot's night vision. Extinguish all unnecessary lights during the landing operation to help preserve the pilot's night vision. Good night vision gives them the ability to distinguish objects and terrain at the landing zone.

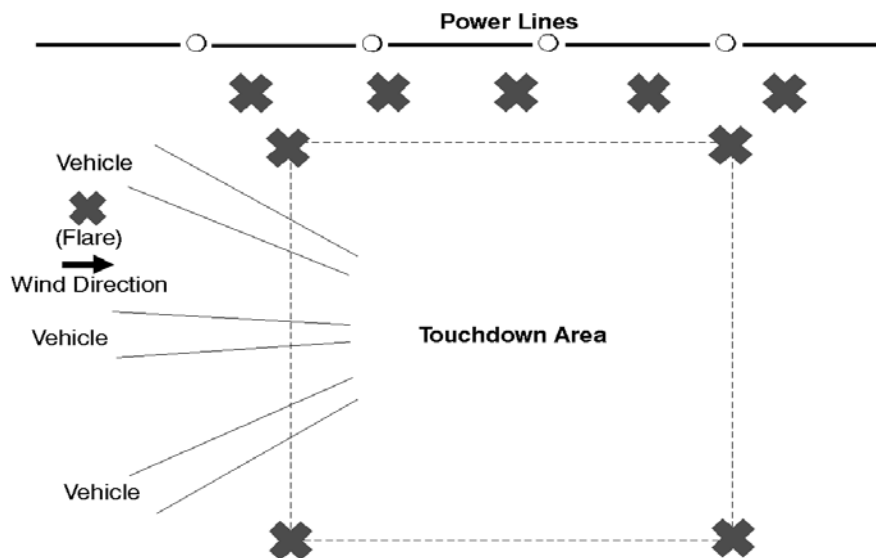
During night flight operations, all spotlights, floodlights and handheld lights should be pointed at the ground-never at the helicopter. All nonessential lights should be turned off, and vehicle lights being used to illuminate the landing zone should be on low beam. Any white lights, including flash photography, can ruin a pilot's night vision and temporarily blind him. Red or blue lights, such as flashlight wand covers, can be very helpful and do not affect night vision. Strobes and rotating warning lights are useful in locating an accident scene or landing zone at night, but their use should be minimized during actual take-offs and landings.

Many helicopters are equipped with powerful flood lights that the pilot can use if needed. Radio communication with the pilot before landing will reveal his preference for landing zone lighting.

Dealing with Wires in the Vicinity of the Landing Zone

Dealing with wires in the vicinity of the landing site is just one of the pilot's concerns, but it is a serious one. Night landings are the most difficult because wires and other obstacles both in the air and on the ground become invisible. Wires are difficult to detect even in the best of light conditions. The pilot and crew rely heavily on ground crew effectiveness in locating wires and other obstacles. After a thorough inspection of the selected site has been completed, a radio conversation will properly advise the helicopter crew of the location of hazards.

Obstructions, such as power lines adjacent to landing zone should be marked with a row of flares 20 feet apart, extending the length of the landing area and placed between the landing area and the obstacle, closest to the obstacle.



Wind Direction at the Landing Zone

Consider the wind direction, when possible. Helicopters land and take off into the wind. In certain cases, a 90 degree cross wind is acceptable. At least one approach and departure path, free of

obstructions (wires, poles, antennas, trees), must be available. If there are any obstructions, please tell the helicopter crew on initial radio contact. Obstructions at the edge of landing zone in line with approach and departure paths should be no higher than 4 feet.

Wind direction can be indicated with a flag, illuminated with flashlights at night if necessary (be careful not to shine the light toward the helicopter). Or wind direction can be indicated with a single light or secured flare on one side of the square landing zone. Vehicle headlights can also be used: one vehicle on the upwind side with two vehicles positioned at 45 degree to the landing area on the upwind side can be used to illuminate the landing area with the headlights on low beam.

