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3. RECOMMENDATIONS

Although the Safety Board has been unable to determine the probable reason for the unrecognized descent below MDA in this instance, the Board wishes to reiterate its concern with the general problem of landing and approach accidents and to reemphasize its interest in the various preventive measures which might prove useful in reducing the rate of these kinds of accidents. There is a need for all segments of the aviation industry to continue to focus attention on the unique demands for crew coordination and vigilance during nonprecision approaches. Area navigation systems, now in the final proving stages of development, will apparently provide descent guidance capability within the aircraft and should be standard equipment on all future transport category aircraft. The retrofitting of aircraft in the inventory should be expedited as much as possible.

The Safety Board also notes and supports the FAA in its issuance of Air Carrier Operations Bulletin No. 71-9 which emphasizes the common faults noted in nonprecision approaches and proposes several recommendations to eliminate these faults. (See Appendix F.)

In view of the foregoing, the Safety Board recommends that:

34- 1. All segments of the aviation industry continue to focus attention on the unique demands for crew coordination and vigilance during nonprecision approaches. Particular emphasis should be placed on the accelerated development of area navigation systems with vertical guidance capability and on heads-up display systems.

The Board, on February 13, 1968, supported a Notice of Proposed Rule Making which would require the installation of an altitude warning device for turbojet powered civil airplanes. The basis for this support, cited in the letter, was a series of aircraft accidents involving air carrier aircraft that had been involved in controlled crashes into the ground or water. Of the five accidents cited, three occurred during the final approach to landing. In the other two cases, the aircraft were descending in preparation for an approach and landing.

On January 17, 1969, writing with reference to accidents which occur during the approach and landing phase of flight, the Board recommended, among other things, the development and installation of audible and visual altitude warning devices and the implementation of procedures for the use of such devices. The FAA response to this recommendation was to cite its rule making dated September 1968, which required the installation of altitude alerting devices in all turbo powered civil aircraft. This device would provide both aural and visual indications to warn pilots when they approach selected altitudes during climbs,

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descents, and instrument approaches. However, the Board has found that this device as installed and operated does not provide any information regarding the aircraft proximity to the ground during the final approach phase of a landing approach.

On November 10, 1971, in an aircraft accident report, NTSB-AAR-71-14, the Board recommended that a ground proximity warning device be developed for use during the approach and landing phase of flight. The Board further recommended that appropriate operating procedures be developed and implemented.

The Administrator's response to this recommendation stated in part: ". . . With respect to the recommendation to develop a ground proximity warning system for use during approach and landing, we believe the present instruments and procedures are safe and adequate. This presupposes that proper cockpit disciplines are maintained . . . We are, however, reassessing our system requirements for nonprecision straight-in approach systems with a view to providing additional assistance to the pilot in the form of accurate position information which will make his evaluation of the visual approach segment less susceptible to human error . . ." (See Appendix G.)

Finally, on February 25, 1972, Board Report NTSB-AAR-72-4 contained a recommendation that the Administrator require all air carrier aircraft to be equipped with a functional ground proximity warning device in addition to the barometric altimeters. The Administrator's response continued to support the earlier position quoted above. (See Appendix G.) In addition, the FAA advised the Board that they were developing new criteria which they proposed to apply to nonprecision approaches. One criterion involves establishing a final approach descent fix. This fix would be located at a point on the final approach from which a normal descent path of approximately 3^{o} from MDA to touchdown could be commenced, provided the required visual reference was established. Pilots would be required to maintain an altitude at or above the MDA until passing this descent fix. Another criterion the FAA proposed will be to provide VASI for each runway served by a nonprecision approach. The VASI will provide vertical guidance at normal descent rates for the visual segment of the approach.

The Board believes that these two items will aid in preventing accidents that occur during nonprecision approaches and believes that these proposals are timely and appropriate. The Board also urges the FAA, wherever physically possible and within the limits of available resources, to convert approaches from nonprecision to precision at qualified airports through the installation of an ILS. In this connection, even the installation of a nonstandard glide slope, such as the one currently in use at Huntington, is a substantial improvement in the aids available to a pilot in making his approach descent.

With regard to the Administrator's response to our recommendation that he reevaluate his position regarding the installation and use of ground proximity warning devices, the Board notes that the decision is based on the assumption that "proper cockpit disciplines are maintained." We have found in several cases of this type that cockpit disciplines were disrupted by unusual actions or events and the crew was distracted from its task of monitoring the aircraft altitude. We believe that a ground proximity warning device would serve to bring the crew's attention back to the altimeters as the aircraft approached preselected altitudes during an instrument approach. Therefore, the Board again recommends that:

35 - 2. The Administrator evaluate the need for the installation and use of ground proximity warning devices on air carrier aircraft.

After consideration of the airport qualifications established by FAR 121.443 and 121.445, the Board concludes that the requirements of 12.445 are less specific than those in 121.443. The Board believes that Part 121.445, or the carrier procedures promulgated thereunder, could be more specific, particularly in the manner by which the pilot is required to show that he has the requisite knowledge. Therefore, the Board recommends that:

36 - 3. The FAA continue to emphasize the importance of the provisions of Part 121.445 in its surveillance and inspection of flight operations under Part 121. Such emphasis is needed to assure that these operators are (1) using the best means available to enable pilots to qualify under 121.445, and (2) requiring pilots to show that they have acquired the requisite knowledge prior to completion of a flight release.

Finally, the Board wishes to acknowledge and express continuing support for the long term Static Pressure Measurements Project undertaken by the National Aeronautics and Space Administration at the Lewis Research Center. The Board believes that these tests and similar efforts by other organizations will provide significant data on the flight and weather conditions which might lead to static system contamination and altitude misinformation, a subject which is invariably raised in connection with landing and approach accidents. The Board therefore urges that such testing be expedited and will await with anticipation the results thereof, which hopefully will shed some light on an area that has too many unknowns.

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

April 14, 1972