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National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 16, 1987

In reply refer to: A-87-107 through -111

Honorable T. Allan McArtor
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On October 25, 1986, Piedmont Airlines flight 467, a Boeing 737-222, N752N, was a regularly scheduled flight operating under 14 CFR 121 from Newark International Airport to Myrtle Beach, South Carolina, with an en route stop at Charlotte Douglas International Airport, Charlotte, North Carolina. There were 114 passengers and 5 crewmembers on board. The flight was routine until its arrival into the Charlotte area, where instrument meteorological conditions prevailed. At 2004:17, the flight was cleared for the instrument landing system approach (ILS) to runway 36R. The airplane touched down at 2007:19 and about 2007:43 it departed the runway. The airplane struck the localizer antenna array located about 300 feet from the departure end of the runway, struck a concrete culvert located 18 feet beyond the localizer, and continued through a chain link fence. It came to rest upon the edge of railroad tracks located 440 feet from the departure end of the runway. The airplane was destroyed, 3 passengers sustained serious injuries, and 3 crewmembers and 28 passengers sustained minor injuries in the accident. ^{1/}

After it left the runway, the airplane struck and broke off the localizer antenna array from its frangible moorings. However, about 18 feet beyond the antenna was a concrete culvert which caused almost all the damage to the airplane and injuries to those who were injured. The Safety Board believes that the presence of the concrete culvert created a more destructive and severe accident than what it otherwise would have been without the culvert.

The Safety Board expressed its concern about runway safety areas following a Texas International Airlines DC-9 accident at the Stapleton International Airport, Denver, Colorado on November 16, 1976. The airplane overran the runway during a rejected takeoff. Subsequent to the accident, the Safety Board recommended that the Federal Aviation Administration:

A-77-16

Amend 14 CFR 139.45 to require, after a reasonable date, that extended runway safety area criteria be applied retroactively to all certificated airports. At those airports which cannot meet the full criteria, the extended runway safety area should be as close to the full 1,000-foot length as possible.

^{1/} For more detailed information, read Aviation Accident Report—"Piedmont Airlines Flight 467, Boeing 737-222, N752N, Charlotte Douglas International Airport, Charlotte, North Carolina, October 25, 1986" (NTSB/AAR-87/08).

The FAA's initial response, dated July 11, 1977, stated that this recommendation would place an economic burden on airport operators. They did propose, however, an amendment to 14 CFR Part 139 that would require extended safety areas concurrently with construction of new airports, runways, and major runway extensions at existing airports. On October 23, 1985, the FAA published Notice of Proposed Rulemaking (NPRM) No. 85-22, "Revision of Airport Certification Rules," published at 50 FR 43094. In its response to the NPRM, the Safety Board supported the proposed section, 139.307, "Safety Area," which would require that safety areas conform to the criteria in effect at the time of an expansion of a runway, or at the time of certification. While the Safety Board continued to stress that criteria for runway safety areas should be made mandatory at all certificated airports regardless of the date of construction, it was sensitive to the practical and economic difficulties of implementing such a requirement.

Because the final disposition of the NPRM is not certain, the Safety Board has maintained Safety Recommendation A-77-16 as "Open—Acceptable Action." However, as a result of the extensive elapsed time since the Safety Board issued this recommendation, and the lack of completed action by the FAA, the Safety Board has changed its classification to "Open—Unacceptable Action," and urges the FAA to complete the rulemaking process as soon as possible.

In lieu of regulatory guidance concerning extended runway safety areas, Advisory Circular (AC) 150/5335-4, Change 2 to Airport Design Standards—Airports Served by Air Carriers" emphasizes the need for establishment of extended runway safety areas. The AC states that "for existing runways . . . extended runway safety zones should be provided wherever physically feasible and economically possible . . ." The AC states that the extended runway safety area is a rectangular area centered on the extended runway centerline. It begins at the end of the runway safety area and extends 800 feet to a point 1,000 feet from the runway end. Its width is the same as the runway safety area. It further stipulates that "the extended runway safety area should be cleared and free of structures, objects, abrupt surface irregularities, ditches, soft spots, and ponding areas. All objects, which, because of their function, must be maintained within the extended runway safety area, should be constructed with frangibly mounted supporting structures of minimum practical heights."

With respect to the extended runway safety area at the departure end of runway 36R at Charlotte Airport, the Safety Board takes a critical view of the location of a concrete culvert on the extended runway centerline 318 feet beyond the runway end. In fact, this culvert was allowed to exist 18 feet behind a localizer antenna that was made frangible at considerable expense.

