

Chapter 10

Movement by Helicopter

10001. Effect of Cold on Mobility

The helicopter is the single best tactical mobility asset available to Marines during cold weather operations. It can move a unit farther and faster than any other means of transportation. The helicopter is not without its limitations, the greatest of which is the lack of dependability due to unpredictable weather and the extreme difficulty of performing maintenance in the cold. Additional maintenance personnel and maintenance shelters may be required. This means that the unit leader must always have an alternate movement plan to get to the destination in time to accomplish the mission. Use the helicopter whenever possible, but avoid becoming totally dependent on it.

10002. Landing Zones

Helicopter operations in an ice or snow-covered landing zone (LZ) are slower. Loading, unloading, approaches and departures, seat belt hook-ups, crew-chief directions, and finally, passenger and aircrew coordination all take more time. Plan for these delays. The information below is intended not for helicopter support team personnel, but for small-unit leaders who must use a LZ in deep snow. The information provided assumes that the LZ is covered by deep snow.

- a. Selection.** You will probably never have the perfect LZ available when you need it. Listed below are some of the LZ selection factors you should consider in each case:

(1) Size. The minimum size for a CH-53, CH-46, or MV-22 is 150 by 150 meters. For a UH-1N or AH-1W, the minimum is 100 by 100 meters. When a LZ has multiple landing spots, 150 meters are required between landing spots.

(2) Approaches and Departures. The perimeter of the LZ should be clear of obstacles over 25 feet tall. Otherwise, the size of the landing zone should be doubled.

(3) Wind Direction. The wind direction is extremely important in the approach and departure direction of the helicopter. Helicopters, when possible, will take off and land into the wind.

(4) Ground Surface. The ground should be as smooth and flat as possible. Large rocks, tree stumps, and fallen tree branches can create possible hazards to personnel and helicopters.

(5) Ground Slope. The slope should be no more than 8 degrees. Helicopters may tip over while landing on slopes greater than 8 degrees.

(6) Cover and Concealment. The LZ should be concealed from direct enemy fields of fire and observation.

(7) Obstacles. Look for obstacles that may be hidden under the snow; large rocks, tree stumps, fence posts, etc.

(8) Snow. Check the depth and consistency of the snow. It has a major impact on the difficulty of LZ operations. Soft snow may cause the helicopter to sink at unpredictable angles, contributing to the problem of ground slope.

- b. Preparation.** Whenever possible, you should walk through the LZ to determine the depth of the snow and appropriate location for the helicopter to touch down. The quickest way of packing a snow covered LZ is by driving a tracked vehicle over the area. Packing a LZ can also be accomplished by walking over the zone with snowshoes, skis, or by boot packing.

- (1) Uniformly pack an area least 50 meters square.
- (2) Probe the area for obstacles that could puncture the underside of the helicopter if it sinks into the snow.
- (3) If more than one helicopter will be using the LZ simultaneously, pack and probe enough landing points at least 100 meters apart to avoid blowing snow.
- (4) Frozen lakes and rivers make excellent LZ's since they are level and have little loose snow due to wind scouring. Ice thickness (see Chapter 9) must be checked: 8 inches is required for UH-1N and AH-1W's. CH-53, CH-46, and MV-22 require 15 inches of ice. Beware of a helicopter skipping on the ice during landing and takeoff, and wind gusts while it is on the ground.

c. Marking LZ and Landing Point. Marking the LZ and landing point is critical due to the local *whiteout effect* when the helicopter lands. It is very important to provide the pilot with a reference point in the LZ.

- (1) The LZ can be marked using conventional panels and lights, by using rescue-survival dyes, dirt sprinkled in the snow, small green tree boughs, or any dark material.
- (2) A smoke grenade is an excellent way in which to show the pilot wind direction at the LZ. Place the smoke grenade on an object to prevent it from sinking into the snow. Do not use white smoke as it will blend in with a winter environment.
- (3) Use an ahkio huddle (see paragraph 10004) to mark the landing points. The huddle should contrast in color to the background in the LZ. Individuals should remove overwhites, wear a protective face mask, and be sure no bare skin is exposed to the rotor wash.

d. Landing Zone Brief. The pre-landing briefing to the helicopter from the LZ should include the following:

- Description of LZ
- Wind direction and strength in knots
- Depth of snow and whether it is packed or unpacked.
- Obstacles or suspected obstacles.
- Any special considerations that will delay embarkation significantly.
- Last known enemy location.

