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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 9, 1980

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-90 through -95

A study 1/ by the National Transportation Safety Board showed that postcrash fires occurred in approximately 8.0 percent of the 22,002 general aviation accidents during 1974-1978. About 59 percent of the accidents involving postcrash fire resulted in fatalities. However, fatalities were involved in only 13.3 percent of those accidents without fire.

A comparison was made of similar types of accidents in two categories: severe and nonsevere. In the severe accidents, fatalities occurred in about 62 percent of the accidents with postcrash fire and in only 18 percent of the accidents without postcrash fire. In the nonsevere accidents, fatalities occurred in about 19 percent of the accidents with postcrash fire, and in less than 1 percent of the accidents without postcrash fire. Thus, whether severe or nonsevere, accidents with postcrash fire are fatal considerably more often than accidents without postcrash fire.

The study further indicated that of the 1,038 fatal accidents involving postcrash fire, only 235 were fatal because of impact. The remaining 803 were fire-related fatal accidents and would have been survivable had there been no postcrash fire. This would indicate that in these accidents, as many as 1,734 lives could have been saved.

The primary causes of postcrash fires have been known for years. Further, for the last 15 years techniques for the control of postcrash fires have been known, especially in the area of fuel containment. Crash-resistant fuel systems have been in use in U.S. Army aircraft since 1970. A study of Army helicopter accidents from 1970-1973 showed that in 895 accidents involving helicopters without crash-resistant fuel systems, postcrash fire occurred in 80, or 8.94 percent of the crashes. Further, these accidents were responsible for 52 fire fatalities and 31 fire injuries. In helicopters equipped with crash-resistant fuel systems, out of 702 accidents, postcrash fire occurred only 14 times, or 1.99 percent. In these accidents, there were no fire injuries or fatalities.

Postcrash fires are occurring in survivable accidents. Regulations under which most general aviation aircraft were designed and certificated, and are currently being manufactured, do not include considerations for fuel containment in crash conditions.

1/ For more information read, "Special Study — General Aviation Accidents: Post Crash Fires and How to Prevent or Control Them." (NTSB-AAS-80-2)

Regulations developed since that time do include considerations for fuel containment under conditions prescribed for a minor crash landing. However, the Safety Board does not believe that these regulations reflect the current state-of-the-art available for general aviation aircraft.

As a result of its special study, the National Transportation Safety Board recommends that the Federal Aviation Administration:

> Amend the airworthiness regulations to incorporate the latest technology for flexible, crash-resistant fuel lines, and self-sealing frangible fuel line couplings at least equivalent in performance to those used in recent FAA tests and described in Report No. FAA-RD-78-28 for all newly certificated general aviation aircraft. (Class II, Priority Action) (A-80-90)
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> Amend the airworthiness regulations to incorporate the latest technology for light weight, flexible, crash-resistant fuel cells at least equivalent in performance to those used in recent FAA tests and described in Report No. FAA-RD-78-28 for newly certificated general aviation aircraft having nonintegral fuel tank designs. (Class II, Priority Action) (A-80-91)
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> Require after a specified date that all newly manufactured general aviation aircraft comply with the amended airworthiness regulations regarding fuel system crashworthiness. (Class II, Priority Action) (A-80-92)
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> Fund research and development to develop the technology and promulgate standards for crash-resistant fuel systems for general aviation aircraft having integral fuel tank designs equivalent to the standards for those aircraft having nonintegral fuel tank designs. (Class II, Priority Action) (A-80-93)
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> Assess the feasibility of requiring the installation of selected crash resistant fuel system components, made available in kit form from manufacturers, in existing general aviation aircraft on a retrofit basis and promulgate appropriate regulations. (Class II, Priority Action) (A-80-94)
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> Continue to fund research and development to advance the state-of-the-art with the view toward developing other means to reduce the incidence of postcrash fire in general aviation aircraft. (Class II, Priority Action) (A-80-95)

KING, Chairman, McADAMS, GOLDMAN, BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, did not participate.

By: James B. King
Chairman