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FAA facilities and modify the procedures to assure that information pertinent to "Safety of Flight" is disseminated without delay.

"2. Require that V reference speed checks be included on the last checklist used immediately prior to takeoff.

"3. Require the installation of runway distance markers at all civil airports where air carrier aircraft are authorized to operate.

"4. Require the use of takeoff procedures which will provide the flightcrew with time and distance reference to associate with acceleration to V_1 speed.

"5 Require manufacturers to include information in the Aircraft Flight Manual concerning the aircraft controllability and performance characteristics with the loss of any system that involves flight controls. Consideration should be given to incorporating training in such in-flight emergencies in all approved simulator programs at the earliest possible date."

On February 24, 1972, the FAA replied that:

1. They had initiated a study to reevaluate the NOTAM system. Following receipt of comments from the FAA regions and evaluation by a headquarters team, a manual which will consolidate and standardize all information concerning NOTAM's will be developed.
2. They plan to issue an operations bulletin to all their field inspectors to ensure that airline training programs emphasize the necessity for flightcrews to assure that takeoff reference speeds include accurate resolution of all pertinent factors prior to initiating a takeoff. They also noted that PAA plans to include takeoff reference speeds on the before-takeoff checklist for all their aircraft.
3. Runway distance markers have been evaluated in the past and found lacking for takeoff purposes.
4. They agreed in principle with the recommendation that flightcrews be provided with time and distance reference to associate with acceleration to V_1 speeds. They also noted that "various segments of the industry" were investigating systems to monitor aircraft takeoff performance. The FAA is following the development of these systems and their possible application to everyday operations.
5. They believe that present flight manuals and training procedures are satisfactory at this time.

In view of the difficulties experienced in transmitting the order to evacuate the aircraft to the cabin attendants and passengers, the Board also recommends that:

1. The FAA require all air carrier aircraft to be equipped with an audio and visual evacuation alarm system. This system should be capable of being activated in the cockpit and at each flight attendant's station. The alarm system should be self-powered so that interruption of the aircraft electrical systems will not interfere with use of the evacuation alarm.

The Board found that there were several problems associated with the escape systems installed in this aircraft. These problems included passenger escape slides that did not function correctly or, when they did function, they were not useable. One slide failed to function because the trigger mechanism in the wheelwell area was damaged by impact. Another slide was dislodged from its installed position at impact. A third slide failed to function because the gas generator bottle was dislodged, probably due to its proximity to the impact area in the fuselage. One slide inflated properly but was blown out of position by the wind and could not be used. Considering these problems, the Board recommends that:

2. The FAA review the slide pack mounting design, gas generator retention design, and

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the protection of the wheelwell mounted gas generator installation. This review should be made to determine what actions can be taken to improve these components and make them more reliable.

The Board has been informed that the manufacturer is reviewing the design of the escape slides to determine what can be done to prevent or reduce the effect of wind on inflated slides. The Board encourages this work and wishes to reiterate its interest in the resolution of this problem.

The Board also noted that there was a difference between the life jackets supplied for passenger use and the lifejackets used by the cabin attendants during the passenger briefing. Only one cabin attendant was aware of this difference. Therefore, the Board recommends that:

3. The FAA take additional steps to ensure that all cabin crewmembers are properly informed regarding the safety equipment installed in the cabin and that the emergency equipment used for passenger demonstrations is the same as that provided for the passengers' use.

The Board is also concerned about the hazard offered by the displacement of ceiling panels in this aircraft. Some of these panels fell into the cabin in such a way that they could have restricted or blocked passenger attempts to escape from the cabin. The Board recommends that:

4. The FAA review the criteria applied to the installation of these panels and effect whatever action is appropriate to improve the installation so that the panels will stay in position during survivable impact load imposed on the cabin structure.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ OSCAR M. LAUREL
Member

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

May 24, 1972.