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National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: February 13, 1991
In reply refer to A-91-16 through -18

Mr. Michael Cerkovnik
President
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On June 2, 1990, at 0937 Alaskan Daylight Time, MarkAir, Inc., flight 3087, a Boeing 737-2X6C registered in the US as N670MA, crashed about 7.5 miles short of runway 14, Unalakleet, Alaska, while executing a localizer approach to that runway.¹ The flight originated at Anchorage International Airport, Anchorage, Alaska at 0828. Instrument meteorological conditions existed at the time, and the flight was on an instrument flight rules (IFR) flight plan. The captain, the first officer, and a flight attendant sustained minor injuries. Another flight attendant sustained serious injuries. There were no passengers on board, and the airplane was destroyed.

MarkAir's initial CRM course stressed established CRM concepts, such as the maintenance of situational awareness, the accident potential in the low-altitude "safety window," the continual monitoring and cross-checking of essential instruments and systems, the appropriate delegation of tasks, and the need to communicate clearly among crewmembers all plans and intentions. A "Life Event Checklist" (Rohe, 1972), which informally ranks life events from most distracting to least distracting, is a training aid in the MarkAir CRM program. The course also emphasized the fact that "appropriately assertive" behavior should be the middle ground in flight deck behavior and that passiveness and aggressiveness are the inappropriate extremes of behavior.

The captain participated in the initial CRM course at MarkAir in May, 1988. This course took 2 days and included 16 hours of classroom work. He stated that he had also participated in the Alaska Air National Guard's CRM training on a recurring basis. The first officer had not yet participated in any formal CRM training at MarkAir. However, CRM was a short topic during his initial indoctrination briefings. He was scheduled to attend the initial CRM course to be held on June 12 and 13, 1990.

¹ For more detailed information, read Aircraft Accident Report-- "MarkAir, Inc., flight 3087, Boeing 737-2X6C, N670MA, Controlled Flight into Terrain, Unalakleet, Alaska, June 2, 1990," (NTSB/AAR-91/02)

The first officer had begun line operations without having received CRM training because MarkAir had not included CRM in its initial training program. Also, the MarkAir CRM program did not incorporate all the elements of a complete CRM program, according to the guidelines of FAA Advisory Circular 120-51. Significantly, line operational simulation was omitted. This part of CRM training gives captains and first officers the opportunity to practice the flying pilot and nonflying pilot roles together as a crew, in a line mission context. It would have emphasized, to the first officer involved in this accident, the importance of nonflying pilot duties and the need to challenge the flying pilot when an approach is not being performed properly.

MarkAir's 16-hour classroom-based CRM training course would not have provided the first officer with the same level of awareness of the need to fulfill his monitoring duties as line operational simulation. However, even a classroom-based CRM course, properly constructed, could have heightened this awareness.

The Safety Board believes that the first officer's ability to perform his role as the nonflying pilot could have improved significantly if he had received CRM training prior to beginning line operations. Therefore, the Safety Board believes that MarkAir should revise its first officer initial training programs to ensure that all pilots receive at least the existing 16-hour CRM course prior to participating in line flight operations. Further, MarkAir should expand its CRM program to conform to the guidelines in FAA Advisory Circular 120-51. Therefore, the Safety Board recommends that MarkAir revise its ground training programs to ensure that all pilots receive at least the currently established 16-hour CRM course prior to participating in passenger-carrying flight operations.

Also, in light of recent FAA guidance concerning more detailed CRM training programs, the Safety Board recommends that MarkAir expand its CRM training to include the concepts outlined in Advisory Circular 120-51. This advisory circular describes a CRM program consisting of three phases. The first phase, similar to MarkAir's current 2-day course, consists of definition and discussion of basic CRM concepts. The second phase consists of practice and feedback through line-oriented flight training (LOFT). The third phase includes continuous reinforcement as part of an airline's operational philosophy.

Concerning the general workload on the accident flight, the captain stated that the workload was "normal" that he did not feel rushed, and that he did not believe that the first officer felt rushed. The first officer stated that he did not think the workload was abnormal compared to his previous experience on MarkAir flights. He did state, however, that because he was new to the B-737, he was "busy all the time" on the accident flight. When asked if the out-of-the-ordinary procedure of closing the engine bleed valves prior to the gravel runway landing would tend to distract him from monitoring the approach, the first officer answered in the affirmative.

The first officer, although experienced in reciprocating and turboprop airplanes, was relatively inexperienced in his duties in the B-737, having

accrued only 80 hours in the turbojet airplane. The captain was aware of the first officer's inexperience and provided guidance regarding the airplane and the operation throughout the flight. Normally, an experienced first officer would be expected to accomplish his duties--reading and accomplishing checklist items, monitoring temperatures and anti-ice system status, switching bleed air valves, and so on--with little difficulty and at the same time successfully monitor the captain's conduct of the approach.

On three occasions, the captain audibly indicated or implied his plan to descend from 1,500 feet when reaching the 10 DME. Whether these comments were intended to solicit confirmation from the first officer that this descent was in accord with the approach plate, it is clear that the first officer did not question the captain's action.

The Safety Board believes it more likely that the first officer was not monitoring the approach closely because he was preoccupied with his other duties. His comment, "I'm new in the airplane and busy all the time," supports a conclusion that the number of new procedures and new actions required distracted him from closely monitoring the instrument approach. He was trained to accomplish the steps in the checklist but was unable to accomplish them quickly and with confidence because of a lack of experience in the B-737.

The first officer's comment concerning his being distracted during the somewhat unusual and, to him, complicated bleed valve reconfiguration procedure also indicates that his monitoring of the instrument approach was inadequate. He was asked to reconfigure the bleed valves as the airplane was descending through 1,700 feet. About this time, the pilots should have begun to level the airplane off at the critical altitude of 1,500 feet and fly to DRIGE. From an approach planning standpoint, it would have been much safer to reconfigure the bleed valves considerably earlier, at a higher altitude, when there was less cockpit activity. Reconfiguring the bleed switches around 1,700 feet prevented a rapid pressurization change within the cabin but was not reason enough to risk pilot distraction at a critical point in the flight.

Therefore, the National Transportation Safety Board recommends that MarkAir, Inc.:

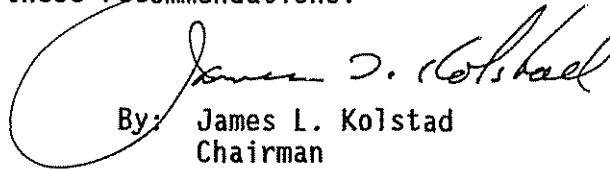
Expand the MarkAir cockpit resource management program to conform to the guidelines in FAA Advisory Circular 120-51. (Class II, Priority Action) (A-91-16)

Revise the MarkAir ground training programs to ensure that all pilots receive the current 16-hour MarkAir cockpit resource management training program prior to participating in scheduled air carrier operations. (Class II, Priority Action) (A-91-17)

Revise the MarkAir flight checklists and training program to ensure that bleed switch deactivation for gravel runway landings is accomplished at sufficient altitude so as not to be a distraction during critical phases of flight. (Class II, Priority Action) (A-91-18)

Also, as a result of this investigation, the Safety Board issued Safety Recommendation A-91-15 to the Federal Aviation Administration.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, BURNETT, and HART, Members, concurred in these recommendations.

A handwritten signature in cursive script, appearing to read "James L. Kolstad". The signature is written in dark ink and is positioned above the typed name and title.

By: James L. Kolstad
Chairman