NATIONAL TRANSPORTATION SAFETY BOARD
DEPARTMENT OF TRANSPORTATION
WASHINGTON, D.C. 20591

A-6925

JAN 10 1969

Mr. David D. Thomas
Acting Administrator
Federal Aviation Administration
Washington, D. C. 20590

Dear Mr. Thomas:

Within the past 6 months, we have investigated five accidents in which an aircraft struck ground objects or crashed short of the runway threshold while executing an instrument approach where visibility had been reduced substantially by fog. The weather conditions which obtained and the type of approach being conducted in these five cases are summarized in the enclosure to this letter.

We have reviewed a number of studies relating to the problems encountered in conducting low visibility approaches. Of particular interest were the many references to hazards associated with the penetration of shallow fog. These references include, among other things, discussion of:

(1) the rapid reduction in the visual guidance segment available to the pilot if the fog is both shallow and dense;

(2) the possibility that the pilot may mistake the reduction in light and the guidance segment as a change in pitch attitude in the nose-up sense, and

(3) the lack of adequate visual clues relating to pitch attitude and aircraft height until the aircraft is less than 100 feet above the approach light or runway level. There is in addition, evidence that, even at this low altitude, pitch information is inadequate unless the runway threshold also is in sight.

Problems associated with shallow fog penetration were discussed at the public hearing conducted in connection with the Piedmont Airlines Accident at Charleston, West Virginia, on August 10, 1968. These discussions, and subsequent conversations with line and company pilots of four other air carriers, revealed that air carrier formal ground school and recurrent training programs do not include specific discussions on shallow fog penetration, the effect on the guidance segment, or the

illusions that may be created in the pilot's mind. The Board was also informed that a simulator capable of providing training in low visibility approaches presently does not exist.

Despite the above considerations, present Part 91 of the Federal Aviation Regulations permits an instrument approach to continue below the published and approved minimum descent altitude or decision height so long as the pilot has some ground object in sight which can be identified with the end of the runway. The pilot is, of course, expected to execute a missed approach if he loses sight of this ground object. However, the decision to continue or abandon the approach is likely then to be made at an altitude where either course of action is dangerous. That this situation is indeed hazardous is confirmed by the recent undershoot accidents. In view of the foregoing, the Board recommends:

(1) That section 91.117 and section 121.649 of the Federal Aviation Regulations be amended to prohibit any approach below 200 feet above field level unless the pilot has the runway threshold in sight and require that he continue to have same in sight during the remainder of the approach.

(2) That the Federal Aviation Administration bring to the attention of all instrument pilots the hazards associated with shallow fog penetration. This might be accomplished in the form of an Advisory Circular and/or by publication in the Airman's Information Manual. Reference to training films, such as the ICAO production of "Fog and Runway Lighting," and the sources from which such films could be obtained, should be included.

(3) That information on shallow fog penetration, the effect upon the guidance segment, and the potential illusions that can be created be included as mandatory items in air carrier training programs and in the curriculum of FAA approved Instrument Flight Schools.

(4) That the Federal Aviation Administration pursue as expeditiously as possible their research project to determine the instrumentation necessary to provide slant visual range information.

(5) That the Federal Aviation Administration establish standards and specifications for, and encourage the development of synthetic trainers capable of providing realistic low visibility approach simulation.

(6) That improved approach zone lighting in at least the last 1,000 feet of the approach preceding the runway threshold be programmed

for installation on a priority basis at airports having a climatological history of frequent heavy fog conditions when and if financial conditions permit.

Sincerely yours,

Original signed by

Joseph J. O'Connell, Jr.

Joseph J. O'Connell, Jr.
Chairman

Enclosure

FIVE RECENT APPROACH ACCIDENTS

CEILING, SKY CONDITION, VISIBILITY, TYPE

OF APPROACH

1. La Guardia Field, New York

   June 3, 1968; 1021 e.d.t., TWA B-727; ILS Approach; Weather: Partial Obscuration, Scattered clouds at 500 feet, High broken clouds, Visibility 3/4 mile in fog and haze.

2. Charleston, West Virginia

   August 10, 1968; 0857 e.d.t., Piedmont Airlines FH-227; ILS Approach; Weather: Partial Obscuration, High thin overcast, Visibility 1 mile in ground fog and smoke.

3. Cherry Point, North Carolina

   September 27, 1968; 0343 e.d.t., Universal Airlines DC-7C; GCA Approach; Weather: Ceiling 300 feet, Sky obscured, Visibility 3/4 mile in fog.

4. San Francisco Bay, California

   November 22, 1968; 0927 P.s.t., Japan Airlines DC-8; ILS Coupled Approach; Weather: Ceiling 300 feet, Sky obscured, Visibility 3/4 mile in fog.

5. Orange County Airport, California

   November 23, 1968; 1959 P.s.t., Cable Commuter Airlines DHC-6; VOR Approach; Weather: Partial Obscuration, Visibility 3/4 mile fog and haze.