10003. Preparation for Embarkation

a. Planning. Helicopters will often have reduced payloads when operating at higher altitudes. In addition, high temperature, high humidity and high Density Altitude will degrade helicopter performance. Consequently, helicopter payloads may change significantly due to both the current and forecasted weather and LZ altitudes. Marines must have the flexibility to change their embarkation plans based on the varying conditions and helicopter support available. Prior detailed planning by unit commanders will greatly assist in quick helicopter operations.

HELICOPTER	SEA LEVEL	5,000 FT MSL	10,000 FT MSL
UH-1N	6 pax and gear	4 pax and gear	2 pax and gear
CH-46E	12 pax and gear	8 pax and gear	6 pax and gear
CH-53E	24 pax and gear	24 pax and gear	18 pax and gear
MV-22	12 pax and gear	10 pax and gear	6 pax and gear

- These numbers are estimates only. Actual lift capacity will vary depending on fuel consumption, ordnance on board, time of flight, weather, etc.
 - The UH-60 should be treated similar to a CH-46 for planning purposes.
 - The CH-47 should be treated similar to a CH-53 for planning purposes.
- b. Personnel.** A major hazard to personnel operating around helicopters in cold weather is the wind chill generated by the rotor wash. Exposed skin should be kept to a minimum. If a long wait is expected, warming tents should be erected. At the very least, provide some form of protection from the elements, even if it is only a windbreak.
- c. Equipment**
- (1) The team sled should be staged as near the landing point as possible. To prevent the team sled from being moved by the rotor wash, the Marines embarking on the helicopter should lay on top of the sled.
- (2) Weapons should be in a Condition 4 when embarking the aircraft. Muzzles should be pointed down on CH-46, CH-53, and MV-22. Muzzles should be pointed up or outward on UH-1N.
- (3) No equipment (skis, radio antennas) should be allowed to protrude above the height of a man.
- (4) Packs should not be worn aboard helicopters due to the restricted movement and the requirement to fasten seat belts before departure. Packs should be staged at the center of the aisle on assault aircraft.

10004. Ahkio Huddle Procedures

The embarkation and debarkation drills (ahkio huddle procedures) described below are designed to get your personnel on and off a helicopter as quickly as possible without severe injury due to rotor blade contact in addition to minimizing exposure to wind chill. These procedures must be practiced so that they can be performed during periods of extreme weather and reduced visibility.

- a. Universal Method.** The ahkio huddle has been developed as a universal method for loading and unloading all types of Marine Corps helicopters in a snow covered environment. (See fig. 10-1) Guides are not recommended or required; however, individuals to be lifted should remove overwhites when conducting ahkio huddles. This contrast in color will provide a recognizable reference for the pilot and aircrew. Having one standard procedure eliminates last minute changes that would be necessary when different models and types of helicopters show up at the LZ. This procedure will:
- Diminish the dangers of troops walking into the helicopter rotor and tail rotor blades.
 - Reduces the problems of wind-chill.
 - Reduces excessive fuel consumption by the helicopters.
 - Decreases the duration of time that a visual and noise signature is presented by a helicopter landing in the snow covered LZ.
 - Eliminates much of the delay involved in loading and unloading the helicopter.

It is important to remember that:

- The tent team(s) is the basic unit for development of the heliteam.
- All of tent group's equipment necessary for survival against the environment must be on the same aircraft as the personnel.



The helo is within a few feet of landing; the ahkio team is huddled about ahkio.

The helicopter lands with the ahkio huddle at the pilots (right seat) 2 o'clock position. (See fig. 10-2) Ahkio huddles(s) must be spaced away from any possible obstacle or far enough apart from the landing sites for other aircraft to allow for the possible drift of the helicopter around the ahkio huddle without conflicting with the obstacles or other helicopters. (see fig. 10-3) The helicopter lands next to the huddle of troops that are to be lifted (within the rotor arc). This ensures the best possible reference for the pilot and the greatest safety for the troops. Pilots will execute an immediate wave off if they lose sight of the ahkio huddle. To be performed efficiently even during periods of extreme weather and reduced visibility, these procedures must be practiced continuously.

