1048

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 19, 1979

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)
A-79-58 and -59

On March 3, 1979, Rocky Mountain Airways Flight 726, a DeHavilland DASH 7, N27RM, landed at Stapleton International Airport, Denver, Colorado, with the nose landing gear retracted. As a result, the lower forward nose section was damaged slightly, but the 3 crewmembers and 49 passengers aboard were not injured. The National Transportation Safety Board's investigation of this incident revealed that accumulated ice in the nose wheel well had caused the gear doors to freeze shut and prevented the nose gear from extending. Investigation also disclosed possible inadequacies in the design of the DASH 7's nose gear system and in the emergency procedures section of the DASH 7 flight manual. The Safety Board believes that the Federal Aviation Administration should take action to preclude the possibility of similar failures.

The aircraft departed Stapleton International Airport at 1941 m.s.t., on a scheduled passenger flight to Aspen, Colorado. When the landing gear handle was lowered for landing at Aspen, the main gear position lights indicated "green" (down) and the nose gear position light indicated "in transient" (unsafe). The pilots recycled the gear and accomplished all of the DASH 7 flight manual emergency landing gear extension procedures; however, the nose gear remained up.

The aircraft returned to the Denver area; and after the pilots consulted with company officials, a decision was made to land nose gear up. The passengers were briefed for an emergency landing, and the aircraft was landed at Stapleton International Airport at 2220 m.s.t.

The ice and slush accumulation in the nose wheel well came from snow and slush covered taxiways and runways at airports where the aircraft had operated earlier in the day. The pilots stated that the accumulation of ice and slush observed on preflight did not appear to be significant. The aircraft was moved from the runway to a hanger and

placed on jacks. The landing gear was cycled repeatedly using the normal and emergency systems with no mechanical failures or discrepancies noted. The investigation team concluded that the nose gear failed to extend because of ice which had frozen the gear doors in the closed position.

The Safety Board's investigation also found two other means by which this incident might have been prevented:

(1) The original design of the DASH 7 permitted the nose gear doors to remain open when the nose gear was down. A kit was provided by DeHavilland in the fall of 1978 to modify the system to close the nose gear doors after the nose gear was extended. The modification was specifically designed to prevent ice and slush from accumulating in the nose wheel well during ground operation. On the accident aircraft the hydraulic actuator for the nose gear door sequencing system developed a leak on February 10, 1979. (DASH 7's manufactured before serial No. 13 do not have such a system.) Since the sequencing system was not a "required" item and replacement parts were not available, the system was disabled and the aircraft continued in service.

The Safety Board believes that the sequencing nose gear door system would have prevented ice and slush from entering the wheel well had it been installed and operational. Therefore, the sequencing door system should be installed on all DASH 7 aircraft and should be operational for all flights where ice and snow might possibly accumulate in the nose wheel well.

During the investigation, Rocky Mountain Airways executives agreed that the sequencing nose gear system should be mandatory equipment for flight operations on snow or slush covered runways or in icing conditions. As a result, Rocky Mountain Airways immediately instituted changes in its maintenance program.

(2) The DASH 7 aircraft has an emergency cabin pressurization outflow valve located in the nose wheel well which is used as a backup to the normal automatic pressurization outflow valves in the aft part of the aircraft and for emergency smoke elimination from the cabin. The pilots control the valve manually; and, if opened in flight, heated cabin air will flow into the nose wheel well and may melt any accumulation of ice. This melting of ice could allow the nose gear doors to open. This procedure is not in the DASH 7 flight manual or any other publication.

The Safety Board believes that the emergency procedures section of the DASH 7 flight manual should be revised to include procedures for opening the emergency outflow valve if ice accumulation is suspected. Rocky Mountain Airways revised its DASH 7 emergency procedures checklist to include such a procedure.

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

> Issue an Airworthiness Directive to require that sequencing nose gear doors are installed on all DASH 7 aircraft and to require that the sequencing nose gear door systems be operational for all flights during which ice or snow could accumulate in the nose wheel well. (A-79-58) (Class I -- Urgent Action)

> Review and revise as necessary the aircraft emergency procedures section of the DASH 7 flight manual to include information on use of the emergency cabin pressurization outflow valve to divert warm cockpit air to the nose gear wheel when icing is suspected. (A-79-59) (Class I -- Urgent Action)

KING, Chairman, DRIVER, Vice Chairman, and McADAMS and GOLDMAN, Members, concurred in these recommendations.

By: James B. King
Chairman