

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

AI-4

ISSUED: June 23, 1981

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-81-65 through -68

On January 21, 1981, at 0844 e.s.t., a Georgia-Pacific Corporation Cessna Citation, N501GP, with the pilot, the copilot, and three passengers aboard, overran the end of runway 23 following an instrument landing system (ILS) approach, crashed, and burned at the Mercer County Airport, Bluefield, West Virginia. The aircraft touched down between 500 and 2,000 feet on the runway which was covered with wet snow, and it did not decelerate normally. About 1,200 feet from the departure end of the runway, the pilot added engine thrust and rotated the aircraft for liftoff; however, it did not get airborne because of insufficient flying speed. The aircraft overran the end of the runway and struck three localizer antennas and a 10-foot embankment before it plunged down a steep, densely wooded hillside. All five occupants were killed, and the aircraft was destroyed by impact forces and postcrash fire. 1/

The length of runway 23 is 4,742 feet; it is 100 feet wide and has a 0.3 percent effective downslope gradient. The runway is also grooved. The remaining runway beyond the glide slope touchdown point is 3,685 feet. The weather conditions at the time of the approach were: 700 feet, overcast, visibility 1 mile, light snow and fog, temperature 32° F, wind 070° at 10 knots and the braking action was reported poor.

The computed Vref for the approach was 107 KIAS. According to the Federal Aviation Administration (FAA) approved aircraft flight manual (AFM), the dry runway field length required with a 10-knot tailwind for the landing aircraft was 2,625 feet. Takeoff and landing performance data in the AFM are based only on a paved dry runway. The AFM does not contain correction factors to use in computing landing field length requirements when landing on wet or icy runways. However, according to the manufacturer's aircraft operating manual, which contains

1/ For more detailed information, read Aircraft Accident Report--"Georgia-Pacific Corporation Cessna 500 Citation, N501GP, Mercer County Airport, Bluefield, West Virginia, January 21, 1981" (NTSB-MAR-81-9).

information not required by regulation, a pilot can expect landing field length requirements to increase over the AFM values by 50 percent if the runway is wet, and 100 percent if it is icy. It is the Safety Board's understanding that these correction factors were based on National Aeronautics and Space Administration (NASA) test data for landing with low braking coefficients and from a computer model developed by the Cessna Aircraft Company. Using these factors, 3,937 feet of runway would have been required to stop the aircraft on a wet runway, and 5,250 feet would have been required to stop the aircraft on an icy runway. Furthermore, the maximum landing tailwind component for the aircraft is 10 knots, and at the time of the accident, about 9 knots was present. An excerpt from page IV-3 of the aircraft operating manual states the following:

With 100 p.s.i. main tires, the CITATION's minimum dynamic hydroplaning initiating groundspeed is 90 kns. At typical landing weights, touchdown is normally accomplished below that speed. Since groundspeed is the critical factor, landing on slick runways with any tailwind component should be avoided.

In accordance with British Civil Airworthiness requirements, Citation aircraft manufactured for export to Great Britain have revisions to the AFM which, in part, increase the landing field lengths by 220 percent on wet and icy runways and restrict operators to landings only into a headwind and on a runway with an uphill gradient. The caution in the aircraft operating manual, therefore, indicates that the foregoing correction factors are inadequate when landing on wet or icy runways with a groundspeed in excess of 90 knots.

The pilot of the accident aircraft had a total of 10,463 hours of flight time; 7,609 hours as pilot-in-command, 5,002 hours in multiengine turbojets, and 3,642 hours in the Citation. A pilot with this amount of experience would be expected to be capable of achieving a thorough knowledge of the performance characteristics of his aircraft by, in part, reviewing all the pertinent aircraft information made available by FAA and the manufacturer. The Safety Board believes that the pilot was aware of the adverse runway condition and the aircraft's limitation to stop on the runway available because of his first attempt to land on runway 05 and the tailwind component present during the second approach to runway 23. Although the Safety Board believes that the pilot exercised poor judgment in attempting a landing on runway 23, it believes that the correction factors used in computing the required landing field length data and the effect the tailwind has on these correction factors are critical information to the safety of flight; therefore, this information should also be included in the AFM. The absence of this information in the AFM appears to be inconsistent with FAA's attempts at achieving a level of safety in accordance with previous practice. An example is the inclusion of similar runway condition correction factors in the AFM for the Gates Learjet aircraft.

A review of the Safety Board's accident files for the period 1970 to 1980 disclosed four other Citation overshoot accidents which involved water/ice on the runway under unfavorable wind conditions. A fifth accident involved a loss of control on takeoff and an attempted abort with an 11-knot tailwind and blowing snow. The range of total flight experience of the pilots involved in these accidents was between 2,600 and 10,000 hours and the total flight time in type ranged between 250 and 750 hours.

The Safety Board believes there is a legitimate need to emphasize and reinforce the landing performance of the Citation under wet and icy runway conditions and that the critical factor under these conditions is groundspeed. It should be made clear that

any landing in excess of 90 knots should not be attempted under the foregoing conditions and the required landing distance cannot be determined because the correction factors used are not adequate. The importance of this information was recognized by the British Civil Aviation Authority by its modification of the AFM and the inclusion of additional restrictions.

It should also be noted that reliable runway condition correction factors involving solid ice, snow, or slush are most difficult to determine and, therefore, a pilot should be skeptical of those correction factors when a landing attempt is made on a runway with either of these surface conditions. The inclusion of that information in the AFM by the manufacturer should serve as a warning that a hazardous situation may be encountered under these conditions.

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

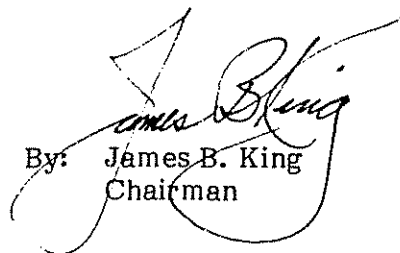
Require Cessna to include in the appropriate sections of all Citation aircraft flight manuals the portion of page IV-3 of the manufacturer's aircraft operating manual which pertains to landing on slippery runways. (Class II, Priority Action) (A-81-65)

Require Cessna to include in the appropriate sections of all Citation aircraft flight manuals a warning that solid ice, snow, or slush corrected landing distances may not be adequate in operations. (Class II, Priority Action) (A-81-66)

Through advisory circulars and/or operations bulletins, emphasize and reinforce in the training curricular for at least all turbojet initial and recurrent phases the limitations and the hazards that may be encountered when landing on slippery runways. (Class II, Priority Action) (A-81-67)

Review and require revisions, as appropriate, of manufacturer's aircraft flight manuals to include sufficient slippery runway condition correction factor information or require an appropriate warning that landing distances under slippery runway conditions are unknown. (Class II, Priority Action) (A-81-68)

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


By: James B. King
Chairman