National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation 2206

Date: March 19, 1990

In reply refer to: A-90-37 through -39

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

On September 27, 1989, Grand Canyon Airlines, flight Canyon 5, a de Havilland DHC-6-300, Twin Otter N75GC, operating as a sightseeing flight under 14 CFR Part 135 crashed while landing at Grand Canyon National Park Airport, Tusayan, Arizona. The 2 crewmembers on board were killed and of the 19 passengers on board, 8 were killed, 9 were seriously injured, and 2 received minor injuries.

The passenger cabin was configured with 19 passenger seats: 6 rows of forward-facing single-occupancy seat units on the left side of the cabin labeled 1A through 7A (there was no 6A seat unit); 6 rows of forward-facing double-occupancy seat units on the right side of the cabin labeled 1C and 1D through 6C and 6D; and 1 single-occupancy seat unit attached to the aft cabin bulkhead on the right labeled 7D. All of the seats were occupied at the time of the accident. Investigators found seats 2C and 2D through 6C and 6D separated from their floor and side wall track attachments. The seats were manufactured by Field Engineering West, LTD, Alberta, Canada.

The airplane's seats, windows, and cabin structure had been modified under Federal Aviation Administration (FAA) supplemental type certificate (STC) SA1841NM, approved by the FAA on March 11, 1983. In accordance with the STC, the airplane's cabin windows were enlarged, the cabin structure was modified to accommodate the larger windows, and passenger seat legs were shortened by about 4 inches to accommodate the larger windows. Also, the seatframes had been chromium (chrome) plated to enhance their appearance, and new upholstery was installed. The chrome plating was not approved by the FAA as part of the STC, and the plating was not performed by an FAA-approved repair station. STC SA3954NM was issued on October 21, 1988, for additional structural changes allowed on the first STC for the modified windows; however, the seat modifications remained the same.

The Safety Board's inspection of the accident airplane's passenger seats revealed three airworthiness problems. First, there were multiple seatframe separations at welds that were made during manufacture. Second, several steel hollow-tube seatframes were so corroded that some frame tubes and seat legs had no wall thickness beneath the chrome plating. Third, preexisting cracks were found at welds located at lower seatback support frames; some of the welds had been previously repaired by Grand Canyon Airlines. As a result of these findings, the Safety Board inspected 21 airplanes operated by Grand Canyon Airlines and its subsidiary, Scenic Airlines, that had the same configuration and similar STC modifications. This inspection revealed similar seatframe and leg corrosion and also revealed cracked seatbacks. One of the airplanes, which did not have the STC modification to the seats and which had no chrome plating on the seats, had no seatframe corrosion; however, one seat unit's backrest support frame was found cracked. Thus, it was apparent that corrosion was present only on seats that had been chrome-plated and that seatbacks were found cracked on both the STC-modified seats and seats that had not been modified or chrome-plated.

The Safety Board's metallurgical examination of some of the corroded seatframes and legs showed that the internal corrosion was apparently related to the improper chrome plating of the seatframes by a non-FAA certified repair station. The chrome plating was not authorized by the STC, and the use of a non-FAA certified repair station was not authorized by the FAA.

During the Safety Board's onscene investigation, the FAA's Western Pacific Region was notified and the region's airworthiness inspectors reviewed the Safety Board's findings. The FAA issued a letter of correction on October 5, 1989, to Scenic Airlines recommending that the airline, before further passenger-carrying operations, visually inspect all passenger seats installed in its fleets and use a Maule Fabric Tester to determine if seatframe tubes had reduced wall thickness due to internal corrosion. The FAA asked that this inspection be accomplished by November 4, 1989. Scenic Airlines and Grand Canyon Airlines complied with the full intent of the FAA's letter, and as a result of their inspection, ordered newly manufactured seats for their fleets. The new seats are being manufactured and should be installed by early spring of 1990.

The Safety Board's continuing investigation of this accident has resulted in the timely action of the FAA and the airline's decision to replace the passenger seats. However, the Safety Board is concerned that the cracked seatframes, cracked welds, and serious corrosion were not detected until this accident was investigated by the Safety Board. Furthermore, the Safety Board is concerned that the airworthiness of passenger seats may not be subject to adequate surveillance by FAA inspectors and that passenger seats may not be properly inspected by operators of air carrier, air taxi, and commercial aircraft.

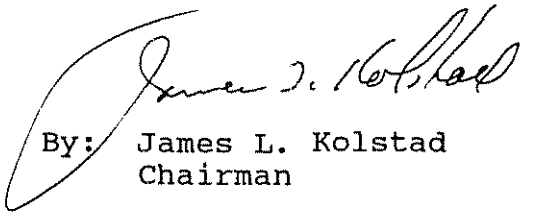
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Instruct principal maintenance inspectors to direct air carrier, air taxi, and commercial operators to inspect passenger seats manufactured by Field Engineering West, LTD, for cracked welds and to repair the seats as necessary. (Class II, Priority Action) (A-90-37)

Instruct principal maintenance inspectors to direct air carrier, air taxi, and commercial operators to inspect passenger seats that have been chromium plated subsequent to manufacture for corrosion and to repair or replace, as necessary, seats that are corroded. (Class II, Priority Action) (A-90-38)

Instruct principal maintenance inspectors to review the adequacy of passenger seat inspections conducted by air carrier, air taxi, and commercial operators to ensure that the inspections address cracks, corrosion, and the adequacy of any repairs. (Class II, Priority Action) (A-90-39)

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



By: James L. Kolstad
Chairman