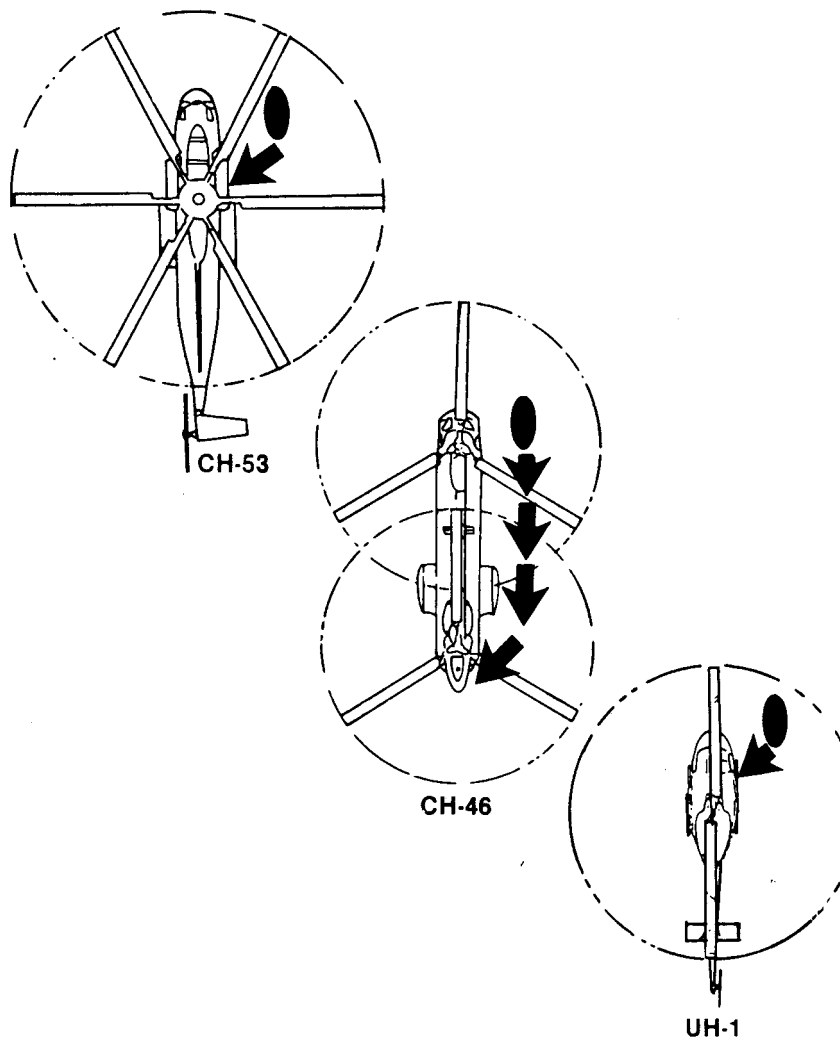


Figure 10-2. Positioning Ahkio Huddles for Loading Marine Helicopter

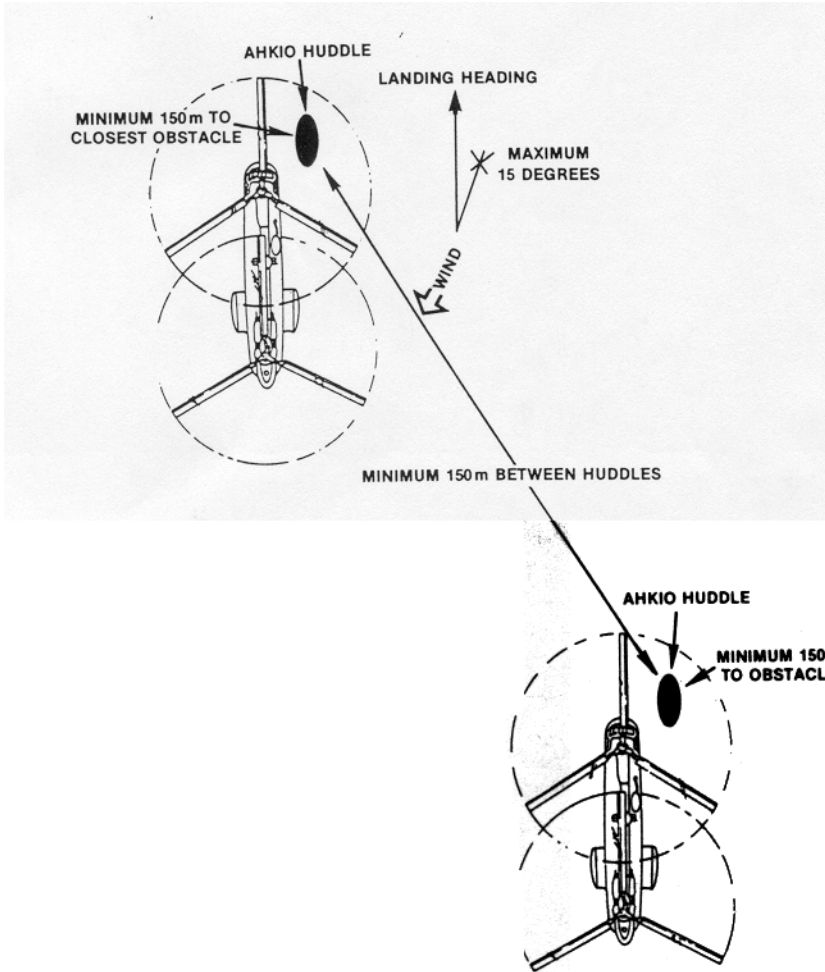


Figure 10-3. Minimum Safe Distance Within Landing Zone.

MV-22 Specific:

- Due to the unique flight characteristics of the MV-22, Marines must be aware of the extreme hazard of the engine exhaust from the nacels. The exhaust is over 550 F. (See fig. 10-4)
- Ahkio teams should position themselves at the pilots 12 o'clock position vice the 2 o'clock position. This will prevent the aircraft from over flying the ahkio team and ensuring engine exhaust does not create a hazard to the troops.

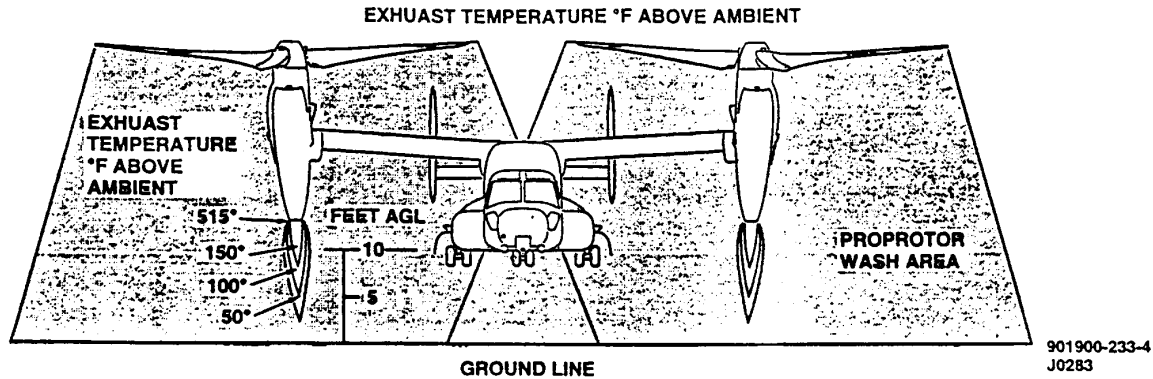


Figure 10-4. MV-22 Engine Exhaust Temperatures

b. Embarkation Procedures. The ahkio huddle is established around the ahkio/group equipment on the landing point. Packs are off; skis and poles are bound together, and snowshoes are attached to packs. Marines group together on top of the equipment, face down, to keep the equipment from blowing away. The helicopter lands beside the ahkio huddle at the pilot's 2 o'clock position. In deep snow, the ramp of the helicopter may not lower enough to embark Marines. Marines must be aware of slipping hazards from ice and snow build up in the cargo ramp area. The hydraulically operated ramp may not operate in severe cold temperatures. Marines may have to load via the crew chiefs door on the side of the aircraft.

- Load the helicopter only when directed by the crew chief who will direct the heliteam to load through either the rear cargo ramp or side door.
