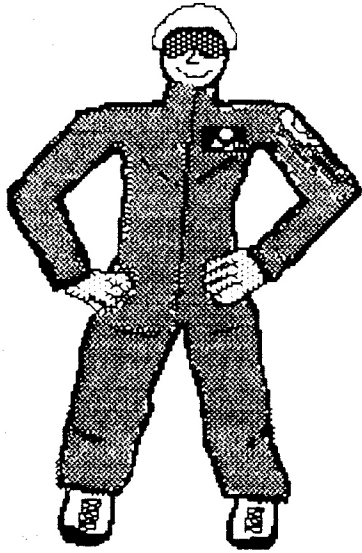


AIR OPERATIONS

Equipment



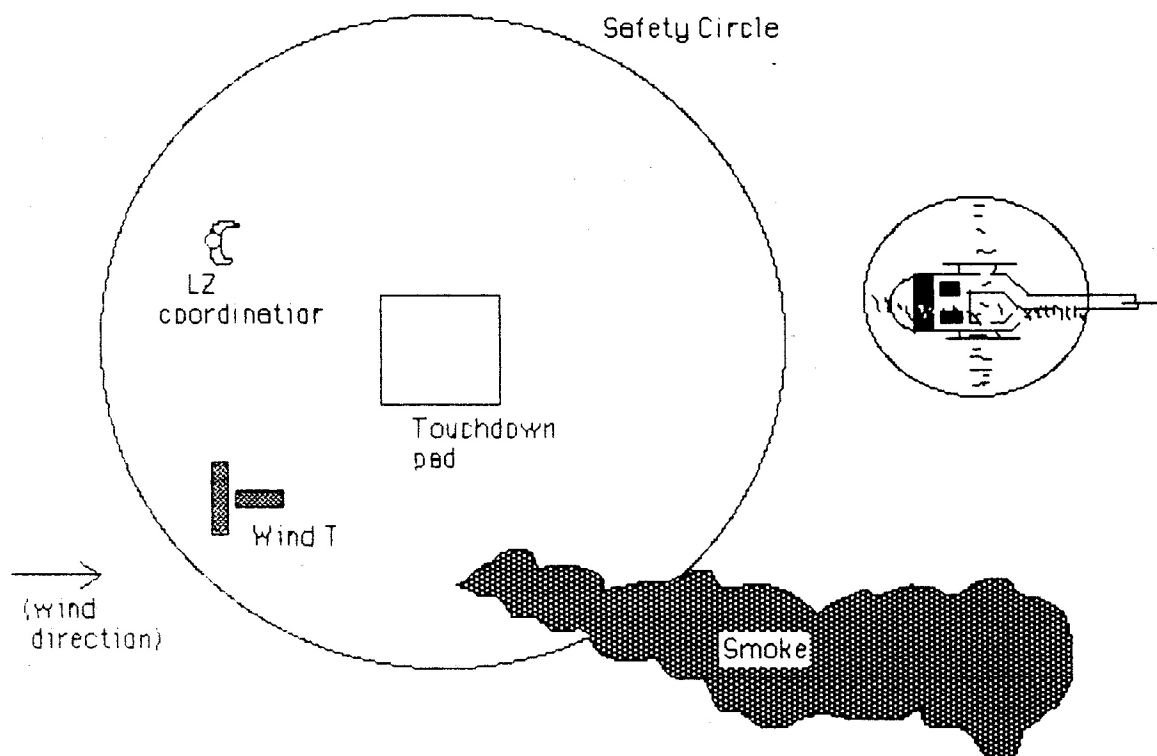
Clothing

- Flight suit or pants/shirt
 - ideally fire-resistant Nomex
 - or cotton or wool, NO POLYPRO, NYLON OR OTHER SYNTHETICS, which will burn/melt
- Gloves
- Boots
- Helmet (flight helmet or safety helmet with chinstrap)
- Safety goggles
- Ear protection
- High visibility (orange clothes or vest)

Other

- Carry enough gear that you can travel by foot safely in the terrain you are flying over
- AT LEAST the ten essentials
- Binoculars
- Radio, other signal devices

