

206-1110

NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

ISSUED: October 30, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-82 through -84

About 2020 e.s.t., on September 8, 1977, Champion Home Builders Company, Gates Learjet 25B, N999HG, crashed shortly after takeoff at Sanford, North Carolina. All five persons aboard were killed, and the aircraft was destroyed.

The aircraft departed Sanford Airport about 2018 e.s.t., for a flight to Flint, Michigan. In accordance with departure instructions from Fayetteville departure control, the flight was about 3 mi west of the airport, climbing through 3,000 ft, on a heading of 270°, when it disappeared from radar. There were no distress calls, but several witnesses west of the airport saw the aircraft on fire below the 600-ft overcast ceiling. The flight completed a right turn to a northeasterly heading and suddenly dove to the ground. Persons in the immediate vicinity reported that the aircraft was on fire before it crashed.

The Safety Board determined that the probable cause of this accident was one or more low-order explosions in the aircraft's aft fuselage which resulted in a fire and loss of control capability. The Safety Board could not determine conclusively the fuel and ignition sources of the initial explosion; however, gases from the aircraft's batteries or fuel leakage from fuel system components, or both, could have been present in the area of the initial explosion. The Safety Board believes that the evidence uncovered by its investigation relating to the ventilation of aircraft batteries and tailcone areas of this and possibly other corporate-type jets merits dissemination throughout the industry.

When an aircraft engine is started by aircraft battery power and, as in this case, the aircraft is equipped with Nickel Cadmium (NiCad) batteries, and the batteries are recharged, they generate hydrogen gas. The amount of gas generated depends on the condition of the batteries. Normally, this gas is vented overboard to prevent a dangerous collection of gas within the aircraft. Venting of the battery system depends on hoses attached to overboard vents, and venting of the tailcone system depends primarily on ram air entering the top of the tailcone and exiting through a bottom fuselage opening. Ground operation of an aircraft with no airflow through the tailcone or taxiing with a tailwind could preclude adequate ventilation.

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On the Gates Learjet airplane involved in this accident, the vent hoses to one side of each battery case were not connected and the venting of this gas overboard depended on air pressure in the battery ventilation and tailcone ventilation systems developed by the movement of the aircraft.

The Safety Board was not able to determine why the hoses were not connected. The Safety Board is aware of 14 CFR 23.1353 and 25.1353 requiring measures to preclude explosive gases emitted by a battery accumulating in hazardous quantities within the aircraft. Following the start of one engine, with the aircraft's battery, the absence of the vent hoses may have permitted hydrogen gas to enter the tailcone of the aircraft. After the engine start, the aircraft taxied downwind. This would have limited the ventilation of the tailcone and could have allowed hydrogen gas from the recharging battery to collect in a confined area.

The Safety Board believes that sufficient hydrogen gas could have been generated to provide a flammable or explosive mixture. This mixture may have ignited as it was drawn overboard past the air conditioning motor. Although classified as explosion-proof, the brush end of the air conditioning motor showed evidence of explosive distortion as did the air plenum chamber through which tailcone air passes en route overboard.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Advise appropriate personnel to be particularly cognizant during aircraft certification of the provisions for battery ventilation to insure that (1) adequate ventilation is provided during all conditions of ground and flight operations, (2) vent system design precludes inadvertent or maintenance-related removal of essential elements, and (3) batteries and the battery ventilation systems are isolated from all possible ignition sources about the aircraft. (Class II, Priority Action) (A-79-82)

Prepare and issue an Advisory Circular to all owners/operators of aircraft equipped with NiCad batteries to stress the necessity of an inspection of the battery ventilating system during preflight inspections. (Class II, Priority Action) (A-79-83)

Emphasize to maintenance personnel and FAA inspectors, through appropriate FAA publications, the hazards that can result from improperly installed battery ventilation systems. (Class II, Priority Action) (A-79-84)

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

By: 
James B. King
Chairman