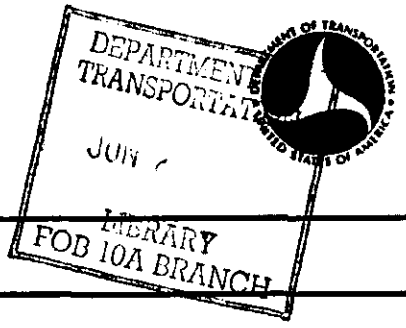
AC 91-32A

DATE 6/21/79

ADVISORY CIRCULAR



DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Washington, D.C.

Subject: SAFETY IN AND AROUND HELICOPTERS

1. PURPOSE. This advisory circular provides suggestions to improve helicopter safety by means of acquainting flight and non-flight crew personnel and passengers with the precautions and procedures necessary to avoid undue hazards.

2. CANCELLATION. AC 91-32, Safety In and Around Helicopters, dated 5/7/71 is canceled.

3. GENERAL. People have been injured, some fatally, in helicopter accidents which would not have occurred had they been informed of the proper method of boarding or deplaning. A properly briefed passenger should never be endangered by a spinning tail rotor. The simplest method of avoiding accidents of this sort is to have the rotors stopped before passengers are boarded or allowed to depart. Because this action is not always practicable, and to realize the vast and unique capabilities of the helicopter, it is often necessary to take on passengers or to deplane them while the engine and rotors are turning. Therefore, if accidents are to be avoided, it is essential that all persons associated with helicopter operations, including passengers, be made aware of all possible hazards, and instructed as to how they can be avoided.

4. FLIGHT AND NON-FLIGHT CREW PERSONNEL. Persons directly involved with boarding or deplaning passengers, aircraft servicing, rigging or hooking up of external loads, etc., should be instructed as to their duties. It would be difficult, if not impossible, to cover each and every type of operation or non-flight crew training matter related to helicopters. A few of the more obvious and common ones are covered below:

a. Ramp attendants and aircraft servicing personnel. These personnel should be instructed as to their specific duties, and the proper method of fulfilling them. In addition, the ramp attendant should be taught to:

(1) Keep passengers and unauthorized persons out of the helicopter landing and takeoff area.

(2) Brief passengers on the best way to approach and board a helicopter with its rotors turning (see paragraph 4a).

b. Aircraft servicing.

(1) The helicopter rotor blades should be stopped and both the aircraft and the refueling unit properly grounded prior to any refueling operation. The pilot should ensure that the proper grade of fuel and, when required, the proper additives are being dispensed.

(2) Refueling the aircraft, while the blades are turning ("hot refueling"), may be practical for certain types of operation. However, this can be hazardous if not properly conducted. Pilots should remain at the flight controls and refueling personnel should be knowledgeable with respect to proper refueling procedures and properly briefed for specific makes and models.

(3) Refueling units should be positioned to ensure adequate rotor blade clearance and persons not involved with the refueling operation should be kept clear of the area.

(4) Smoking must be prohibited in and around the aircraft during all refueling operations.

c. External-load riggers. Rigger training is possibly one of the most difficult and continually changing problems of the helicopter external-load operator. A poorly rigged cargo net, light standard, or load pallet could result in a serious and costly accident. It is imperative that all riggers be thoroughly trained to meet the needs of each individual external-load operation. Since rigging requirements may vary several times in a single day, proper training is of the utmost importance to safe operations.

d. Pilot at the flight controls.

(1) Many helicopter operators have been lured into a "quick turnaround" ground operation to avoid delays at airport terminals and to minimize stop/start cycles of the engine. As part of this quick turnaround, the pilot will leave the cockpit with the engine and rotors turning. Such an operation can be extremely hazardous if a gust of wind disturbs the rotor disc or the collective flight control moves causing lift to be generated by the rotor system. Either occurrence may cause the helicopter to roll or pitch resulting in a rotor blade striking the tailboom or the ground.

(2) Good operating procedures dictate that pilots remain at the flight controls whenever the engine is running and rotors are turning. On occasion, however, the pilot may find it necessary to leave the controls of a "running machine." On these occasions the pilot should:

(i) Ensure that all controls are secured in accordance with the aircraft flight manual.

(ii) Reduce rotor and/or engine RPM to ground idle or minimum recommended settings.

(iii) Turn off hydraulic boost when appropriate.

e. External-load hookup personnel.

(1) Know the lifting capability of the helicopters involved. Since some operators have models of helicopters that have almost identical physical characteristics but with different lifting capabilities, this knowledge is essential. For example, a hookup person may be working with a supercharged helicopter on a high altitude project and without any warning a non-supercharged helicopter, which looks exactly the same to the ground crew, comes to a hover to pick up a load. It does not take a vivid imagination to see what could happen if the hookup person connects a load far too heavy for the non-supercharged helicopter to lift.

(2) Know the pilots. The safest plan would be to standardize all pilots insofar as the manner in which sling loads are picked up and released. Without pilot standardization, the hookup person should learn the technique used by each pilot. Does the pilot come in fast or slow, high or low? Does the pilot try to lift the load off with a combination of collective and cyclic? The hookup person should specifically demand standardization on the pilot technique for any sort of emergency occurring while personnel are beneath the helicopter.

(3) Know the cargo. Many items carried via sling are very fragile, others can take a beating. The hookup person should always know when a hazardous article is involved, and the nature of the hazard; such as explosives, radioactive materials, and toxic chemicals. In addition to knowing this, they should be familiar with the types of protective gear or clothing or actions that are necessary for their and the operations safety.