The Safety Board reiterates its position that, unless physically impossible or economically impossible, the extended runway safety area should be maintained beyond the end of the runway. In the case of Charlotte Airport, although it would be impractical to move the railroad tracks located approximately 450 feet beyond the end of runway 36R, the concrete culvert probably could have been placed out of the extended runway safety area or could have been covered at little expense. Therefore, the Safety Board believes that the FAA should require airport managers to repair and/or remove, at the earliest opportunity, obstacles, such as concrete culverts, that are adjacent to airport areas.

The Safety Board is concerned that, due to the preexisting fatigue cracks, the forward flight attendant's seat could have failed had the cracks continued to be undetected under normal use loads, in addition to the type of high loads produced in this

accident. This could pose a danger to flight attendants and, as a result, threaten the ability of flight attendants to assist in an emergency. As a result, the Safety Board believes that the FAA should issue an airworthiness directive for a one-time inspection of the seat pan roller assembly of this type of seat (Trans Aero Industries, part No. 90835) for evidence of fatigue cracks.

The investigation also revealed that a potential hazard to the evacuation existed because of passengers who were considered to be intoxicated. It is clear that intoxicated passengers can pose a danger to themselves and others on an aircraft at all times, particularly in an emergency. As a result of its investigation into the accident involving an Embraer EMB-110P1 in Alpena, Michigan, on March 13, 1986, 2/ the Safety Board recommended that the FAA:

A-87-14

Issue an Operations Bulletin to Principal Operations Inspectors of carriers operating under 14 CFR Part 135 informing them of the need to improve passenger screening to prevent intoxicated passengers from boarding aircraft.

On June 2, 1987, the FAA informed the Safety Board that an Air Carrier Operations Bulletin (ACOB) was being developed which would address the issue of intoxicated passengers. The Safety Board has therefore classified Safety Recommendation A-87-14 as "Open—Acceptable Action," pending its review of the ACOB.

However, this accident demonstrates that operators of aircraft operating with flight attendants on board also must be vigilant to the potential dangers presented by intoxicated passengers. In an emergency where there is a need for passengers to exit the airplane quickly, such passengers can hamper a rapid evacuation. They can also become unruly and interfere with the duties of flightcrew members, thereby creating an emergency situation. Although the investigation was unable to determine whether the particular passengers were served alcohol while on board PI 467, the Safety Board believes that all flight attendants must be vigilant in preventing passengers from being given additional alcohol to the point where they reach intoxication. Therefore, the Safety Board urges the FAA to issue an operations bulletin to principal operations inspectors of air carriers operating aircraft with flight attendants informing them of the need to cease providing alcohol to passengers who are in, or appear that they are about to be in, an intoxicated state.

The lack of acceptable friction in portions of the runway increased the severity of the accident because the airplane departed the runway at a higher speed than it probably would have had there been adequate grooving and drainage in the departure end of the runway. The evidence indicates that PI 467 experienced hydroplaning before it departed the runway, as indicated by the reverted rubber marks found on the four main landing gear tires and the "steam clean" marks found on the departure end of the runway. Although runway friction was, according to FAA-recommended standards, not acceptable only near its departure end, the Safety Board concludes that the runway condition was not a primary cause of the accident because of the excessive speed of the airplane as it entered the last 1,500 feet of the runway; but the poor friction did contribute to the severity of the accident.

2/ For more detailed information, read Aircraft Accident Report—"Simmons Airlines Flight 1746, Embraer Bandeirante, EMB-110P1, Near Alpena, Michigan, March 13, 1986" (NTSB/AAR-87/02).

Although the Safety Board concludes that the condition of runway 18L/36R did not contribute to the cause of the accident, the evidence indicates that the runway did not meet the maintenance standards recommended in FAA Advisory Circular (AC) 150/5320-12A, dated July 11, 1986. The circular also indicates that the Charlotte Airport Authority did not comply with 14 CFR 139.83 regarding the prevention of ponding on runway pavement areas. The Safety Board believes that as part of the FAA annual certification inspection of airports, such defects should be identified and corrected.