LZ Design



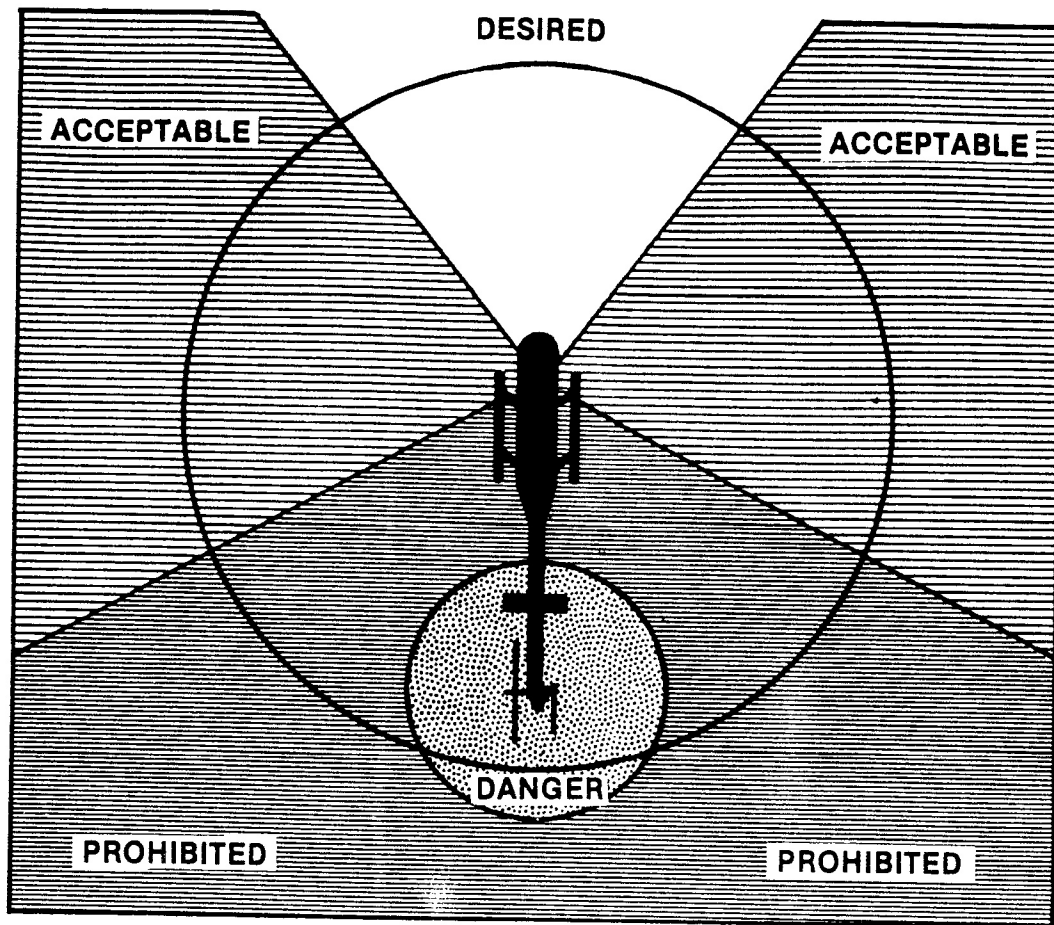
HELICOPTER TERMINOLOGY

It is important that anyone working with helicopters be familiar with some of these terms and conditions.

