

UNITED STATES OF AMERICA
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: January 3, 1972

Adopted by the NATIONAL TRANSPORTATION SAFETY BOARD
at its office in Washington, D. C.
on the 8th day of December 1971

FORWARDED TO:)
Honorable John H. Shaffer)
Administrator)
Federal Aviation Administration)
Washington, D. C. 20591)

SAFETY RECOMMENDATIONS A-72-1 thru 5

Five items, which warrant corrective action, have come to the attention of the National Transportation Safety Board during the course of our investigation of the Pan American World Airways, Inc., B-747 accident that occurred on July 30, 1971, at San Francisco International Airport.

First, a difference of opinion exists between the airport management and the Flight Service Station personnel concerning what airport information should be published as a NOTAM. Consequently, the NOTAM and AIRAD service was discussed at length during the accident hearing. Each person queried gave a different interpretation of what could be designated as a NOTAM. We believe, therefore, that a review of the NOTAM system should be conducted to standardize the thinking within the industry concerning this useful safety tool.

Second, a perusal of the "Normal Procedures" portion of the Pan American B-747 flight manual showed that the V reference speed bugs were supposed to be set during performance of the "Pre-Start" checklist. They are not mentioned again until the "Approach" checklist. Since V reference speeds can be very critical at times, they should be included as an item on the last checklist used prior to taking the runway for departure.

Third, this accident provides further substantiation for our previous recommendations regarding the need for revised takeoff computation procedures. V reference speeds are of very little value unless associated with time and/or distance along the runway. If runway distance markers had been installed at San Francisco, the crew of Flight 845 would have known that they had less than 9,000 feet of runway remaining at the initiation of takeoff, rather than the

9,500-foot figure given to them by the dispatcher. Also, runway distance markers could be used by landing aircraft to determine the adequacy of the remaining runway for landing and stopping. We believe this would assist in reducing the number of aircraft that slide off the ends of runways.

Fourth, this aircraft has an inertial navigation system installed. This system could be used quite advantageously as an acceleration check device, if associated with the concomitant institution of proper procedures. Without such procedures, however, the system capabilities are not fully utilized during an important part of the operation.

Fifth, there was no information readily available to the flightcrew of Pan American Flight 845, either on the flight deck or in their preceding training which described the controllability of the aircraft following the loss of control-related systems. In the instant case, the flightcrew knew what controls were still available but they were unable to assess rapidly the degradation of aircraft controllability and performance with only the No. 2 hydraulic system operable. Flightcrews should be prepared to cope with in-flight control system emergencies, regardless of whether the emergencies are generated by accidents or malfunctions during normal operations. Rapidity of assessment capability with respect to aircraft controllability and requisite operational procedures is vital. For this reason, we believe aircraft manufacturers should provide operational information regarding the handling of such emergencies for incorporation in airplane flight manuals.

The Board recommends, therefore, that the FAA:


1. Review the procedures for the issuance of NOTAM and AIRAD for standardized implementation within the appropriate FAA facilities and modify the procedures to assure that information pertinent to "Safety of Flight" is disseminated without delay.
2. Require that V reference speed checks be included on the last checklist used immediately prior to takeoff.
3. Require the installation of runway distance markers at all civil airports where air carrier aircraft are authorized to operate.
4. Require the use of takeoff procedures which will provide the flightcrews with time and distance reference to associate with acceleration to V_1 speed.
5. Require manufacturers to include information in the Aircraft Flight Manual concerning the aircraft controllability and performance characteristics with the loss of any system that involves flight controls. Consideration

should be given in incorporating training in such in-flight emergencies in all approved simulator programs at the earliest possible date.

Members of the Board and our Bureau of Aviation Safety staff will be available for consultation in the above matters if desired.

These recommendations will be released to the public on the issue date shown above. No public dissemination of the contents of this document should be made prior to that date.

Laurel, McAdams, Thayer and Burgess, Members, concurred in the above recommendations. Reed, Chairman, was absent, not voting.


By: John H. Reed
Chairman