Log 1075

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 5, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)
A-79-44

The National Transportation Safety Board has studied statistically its data files of 17,312 accidents that occurred from 1972 to 1976 and involved light, single-engine, fixed-wing aircraft (single-engine aircraft). Single-engine aircraft accounted for approximately 72 percent of all general aviation flying hours from 1972 to 1976, about 81 percent of the accidents, 76 percent of the fatal accidents, and 69 percent of the fatalities. Clearly, single-engine aircraft accidents are the most significant segment of general aviation in terms of activity and loss.1/

Contingency table analyses were used to ascertain the role of the aircraft, the pilot, and the environment in single-engine aircraft accidents. All single-engine aircraft makes and models with more than 500 active aircraft in 1976 were included in the study, excluding those aircraft specifically designed and produced for aerial application flying. This resulted in the inclusion of 33 aircraft makes and models in the study.

The Safety Board's attempts to assess the effect of pilot characteristics such as experience (total flight time, time in type, and time last 90 days), type of certificate, age, and medical waivers, and the effects of environment, including flight in IFR conditions, unfavorable winds, high density altitude, and terrain led to the conclusion: A lack of exposure data is preventing the effective assessment of the role of the pilot and the environment in these accidents. A precise understanding of the observations and thus the development of remedial action will depend on a determination of the role of the pilot. Thus, the Safety Board concludes that the Federal Aviation Administration should begin to collect adequate exposure data. This need was also recognized at the Aircraft Operators Pilot Association Air Safety Foundation/General Aviation Manufacturers Association Safety Workshop held in January 1979.

1/ For more detailed information, read "Special Study—Single-engine, Fixed-wing General Aviation Accidents, 1972-1976" (NTSB-AAS-79-1).

The mean fatal accident rate per 100,000 hours of the Cessna-built aircraft included in this study (1.65) was significantly lower than the mean fatal accident rates of the other five manufacturers still producing aircraft—Beech (2.54), Bellanca (4.84), Grumman (4.13), Mooney (2.50), and Piper (2.48).

The Bellanca 14-19, the Beech 35 (V-tail), and the Piper PA-24 accounted for over one-third of all in-flight airframe failures of the selected group of 33 single-engine aircraft reviewed in this study. All three aircraft had in-flight airframe failure rates significantly higher than the mean rate of the selected group of 33 aircraft; the Bellanca 14-19 had the highest rate of all the aircraft at 1.49 per 100,000 flying hours. The Beech 35 (V-tail) had a mean airframe failure rate of 0.58, and the Piper PA-24 rate was 0.42.

The Cessna 150 and Piper PA-28 account for almost half of the midair collisions involving the selected group of aircraft. The influence of instructional flying on these accidents is not known, but it could be significant.

Older model aircraft appeared to be associated with high rates of fatal and nonfatal accidents. Many of the older aircraft are tailwheel configured, and the association with ground loop accidents was obvious. The high rate of stall accidents among older aircraft and among tailwheel aircraft is possibly related to higher power loading.

Much additional research is necessary to determine the relationships of the various factors in the observations cited above, but the potential rewards of increased safety and decreased accident losses should be well worth the effort.

Based on the results of this study, the National Transportation Safety Board recommends 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, and McADAMS and HOGUE, Members, concurred in the above recommendation.

By: James B. King
Chairman