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AERONAUTICAL INFORMATION CIRCULAR

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The following circular is hereby promulgated for information, guidance and necessary action.

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Director General

HAZARDS OF ROTATING PROPELLER AND HELICOPTER ROTOR BLADES.

The following information has been extracted from FAA Advisory Circular and is promulgated for the attention of all personnel operating on the airport airside.

1. PURPOSE:
This Circular reviews recent statistical information on propeller and rotor to person accidents and offers suggestions to reduce the frequency of those accidents.

2. BACKGROUND :
A review of world-wide reports of propeller and rotor-to-person accidents for the years 1979 1980 and 1981, showed a total of 54 of those accidents, two were a result of helicopter rotors which caused two serious injuries. The 52 propeller accidents caused 9 fatalities and 45 serious injuries. Propeller-and rotor- to-person accidents are a small percentage of the total aircraft accidents. With proper education and discipline, those accidents could be reduced to zero. The following chart summarizes the events leading to the various accidents.

3. GENERAL:
It is particularly tragic that propeller and rotor-to-person accidents along with airmen, have included bystanders, passengers and children. among the injured persons. Propeller-and rotor-to-person accidents differ from other accidents in that they usually result in fatal or serious injury. This is due to the fact that a propeller or rotor rotating under power, even at a slow idling speed, has sufficient force to inflict serious injury. It should be remembered that a rotating propeller or rotor is extremely dangerous and should be treated with all due caution.

EVENTS LEADING OF THE ECCIDENT	FATALITIES	SERIOUS INJURIES
Passengers deplaning aircraft with operating engine(s)	2	16
Passengers enplaning aircraft with operating engine(s)	1	3

Hand cranking of propeller by Pilot	1	9
Hand cranking of Propeller by passengers	0	2
Pilot working on aircraft with engine(s) operating	0	2
Passengers assisting pilot taxiing and parking	2	1
By standers in the vicinity of operating aircraft	2	7
Ground personnel working near aircraft with operating engine (s)	1	2
Propeller blade separation	0	0
Ground personnel working near helicopter with rotor in motion	0	2
Hand cranking of propellers by ground crew	0	2
Pilot exiting aircraft with engine operating	0	1

4. CONSPICUITY:

The propeller or rotor is difficult to see when in operation, and non-professional public is often not aware of its danger. Even personnel familiar with the danger of a turning propeller or rotor are likely to forget it.

a). Some manufacturers of propeller and rotor blades use paint schemes to increase the conspicuity of the blades. Owners should give strong consideration to maintaining the conspicuity paint scheme of the original manufacturer.

b). In the event that the paint scheme does not land itself to conspicuity, the owners should consider having the blades repainted. A customized paint scheme should not be used until an evaluation is made by a person qualified to determine that it will not interfere with pilot visibility, promote vertigo, or create an unbalanced blade condition.

5. NON FLIGHT CREW PESONNEL

Persons directly involved with enplaning or deplaning passengers and aircraft servicing should be instructed as to their specific duties through proper training with emphasis placed on the dangers of rotating propellers and rotors. Ramp attendants passenger handling personnel should be made aware of- the proper procedures and methods or directing passengers to and from parked aircraft. The following safety measures should be considered to help prevent accidents on airport ramp areas.

a) When the possibility of passengers wondering on the ramp exists, physical barriers should be provided such as rope stanchions from the aircraft to the terminal doors.

b) Airport management personnel should be on the alert to keep unauthorized persons from milling around on ramps among parked aircraft, When spectators are permitted to view and move among aircraft parked on a ramp, the airport management personnel should caution those persons to stay clear of all propellers and not touch or move them.

c). Helicopter landing and ramp areas should be marked and provided with safety barriers to restrict access by authorized persons.

d). Tail rotor danger areas should be clearly marked on ramp areas. Helicopters should be parked with tail rotors within the marked area.