1. **Autorotation.** A non-powered flight condition with the rotor system rotating due to the relative wind caused by the descending helicopter. The rotor has inertia which is dissipated as the helicopter rate of descent is reduced near the ground and landing is made.
2. **Center of Gravity (CG) Limitations.** The movement of the CG in a helicopter is restricted to certain limits. It is extremely important when loading a helicopter that these limits are not exceeded because controllability of the helicopter will be affected.
3. **Density Altitude.** Air density is affected by three factors, height above sea level, temperature, and relative humidity. A high density altitude adversely affects the performance of both rotors and engine.
4. **Rotor Disc Area.** The area swept by the rotor blades.
5. **Ground Effect.** A beneficial gain in lifting power when operating near the surface, caused by air being compressed beneath the helicopter.
6. **Helicopter Flight Controls.** There are three primary controls used in conjunction with each other when flying a helicopter:
 - a. **Anti-torque pedals** which control the pitch of the tail rotor which compensates for torque;
 - b. **Collective pitch control** is used to change the pitch or angle of the main rotor blades. As pitch is increased, the amount of lift is normally increased causing the helicopter to lift off or climb;
 - c. **Cyclic pitch control** is used to tilt the main rotor system causing the entire helicopter to move in that direction. Directional movement and bank during turns in flight is induced by this control.
7. **Tip-path Plane.** The plane in which rotor blade tips travel when rotating.
8. **Translational Lift.** Lift that is obtained when translating from a hover to forward flight. This is developed by the additional volume of air passing through the rotor system.

HELICOPTER BOARDING AND EXITING

SAFE APPROACH ZONES



SAFETY CONSIDERATIONS WHEN BOARDING OR EXITING HELICOPTERS

Wait for permission to board or exit from pilot.

Approach or leave the helicopter from near the front so the pilot can see you at all times.

No smoking around the helicopter.

Hats and other loose items should be secured to protect against rotor winds.

Keep long-handled tools, litters, radio antenna and similar items away from rotor blades.

Keep your head down at all times, the slower the rotor blades are turning, the lower they will dip towards the ground.

Never approach or leave a helicopter from any side where the ground is higher than where the helicopter is standing, you may walk into a rotor blade!

SUGGESTED HELICOPTER CRASH PROCEDURES FOR PASSENGERS

Keep seat belts tight at all times.

If a crash is imminent, bend forward at the waist with feet planted firmly on floor, and rest chest on knees.

Remain seated with seat belt on until rotors are stopped.

Do not leave the helicopter until instructed by pilot unless fire or other circumstances force such actions.

Assist other personnel if able.

Depart, normally into the wind, and remain well clear of helicopter. Account for all personnel.

HELICOPTER MARSHALLING SIGNALS

Note: These signals are advisory, the pilot is under no obligation to obey them. Conditions beyond the control of the pilot or factors unknown to the ground marshaller may make it necessary to disregard the signals.

PROCEED TO NEXT MARSHALLER

Right or left arm down, other arm moved across the body and extended to indicate direction of next marshaller.



NEGATIVE (NOT CLEAR)

Hand raised, thumb down.



THIS MARSHALLER

Arms above head in vertical position with palms facing inward.



AFFIRMATIVE (ALL CLEAR OR "OK")

Hand raised, thumb up.



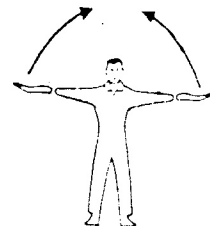
START ENGINE(S)

Circular motion of right hand at head level with left arm pointing to engine.



VERTICAL MOVEMENT—MOVE UPWARD

Arms extended horizontally sideways beckoning upwards, with palms turned up. Speed of movement indicates rate of ascent.



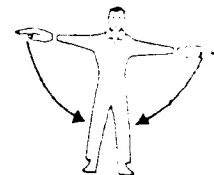
ENGAGE ROTOR(S)

Circular motion in horizontal plan with right hand above head.



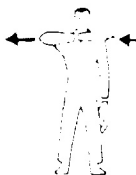
VERTICAL MOVEMENT—MOVE DOWNWARD

Arms extended horizontally sideways beckoning downwards with palms turned down. Speed of movement indicates rate of descent.



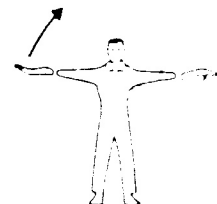
CUT ENGINE(S)/ROTORS

Either arm and hand level with shoulder, hand moving across throat, palm downward.



HORIZONTAL MOVEMENT—MOVE TO RIGHT (STARBOARD)

Left arm extended horizontally sideways in direction of movement and other arm swung over the head in same direction, in a repeating movement.



