

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

SP-20
Log 143

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Forwarded to:

Honorable J. Lynn Helms
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-82-145

About 2000 mountain standard time, on December 31, 1981, Sun West Airlines, Inc., Flight 104, N41070, a Piper PA-31-350 crashed during an attempted missed approach at Durango, Colorado. The pilot had executed a nonprecision VOR-DME approach to runway 2 at Durango-LaPlata County Airport in weather conditions at or slightly below the landing minimums for the approach. The airplane descended and crashed about 3,250 feet from the missed approach point. The pilot and three passengers were killed and two passengers were seriously injured as a result of the accident. 1/

The Safety Board was unable to determine the cause of the accident which occurred at night during marginal weather conditions, and during a period of heavy pilot workload. Flight 104 was being operated as a single-pilot, instrument flight rules (IFR) flight in accordance with the provisions of 14 CFR Part 135.

Single-pilot operation in environmental conditions such as those existing at the time of the accident, coupled with the workload in conducting a nonprecision approach and missed approach in a twin-engine airplane, is very demanding. While numerous successful single-pilot operations occur daily in poor weather and high workload situations, the margin for error is much less during such operations because of the lack of redundancy provided by a second pilot.

The issue of single-pilot IFR operations in commuter service was examined by the Safety Board as part of its special study of commuter airlines in 1980. 2/ Seventy percent of the operators surveyed as part of that study stated that their companies were authorized to conduct single-pilot IFR flights; however, many commented that the practice was "marginally safe" for many reasons. Among the reasons cited were the high workload factors associated with high-density air traffic control areas and airport environments, and the demands of the cockpit which can overburden a single pilot.

1/ For more detailed information read Aircraft Accident Report—"Sun West Airlines Flight 104, Piper PA-31-350(T-1020), N41070, Durango-LaPlata County Airport, Durango, Colorado, December 31, 1981" (NTSB-AAR-82-13).

2/ Special Study, "Commuter Airline Safety," NTSB-AAS-80-1, issued July 22, 1980.

As a result of the commuter special study, the Safety Board made several safety recommendations to the Federal Aviation Administration (FAA), some of which addressed the need to upgrade pilot experience and training requirements in general for commuter operations. Specifically, the Safety Board recommended that the FAA, "Evaluate and revise as appropriate the criteria for the authorization of single-pilot IFR operations for commuter airlines. (A-80-72)." The FAA responded that it concurred with the recommendation and that effective March 1, 1980, 14 CFR Part 135 was amended to require that the pilot-in-command for single-pilot IFR operations must have logged 100 hours as pilot-in-command in the make and model airplane to be flown. The amendment to 14 CFR Part 135 also required more stringent ground and flight training for commuter airplane pilots. As a result of those actions, the Safety Board classified the recommendation as "Closed--Acceptable Action."

The Safety Board believes that the amendments to 14 CFR Part 135 pertaining to upgraded pilot experience and training for certification to fly single-pilot IFR are positive steps toward improving commuter safety; however, the Safety Board remains concerned about the basis for certification of single-pilot IFR air taxi and commuter operations as it pertains to the airplane and its equipment and the interface of the pilot with the airplane; i.e., human engineering.

In general, 14 CFR Part 135 allows operators to fly single-pilot IFR provided the airplane is equipped with an operational three-axis autopilot, and if the airplane has a passenger seating configuration of 10 seats or less. The autopilot requirement obviously is to provide the pilot assistance to reduce fatigue and workload. However, the passenger seating standard has no relevant bearing on pilot workload.

The Safety Board is aware that the original type certification of a particular airplane includes crew-size evaluations that include workload data and instrument/control placement to facilitate single-pilot operation; however, these evaluations are performed by pilots and engineers without the assistance of persons trained in human engineering. Nor do the evaluations take into account the operating environment. The regulations pertaining to single-pilot IFR operations contain no human engineering criteria to alleviate workload, such as requirements for standardized location of displays and controls, control yoke-actuated microphone button with a boom-microphone, or criteria to minimize design-induced errors.

The Safety Board believes that the circumstances of this accident, and many others, and the existing environment in which single-pilot certificated air taxi and commuter airplanes operate dictate the need for a closer examination of single-pilot IFR operations under 14 CFR Part 135. A safe nonprecision instrument approach to an uncontrolled airport in snow, fog, and icing conditions, at night, in a twin-engine, propeller-driven airplane, possibly followed by a missed approach procedure, involves human engineering considerations and equipment beyond the availability of an autopilot. In fact, most autopilots cannot be used at low approach altitudes or for a missed approach. Certainly, the number of seats forms no basis for measuring the complexity of the airplane operations. Therefore, the Safety Board believes that the FAA should reevaluate its basis for certifying single-pilot IFR operations for passenger-service air taxi and commuter operators of multiengine airplanes.

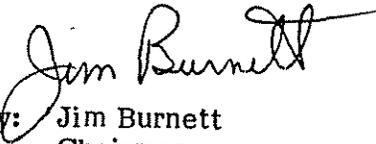
The Safety Board believes that 14 CFR Part 135 certification to fly single-pilot IFR should include more than the increased pilot experience and training requirements. The certification rules also should require a thorough evaluation of the airplane, including its controls and displays, the operating environment, and the interface of these aspects with

the pilot. Human engineering evaluations should be accomplished concurrently by persons trained in aviation human engineering, as well as pilots and hardware engineers. Thorough evaluations of this type will help identify and reduce the potential for pilot/airplane interface problems which can result in degraded pilot performance and, thereby, result in an accident.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Amend 14 CFR Part 135 to require human engineering evaluations of the airplane, including the operating equipment as well as its controls and displays, as a basis for certification of single-pilot, multiengine IFR operations. (Class II, Priority Action) (A-82-145)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY and ENGEN, Members, concurred in this recommendation. McADAMS, Member, did not participate.


By: Jim Burnett
Chairman