

Adopted: 1-29-91

Log 2266



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: January 30, 1991

In reply refer to: A-91-13 through -14

Honorable James S. Busey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On November 30, 1990, at 1925 eastern standard time, a Cessna S550 Citation, N185SF, registered to Sovran Bank NA, experienced an uncontained failure of the Pratt & Whitney of Canada (P&WC) JT15D-4B right engine, while accelerating through 84 knots, approaching V1 speed during a takeoff roll at the Columbus Metropolitan Airport, Columbus, Georgia. The flight was operated under instrument flight rules; however, night visual meteorological conditions prevailed at the time of the incident. The airplane sustained minor damage. The five occupants were not injured.

The pilot had accomplished preflight preparation, which revealed no engine anomalies, and all engine instruments were in the normal operating range before the failure. Immediately after the failure, the flightcrew experienced throttle control difficulty that was later determined to have been the result of secondary engine damage. The first officer, with assistance from the captain, rejected the takeoff and stopped the airplane on the runway.

The engine teardown examination conducted by the National Transportation Safety Board at P&WC revealed that the gas generator case (P/N 3106469-01), installed in the right engine, was of an early design that had been superseded by an improved gas generator case (P/N 3110464-01). The investigation revealed that the P/N 3106469-01 gas generator case had developed cracks at spot welds as a result of fatigue, causing the case to rupture during the takeoff. The gas generator case and outer by-pass duct burst from the 12 o'clock to the 5 o'clock position (viewed from aft looking forward). The displaced outer by-pass duct had flattened fuel, oil, and P3 air tubes and had bent the fuel control lever shaft. The right side of the engine cowling was displaced about 12 inches outboard of its normal position. Fatigue cracks had propagated 2.6 inches from a spot weld before rupture. The gas generator case also exhibited cracks at 12 additional spot welds.

On October 10, 1985, P&WC Service Information Letter (SIL) No. 7017 advised customers about the incidence of cracks in the gas generator cases and recommended borescope inspection of stitch weld areas at intervals of 300 hours, plus or minus 50 hours. A revision to Maintenance Manual 72-00-50, dated July 5, 1989, recommended the inspection of the stitch weld areas either by borescope or by eddy current, and the choice of such an inspection method was left to the operators. The recommended procedure did not specify inspection of the spot welds areas. In October 1987, the improved P/N 3110464-01 gas generator case was introduced by Service Bulletin No. 7240. Replacement of the case was recommended but not required.

N185SF aircraft engine records indicated that the right engine had been operated 2,257 hours and 3,347 cycles since new, and 942 hours and 1,291 cycles since it was repaired at P&WC in November 1988. Records indicated that the ruptured gas generator case was inspected in March 1990, in accordance with the 300 hour inspection procedure specified in the maintenance manual, 176 hours before failure. It could not be determined whether the spot welds were inspected, but they were not required to be inspected at the time of the manufacturer recommended stitch weld inspections.

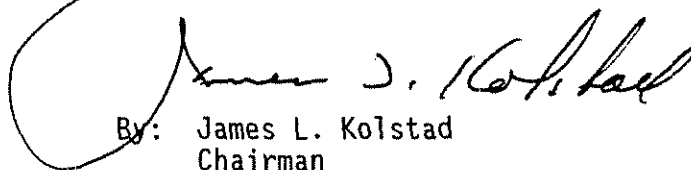
A total of 44 P/N 3106469-01 gas generator cases were manufactured for the model JT15D-4B and -4C engines. The -4C engine had military applications and the superceded gas generator cases on those engines were replaced with the more durable P/N 3110464-01 assemblies. Currently, 24 of the P/N 3106469-01 gas generator cases remain in service. The Safety Board is concerned that those gas generator cases may rupture as a result of cracks emanating from spot welds if the welds are not promptly and properly inspected. Therefore, the Safety Board believes that inspection of the gas generator cases should be required as soon as possible and that replacement of the P/N 3106469-01 gas generator cases should be required subject to availability of the improved cases. P&WC has initiated further action to inspect gas generator cases on the affected engines by issuing SIL No. 7040 on December 17, 1990; but those recommended (borescope) inspections are not mandatory.

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

Issue an airworthiness directive to require that the P/N 3106469-01 gas generator case installed in Pratt & Whitney of Canada JT15D-4B engines be inspected within the next 10 flight hours and at appropriate intervals thereafter, for cracks in the area adjacent to the outer case spot welds; any case found to have any cracks in this area should be replaced before further flight. (Class I, Urgent Action) (A-91-13)

Require the engine manufacturer to review and revise as necessary the current maintenance manual, or other inspection requirements for the P/N 3106469-01 gas generator case, to ensure that the area adjacent to the spot welds is thoroughly and properly inspected for cracks. (Class I, Urgent Action) (A-91-14)

Chairman KOLSTAD, Vice Chairman COUGHLIN, Members LAUBER, BURNETT, and HART concurred in these recommendations.



By: James L. Kolstad
Chairman