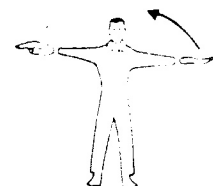
ABANDON AIRCRAFT

Marshaller first gives signal to cut engines, followed by signal simulating untieing seat belt and shoulder straps and throwing them up and off.



HORIZONTAL MOVEMENT—MOVE TO LEFT (PORT)

Right arm extended horizontally sideways in direction of movement and other arm swung over the head in the same direction, in repeating movement.



CLEARANCE FOR PERSONNEL TO BOARD/EXIT HELICOPTER.

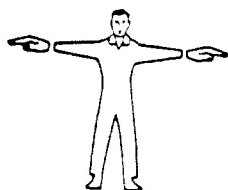
Pilot will look at person and give a "thumbs up" for clearance to board/exit helicopter.



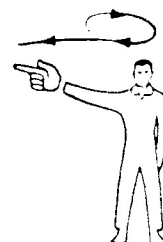
SAFETY WARNING: Eye protection will be worn by the ground marshaller when marshalling helicopters.

HOVER

Arms extended horizontally sideways, palms downward.

**TAKE OFF THIS WAY (at pilot's discretion)**

Marshaller conceals left hand and makes circular motion of right hand over head in horizontal plane ending in a throwing motion of arm towards direction of takeoff.

**SPOT TURN**

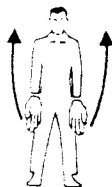
Left or right hand moving upward and backward, from a horizontal position, to indicate direction of tail movement. Other hand pointing to center of spot turns. Marshaller must remain in full eye-view with pilot.

**WAVE OFF**

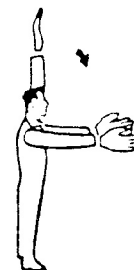
Waving of arms over the head.

**MOVE BACK**

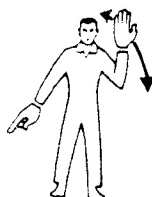
Arms by sides, palms facing forward, arms swept forward and upward repeatedly to shoulder height.

**LANDING DIRECTION**

Marshaller turns and faces toward point where aircraft is to land, the arms are lowered repeatedly from a vertical position to a horizontal position, stopping finally in the horizontal position.

**TURN TO PORT (LEFT)**

Point right arm downward, left arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn.

**LAND**

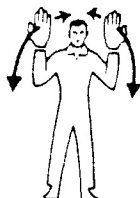
Arms crossed and extended downwards in front of the body.

**TURN TO STARBOARD (RIGHT)**

Point left arm downward, right arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn.

**MOVE AHEAD**

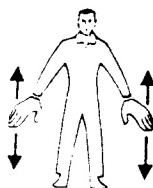
Arms a little aside, palms facing backwards and repeatedly moved upward-backward from shoulder height.

**STOP**

Arms crossed above the head, palms facing forward.

**SLOW DOWN**

Arms down with palms toward ground, then moved up and down several times.

**MARSHALLING FINISHED**

Right arm raised with elbow at shoulder height with palm facing forward.



HELICOPTER LANDING AREA SELECTION

Material is furnished in this attachment to assist CAP personnel in selection of safe, suitable landing areas for helicopters away from airports.

1. **Wind.** Wind direction and velocity in relation to the long axis of the landing zone must be considered when selecting a helicopter landing area. Select an open area with the wind blowing parallel to the long axis, or as nearly parallel as possible.
2. **Landing Zone.** Contrary to popular belief, lengthy, vertical descents or ascents are unsafe helicopter maneuvers. Take-off and landing approach angles must be considered when selecting a landing zone. As a rule of thumb, approach and takeoff angles will not exceed 20 degrees from the horizontal. The 20-degree angle must be clear of all obstacles by at least ten feet. The higher the barriers around the landing zone the steeper the approach angle may be and the longer the landing zone should be. Landing areas must not contain loose brush or other debris. These areas should also be free of hazards such as rocks, poles, logs, or the like that will damage the helicopter on landing. Snow, loose dirt, and other fine particles may cause a "white-out" condition where the pilot may lose all outside flight references. Dry grass may be a fire hazard. Ice may cause the helicopter to spread its skids after power is reduced. If using old roads or parking lots, beware of power or telephone lines. Always choose a landing zone with sufficient room for the rotor blades, to include the space to turn the helicopter around if needed. Included in this attachment are some general guidelines for site selection and a few "do's" and "don'ts" which provide a quick general reference (figure 1).
3. **Night Landing Sites.** In case of an emergency requirement to make a night helicopter landing in an area without lights, figure 2, this attachment, is provided to show placement of automobile/truck light placement to assist the helicopter pilot to see the landing area without being blinded.