- The heliteam leader loads first, moves to the front of the helicopter, and coordinates with the pilot.
- Ahkio huddles are located at the 2 o'clock position for all helicopters except MV-22's. Loading is accomplished as depicted in the diagram. (Fig. 10-1)
- Designated Marines load equipment near the ramp or exit for they will be the first things offloaded in the new LZ. All other heliteam members enter the aircraft and take their seats. The heliteam leader supervises the loading of the ahkio and any other equipment.
- Snowshoes are strapped to the backpack or team sled.
- Skis and ski poles may be bound together in bundles of four. When loading and unloading, keep skis parallel to the deck at waist level. Once loaded, place skis on the deck of the aircraft beneath the feet.
- As soon as possible after entering the aircraft, each Marine brushes all ice and snow from his uniform and ventilates his clothing to prevent overheating. The crew chief will attempt to maintain the temperature of the helicopter at no more than 40 F. (4 C).

c. Debarkation. As during embarkation, the objective during debarkation is efficiency and safety. (Fig. 10-5)

- Unload the team sled and other equipment first.
- Then all remaining Marines exit in reverse order of embarkation.
- Establish ahkio huddle. Do not move outside rotor arc until aircraft departs.
- Visibility may be poor when debarking aircraft. Be sure each Marine knows where to go.
- When all equipment and personnel are out of the aircraft and equipment has been secured, the heliteam leader signals the crew chief who indicates to the pilot that it is safe for the helicopter to lift off.