Personnel Safety

Keep spectators at least 200 feet from the touchdown area. Keep emergency personnel at least 100 feet away. Have fire equipment (if available) standing by. Assure that everyone who will be working near the helicopter wears eye protection. If helmets are worn, chinstraps must be securely fastened (no loose hats blowing up through the rotors). Have firefighters wet down the touchdown area if it is extremely dusty. When the helicopter has landed, do not allow anyone to approach the aircraft. The pilot will communicate with the ground personnel securing the landing zone.

Landing Zone Coordinator and Security

One person at the scene (hopefully, who is knowledgeable about helicopter operations) should be deemed the landing zone coordinator. This person will help land the helicopter and should be the only person communicating with the pilot. The landing zone coordinator should wear eye and hearing protection, as well as long sleeves and pants (ideally, full bunker gear and a helmet with chin strap fastened and visor down).

The coordinator should position himself in the middle of the outer perimeter of the landing zone, with his back to the wind. Since a helicopter prefers to land into the wind, this allows it to land facing the landing zone coordinator, ensuring eye contact between him and the pilot. One of the most important of the landing zone coordinator's jobs is to keep an eye on the tail rotor during landing, since a helicopter pilot cannot see behind him.

Many people resist being the landing zone coordinator because of the numerous hand signals involved in directing a helicopter; however, the pilot in command is ultimately responsible for safety and will put the helicopter down where he deems best.

It's really only necessary to know the following two hand signals to get an immediate response:

- Both arms outstretched and pointing to indicate the landing zone.
- Crossing and uncrossing your arms above your head to wave off landing. This indicates a dangerous condition or situation, and the pilot will immediately abort the landing.

Make certain hand signals are deliberate, using both arms. This will enable the pilot to see the movements from the air.

Approved Hand Signals



Make certain movements are deliberate and exaggerated!

Landing Zone Communications

If radio communications is available, the EMS helicopter will contact the landing zone officer while they are in route to the scene and as soon as the aircraft is within range. Prior to the aircraft arriving overhead, any update on patient's medical status should be relayed to the flight crew.

Once the aircraft has arrived over the accident site, please hold any medical information and only give landing instructions so that EMS may assist you as soon as possible.

From the air, obstructions such as power lines, poles and signs are extremely difficult to see. Your help in reporting such obstructions is a tremendous help in the safe operation of the helicopter. The helicopter will circle the landing zone as many times as the pilot feels necessary in order to complete a safe landing.

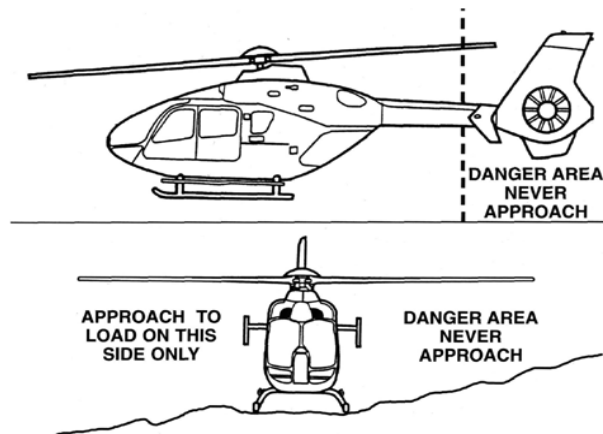
Once the helicopter begins its final approach, the crew on board is busy watching for hazards. The pilot monitors the radio frequency of the landing zone in case further radio communication is necessary. During the landing, the landing zone officer should maintain visual contact with the aircraft, but be far enough away from the touchdown area to maintain clear communication with the pilot. Ground personnel near the touchdown area should wear goggles or face visors to protect eyes from blowing debris.

