Log 1429

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 7, 1982

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

SAFETY RECOMMENDATION(S)

A-82-46 and 47

On June 11, 1981, a Shorts SD3-30 twin-turboprop transport aircraft, N331CA, was involved in a landing approach incident at Harrisburg International Airport at Middletown, Pennsylvania. After the landing gear had been extended in preparation for landing at the airport, the right main gear unlocked indicator light illuminated. The light remained illuminated even after the landing gear was recycled. The captain discussed the problem with company maintenance personnel and then flew by the control tower for a visual observation of the landing gear by tower controllers. The landing gear appeared fully extended, and the aircraft was landed without further difficulty. The aircraft, operated by Pennsylvania Commuter Airlines, had been manufactured by Short Brothers Limited of Belfast, Northern Ireland, and had been imported to the United States in accordance with appropriate Federal aviation regulations.

The investigation disclosed that the gear unlocked indicator light had illuminated because an electrical wire had broken in the right main gear downlock switch. The design of the switch allows electrical wires to the switch to flex and bend in the air stream each time the landing gear is actuated. Consequently, wire breakage has been a recurring problem, indicating a design deficiency. Some maintenance personnel have attempted to correct the problem by applying a silicone rubber compound at the point where the wires attach to the switch assembly. This treatment reportedly reinforces the wires, prevents undue flexure, and seals out moisture.

A review of the Federal Aviation Administration's (FAA) Maintenance Analysis Center service difficulty reports regarding the Shorts SD 3-30 aircraft during the period February 1977 to February 1982 revealed 20 malfunctions of the landing gear downlock switches. Many of these were the result of broken wires.

According to the most recent FAA census, 42 Shorts SD3-30 aircraft were registered in the United States as of December 31, 1980. The 30-passenger Shorts SD3-30 aircraft were designed primarily for commuter and regional air service operations. Typically, these operations involve short stage lengths and frequent actuation of the landing gear. Under these conditions, a high degree of reliability of the landing gear indicating system is essential for safe and efficient operations.

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

> Issue an Airworthiness Directive applicable to Shorts SD3-30 aircraft outlining appropriate interim action to be taken to prevent flexing and breakage of currently installed landing gear downlock switch electrical wires. (Class II, Priority Action) (A-82-46)
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> Require Short Brothers Limited to modify the design of the Shorts SD3-30 landing gear downlock switches to prevent flexing and breakage of the electrical wires to the switch and require the retrofit of all SD3-30 aircraft registered in the United States with the improved design. (Class II, Priority Action) (A-82-47)

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS and BURLSEY, Members, concurred in these recommendations.

By: Jim Burnett
Chairman