

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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(202) 426-8787

ISSUED: June 30, 1976

Forwarded to:

Honorable John L. McLucas
Administrator
Federal Aviation Administration
Washington, D. C. 20594

SAFETY RECOMMENDATION(S)

A-76-87 and 88

The National Transportation Safety Board recently reviewed 10 years of accident data in U. S. Civil Aviation involving personal injuries caused by contact with rotating propellers and helicopter rotors. The Board believes that many of the injuries could have been avoided if the propellers or rotors had been more clearly visible.

From 1965 through 1974, 200 fixed-wing aircraft and 40 helicopter accidents resulted in 82 fatalities and 158 serious injuries when persons were hit by propellers and rotors. Rotor and propeller contact injuries have increased steadily -- from 17 in 1965 to 30 in 1974.

Fifty-one percent occurred in the noncommercial, pleasure/personal transportation category of flying. Injuries experienced in this category were distributed as follows:

	<u>Pilot</u>	<u>Passenger</u>	<u>Other</u>	<u>Total</u>
Fatal	6	15	12	33
Serious	<u>21</u>	<u>38</u>	<u>31</u>	<u>90</u>
Total	27	53	43	123

Of these 123 accidents, 44 occurred when starting engines by rotating the propeller by hand. The remaining 79 were caused mainly by inattention and by the unfamiliarity of persons with aircraft. Statistics indicate that the majority of injuries were suffered by passengers and spectators.

The Safety Board is aware of the aggressive campaign by the FAA to reduce propeller-to-person accidents. Advisory Circular 91-42,

dated July 17, 1975, exemplifies the wide dissemination given this subject among pilots and others in the aviation community. The Safety Board believes, however, that this information does not reach those persons who, because of their unfamiliarity with aviation matters, are most in need of such information.

Aircraft propellers and helicopter rotors are difficult to see when they are in motion. Except for the conspicuity requirement for tail rotors in 14 CFR 27 and 29, there are no other requirements in the Federal Aviation Regulations for increasing the conspicuity of propellers and rotor blades as they rotate. This problem was addressed by the U. S. Army in 1967, when aircraft fleet expansion indicated the need for increased aircraft conspicuity from a standpoint of the propeller/rotor danger, as well as the increasing midair collision avoidance problem.

As a result of the Army's study of propeller and rotor conspicuity, a gloss black and white paint scheme was developed. The scheme produces a 20-percent offset on one blade which creates small concentric circles when the propeller or rotor is in motion. The Civil Aviation Authority of the United Kingdom evaluated a similar paint scheme; it issued Aeronautical Information Circular 104/1973 which recommended that aircraft owners and operators adopt the scheme in the interest of safety.

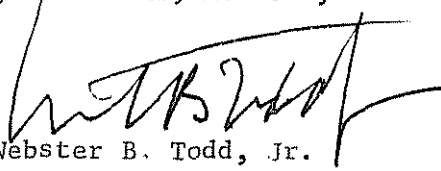
The Safety Board also believes that prominent warning signs should be placed near or on the inside face of aircraft doors to alert occupants of the dangers of rotating propellers. Such signs would serve as a reminder to deplaning passengers and crewmembers that the aircraft engines may be operating.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

1. Revise Advisory Circular 91-42 to include a consideration of the paint scheme developed by the U. S. Army to increase the conspicuity of rotating aircraft propellers and helicopter rotors and to urge all operators of propeller and rotor driven aircraft to paint them in such a scheme in the interest of safety. (A-76-87.) (Class II-Priority Followup)

2. Reemphasize to all pilots of fixed-wing aircraft the need to shut down the engines when boarding or deplaning passengers and require that prominent warning signs be placed in the aircraft's interior on, or in close proximity to, the doors to remind deplaning passengers and crewmembers of the dangers of rotating propellers and rotors. (A-76-88.)
(Class II - Priority Followup)

TODD, Chairman, McADAMS, HOGUE, BURGESS, and HALEY, Members, concurred in the above recommendations.

By: 
Chairman

THESE RECOMMENDATIONS WILL BE RELEASED TO THE PUBLIC ON THE ISSUE DATE SHOWN ABOVE. NO PUBLIC DISSEMINATION OF THIS DOCUMENT SHOULD BE MADE PRIOR TO THAT DATE.