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b. Probable Cause

The Board determines that the probable cause of this incident was the premature touchdown of the aircraft during a visual approach to a relatively short runway, induced by the pilot's not establishing a glidepath which would assure runway threshold passage with an adequate safety margin, under somewhat unusual environmental and psychological conditions.

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3. RECOMMENDATIONS

As a result of its study of the evidence, the Board recommends that the FAA:

1. Require the installation and use of a VASI system at all airports used by large, wide-bodied jet transport aircraft.

2. Initiate action to insure that modifications are made to the present VASI system so as to make the system more compatible with the characteristics of large, wide-bodied jet transport aircraft, yet retaining its utility for the smaller aircraft. Consideration of the pulsed light concept is particularly encouraged.

3. Undertake quantitative research into the effect of rain on the windshield in order to determine more accurately the finite relationships between the amount of rain and the degree of displacement between the real and apparent positions of objects viewed through a water-covered windshield.

4. Undertake research to determine the effect of curved windshields and the possibility of false visual cues from multiple lights in the peripheral visual areas.

5. Develop and require "in the cockpit" devices which would display the approach path to the pilot, in the absence of externally originated information such as ILS, VASI, etc. Such devices, however, must not appreciably increase the crew cockpit workload, nor distract the pilot from proper use of his flight instruments.

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

August 26, 1970.

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