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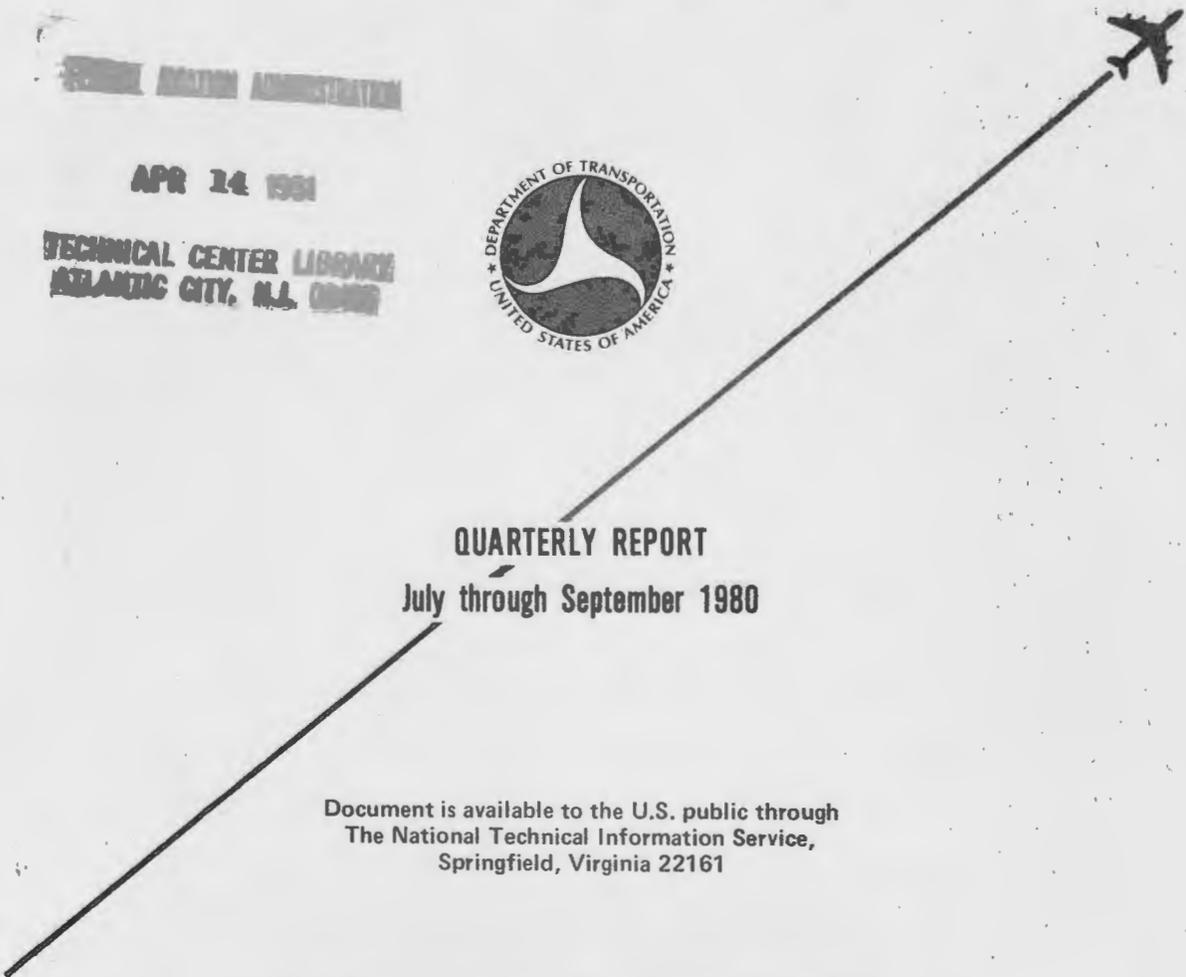
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# SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSES TO NATIONAL TRANSPORTATION SAFETY BOARD SAFETY RECOMMENDATIONS

FEDERAL AVIATION ADMINISTRATION

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QUARTERLY REPORT  
July through September 1980

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**U.S. DEPARTMENT OF TRANSPORTATION**