After the Helicopter Lands

The following rules are a commonsense approach to helicopter safety:

Establishing a Helicopter Landing Zone

- Once a helicopter has landed, wait for the rotor speed to slow or stop and for the pilot to signal before anyone approaches the ship.
- Always approach the helicopter in full view of the pilot-between 10 and 2 o'clock of the nose-and always make sure the pilot sees you and waves you forward.
- Keep a crouching, low body profile to advise others that you are aware of the rotor hazard. There is an interesting phenomenon with helicopters known as “flap” or “sail” at warm-up or cool-down rotor speeds, when a sudden wind gust can cause the rotor blades to dip to people level and result in serious injury or death.
- If you have a helmet, secure the chinstrap. No other hats should be worn, and nothing loose such as a stethoscope should be worn around your neck.
- Never carry anything overhead, including IV fluids. All long objects should be carried parallel to the ground.
- Always walk, never run, around a helicopter. If the landing zone is uneven, never approach or depart from the uphill side. Always use the downhill side where you are in the pilot's view.
- The tail rotor, which is the helicopter's most serious hazard, is usually somewhere around head level and, when at speed, is almost invisible (with perfect lighting). Since most EMS operations are in less than perfect conditions, the tail rotor cannot



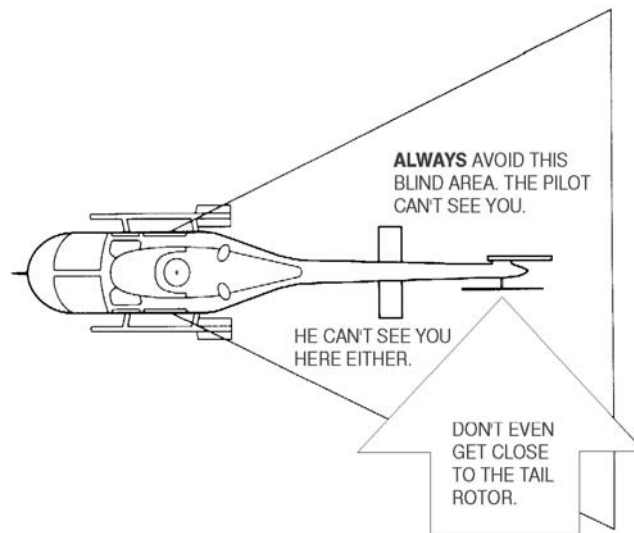
Assisting the Crew

Once the helicopter has landed, do not approach. The crew will approach you when it is safe to do so.

Please be prepared to assist the crew by providing security for the helicopter. If asked to provide security, do not allow anyone but the crew to approach the helicopter.

Once the patient is packaged and ready to load, allow the crew to select two or three personnel to assist loading. When approaching or departing the helicopter always do so via the front of the

aircraft, remaining in the pilots view at all times. Always be aware of the tail rotor and follow the crew's directions for your safety.



Lift-Off and Departure

The landing zone coordinator will notify the pilot when the landing zone is clear of all ground personnel. Maintain all protective devices against flying debris. If at all possible, try to maintain a secure landing zone with all personnel and emergency equipment for 5 minutes after the helicopter departs. If an in-flight emergency develops, this will allow the pilot to return safely to a secure landing zone.

Information You May Need to Provide When Calling EMS

Calling Party

- Your name
- Call back telephone number

Nature of the Emergency

- Extent of injuries and/or type of illness
- Number of patients

Location

- Location and grid coordinates
- Provide large landmarks if possible

Landing Zone Information

- On-scene radio frequency

- Agency coordinating the landing zone
- Name/Unit number of ground contact person

Information You May Need to Give to EMS Pilot

Landmarks

- Water / Radio Towers
- Schools
- Baseball or Football Fields
- Major road intersections

Landing Zone Descriptions

- Type of LZ (i.e. field, road, pasture)
- LZ surface (i.e. field, grass, concrete, gravel, dirt)
- Boundaries of the LZ (i.e. trees, houses, wires, emergency vehicles)
- Approach and departure pathways

Landing Zone Hazards

- Power lines
- Any obstacles that might interfere with landing

Notify the Pilot When You

- Hear the aircraft
- See the aircraft
- Direct the pilot to your location using the clock method remembering the pilot is facing the 12 o'clock