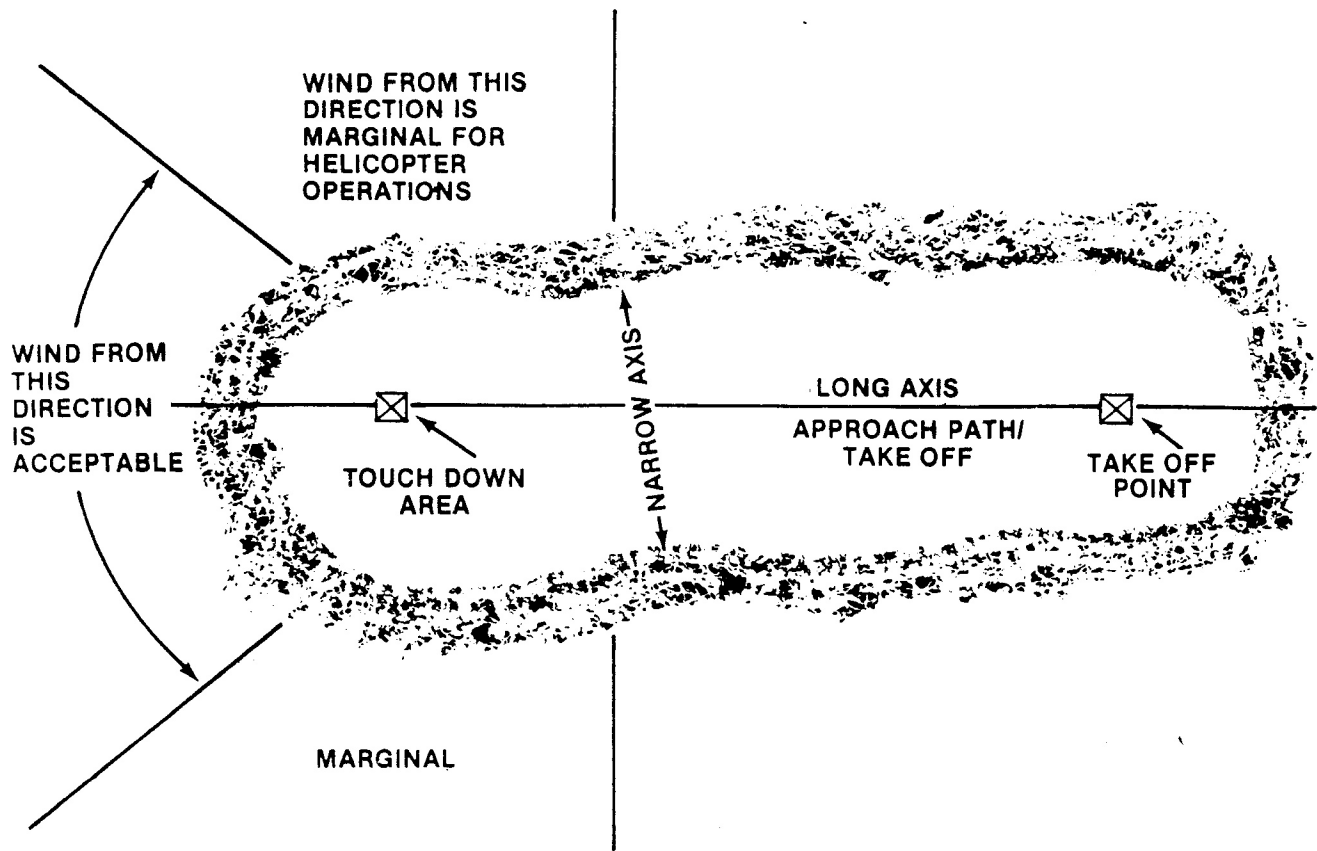


Figure 1

SUMMARY OF SOME "DOs" AND "DON'TS" IN SELECTING HELICOPTER LANDING AREAS

1. The landing zone must be large enough to allow for the helicopters approach, landing and turning around.
2. Attempt to find a large area that will permit a 15-degree approach angle and a 15-degree takeoff angle.
3. Remember, the higher the barriers, the longer the landing zone must be.
4. Attempt to find a landing zone that is oriented with the long axis generally into the wind.