**FEDERAL AVIATION ADMINISTRATION**

Office of Aviation Safety

Washington, D.C. 20591

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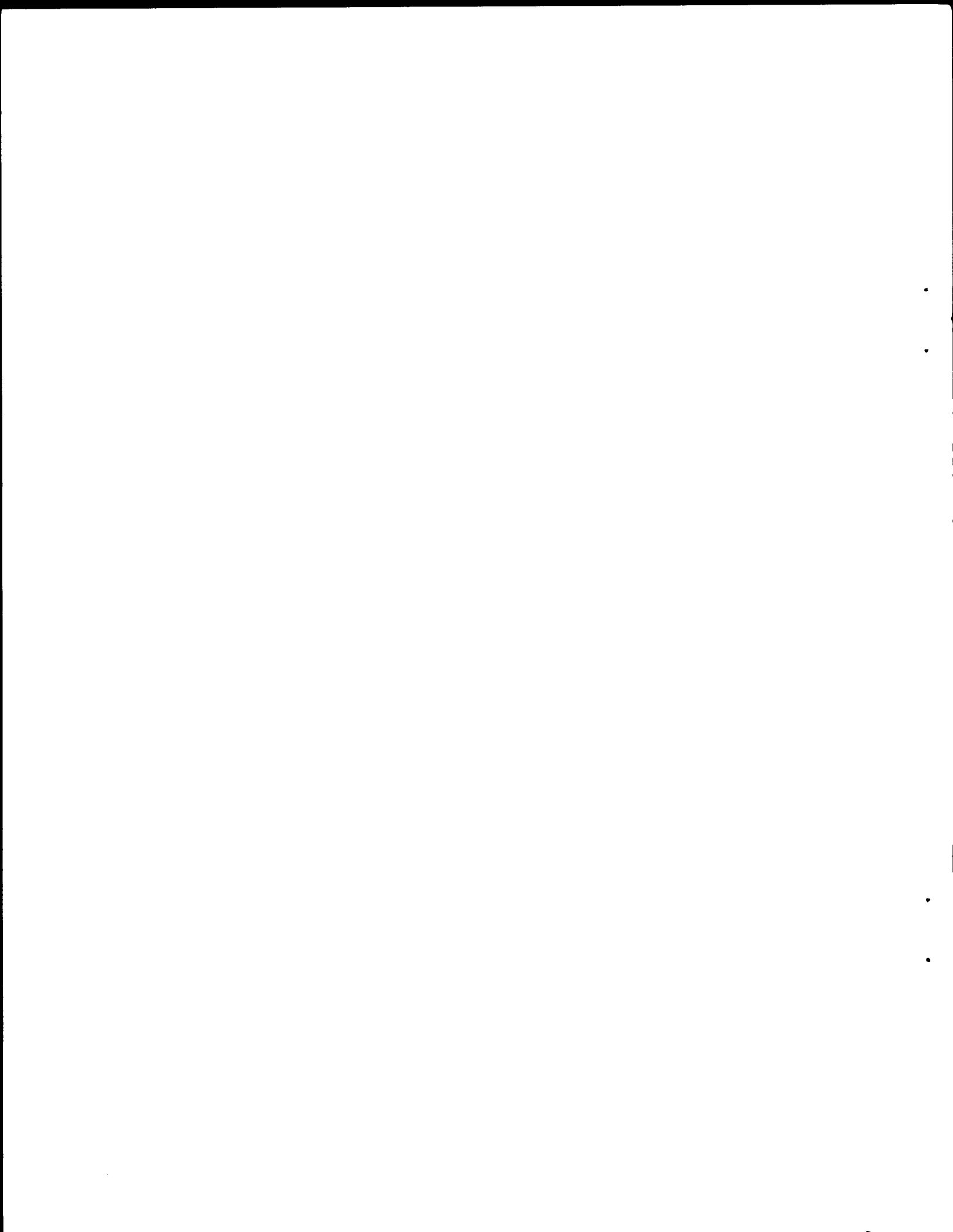
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1. Report No.		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Summary of Federal Aviation Administration Responses to National Transportation Safety Board Safety Recommendations		5. Report Date October 1980		6. Performing Organization Code ASF-300	
		8. Performing Organization Report No.			
7. Author(s) Harrison, J. R., et al					
9. Performing Organization Name and Address Office of Aviation Safety Federal Aviation Administration U. S. Department of Transportation Washington, D.C. 20591		10. Work Unit No. (TRAIS)		11. Contract or Grant No.	
		13. Type of Report and Period Covered Quarterly July - September 1980			
12. Sponsoring Agency Name and Address Office of Aviation Safety Federal Aviation Administration U. S. Department of Transportation Washington, D.C. 20591		14. Sponsoring Agency Code ASF-300			
		15. Supplementary Notes			
16. Abstract  This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions.  The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as "Closed" by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-80-27 through 29), but background material is included only for those recommendations which remain in an "Open" status. Background information for those recommendations which have been closed is available in FAA headquarters files.					
17. Key Words National Transportation Safety Board Safety Recommendations Aviation Federal Aviation Administration			18. Distribution Statement Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	22. Price



## FOREWORD

The National Transportation Safety Board as established by Public Law 93-633, Title III, "Independent Safety Board Act of 1974," has among its duties the requirement to ". . . issue periodic reports to the Congress, federal, state, and local agencies concerned with transportation safety, and other interested persons recommending and advocating meaningful responses to reduce the likelihood of recurrence of transportation accidents and proposing corrective steps."

