

Log 1388

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: March 25, 1982

Forwarded to:

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

SAFETY RECOMMENDATION(S)
A-82-27 through -29

On July 16, 1981, a Piper PA-28-140 Cherokee Cruiser, N56731, crashed at Palm Bay City, Florida, killing the pilot and seriously injuring the other person aboard. The pilot-in-command was a commercial flight instructor employed by the Florida Institute of Technology (FIT) at Melbourne, Florida. He was accompanied by an FIT trainee (a commercial pilot) who was being given instruction in spins and other maneuvers in accordance with FIT's FAA-approved (14 CFR Part 141) Flight Instructor Airplane Course.

After departing Melbourne Airport, one of the pilots aboard the accident aircraft advised Patrick Air Force Base Approach Control that they would be practicing spins about 6 miles southwest of Melbourne between 2,000 and 4,500 feet msl. Shortly thereafter, one of the pilots said, "It still won't come out. Mayday. Mayday." Witnesses observed the aircraft spinning nearly straight down before impacting the ground.

The Piper PA-28-140 is certificated for operations in both normal and utility categories. Spins and certain other aerobatic maneuvers are permitted only when the aircraft is configured in the utility category which requires that gross weight and center of gravity not exceed 1,950 pounds and 86.5 inches aft of a specified datum, respectively. The Safety Board's investigation disclosed that, at the time of the accident, the aircraft gross weight was about 1,902 pounds and the center of gravity was approximately 87.0 inches aft of the datum. According to information from the Piper Aircraft Corporation, it is hazardous to conduct spins in the aircraft even when the utility-category aft center of gravity limit is only slightly exceeded.

The investigation revealed that upon departing Melbourne the aircraft contained about 37 gallons of fuel, and at the time of the accident approximately 32 gallons remained. If this aircraft had been dispatched properly for utility operation, a correct weight and balance determination would have disclosed that the maximum allowable fuel load was about 21 gallons. The aircraft's gross weight under these conditions would have been approximately 1,831 pounds, and the center of gravity would then have been at the utility category aft limit of 86.5 inches.

On July 18, 1977, another Piper Cherokee PA-28-140, N6899J, on a 14 CFR Part 141 flight, was involved in an accident at Wadsworth, Illinois, similar to the accident involving N56731. The pilot-in-command of N6899J, a highly experienced flight instructor, and a flight instructor trainee were killed when the airplane crashed after they apparently were unable to recover from an intentional spin. The gross weight at the time of the accident was 1,941 pounds and the fuel load and center of gravity were estimated at 32 gallons and 86.8 inches aft of the datum, respectively—values almost identical to those estimated for N56731.

Since the front seats of Piper PA-28-140 aircraft are located near the airplane's empty-weight center of gravity, pilot or front passenger weight has only a slight effect on the airplane's loaded center of gravity position. Fuel, which is located further aft, has a greater effect and, for the utility category configuration, is the primary variable affecting the center of gravity. Moreover, the range of the utility category center of gravity envelope (at 1,950 pounds) is only 0.7 inch compared to the 10.1-inch normal category envelope. The criticality of fuel loading on utility category operations is not specifically addressed in Piper PA-28-140 Pilot Handbooks for flight manuals, and the pilots of N56731 and N6899J apparently did not know or fully appreciate this important relationship.

In view of the above accidents, the Safety Board believes that Piper PA-28-140 owner/operators should be provided additional detailed precautionary information regarding spins. The Piper Aircraft Corporation should specify in applicable aircraft pilot handbooks and flight manuals the criticality of fuel loading on airplane center of gravity and the maximum permissible or recommended fuel loads in typical spin training situations such as those involving N56731 and N6899J.

Some aircraft manufacturers have, for several years, recommended minimum spin initiation and recovery altitudes. For example, the Pilots Operating Handbook for the Cessna Model A150M recommends that six-turn spins be initiated at no less than 6,000 feet above ground level and that recoveries be completed at 4,000 feet or more above ground level. These criteria provide a margin of safety in the event of recovery difficulties due to confusion, apprehension, operational or mechanical anomalies, or improper application of spin recovery controls. In addition, a greater field of view is available to assist in maintaining pilot orientation. The Safety Board agrees with these procedures and believes that a minimum spin initiation altitude of 6,000 feet should be incorporated in all 14 CFR Part 141 flight training programs.

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

Review, and revise as necessary, the flight training curricula of the Florida Institute of Technology and other 14 CFR Part 141 pilot schools to assure that proper safety procedures and practices relative to utility category flight operations are in effect. (Class II, Priority Action) (A-82-27)

Require Piper Aircraft Corporation to supplement Piper PA-28-140 pilot handbooks and flight manuals by providing additional detailed precautionary information regarding spins. This information should include the criticality of fuel loading on airplane center of gravity and the maximum permissible or recommended fuel loads in typical spin training situations. (Class II, Priority Action) (A-82-28)

Require that spins conducted under a 14 CFR Part 141 training program be initiated at no less than 6,000 feet above ground level. (Class II, Priority Action) (A-82-29)

BURNETT, Acting Chairman, and McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.


By: Jim Burnett
Acting Chairman