6. AIRCRAFT SERVICE PERSONNEL:

Persons directly involved with aircraft service are most vulnerable to injuries by propellers or rotors. Working around aircraft places them in the most likely position for possible propeller or rotor accidents. Aircraft service personnel should develop the following safety habits.

a). Treat all propellers as though the ignition switches are “on”.

b). Chock airplane wheels before working around aircraft.

c). Use wheel chocks and parking brakes before starting engines or hand-cranking engines. Hand-cranking a starter equipped engine with a low battery or defective starter although convenient, can expose personnel to a possible accident. For safety reasons, the replacement of the faulty starter and on the use of ground power source should be considered rather than hand-cranking. Only experienced persons should do the hand cranking with a reliable person in the cockpit. Hand-cranking with the cockpit unoccupied has resulted in accidents.

d). Attach pull ropes to pull chocks from wheels close to rotating propeller or rotor blades.

e). After an engine run and before an engine is shut down, perform an ignition switch test to detect a faulty ignition switch. Follow the manufacturer’s recommendations for the switch test procedures to be followed when a faulty switch is found. Applicable airworthiness directive requirements related to ignition switches have been issued to help locate and eliminate faulty switches.

f) Before moving a propeller or connecting an external power source to an aircraft, be sure that the aircraft is docked, ignition switches are in the “off” position, throttle is closed mixture is in ‘idle cut off’ position, and all equipment and personnel are clear of the propeller or rotor. Faulty diodes in aircraft electrical systems have caused starters to engage when external power was applied regardless of the switch position.

g). Remember when removing an external power source from an aircraft, keep the equipment and your self clear of the propeller or rotor.

h). Always stand clear of rotor and propeller blade paths especially when moving the propeller. Particular caution should be practiced around warm engines.

i). Ground personnel should be given recurrent propeller and rotor safety lectures to keep them alert to dangers when working around helicopters and fixed wing aircraft.

j). Before removing chocks, signal pilot to hold brakes or apply parking brake.

k). Be sure all equipment and personnel are clear of an aircraft before giving the pilot the signal to depart.

7. FLIGHT PERSONNEL AND FLIGHT INSTRUCTORS:

Prior to starting an engine, flight personnel should make certain that all personnel are clear of the propeller or rotor.

a). The engine of a fixed-wing aircraft or of a helicopter should be shut down before loading or deplaning passengers. This is the simplest method of avoiding accidents.

b). Boarding or deplaning of passengers, with engines running, should only be allowed under close supervision. The pilot-in-command should have knowledge that either the company or the airport operator has ground attendants fully trained in their specific duties to board or deplane passengers from an aircraft with an engine(s) running. The pilot should instruct passengers, before they exit an aircraft with engine(s) running, the path to follow to avoid the propeller or rot-or blades.

c). When necessary to discharge a passenger from an aircraft on which an engine is running, never stop the aircraft with the propeller in the path of the passenger's route from the aircraft.

d). When flight and ground instructors an instructing their students about propellers or rotors they should emphasize the danger of rotating propeller or rotor blades. Students should be taught the techniques and safety procedures for hand-cranking, and how to determine which engines should not be hand cranked. Safety through education is the best and most positive means available for reducing potential accidents from rotating propeller and rotor blades,

e). The pre-start portion of the check list should include an item to make sure the propeller or rotor blades are clear. The proper use of the aircraft check list should be taught to all student pilots.

f). Flight personnel should perform an ignition switch test prior to engine shut down to detect faulty switches. (see item (e)). The checklist should include an item for that test to be made
and an item to assure that the switch is off before leaving the cockpit.

8. SUMMARY

a). In viewing propeller and rotor- to- person accidents, the most impressive fact is that every one of them was preventable. The danger of rotating propeller or rotor blades is universally recognized.

b) The pilot can most effective in ensuring that his or her passengers arrive and depart the vicinity of the aeroplane safely by stopping the engine the engine completely at the time of and un loading, or by providing a definite means of keeping them clear of the propeller if it is left in motion.

c). Prominent warning signs placed in the aircraft's interior near or on the inside face of the aircraft doors to alert passengers and crew members of propeller or rotor hazards could be helpful in preventing accidents.

Cancel AIC 2/1983.