The Act specifies that whenever the Board submits a recommendation regarding transportation safety to the FAA, or other agencies of the Department of Transportation, that the agency shall respond to each such recommendation formally and in writing not later than 90 days after receipt thereof. The Act also requires that the response to the Board shall indicate the agency's intention to initiate adoption of the recommendation in full or in part, or to refuse to adopt such recommendation, in which case the response shall set forth in detail the reasons for the refusal.

A notice of each recommendation and the receipt of a response from the agency is published in the Federal Register. There is no requirement to publish either the recommendation or the response in its entirety.

The Federal Aviation Administration places a high priority on the evaluation of the Board's investigation and its recommendations. In recognition of the importance of these recommendations and the responses, the FAA, beginning with the first quarter of calendar year 1980, publishes quarterly reports of NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions.

The NTSB system of priority classification for action provides for documented NTSB followup action for each safety recommendation in accordance with one of the following classifications:

1. Class I - Urgent Action: Urgent commencement and completion of action is mandatory to avoid imminent loss of life or injury and/or extensive property loss.
2. Class II - Priority Action: Priority commencement of action is necessary to avoid probable loss of life or injury and/or property loss.
3. Class III - Longer-Term Action: Routine action is necessary so that possible future injury and loss of life and property may be avoided.

The purpose of this publication is to provide a systematic quarterly update and summation of NTSB Safety Recommendations and FAA actions and reponses. This document is intended to keep the public abreast of NTSB and FAA efforts in the area of aviation safety for the applicable quarter covered by the report.

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SUMMARY

Statistics for CY 1979 included:

108 new recommendations issued to FAA.

46 recommendations officially "CLOSED" during this period.

The following exchanges of NTSB/FAA correspondence concerning NTSB Safety Recommendations occurred during the third quarter, July 1 - September 30, 1980:

- FAA initial responses to NTSB recommendations:

16 letters involving 28 recommendations

- FAA letters to NTSB discussing reconsideration of earlier responses, current status or followup actions:

7 letters involving 12 recommendations

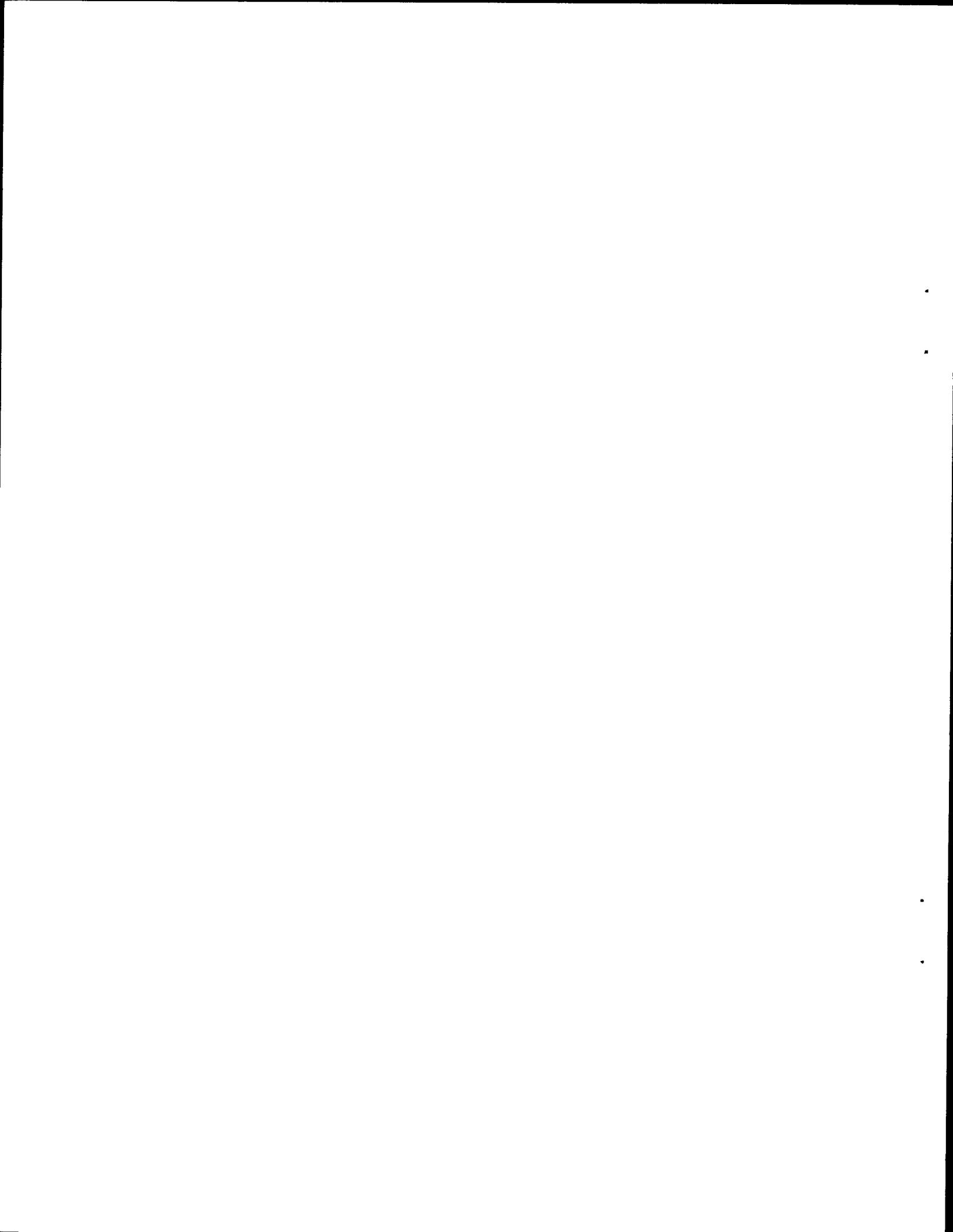
- FAA "final report" letters to NTSB:

