



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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Date: May 28, 1993

In reply refer to: A-93-49 through -54

Mr. Joseph M. Del Balzo  
Acting Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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On July 30, 1992, at 1741 eastern daylight time, Trans World Airlines (TWA) scheduled passenger flight 843, an L-1011, N11002, experienced an aborted takeoff shortly after liftoff from John F. Kennedy International Airport, Jamaica, New York, en route to San Francisco International Airport, California. The airplane came to rest, upright and on fire, on grass-covered soil, about 290 feet to the left of the departure end of runway 13R. There were no fatalities among the 280 passengers on board the airplane, but there were 10 reported injuries that occurred during the emergency evacuation. The flight was operating under 14 Code of Federal Regulations Part 121.<sup>1</sup>

The National Transportation Safety Board has determined that the probable causes of this accident were design deficiencies in the stall warning system that permitted a defect to go undetected, the failure of TWA's maintenance program to correct a repetitive malfunction of the stall warning system, and inadequate crew coordination between the captain and first officer that resulted in their inappropriate response to a false stall warning.

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<sup>1</sup>For more detailed information, read Aircraft Accident Report--"Aborted Takeoff Shortly After Liftoff, Trans World Airlines Flight 843, Lockheed L-1011, N11002, John F. Kennedy International Airport, Jamaica, New York, July 30, 1992" (NTSB/AAR-93/04)

During the investigation of this accident, it was found that a false stall warning stickshaker occurred as the airplane lifted off the runway. The first officer, who was the flying pilot for the takeoff, incorrectly perceived that the airplane was stalling and transferred control of the airplane to the captain without the proper coordination. The captain then aborted the takeoff.

Although the pilots were trained in accordance with applicable TWA and Federal Aviation Administration (FAA) requirements, the Safety Board found training inadequacies in flightcrew coordination in transferring control of the airplane and in evaluating and reacting to unexpected anomalies, such as false stall warnings and overspeed warnings, during takeoff. Moreover, the TWA procedure that allows flightcrews to initiate takeoffs without a predeparture briefing does not adequately prepare them for coordinating potential abnormal circumstances.

The Safety Board is also concerned about the prudence of the common practice by many airlines of requiring the captain to initiate rejected takeoffs with his hand on the throttles for all takeoffs, even when the first officer is making the takeoff. This "split" control responsibility may not be in the best interest of proper crew coordination during such a critical phase of flight. Therefore, the Safety Board believes that the FAA should study this practice, in cooperation with the National Aeronautics and Space Administration, with a view toward evaluating and revising, as appropriate, airline procedures and training. The study should include a comprehensive review and analysis of accident and incident data and simulator or other research, as necessary.

A malfunction of the right angle-of-attack (AOA) sensor, which had malfunctioned eight times previous to its installation on the accident airplane, was not detectable during the pilots' preflight checks and did not trigger a fault light in the system's automatic monitoring system. Moreover, the malfunction was not detected by the TWA quality assurance trend monitoring program because a calendar day, rather than a flight hour, basis was used to detect trends. If TWA's trend monitoring program had been based on the number of flight hours of the AOA sensor, the Safety Board believes that the chronic nature of the problem would most likely have been detected.

Therefore, the Safety Board believes that the FAA should determine if there are stall warning system anomalies on other transport-category airplanes, including L-1011s, that could be undetected during ground tests and could lead to false stall warnings during takeoffs. The FAA should also require aircraft

manufacturers to develop a means to illuminate a caution/warning light on pilot instrument panels when a stall warning system fault exists. Further, the Safety Board believes that to prevent a recurrence of the circumstances that led to this accident, the FAA should examine the quality assurance programs of TWA and other airlines that are supposed to detect repetitive and unsafe trends in component failures.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the FAA:

Issue an air carrier operations bulletin directing Principal Operations Inspectors for 14 CFR 121 and 14 CFR 135 airlines to include in the training and procedures a requirement for crew coordination briefings on actions to take in the event of abnormal situations during the takeoff and initial climb phase of flight, and the proper techniques for the transfer of control of the airplane, especially during time-critical phases of flight. (Class II, Priority Action) (A-93-49)

Issue an air carrier maintenance bulletin directing the Principal Maintenance and Avionics Inspectors for 14 CFR 121 and 14 CFR 135 airlines to review the airlines' maintenance and quality assurance programs and take appropriate actions to verify that the trend monitoring programs are structured to detect repetitive malfunctions by means of flight-hour monitoring, as well as calendar-day monitoring. (Class II, Priority Action) (A-93-50)

Issue an airworthiness directive to require that a caution or warning light illuminates on the pilots' caution-warning panel in the event of a failure within the circuitry of L-1011 stall warning systems during ground or flight operations. (Class II, Priority Action) (A-93-51)

Require that the redundant stall warning systems installed on transport-category airplanes have ground test features and self-monitoring systems to alert the pilots to malfunctions in the stall warning systems. (Class II, Priority Action) (A-93-52)


Issue air carrier bulletins directing the Principal Inspectors for 14 CFR 121 and 14 CFR 135 airlines to review the circumstances

of the accident involving TWA flight 843 on July 30, 1992, and to make the facts, conditions, and circumstances of the accident known to the appropriate airline operations, training, and maintenance personnel. (Class II, Priority Action) (A-93-53)

Conduct a human factors study, in cooperation with the National Aeronautics and Space Administration, of the practice by many airlines of requiring the captain to initiate and execute a rejected takeoff, even when the first officer is making the takeoff. The study should include a thorough examination of the practice of having the captain keep his hand on the power levers when the first officer is making the takeoff. The study should also include a comprehensive review and analysis of accident and incident data and simulator or other research, as necessary. The results of the study should be widely disseminated to the airline industry for use in evaluating and revising, if appropriate, rejected takeoff procedures and training. (Class II, Priority Action) (A-93-54)

Also, the Safety Board issued Safety Recommendation A-93-69 to the Port Authority of New York and New Jersey.

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HAMMERSCHMIDT and HART concurred in these recommendations.

  
By: Carl W. Vogt  
Chairman