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# NATIONAL TRANSPORTATION SAFETY BOARD
## WASHINGTON, D.C.

ISSUED: December 31, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-94 through -97

The National Transportation Safety Board has studied its data files of accidents following engine failures or malfunctions in light twin-engine aircraft (light-twins) that occurred from 1972 through 1976. 1/ The complete records of accidents thought to be particularly relevant and enlightening were studied in detail to determine the specific acts of omission or commission by the pilot or deficiencies in the aircraft that led to the acts and why they were not overcome. Pilot or owner handbooks and other materials available to pilots which provide information on engine-out performance and emergency procedures in light-twins were reviewed. These reviews were performed to determine if such information was adequate to enable the pilot to cope with these emergencies. A limited number of interviews were conducted with light-twin pilots, certificated flight instructors, and FAA-designated check pilots to gain some insight into their knowledge, attitudes, and perceptions regarding management of power loss in light-twins.

From 1972 through 1976, there were 477 light-twin accidents following engine failures, 123 of which were fatal, accounting for the loss of 289 lives. The percentage of fatal light-twin accidents following engine failures is more than four times that in single-engine aircraft. Probably contributing to this substantial difference in the percentage of fatal accidents is the considerably higher average cruise speeds, stall speeds, and generally greater weight of the light-twins, resulting in more severe crashes.

The data show that the accident rate in light-twins is much lower in the category involving professional flying than it is for the category involving primarily nonprofessional flying. Also, landing types of accidents are the most prevalent kind of accidents following engine failure; however, they are almost never fatal. Stalls, collisions with the ground or water, and collisions with obstacles account for 92 percent of the fatal accidents following engine failures.

1/ For more detailed information read "Special Study--Accidents Following Engine Failures in Light Twin-Engine Aircraft, 1972-1976" (NTSB-AAS-79-2).

There is a relationship between the rate of occurrence of accidents following engine failures in light-twins and the power loading (ratio of gross weight to horsepower) of these aircraft. The Safety Board believes that this relationship should be considered carefully by the FAA in reviewing current airworthiness regulations and when drafting new regulations, especially in regard to 14 CFR Part 135 operations, where the increased use of light-twins for revenue-producing operations presents increased potential for serious consequences. The Safety Board also believes that the general aviation aircraft manufacturers should be cognizant of this apparent relationship when designing new light-twins.

The pilot operating handbooks have been improved over the years and now generally provide most of the information regarding single-engine performance of light-twins and emergency procedures necessary for coping with power loss; however, some of the graphs or charts used to present some performance data in the handbooks are difficult to understand. There is excellent supplemental information in the form of FAA and industry publications and articles presented in the aviation media regarding the hazards of, and the techniques for coping with, power loss in light-twins. The pilot handbooks and supplemental materials which are available are apparently not utilized to the extent necessary for pilots to remain knowledgeable about their aircraft's engine-out performance and the procedures for coping with the emergency.

The pilot total time and time-in-type data suggested that accidents in light-twins following engine failures are not unique to low-time pilots. Further, accidents following engine failures in light-twins generally involve a lack of proficiency in responding to these emergencies. Often these accidents involve some degree of panic, probably related to inadequate immediate recall of the exact emergency procedures or lack of confidence in one's ability to execute the emergency procedures.

It was not possible to assess, in sufficient detail, the precise role of the pilot in these accidents because of the lack of appropriate flight exposure data. The Safety Board concludes that the FAA should begin to collect adequate pilot exposure data.

Based on the results of this study, the National Transportation Safety Board recommends that the Federal Aviation Administration:

> Examine pilot handbooks for light twin-engine aircraft to determine if, for certain models, there is a need for any additional explanatory information, especially regarding single-engine performance and normal operation of the aircraft below $V_{mc}$ and provide any such information to all pilots through accident prevention notices or other means at its disposal. (Class II, Priority Action) (A-79-94)
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> Periodically disseminate to pilots, certificated flight instructors, and FAA inspectors and their designees, additional information on how to manage light twin-engine aircraft following an engine failure, using advisory circulars, safety seminars, or other means at its disposal. (Class II, Priority Action) (A-79-95)

Amend 14 CFR Part 61.57 to require that to act as pilot-in-command of a multiengine aircraft a person must have successfully completed, within the last 24 months, a flight review in a multiengine aircraft. (Class II, Priority Action) (A-79-96)

Amend 14 CFR Part 61.57 to require that during the multiengine flight review, the pilot demonstrate the maneuvers that are required for a multiengine proficiency check in accordance with the flight test guide, especially those maneuvers related to power loss. (Class II, Priority Action) (A-79-97)

The Safety Board also reiterates its recommendation of May 31, 1979, that the Federal Aviation Administration:

Generate, through a stratified sampling of general aviation pilots, the date, duration, aircraft make and model, the geographical location of the flight, and the flight time in IFR, high density altitude, and wind conditions, all on a per flight basis; the data collected should include the pilot's total time, time in each type aircraft flown, age, occupation, certificate, and medical waivers. (Class II, Priority Action) (A-79-44)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in the above recommendations.

James B. King
Chairman