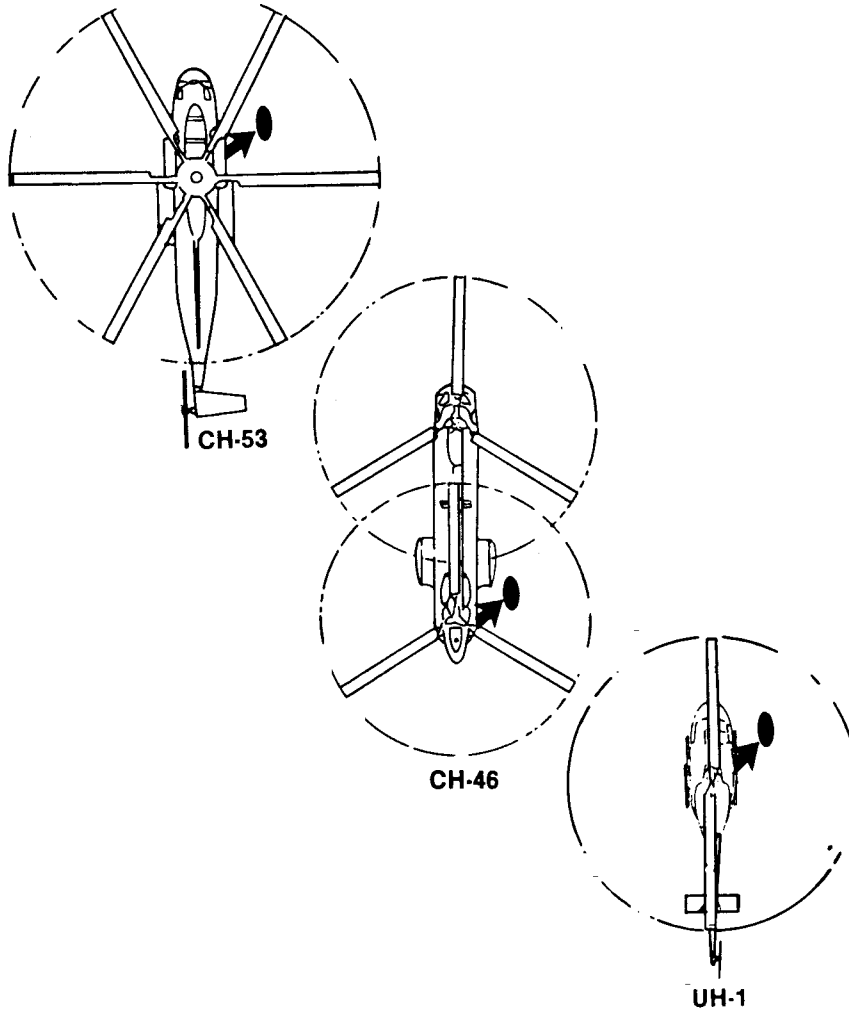


Figure 10-4. Debarkation Procedures for Marine Helicopters.

- d. **Immediate Action in the LZ.** The “snowball” signature created by the helicopter when it lands can be seen from a considerable distance. Therefore, after the helicopter(s) leave the LZ, move away as quickly as possible.
- e. **Rotor Clearance.** All Marines must realize that helicopters settle into the snow when operating in snow covered LZs. This lowers the distance between the snow surface and the helicopter blades. Using the universal method of helicopter loading (ahkio huddle) eliminates this problem. **Do not approach helicopters from outside the rotor arc. When unloading, do not leave the ahkio huddle before the helicopter debarks the LZ.** (See fig. 10-6, 10-7)

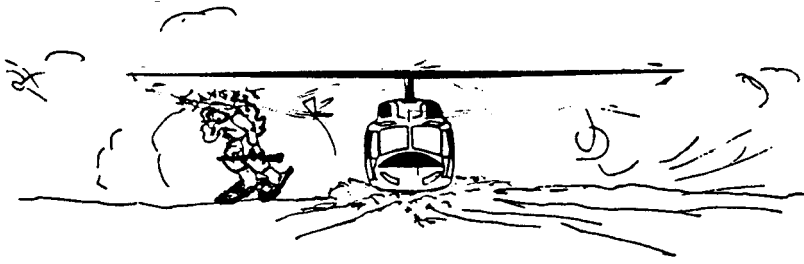


Figure 10-5. Beware of Rotor Clearance.