(4) Know appropriate hand signals. When direct radio communications between ground and flight personnel are not used, the specific meaning of hand signals should be coordinated prior to operations.

(5) Know emergency procedures. Ground and flight personnel should fully agree to and understand actions to be taken by all participants in the event of emergencies. This prior planning is essential to avoid injuries to all concerned.

5. PASSENGERS. The term "passenger" used throughout this advisory circular refers to all non-flight crew personnel that ride in helicopters, and is not limited to the fare-paying customer. All persons that board a helicopter while its rotors are turning should be instructed as to the safest means of doing so. Naturally, if the pilot is at the controls, he/she may not be able to conduct a boarding briefing. Therefore, the individual who arranged for the passenger flight or assigned as the ramp attendant should accomplish this task. The exact procedures may vary slightly from one helicopter model to another, but in general the following should suffice:

a. Boarding.

(1) Stay away from the rear of the helicopter.

(2) Crouch low before getting under the main rotor.

(3) Approach from the side or front, but never out of the pilot's line of vision.

(4) Hold firmly to hats and loose articles.

(5) Never reach up or dart after a hat or other object that might be blown off or away.

(6) Protect eyes by shielding with a hand or by squinting.

(7) If suddenly blinded by dust or a blowing object, stop - crouch lower - or better yet - sit down - and await help.

(8) Never grope or feel your way toward or away from the helicopter.

b. Pre-takeoff briefing. Since few helicopters carry cabin attendants, this briefing must be made by the pilot. The type of operation will dictate what sort of briefing is necessary. Passengers should always be briefed on:

(1) Seatbelts. The use and operation of seatbelts for takeoff, en route and landing.

(2) Overwater flights. The location and use of flotation gear and other survival equipment that might be on board. How and when to abandon ship should a ditching be necessary.

(3) Flights over rough or isolated terrain. All occupants should be told where maps and survival gear are located.

(4) Emergency instructions. In the event of an emergency, each passenger should be instructed as to what actions and precautions to take; such as the body position for best spinal protection against a high vertical impact landing (erect with back firmly against the seat back); and when and how to exit after landing. Ensure that passengers are aware of fire extinguisher and survival equipment locations.

(5) Smoking. Smoking within 50 feet of an aircraft on the ground should be prohibited. Smoking could be permitted, at the discretion of the pilot, except under the following conditions:

(i) During all ground operations;

(ii) Immediately before, during, or after takeoff or landing; or

(iii) When carrying flammable or hazardous materials.

c. Pre-landing briefing. The nature of the landing will determine what the passengers need to be told. A few items to consider are:

(1) If on a hill, depart downhill. If this involves walking around the helicopter to avoid the area of lowest rotor clearance, always go around the front, never the rear.

(2) Repetition of the basic instructions shown in paragraph 4a.

6. SAFETY AROUND HELICOPTERS. The material appearing in Appendix 1 was taken from the June 1970 issue of ROTORNEWS, a publication of the Helicopter Association of America.

JAMES M. VINES
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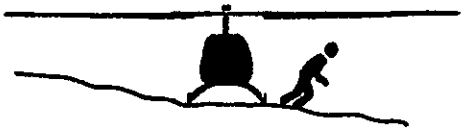
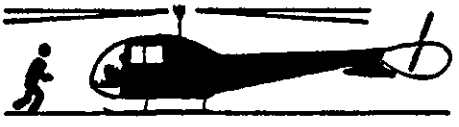
SAFETY AROUND HELICOPTERS

1. Approach or leave machine in a crouching manner (for extra clearance from main rotor).



2. Approach or leave on the down slope side (to avoid main rotor).



3. Approach or leave in pilot's field of vision (to avoid tail rotor).

4. Carry tools horizontally, below waist level (never upright or over shoulder).

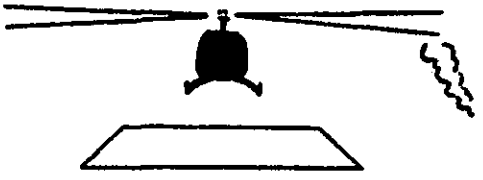
5. Hold onto hard hat when approaching or leaving machine, unless chin straps are used.

6. Fasten seat belt on entering helicopter and leave it buckled until pilot signals you to get out.

7. If leaving machine at the hover, get out and off in one smooth, unhurried motion.

8. Do not touch bubble or any of the moving parts (tail rotor linkage, etc.).

9. Keep helispot clear of loose articles — water bags, groundsheets, empty cans, etc.



10. Keep cooking fires well clear of helispot.

11. Loading assistants should always be supplied with plastic eye shields.

12. After hooking up cargo sling, move forward and to side to signal pilot (to avoid entanglement and getting struck, with loaded sling).

13. When directing machine for landing, stand with back to wind with arms outstretched toward landing pad.

14. When directing pilot by radio, give no landing instructions that require acknowledgement as pilot will have both hands busy.

15. When moving larger crews:

   (a) Brief them on safety as above.

   (b) Keep them together and well back at side of landing zone (this gives the pilot a chance in the event he has to land suddenly either during landing or take-off).

   (c) Have them face away from machine during landing and take-off.

   (d) Have each man look after his own personal gear.

   (e) Have men paired off and ready to get aboard, as soon as pilot gives the signal.