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

A-68-6

MAR 18 1968

IN REPLY
REFER TO: NC-1-NA-90

Honorable William F. McKee
Administrator
Federal Aviation Administration
Department of Transportation
Washington, D. C. 20590

Dear General McKee:

In our investigation and analysis of general aviation accidents, we consider all relevant aspects of meteorological facilities, services, and procedures. Our analysis of aircraft accident data covering general aviation during the year 1966 has recently been published. Among other things, this analytical summary reveals that weather was shown as a direct cause in only 2.4% of all such accidents and 6% of these were fatal. However, it also shows that weather was cited as a related factor more frequently than any other (751 accidents or 13.1% of the total and, of these, 22% were fatal). Similar figures could be quoted for previous years. In the light of such statistics, it is incumbent upon all concerned to seek ways and means of improving the record.

Based upon all the information at our disposal, it is our conviction that improved meteorological facilities, services, and procedures could have reduced substantially the degree of hazard involved in these general aviation operations. Our recommendations relative to such improvements are attached hereto. Some of these recommendations have been stated by the Board previously. Many of the others are not original with the Board; some were highlighted by the Environmental Science Services Administration (ESSA)/Federal Aviation Administration (FAA)/Industry Survey conducted last year. Nevertheless, we feel it imperative that an effort be made to identify areas of the aviation weather service that are in need of improvement so that the responsible agencies may undertake effective corrective action.

General William F. McKee (2)

The Board is aware that implementation of this entire program would involve very substantial increases in funds available for such purpose. We are also aware that there are over-all budget considerations which would make the rapid implementation of such a program unrealistic in terms of early complete accomplishment.

However, as a long-range program we believe our recommendations are worthy of adoption. We also believe some of the improvements suggested are susceptible of accomplishment without basic change in existing programs, but rather by more affirmative attention to them. Recommendations numbered 6, 17, 20, 21, 22, 24, and 25 are examples of the sort of thing we have in mind as subject to improvement along the lines just mentioned.

In view of the Memorandum of Agreement between the FAA and ESSA dated August 2, 1965, and in the interest of facilitating coordination between your two agencies, a similar letter transmitting our recommendations is being forwarded to the Administrator of ESSA.

Sincerely yours,

Joseph J. O'Connell, Jr.
Chairman

Enclosure

ENCLOSURE

NATIONAL TRANSPORTATION SAFETY BOARD RECOMMENDATIONS
FOR IMPROVEMENTS IN THE AVIATION WEATHER SERVICE

1. Increase the number of aviation weather observing sites. There are many gaps in the network both in the contiguous U. S. and in Alaska. Even taking into account the Supplementary Aeronautical Reporting Stations (SAWRS), there is still only about one observing station for each nine airports and only a portion of them are open on a 24 hour per day basis.
2. A vigorous program of quality control of aviation weather observations should be developed. A basic requirement of the aviation community is detailed, accurate reports.
3. Cloud-height measuring equipment should be provided at all aviation weather observing stations. The practice of estimating cloud heights is simply not conducive to providing accurate information or to safe aircraft operations.
4. Additional efforts should be made to standardize the location of weather instruments at airports. We have in mind particularly, standard locations for representative measurements of wind and cloud height over the airport and cloud information from that area along the approach path where "decision height" is involved.
5. Methods should be developed for measuring and forecasting low-level wind shear in the terminal area.
6. In order to insure more accurate visibility observations, adequate visibility reference markers (particularly nighttime markers) should be provided for the guidance of observers. A survey of copies of visibility reference marker charts should reveal those locations where inadequacies exist, and corrective action should be taken thereafter. These inadequacies have been revealed on numerous occasions during aircraft accident investigations such as at Freeland, Michigan, Barnes Airport, Westfield, Massachusetts, Miles City, Montana, Ardmore, Oklahoma, and Cincinnati, Ohio.
7. Continued efforts should be made to expand the upper-air observing network and to increase the number of rawinsonde ascents to four per day. Gaps in the network are numerous and two ascents per day are certainly not optimum for aviation purposes.

