



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 30, 2007

In reply refer to: A-07-39 through -40

Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On December 19, 2005, about 1439 eastern standard time, a Grumman Turbo Mallard (G-73T) amphibious airplane, N2969, operated by Flying Boat, Inc., doing business as Chalk's Ocean Airways flight 101, crashed into a shipping channel adjacent to the Port of Miami, Florida, shortly after takeoff from the Miami Seaplane Base.¹ Flight 101 was a regularly scheduled passenger flight to Bimini, Bahamas, with 2 flight crewmembers and 18 passengers on board. The airplane's right wing separated during flight. All 20 people aboard the airplane were killed, and the airplane was destroyed by impact forces. Flight 101 was operating under the provisions of 14 *Code of Federal Regulations* (CFR) Part 121 on a visual flight rules flight plan. Visual meteorological conditions prevailed at the time of the accident.

The National Transportation Safety Board determined that the probable cause of this accident was the in-flight failure and separation of the right wing during normal flight, which resulted from (1) the failure of the Chalk's Ocean Airways maintenance program to identify and properly repair fatigue cracks in the right wing and (2) the failure of the Federal Aviation Administration (FAA) to detect and correct deficiencies in the company's maintenance program.

Recurring Maintenance Discrepancies

Chalk's Ocean Airways' flight logs documented numerous fuel leak discrepancies involving the accident airplane. Minutes from the July 2005 continuing analysis and surveillance system (CASS) meeting showed that the accident airplane had a fuel leak from either the left or right wing near the fuel tank six times during a 5-day period. Also, the minutes from the September 2005 CASS meeting showed that the accident airplane had a fuel leak in its right

¹ For more information, see *In-flight Separation of Right Wing, Flying Boat, Inc., doing business as Chalk's Ocean Airways Flight 101, Grumman G-73T, N2969, Port of Miami, Florida, December 19, 2005*, Aviation Accident Report NTSB/AAR-07/04 (Washington, DC: NTSB, 2007), available on the National Transportation Safety Board's Web site at <<http://www.ntsb.gov/publictn/2007/AAR0704.pdf>>.

wing dry bay for 3 consecutive days. The repair methods used to address these fuel leaks involved removing and replacing the sealant on the fuel tank.

The Chalk's Ocean Airways' repair methods to resolve the fuel leak discrepancies were not effective, as demonstrated by the recurring leaks in the same areas. As part of its continuous airworthiness maintenance program (CAMP) and CASS program, Chalk's Ocean Airways was required to monitor the mechanical performance of the flying fleet by collecting and analyzing operational data. However, the company's evaluation of the recurring leaks was inadequate because it failed to recognize that the leaks were repeated indicators of structural damage inside the right wing. A thorough evaluation of the leaks should have recognized that, because the leaks recurred after repeated skin repairs, the skin repairs were not effective. This should have prompted further evaluation to determine a more effective repair. In the case of the accident airplane, further evaluation should have detected the structural damage inside the wing that led to skin cracks and the recurring leaks. Correction of that structural damage not only would have corrected the leaks but also would have prevented the accident.

If Chalk's Ocean Airways had established a repair threshold that limited the number of times such a discrepancy may recur in a given period, the recurrence of the leaks following multiple repairs may have prompted further troubleshooting, maintenance, engineering, and/or grounding of the airplane. Therefore, the Safety Board concludes that the establishment of repair thresholds in all maintenance programs would help ensure that repeated occurrences of a specific discrepancy would be sufficiently evaluated. Therefore, the Safety Board believes that the FAA should verify that the maintenance programs of commercial aircraft operators include stringent criteria to address recurring or systemic discrepancies, including, if necessary, further analysis of the discrepancies through a comprehensive engineering evaluation.

Importance of Program Oversight for Aircraft With Limited Support

The Safety Board has long recognized that effective FAA oversight of air carriers serves as an important safety function to help prevent accidents. For example, during its investigations of the May 11, 1996, ValuJet Airlines accident² and the August 7, 1997, Fine Airlines accident,³ the Board noted that FAA oversight activities did not detect systemic deficiencies at each airline that were related to the circumstances of each accident. As a result, the Board issued Safety Recommendation A-98-51 on July 10, 1998, which asked the FAA to determine why certain oversight procedures failed to detect systemic safety problems at ValuJet Airlines and Fine Airlines and to modify those procedures.⁴

² National Transportation Safety Board, *In-flight Fire and Impact With Terrain, ValuJet Airlines Flight 592, DC-9-32, N904VJ, Everglades, Near Miami, Florida, May 11, 1996*, Aircraft Accident Report NTSB/AAR-97/06 (Washington, DC: NTSB, 1997).

³ National Transportation Safety Board, *Uncontrolled Impact With Terrain, Fine Airlines Flight 101, Douglas DC-8-61, N27UA, Miami, Florida, August 7, 1997*, Aircraft Accident Report NTSB/AAR-98/02 (Washington, DC: NTSB, 1998).

