Log 1430

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 27, 1982

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

SAFETY RECOMMENDATION(S)

A-82-74

About 1211 e.d.t., on August 14, 1981, an Aero-Commander model 685, N8007H, en route from Stuart, Florida, to Banner Elk, North Carolina, crashed near Wrens, Georgia. All five persons aboard the aircraft were killed.

When the aircraft departed Stuart about 0920, the pilot had requested an altitude of 9,000 feet. At 1005, Orlando Approach Control informed the pilot that the aircraft was about 4 miles off course. At 1031, the Jacksonville Terminal Radar Approach Control (TRACON) controller informed the pilot that it would be necessary for the aircraft to deviate to the west because he was about to enter a warning area. The pilot's response was unrelated to the controller's advisory. At 1051, the Jacksonville TRACON instructed the pilot to contact Jacksonville Center. About 3 minutes elapsed before the pilot responded to the instructed frequency change. At 1056, the Jacksonville TRACON controller stated to the center controller, "I don't know what the problem is with him but he's not responding like he should." At 1102, the Brunswick (Georgia) low-altitude radar controller at Jacksonville Center established contact with the pilot. The controller advised the pilot that he had entered Warning Area 157, and he asked the pilot about the aircraft's easterly heading. The pilot replied, "Negative, we're not aware of it." The pilot was then told to head 300° and to exit the warning area. When asked his heading 8 minutes later, the pilot stated, "I indicate 040°." By 1103, the pilot had penetrated the warning area approximately 10 miles. At 1130, the aircraft began a slow descent from 9,000 feet and began to veer to the northwest. Between 1135 and 1155, the aircraft descended from 6,400 to 2,900 feet. At 1156, the controller observed the aircraft make a left turn which continued for 180° before radar contact was lost. About 15 minutes later, the aircraft crashed in an open field.

Autopsies were performed on the pilot and passengers. The results of the toxicological examination disclosed that the pilot had a 32 percent saturation of carbon monoxide in his blood with a hemoglobin concentration of 12.7 gm percent. Results of the toxicological examinations of the passengers disclosed similar amounts of carbon monoxide.

Aero-Commander model 685 aircraft, which can fly at altitudes up to 25,000 feet, are pressurized by an engine exhaust-driven turbocharger located in the lower aft section of each engine nacelle. Ambient air enters the inlet ducting located in the engine cowling, passes over the right bank of cylinders, enters a flexible metal duct with a 90° elbow that is secured by a Benco duct clamp, passes through the turbocharger, and then is routed to the cabin.

A postaccident examination of N8007H disclosed a broken No. 2 cylinder exhaust stack in the right engine and a separation of the flexible duct for the turbocharger inlet air at a Benco clamp at the 90° induction elbow. The clamp had slipped off the elbow before the aircraft crashed. Examinations by electron microscope and an energy-dispensive X-ray spectrometer disclosed that particles inside the pressurization duct were from the engine exhaust system. Also, maintenance records showed that the No. 2 cylinder exhaust stack had been welded 7 weeks before the accident.

On April 29, 1974, Rockwell Commander, manufacturer of the aircraft, issued Engineering Order No. 610597, effective for newly manufactured aircraft, that required added beads on the ends of the 90° induction elbow (P/N 610597) to prevent the flexible duct from separating or collapsing from excessive clamp pressure. The manufacturer also issued Service Letter No. 300, dated July 2, 1975, which recommended that, before installing the 90° elbow, four rivets be inserted 1/4 inch from each end of the elbow to "prevent the flexible duct from slipping from the elbow when the duct clamps are tightened." Examination of the 90° induction elbow from N8007H revealed that it had neither the added beads nor the rivets.

The Safety Board concludes that the separation of the 90° induction elbow from the turbocharger inlet allowed exhaust air from the aircraft's engine to enter the aircraft cabin and cause the pilot to become incapacitated by carbon monoxide poisoning. In view of the danger associated with exhaust system leaks on this model aircraft, the National Transportation Safety Board recommends that the Federal Aviation Administration:

> Issue an Airworthiness Directive to require a modification of the 90° induction elbow on the turbocharger inlet on Aero-Commander model 685 aircraft by adding beads and rivets similar to the modifications established by Rockwell Engineering Order No. 610597 and recommended by Rockwell Service Letter No. 300, and to require an immediate inspection of all Aero-Commander model 685 aircraft, and any other Rockwell series aircraft with a similar induction inlet system, to insure that a positive retention system exists for preventing the separation of the flexible duct from the 90° induction elbow on the turbocharger inlet. (Class II, Priority Action) (A-82-74)

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

By: Jim Burnett
Chairman