8. The weather radar network should be expanded, particularly west of approximately 100° West Longitude, and weak, obsolete, war-surplus equipment should be replaced with up-to-date, long-range weather radar sets.

9. It is recognized that it is generally impractical to base a staffing plan on the "bad weather" situation. It appears, however, that some revisions or expansions are required, so that a continuous weather watch could be maintained and improved pilot briefing services provided at those locations manned by one person during certain hours. There are many locations where a single person is faced with a mountainous workload during bad weather and making aviation weather observations in an accurate and timely manner may have to take a lower priority than other assigned duties.

10. Continue the expansion of the Runway Visual Range (RVR) program including the multiple installation of transmissometers. When more than one transmissometer is installed along an instrument runway, appropriate procedures will be required to standardize the extent and type of RVR information to be provided to the pilot, e.g., information from the touchdown zone, roll-out area and/or center of the runway complex. It is also clear that in the low visibility ranges, additional research is required into the means to adequately assess RVR.

11. A means of measuring slant visibility or slant visual range which a pilot would experience on an approach to landing would certainly enhance air safety.

12. In view of the enthusiastic support by the users of the Pilot-to-Forecaster experimental programs at Kansas City and Washington, it is suggested that serious consideration be given to establishing an operational program on a national basis.

13. The Transcribed Weather Broadcasts (TWEB) network should be expanded to provide coast-to-coast coverage.

14. The Pilots Automatic Telephone Weather Answering Service (PATWAS) should be greatly expanded to provide its service to many additional areas, particularly those areas where live weather briefing may not now be available.

15. There is a need for more pilot weather briefing facilities.

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16. Substantial improvements in weather briefings could be realized by the provision of facsimile equipment for all weather briefing facilities. This would also assist in the desired standardization of pilot weather briefing procedures.

17. Additional efforts should be made to improve and standardize weather briefing displays.

18. Provision should be made for additional telephone lines to weather briefing facilities. In this connection, arrangements could be made for the caller to receive (when the briefers are occupied) a recorded announcement to stand by for a briefing. Receipt of such an announcement would certainly be an improvement over a busy signal and in many cases would lead to a pilot receiving a slightly delayed briefing instead of being tempted to depart with no information.

19. In order to assist the Safety Board in accident investigations and for ESSA/FAA quality control purposes, audio recording of pilot weather briefings is advocated.

20. Aviation stands to benefit from information derived from weather satellites. Accordingly, it is considered that special efforts should be made to devise refined techniques and procedures for providing aviation-oriented weather satellite information on a national basis.

21. The terminal forecasting program should be expanded. Terminal forecasts are currently available on a routine basis for only about 5% of the airports in the United States.

22. There continues to be a need for improved delineation of aviation forecast area boundaries. A revision of the present system of delineation should be considered in order to define more precisely the area boundaries--perhaps a reassignment of areas of forecast responsibility to make the boundaries contiguous with state boundaries.

23. We adhere to the belief that a centralized Clear Air Turbulence (CAT) forecasting center should be established, similar to the Severe Local Storms (SELS) unit. Certainly safety, efficiency, and economy would be enhanced by such an establishment.

24. Continued efforts should be made to improve the procedures for obtaining and disseminating inflight weather information.

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25. We are concerned with instructions to forecasters regarding the modifiers to be used for In-flight Advisories (SIGMETs) containing Clear Air Turbulence (CAT) forecasts. Forecasters are directed to use the phrase "moderate or greater" in CAT forecasts and may only use "severe" or "extreme" in CAT reports. These instructions (in Chapter D-22 of the Weather Bureau Operations Manual) appear to be contrary to preceding instructions (in that Manual) which call for SIGMETs to be issued when (among other things) "severe" or "extreme" turbulence are expected. Unfortunately, "moderate or more turbulence" includes all intensities except "light". Furthermore, it seems unfair and certainly not very helpful to the pilot not to be apprised of the forecasters thinking and intent in regard to the category of turbulence to be anticipated.

26. There has always been a requirement for more accurate aviation weather forecasts, particularly for the terminal area, and research into improved forecasting methods should continue to be pursued. Research should also be conducted to develop objective methods for measuring or forecasting the intensity of icing and turbulence.