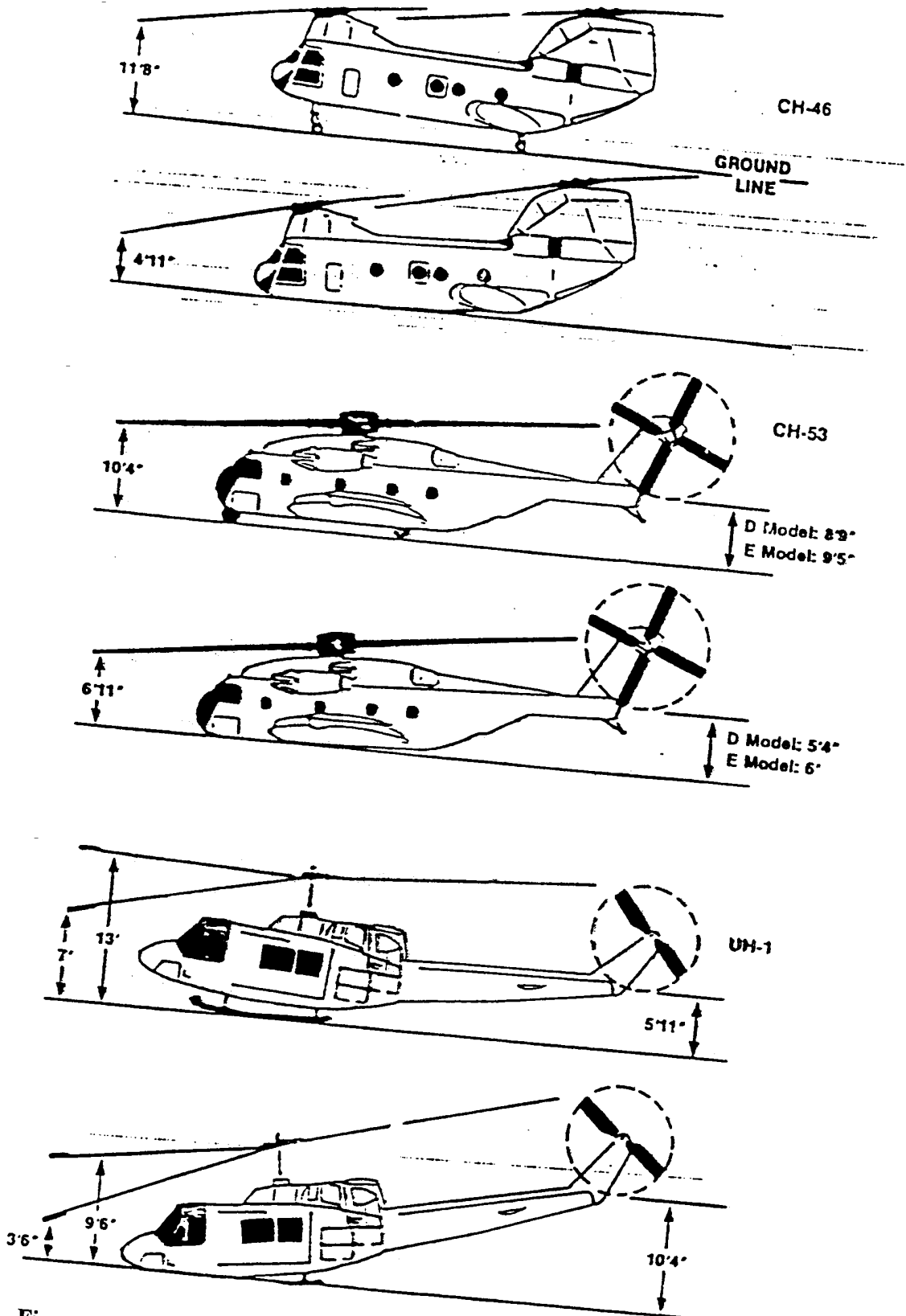


Figure. 10-6. Marine Helicopter Rotor Blade Clearances