

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

AI-4

Log 891

ISSUED: February 16, 1978

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D. C. 20594

SAFETY RECOMMENDATION(S)

A-78-3

During investigation of several air carrier accidents, the National Transportation Safety Board has identified wind shears and their associated hazards as causal factors. These hazards are usually encountered during takeoff or approach. Although wind shear was a recognized phenomenon in the atmosphere, it was not fully recognized as a hazard to flight safety. Recent sophisticated investigative techniques, however, have enabled the Safety Board to determine more accurately the extent to which variable winds may degrade airplane capabilities at low altitude and significant efforts by Government and industry groups have been launched to minimize such hazards.

The Safety Board has emphasized in accident reports, safety recommendations, and other correspondence that flight into a hazardous environment should be avoided, and we commend the Federal Aviation Administration for its efforts to develop systems to detect and measure wind shear, which should greatly assist pilots in avoiding such hazards.

In spite of these efforts, flightcrews continue to be confronted with unanticipated hazardous winds, and the Safety Board believes that every means must be afforded them to assure safe passage through these atmospheric variations. In several recent accidents, the Safety Board has found that the full performance capability of the airplane was not used following the extreme wind encounter. Postaccident studies have shown that, under similar circumstances, had flight techniques of an emergency nature been used immediately, the airplane would have remained airborne and the accident averted. In the Allegheny Airlines DC-9 accident at Philadelphia, Pennsylvania, on June 23, 1976, the Safety Board concluded that the aircraft's ability to cope with severe wind shears was border-line when flown according to the then existing standard operating procedures.

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AAR-78-3

In June 1976, following the Continental Air Lines Boeing 727 crash after takeoff from Denver, Colorado, the Safety Board recommended (A-76-76) that you evaluate all air carrier takeoff and climb procedures to determine whether different procedures can be developed and used that will better enable flightcrews to cope with known or suspected low-altitude wind shears. Your reply of August 11, 1976, indicates your belief that it would not be practical to develop such techniques and that the best procedure possible is for crews to avoid or delay takeoffs under conditions of high wind shear. Since we continue to believe that improved flight techniques can and should be developed, we reiterate recommendation A-76-76, which follows:

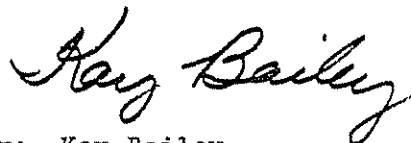
"Evaluate all air carrier takeoff and climb procedures to determine whether different procedures can be developed and used that will better enable flightcrews to cope with known or suspected low-altitude wind shears. If different procedures are developed, they should be incorporated into the air carriers' flight manuals. (Class II - Priority Followup)"

Two airframe manufacturers, the Boeing Commercial Airplane Company and the Lockheed-California Company, have conducted performance studies which reached mutually supporting conclusions. In summary, these studies state that if during takeoff or landing, a severe tailwind shear or an intense downdraft, or both, is inadvertently encountered, as indicated by loss of airspeed and altitude, rated takeoff thrust should be applied and the airplane pitched up to at least the go-around attitude to check the rate of descent. The reports state that if this action does not arrest the rate of descent, the airplane's pitch attitude can be further increased slowly in a temporary exchange of airspeed for climb capability until further altitude loss can be prevented. The reports note that a temporary loss of airspeed may well occur in arresting the rate of descent and recommend that no attempt be made to accelerate back to approach or V_2 speeds during the penetration of the wind shear. The reports state that temporary flight close to stickshaker speeds may be required to achieve sufficient climb capability.

The Safety Board believes that the evidence and the airplane performance data contained in the manufacturers' reports are worthy of consideration. We do not know if the proposed flight techniques are totally valid in all abnormal circumstances and we recognize that critical limitations to the procedure may exist in an operational environment. However, we believe that the best qualified persons of diverse interests should be assembled to evaluate the safety aspects of flight below normal procedural airspeeds when hazardous atmospheric conditions are encountered. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Establish a joint Government-industry committee to develop flight techniques for coping with inadvertent encounters with severe wind shears at low altitude. (Class II, Priority Action) (A-78-3)

BAILEY, Acting Chairman, McADAMS, HOGUE, and KING, Members, concurred in the above recommendation.

A handwritten signature in cursive script that reads "Kay Bailey".

By: Kay Bailey
Acting Chairman