

alarm was timely, and the first unit reported "on scene" within 1 minute of the time the alarm was sounded.

2.2 Conclusions

a. Findings

1. The visibility at O'Hare at the time of the accident was one-fourth mile in fog.
2. Airport traffic beyond the confines of the main terminal area could not be observed visually from the control tower.
3. The ASDE "BRITE" equipment at the O'Hare tower provided indistinct displays of airport ground traffic.
4. The ground controller's transmission to the CV-880 was ambiguous because he did not specify which of two similarly numbered runup pads was to be used as a holding point.
5. The flightcrew of the CV-880 did not request clarification of the ground controller's ambiguous transmission.
6. Flightcrews and controllers in the Chicago terminal area both deviated from the prescribed ATC communication procedures.
7. The captain of the DC-9 was operating under a valid clearance.
8. Neither the local controller nor the flightcrew of the DC-9 was aware of the proximity of the CV-880 to Runway 27L.

b. Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the traffic control system to insure separation of aircraft during a period of restricted visibility. This failure included the following: (1) the controller omitted a critical word which made his transmission to the flightcrew of the Delta CV-880 ambiguous; (2) the controller did not use all the available information to determine the location of the CV-880; and (3) the CV-880 flightcrew did not request clarification of the controller's communications.

3. RECOMMENDATIONS

On March 20, 1973, the Federal Aviation Administration issued Air Carrier Operations Bulletin 73-1. This bulletin requested that each Principal Operations Inspector review his assigned carrier's emergency evacuation training program to assure compliance with 14 CFR 121.417. The bulletin recommended that the initial and recurrent training programs

provide for operation of each emergency exit by individual crewmembers either on the aircraft or on a suitable mockup.

On March 21, 1973, the FAA advised North Central Airlines that the portion of its emergency evacuation training program which authorized training by demonstration on the operation and use of emergency exits was cancelled. Also, provisions were set forth that required: (1) all crewmembers individually to operate each type of emergency exit during initial and recurrent training; (2) all DC-9 crewmembers, except those who had done so in the preceding 12 months, to operate the DC-9 tail cone exit within the succeeding 90 days; and (3) North Central Airlines to demonstrate an emergency evacuation of a DC-9 within the succeeding 30 days.

The Board has submitted six recommendations (A-73-21 through 26) to the FAA concerning air traffic control procedures. Correspondence related to these recommendations is included in Appendix E.

Five recommendations (A-73-39 through 43) concerning the crash survival aspects of this accident and two other recent accidents were submitted to the Federal Aviation Administration in a letter issued June 25, 1973. (See Appendix F.)

An additional survival aspect, a need for improved emergency evacuation capability in darkness and smoke conditions, was illustrated by this accident. In the darkness and smoke, the passengers had extreme difficulty in finding their way to the main exit and in locating exits. Four passengers left their seats and apparently attempted to find an exit but were unable to do so under the conditions that existed.

In January 1968, a study entitled, "New Concepts for Emergency Evacuation of Transport Aircraft Following Survivable Accidents" was prepared by North American Rockwell Corp., Aerospace and Systems Group. This study discussed a number of concepts to improve egress from aircraft involved in survivable accidents. These concepts included among others, sonic indicators at emergency exits; "chemical light" to outline aisles, exits and egress devices; revised cabin lighting; floor level lighting; and tactile indicators for exit routes.

Our evaluation of this accident as well as other recent survivable accidents indicates that egress from the aircraft would have been easier and faster if some or all of the above listed items had been available in the aircraft.

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

1. Amend the existing certification and operating rules for air carrier and air taxi aircraft to include provisions requiring tactile guidance and improved visual guidance to emergency exits,

as well as more efficient methods of indicating the location of emergency exits in a dark or smoke environment. (Recommendation A-73-53)

A major factor in this accident was that the ground controller did not know the position of the CV-880 following initial radio contact because he did not hear the position given by the flightcrew. Additionally, the controller did not use the ASDE to verify or determine the position of the aircraft, the controller did not issue instructions to taxi via a specific route to a specific destination, and the flightcrew did not request additional clarifying information from the controller. To eliminate these problems, the Board recommends that the Federal Aviation Administration:

2. Require flightcrews to report their aircraft position on the airport when establishing radio communications with controllers, and require the controllers to read back the reported aircraft position when it cannot be verified either visually or by means of radar. (Recommendation A-73-54)
3. Require flightcrews to read back taxi clearances when operating in visibilities of less than one-half mile. (Recommendation A-73-55)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

July 5, 1973