

Log 2607



National Transportation Safety Board

Washington D.C. 20594

Safety Recommendation

Date: June 26, 1996

In reply refer to: A-96-31 and -32

Honorable David R. Hinson
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On November 12, 1995, at 0056 eastern standard time (est), American Airlines (AAL) flight 1572, a McDonnell Douglas MD-80, registered in the United States as N566AA, struck trees on a ridge line northeast of the airport, in East Granby, Connecticut, which is about 2.54 miles from the end of runway 15, at Bradley International Airport (BDL), Windsor Locks, Connecticut. The tree strike occurred during an instrument approach to runway 15 in darkness and in variable wind conditions. Both engines subsequently lost power following ingestion of tree limbs, but the flightcrew was able to continue the flight to the airport. The airplane was substantially damaged during the emergency landing. One of the 72 passengers received a minor injury during the emergency evacuation, and none of the five crewmembers was injured in the accident. The flight, which was operating under 14 Code of Federal Regulations Part 121, originated at O'Hare International Airport, Chicago, Illinois, about 2 hours before the accident.

BDL has a VASI-4 (visual approach slope indicator) system for runway 15. The system defines a 3.5-degree glideslope in which the upwind

bar is aimed at 3.5 degrees and the downwind bar at 3.0 degrees.¹ The VASI should be visible as far as 4 nautical miles (nmi) out and should have a "clear 2 degree obstacle clearance surface" originating at the VASI downwind bar and extending to 4 nmi, according to Federal Aviation Administration Order 6850.2A, paragraph 301b.

The chart for the very high frequency omnidirectional radio range (VOR) runway 15 approach to BDL, used by flight 1572, was first published and became effective on February 9, 1989. Amendment 2, a major overhaul of the procedure, became effective on April 1, 1993. One change in amendment 2 was the addition of a visual descent point (VDP) to the approach. A VDP is defined as a point on the final approach from which normal descent from the minimum descent altitude (MDA) to the runway touchdown point may commence, provided that visual reference to the airport is established. The VDP was 3.1 nmi from the BDL VOR and was 2.86 nmi from the threshold of the runway. Descents were being started 0.3 nmi before crossing the ridge of trees that the accident airplane struck.

A letter dated April 8, 1994, from the Air Line Pilots Association (ALPA) to the Manager, New England Region, Flight Procedures Review Branch, Federal Aviation Administration (FAA), concerning the BDL runway 15 approach procedure, discussed the fact that the pilots of several airplanes had experienced ground proximity warning system (GPWS) warnings during the latter portion of the approach. ALPA stated that the GPWS problem might have been exacerbated by the proximity of the ridge line.

As a result of ALPA's concerns, the FAA undertook an analysis of the VDP. The FAA specialists who devise and analyze instrument approaches determined that "no-VASI" criteria were used in the original VDP placement. No-VASI criteria normally provide for a 3-degree descent angle; and, in this case, the criteria resulted in placement of the VDP at 2.86 nmi from the runway. Analysts also determined that "with-VASI" criteria should have been used because a 3.5-degree VASI was located on runway 15 at BDL. With-VASI criteria would have placed the VDP 2.5 nmi from the runway.

¹A VASI is a system of red and white lights so arranged to provide visual descent guidance during an approach to a runway. The design of a 3.5 degree system incorporates shuttering of the lights that optimizes the visual guidance at 3.5 degrees even though the upwind bar is aimed at 3.5 degrees and the downwind bar is aimed at 3.0 degrees.

Descents could then be started about 0.3 nmi after airplanes crossed the ridge.

However, at that time, analysts also determined that based upon charts, rather than an actual survey, the VASI "clear 2 degree obstacle clearance surface" was penetrated by obstacles (the ridge line and its trees) by 55 feet. According to the TERPS [terminal instrument procedures] Handbook (FAA Order 8260.3B), this situation would preclude the ability to chart a VDP on this approach. Therefore, analysts determined that the original VDP should not have been published, and it was removed by Amendment 2A on April 18, 1994.² This amendment was the latest for the BDL runway 15 VOR approach.

Records revealed that in 1987, the FAA's New England Region, Airways Facilities Division (AFD), checked the VASI by survey, and it was validated as "clear." On November 13, 1995, the day after the accident involving AAL flight 1572, the FAA's Flight Inspection Area Office, Atlantic City, New Jersey, conducted a flight and ground inspection of runway 15's VOR approach and VASI. In part of this inspection, a theodolite (an optical surveying instrument) was used adjacent to the VASI array to determine if the clear 2-degree obstacle clearance surface was, in fact, clear of obstacles. The flight inspection form indicates that the VASI was checked "satisfactory" for obstacle clearances. A further FAA letter from the manager of the AFD stated that the angle to the tops of the trees was "1.98 degrees, just under the 2 degree plane" and thus acceptable to the AFD.

As a result of the continuing investigation of this accident, the Safety Board believes that a VDP should be placed closer to the runway threshold than the ridge line. This VDP should prevent flightcrews from descending prematurely toward the ridge line. If the chart method of determining a clear flightpath to runway 15 must be used, thus precluding the placement of a VDP, then the FAA should ensure that a warning about the 3.5-degree glideslope and the high terrain along the approach path is placed on VOR runway 15 instrument approach charts for BDL, should make such a warning a permanent Notice to Airmen (NOTAM) for BDL, or should use some other means to disseminate such a warning to pilots on a permanent basis.

²The fact that the VASI "clear 2 degree obstacle clearance surface" was believed to be penetrated by obstacles should have raised the question of the validity of the VASI installation. This question is now moot. See next paragraph.

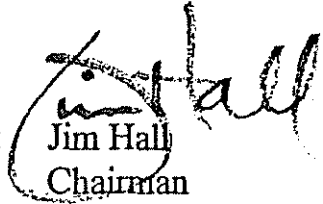
Further, the Safety Board believes that it is especially important to resolve this matter because it has been determined (as part of this investigation) that the approach control radar MSAW [minimum safe altitude warning] computer program will not function consistently (because the ridge interferes with the radar returns) for approaches to runway 15 and did not function adequately for AAL flight 1572.

The investigation of this accident is continuing, and the probable cause has not been determined. However, the Safety Board recommends that the Federal Aviation Administration:

Publish a visual descent point (VDP) for runway 15 in the appropriate location, and ensure that the VDP is present on all VOR runway 15 instrument approach charts used by pilots flying into Bradley International Airport (BDL). (Class II, Priority Action) (A-96-31)

If the inclusion of a VDP on approach charts to runway 15 is not possible due to obstacles, because charting methodology rather than empirical measurement was used to determine obstacle clearance, then ensure that a warning about the 3.5-degree glideslope and the high terrain along the approach path is placed on VOR runway 15 instrument approach charts for BDL, or make such a warning a permanent Notice to Airmen (NOTAM) for BDL, or use some other means to disseminate such a warning on a permanent basis. (Class II, Priority Action) (A-96-32)

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By: 
Jim Hall
Chairman