5. Remember that wires are extremely difficult for the pilot to see when approaching the landing zone.
6. The touchdown zone must be free of obstacles that might damage the bottom of the helicopter, that is, tree stumps, large rocks, etc.
7. Remove all loose brush and debris from areas that the helicopter may be landing in, hovering around, or taking-off from.
8. Mark landing zones, if needed! Indicate wind direction via streamers, smoke, etc.
9. Keep unauthorized personnel away!

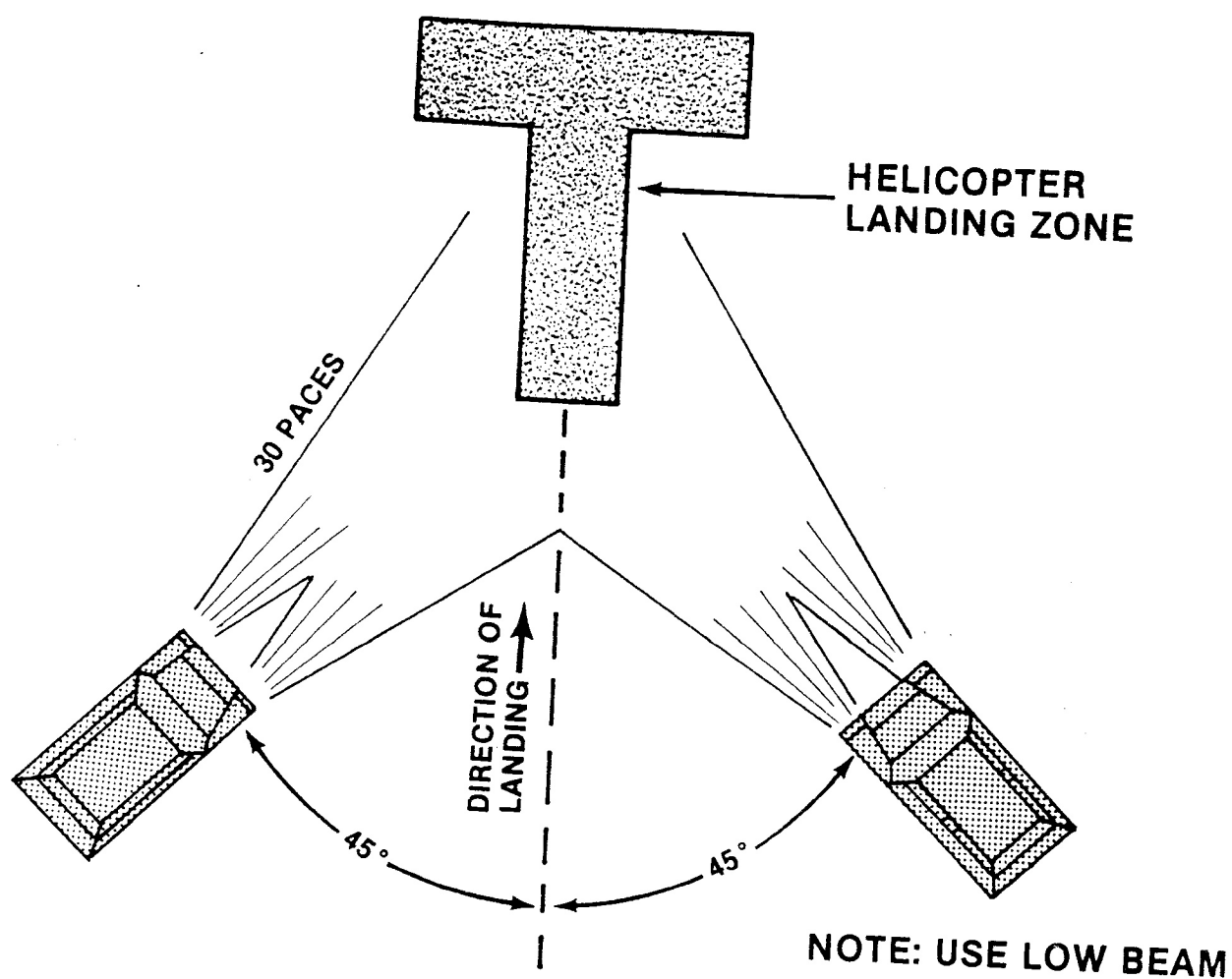
NIGHT HELICOPTER LANDINGS AT UNLIGHTED FACILITY

