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**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

ISSUED: April 16, 1981

Forwarded to:

Honorable J. Lynn Helms  
Administrator-Designate  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-81-46 and -47

On May 9, 1980, a Bell 206B helicopter, N90095, rolled rapidly to the right and crashed into the Gulf of Mexico during an attempted vertical takeoff from an offshore oil rig helipad. The pilot was killed; the two passengers were not injured. The Safety Board's investigation revealed that the right main landing skid had been momentarily snagged on the edge of a trap door located on the helipad. The abrupt right roll apparently was caused by the snag, and the pilot was unable to take corrective action to regain control because of the dynamic rollover characteristics of single rotor helicopters.

Dynamic rollover was initially identified during military helicopter operations involving sideslope landings and takeoffs. If a pilot is not attentive to roll attitude during the maneuver, a rolling moment can develop about a landing skid in contact with the slope. If the roll angle reaches a critical value, application of full opposite lateral cyclic will not be sufficient to prevent the helicopter from rolling over on its side. As a result of numerous occurrences of this type, the military safety organizations prepared and distributed information concerning the causes of this phenomenon and the corrective actions to be taken should dynamic rollover conditions be encountered; appropriate warning notices and the critical slope angles for individual helicopter models were also added to the flight manuals. As a result of these actions, the number of military helicopter accidents involving dynamic rollover has been reduced significantly.

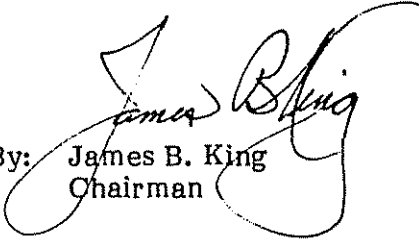
A review and evaluation of civil rotorcraft accidents from 1974 through 1978 indicate that about 20 percent of the 101 rollovers listed had conditions present which could have resulted in dynamic rollover. The Safety Board is concerned that the civil helicopter community has not been adequately warned about conditions which can lead to this phenomenon. As was evident in this accident, a takeoff from a sideslope is not a prerequisite for dynamic rollover. Any condition which causes the helicopter's attitude to reach its critical roll angle with one skid in contact with the ground before the pilot recognizes the problem can lead to this type of rollover accident.

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

Require single rotor helicopter manufacturers to analyze and define the critical slope angles of each model and include this information in the individual flight manuals. (Class II, Priority Action) (A-81-46)

Include detailed discussions on helicopter dynamic rollover characteristics and corrective actions to be taken in: (1) the Basic Helicopter Handbook, (2) written examinations, (3) helicopter flightcheck oral examinations, and (4) any other publication deemed appropriate for the dissemination of safety of flight information. (Class II, Priority Action) (A-81-47)

KING, Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, did not participate.

  
By: James B. King  
Chairman