Currently, airports that are certificated under 14 CFR Part 139 are responsible for their own "self-inspection" program that, among other things, requires them to ensure that the airport pavement surface is adequately maintained. The Charlotte Airport Operations Manual (AOM) was examined subsequent to the accident. It stated that "the runways have been designed to provide 1 1/2 percent crown . . . all of the runways are grooved full length and width to facilitate runoff." Because of the deficiencies that were found in the condition of runway 36R (i.e., it did not have 1 1/2 percent crown in over half the length, the grooving was substantially collapsed in the last 1,500 feet, there were ruts (which were conducive to ponding) for almost the entire length, and the measured friction over the last 1,500 feet was substandard), the Safety Board believes that the airport operator failed to maintain the runway surface to standards specified in the AOM or to the criteria recommended in AC 150/5320-12A.

Subsequent to the World Airways, DC-10 overrun at Boston-Logan International Airport on January 23, 1982, 3/ The Safety Board recommended that the FAA:

A-82-153

Use a mechanical friction measuring device to measure the dry runway coefficient of friction during annual certification inspections at full certificate airports and require that a Notice to Airmen (NOTAM) be issued when the coefficient of friction falls below the minimum value reflected in Advisory Circular 150/5320-12, Chapter 2.

A-82-154

Require that full certificate airports have a plan for periodic inspection of dry runway surface condition which includes friction measuring operations by airport personnel or by contracted services and which addresses the training and qualification of operators, calibration and maintenance of the equipment, and procedures for the use of the friction measuring equipment.

On January 14, 1987, the FAA responded to these safety recommendations stating that ". . . the FAA does not believe that measuring dry runway coefficient of friction during certification inspections would be cost-effective nor would any significant safety improvement result" and indicated that no further action was contemplated.

3/ Aircraft Accident Report—"World Airways, Inc., Flight 30H, McDonnell Douglas DC-10-30, Boston-Logan International Airport, Boston, Massachusetts, January 23, 1982" (NTSB-AAR-82-15).

In light of the frictional deficiencies that were found on portions of runway 36R at Charlotte Airport, the Safety Board believes that the concepts at issue in Safety Recommendations A-82-153 and -154 still have considerable merit. However, because the recent response indicates that FAA does not intend to take further action on these recommendations, and because the Safety Board is issuing new safety recommendations concerning these issues, Safety Recommendations A-82-153 and -154 have been classified as "Closed—Unacceptable/Superseded."

Despite the FAA's position with regard to annual measurements of runway friction, the Safety Board also believes that the deteriorated condition of runway 36R at Charlotte Airport is indicative of failures on the part of the airport operator and the FAA inspectors to identify and correct other runway conditions that could adversely affect the safety of air carrier operations during inclement weather conditions. Further, the Safety Board believes that the recently revised AC 150/5320-12A should serve as a basis for an aggressive runway inspection and maintenance program.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require airport managers to repair areas and/or remove obstacles, such as concrete culverts, that are adjacent to airport operating areas. Such repairs should be performed at the earliest opportunity. (Class II, Priority Action) (A-87-107)

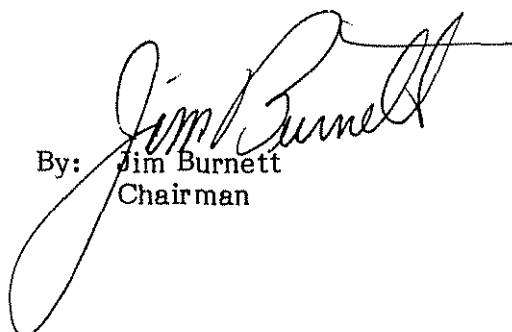
Issue an operations bulletin to principal operations inspectors of air carriers operating aircraft with flight attendants informing them of the need to cease providing alcohol to passengers who are in, or appear that they are about to be in, an intoxicated state. (Class II, Priority Action) (A-87-108)

Issue an airworthiness directive for a one-time inspection of the seat pan roller assembly of the flight attendant seat, Trans Aero Industries, part No. 90835, for evidence of fatigue cracks. (Class II, Priority Action) (A-87-109)

During annual inspections of full certificate airports, emphasize the identification of deficient runway conditions and use approved friction-measuring devices to measure the dry runway coefficients of friction; encourage the airport operator to correct (or provide appropriate notice to users) runway conditions that do not meet the criteria recommended in Advisory Circular 150/5320-12A. (Class II, Priority Action) (A-87-110)

During annual inspections of full certificate airports, verify that airport operations manuals address runway pavement inspection and maintenance criteria as recommended in Advisory Circular (AC) 150/5320-12A, and that airport operators are taking actions needed, including appropriate measurements of dry runway coefficients of friction with approved devices, to maintain runways to the criteria recommended in AC 150/5320-12A. (Class II, Priority Action) (A-87-111)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in these recommendations.

By:  Jim Burnett
Chairman