Figure 2

Additional guidance:

1. Beware of any hazards such as power lines, fences, trees, etc., that the pilot may not be able to see.
2. Park vehicles with low beams on approximately 40 to 50 feet from helicopter landing area, offset from helicopter approach route.
3. Never shine lights at helicopter which may blind pilot.

| | | | |
|---|--|--|---|
| HELICOPTER PILOT MISSION EVALUATION | | FAA CERTIFICATE NUMBER | DATE |
| NAME AND GRADE OF APPLICANT | | CAP SERIAL NUMBER | DATE OF LAST FAA MEDICAL CERTIFICATE |
| ORGANIZATION | | WING | DATE OF FCC RADIO-TELEPHONE OPERATOR'S PERMIT |
| EMERGENCY SERVICES PROCEDURES | | <div style="text-align: center;"> <div>SATISFACTORY</div> <div>UNSATISFACTORY</div> </div> | |
| 1. Knowledge of CAP Publications (CAPR 60-1, CAPM 50-15, CAPM 55-1, etc.) | | | |
| 2. Mission Planning: Helicopter Performance Data (Including T/O and Landing Data, Power Required, Power Available) | | | |
| 3. Preflight/Visual Inspection | | | |
| 4. Mission/General Equipment Check | | | |
| 5. Aircrew Briefing | | | |
| 6. Safety Consideration | | | |
| 7. Communications Procedures (Including Ground-Air Signals) | | | |
| 8. Air Navigation | | | |
| 9. Search/Reconnaissance Procedures (Including Search Patterns) | | | |
| 10. Landing Site Evaluation Procedures | | | |
| 11. Remote Area T/O and Landings (Including Slope Landings, Confined Area T/O and Landings, and Restricted Power T/O and Landings) | | | |
| 12. Fuel Management | | | |
| 13. Aircrew Coordination | | | |
| 14. Debriefing Responsibilities | | | |
| 15. Knowledge of Helicopter Mission Prohibitions/Restrictions | | | |
| 16. Other (Specify) | | | |
| REMARKS (Cover exceptional, marginal, and unsatisfactory performance. Unsatisfactory performance in any area will require further training prior to recheck.) | | | |
| The examinee (has) (has not) satisfactorily demonstrated competency on items listed on the helicopter mission pilot evaluation and recommend (him) (her) for (Helicopter mission pilot) (further training and recheck). | | | |
| SIGNATURE AND GRADE OF UNIT COMMANDER | | SIGNATURE AND GRADE OF CHECK PILOT | |
| <input type="checkbox"/> CONCUR <input type="checkbox"/> DO NOT CONCUR | | <input type="checkbox"/> CONCUR <input type="checkbox"/> DO NOT CONCUR | |

CAP FORM 92
JAN 83