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Reg 1825

**NATIONAL TRANSPORTATION SAFETY BOARD**  
WASHINGTON, D.C.

ISSUED: November 14, 1985

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Forwarded to:

Honorable Donald D. Engen  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

**SAFETY RECOMMENDATION(S)**

A-85-127 and -128

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At 1337 on September 25, 1985, Markair Airlines Flight 71 (MA71), a Boeing 737-2X6C, N674MA, crashed during an attempted landing at Dutch Harbor Airport, Unalaska, Alaska. MA71 was a regularly scheduled passenger service flight from Anchorage, Alaska, to Unalaska. Preliminary evidence indicates that the airplane touched down about 70 feet short of the runway threshold, bounced, and landed hard on the runway with the left wing and left engine striking the runway. The left main landing gear and the left engine separated from the airplane, and the airplane came to rest approximately 1,300 feet beyond the approach end and 50 feet off the left side of runway 12. The captain, the first officer, 2 flight attendants and 16 passengers were not injured; there was no fire, but the airplane was substantially damaged.

Visual meteorological conditions existed at the time of the accident. The reported weather was 3,000 feet broken, visibility -- 20 miles, temperature -- 55°F, wind -- 160° at 8 knots.

Although the National Transportation Safety Board's investigation of this accident is continuing, the preliminary investigation has revealed safety related deficiencies in the operation of B-737 airplanes into Dutch Harbor Airport. Dutch Harbor Airport is a certificated airport under 14 CFR Part 139, and it has one compacted gravel runway (12/30) which measures 3,900 feet long and 100 feet wide. The runway is surrounded by water and mountains, and there are no safety areas or clearways at either end. Runway 12 has runway end identification lights and runway end reflective markers. A vertical cliff is situated 56 feet from and parallel to the left side of runway 12 near the approach end. This cliff rises rapidly to a height of 1,634 feet, and because of its proximity to the runway, the wind often produces localized drafts affecting the landing of airplanes on runway 12.

An inspection of the runway revealed that the approach end of runway 12 was not marked as required. One marker cone was completely out of sight in a washed-out gully. Flotsam had washed up and had covered the area immediately short of the runway 12 threshold. A large log, located just short of the runway, was lying perpendicular to the airplane's flightpath and had been struck by the airplane's left landing gear. A VASI for runway 12 had been washed away by high water in December 1980. Although the FAA subsequently considered rebuilding the VASI installation, they cancelled the project pending completion of other runway improvements by the State of Alaska. There are no current plans to replace the VASI.

The Safety Board has reviewed the Markair Airlines operations specifications, which were approved by the Federal Aviation Administration (FAA) to authorize scheduled passenger service in Boeing 737-200 airplanes to and from Dutch Harbor Airport under the provisions of the 14 CFR Part 121. The operations specifications contain 14 special conditions and limitations that the operator must comply with to conduct Boeing 737-200 operations to and from the airport. Included are landing and takeoff weight limitations, flightcrew training requirements and restrictions, wind and weather restrictions, airplane touchdown zone limitations, mandatory use of maximum auto brake during landing, special aborted takeoff procedures, and other operational limitations. According to the airplane flight manual, the landing distance 1/ for the Boeing 737-200 at the authorized landing weight under the foregoing special conditions and limitations is about 2,100 feet. Thus, the airplane can be landed on a runway having approximately 3,500 feet effective length 2/ and meet the requirements imposed for air carrier operations in Part 121.

Although the operation of Boeing 737-200 airplanes to and from Dutch Harbor Airport meets the regulatory requirements when the special conditions and limitations of Markair Airlines operations specifications are observed, the Safety Board is concerned that the level of safety provided is not sufficient for passenger-carrying operations. The pilot must conduct a nearly perfect approach at reference airspeed in order to achieve the touchdown precision and the minimal ground stopping distance used for the regulatory runway length determination in the airplane flight manual. The terrain-induced winds at the approach end of runway 12 combined with the absence of vertical guidance makes the achievement of such a precise approach path, speed control, and touchdown point difficult. Furthermore, the Safety Board believes that the airplane's braking performance upon which the stopping distance is predicated may not be achievable consistently on a compacted gravel surface. Therefore, the pilots, aware that they have a minimal landing distance margin, may be prompted to compensate by conducting a low and slow approach, thereby reducing the threshold crossing height and risking a landing short of the runway.

1/ The horizontal distance necessary to land and to come to a complete stop from a point 50 feet above the landing surface as determined during the airplane's certification.

2/ The airplane must be capable at its landing weight and conditions of making a full-stop landing within 60 percent of the effective length of the runway from a point 50 feet above the intersection of the obstruction clearance plane and the runway. For the Dutch Harbor Airport, the intersection is the end of the runway surface.

The questionable safety margin inherent in the operation is even further degraded by the lack of runway safety areas. The Safety Board has repeatedly expressed its concern -- prompted by several accidents -- about the general adequacy of runway safety areas. On April 20, 1977, the Board recommended that the FAA amend 14 CFR 139.43 to require that extended runway safety area criteria be applied retroactively to all certificated airports or that they be required to meet the full 1,000-foot length wherever possible. The FAA determined that such a requirement would place an unreasonable burden on airport operators. Consequently, the Board instead has urged voluntary action by airport operators to upgrade those runways which fail to meet current design criteria for extended runway safety areas.

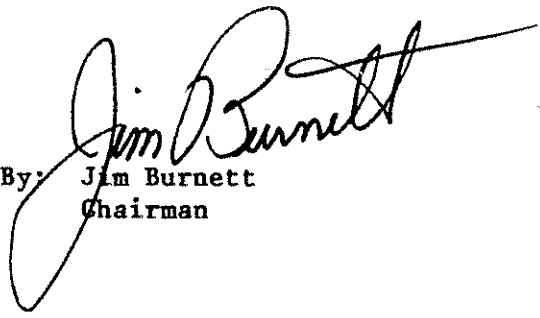
Although it may be impractical to add a safety area to the 3,900-foot runway at Dutch Harbor Airport, comparable safety can be achieved by considering a part of the existing runway as a safety area when determining landing limitations for compliance with 14 CFR 121.195. Thus, the Safety Board believes that it would be reasonable to consider the effective length of runway 12/30 to be no greater than 3,000 feet for landing and takeoff. Such a consideration would probably preclude the use of most turbojet transport airplanes for operations at the Dutch Harbor Airport. The facilities however would be acceptable for the performance capabilities of many turboprop and short-takeoff or landing types of airplanes, and operations with these airplanes would provide a level of safety consistent with other air carrier operations.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Reduce the effective length of the runway at the Dutch Harbor Airport, Unalaska, Alaska, to 3,000 feet for the purpose of determining aircraft suitability for passenger-carrying operations under 14 CFR Part 121. (Class I, Urgent Action) (A-85-127)

Improve the surveillance of the Dutch Harbor Airport, Unalaska, Alaska, to verify that runway markers, landing aids, and areas surrounding the runway surface are installed and adequately maintained. (Class I, Urgent Action) (A-85-128)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.

  
By: Jim Burnett  
Chairman