⁴ Safety Recommendation A-98-51 specifically asked that the FAA do the following: "Review its national aviation safety inspection program and regional aviation safety inspection program inspection procedures to determine why inspections preceding these accidents failed to identify systemic safety problems at ValuJet and Fine

The Safety Board has also long recognized the value of engineering services in assisting operators to periodically evaluate and improve their maintenance practices. For example, on July 21, 1989, the Board issued Safety Recommendation A-89-61,⁵ which asked the FAA to require that air carrier maintenance departments use the engineering services available from the manufacturer or other sources to periodically evaluate their maintenance practices.⁶ In response to the recommendation, the FAA stated, “present association between the manufacturers’ engineering organizations and the air carriers’ maintenance organizations is adequate,” and “air carrier engineering departments maintain a close liaison with their counterparts in the manufacturers’ organizations and their maintenance department liaison with the manufacturers’ service representatives.”

However, in the case of Chalk’s Ocean Airways, neither the airplane’s manufacturer nor the current type certificate holder provided engineering services, and Chalk’s Ocean Airways did not have an engineering department. Engineering support for Chalk’s Ocean Airways was provided by individual contracts with multiple designated engineering representatives. This type of support does not provide the comprehensive understanding of the operator’s fleet that sole-source engineering support could provide. In addition, a structural repair manual was not issued for the G-73 because one was not required at the time the airplane was manufactured.

The Safety Board notes that, because of the limited availability of engineering services and manufacturer support for the G-73T airplanes, effective FAA oversight of the Chalk’s Ocean Airways maintenance program plan was important to ensure that the program addressed the airworthiness issues of such a fleet. However, although the program plan met Federal Aviation Regulation requirements and the principal maintenance inspector performed his required oversight activities, these activities did not result in the detection and correction of the systemic deficiencies in the maintenance program that led to this accident. Thus, the Safety Board concludes that the Chalk’s Ocean Airways maintenance program plan was inadequate to maintain the structural integrity of its aircraft fleet. Further, the Safety Board concludes that the FAA’s procedures for maintenance program oversight, when applied to commercial operators of aircraft with limited manufacturer or engineering support, such as Chalk’s Ocean Airways, are insufficient to ensure the adequacy of such programs’ structural airworthiness plans and, thus, the safety of such aircraft operations and that the FAA’s failure to identify the inadequacy of the

Air[lines] and, based on the findings of this review, modify these inspection procedures to ensure that such systemic indicators are identified and corrected before they result in an accident.” On March 12, 2001, the Safety Board classified Safety Recommendation A-98-51 “Open—Unacceptable Response” because the FAA did not answer why the inspections failed to identify systemic safety problems at ValuJet and Fine Airlines and did not address how the program modifications ensure that such systemic indicators are identified and corrected before they result in an accident.

⁵ Safety Recommendation A-89-61 was issued as part of the Safety Board’s final report on the April 28, 1988, Aloha Airlines flight 243 accident. The airplane experienced an explosive decompression and structural failure at 24,000 feet while en route from Hilo to Honolulu, Hawaii. About 18 feet of cabin skin and structure aft of the cabin entrance door and above the passenger floorline separated from the airplane. For more information, see National Transportation Safety Board, *Aloha Airlines, Flight 243, Boeing 737-200, N73711, Near Maui, Hawaii, April 28, 1988*, Aircraft Accident Report NTSB/AAR-89/03 (Washington, DC: NTSB, 1989).

⁶ On September 22, 1992, the Safety Board classified Safety Recommendation A-89-61 “Closed—Acceptable Alternate Action” as a result of the implementation of several FAA initiatives to reinforce the requirements of the existing regulation (14 CFR 121.373) and to provide assurance that operator maintenance programs were satisfactory.

Chalk's Ocean Airways maintenance program was causal to the accident. Therefore, the Safety Board believes that the FAA should identify the systemic deficiencies in the maintenance program oversight procedures that led to this accident and modify those procedures to ensure that the maintenance program plans for commercial operators are adequate to ensure the continued airworthiness, both structural and otherwise, of the operator's fleet.

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

Verify that the maintenance programs of commercial aircraft operators include stringent criteria to address recurring or systemic discrepancies, including, if necessary, further analysis of the discrepancies through a comprehensive engineering evaluation. (A-07-39)

Identify the systemic deficiencies in the maintenance program oversight procedures that led to this accident and modify those procedures to ensure that the maintenance program plans for commercial operators are adequate to ensure the continued airworthiness, both structural and otherwise, of the operator's fleet. (A-07-40)

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred with these recommendations. Members Hersman and Higgins filed concurring statements, which are attached to the Aircraft Accident Report for this accident.

[Original Signed]

By: Mark V. Rosenker
Chairman