9 letters involving 21 recommendations

Officially "Closed" by NTSB during this quarter - 21 recommendations.

There were 4 FAA responses to 7 Class I--Urgent Action recommendations during this quarter.

<u>Accident Date</u>	<u>Recommendation Number</u>	<u>Issue Date</u>	<u>Response Date</u>	<u>FAA Action</u>
2/2/80	A-80-26	4/9/80	7/1/80	AD issued
1/1/80 (incident)	A-80-27	4/9/80	7/8/80	AD issued
3/20/80	A-80-32 & 33	4/24/80	7/18/80	AD issued
5/6/80	A-80-53 thru 55	6/27/80	9/25/80	AD & GENOT issued



The FAA response to Class I - Urgent Action recommendations is reflected by the following summaries:

A-80-26.

On February 2, 1980, a Piper Model PA-22-135, N3747A, crashed at Princeton, Illinois, after the right wing separated in flight. On February 18, 1978, a Piper Model PA-22, N1693P, sustained an inflight failure of the right wing and plummeted to the ground at Camden, Tennessee. In each accident, both persons aboard were killed.

Both investigations disclosed that the right front fork assembly, attaching the front wing lift strut to the fuselage, failed in the threaded portion due to metal fatigue. Both assemblies were cadmium plated, steel fork models and were configured with cut-threads. Forks with rolled-threads are stronger and less prone to metal fatigue. For this reason, Piper Aircraft Corporation currently produces these forks with rolled-threads only, although replacement forks with cut-threads may still be available.

On April 21, 1977, a related, nonfatal accident involving a Piper Model J-5, N38702, occurred at Hindsville, Arkansas. The investigation disclosed that the left rear lift strut fork failed and the strut detached itself from the fuselage. Despite severe control difficulty, the pilot made a successful emergency landing.

Airworthiness Directive 58-10-02, applicable to Piper Models PA-22, -20, -19, -18, -16, -14, and -12, J-4, J-5, AE-1, and HE-1 series aircraft, requires that all lift strut forks be replaced every 1,000 hours on seaplanes and every 2,000 hours on landplanes. This AD has been effective in maintaining a good level of safety since 1958 for an average of about 30,000 airplanes that use wing lift strut fork P/N 14481 and 11431.

However, it became evident that some airplane operators/owners were switching forks from one airplane to another. Therefore the time in service reflected in field records became questionable. To avoid reliance upon these questionable records, an emergency AD was issued April 17, 1980, which satisfied the recommendations of NTSB Safety Recommendation A-80-26. This AD also eliminated reliance upon a relatively short repetitive inspection interval for maintenance of the lift strut forks with machine threads. It requires a magnetic inspection of all wing lift strut forks within 5 hours; replacement of machine-threaded forks with forks with rolled threads within 50 hours or 180 days, whichever occurs first; 500-hour repetitive inspection of forks with rolled threads; and continues the existing service life on forks with rolled threads. The FAA also included in the AD a request for the results of the inspection required by the AD for the purpose of determining if any further action would be required for the forks with rolled threads.

AD 58-10-02 was amended April 25, 1980, by airmail letter. This amendment permits a dye penetrant inspection within 5 hours or 25 days, whichever occurs first. This dye penetrant inspection is permitted at 20-hour intervals, until a maximum of 50 hours or 180 days, whichever occurs first, at which time the magnetic inspection must be accomplished. Additionally, it provides relief for operators who obtained these forks from Piper, or an FAA-approved source. This is accomplished by the provision that states if the parts have less than 195 hours or 3 years in service, whichever occurs first, compliance with the inspection requirements of the AD do not have to be accomplished until the accumulation of 200 hours in service, or 3 years, whichever occurs first. The FAA also included a number of older models in the 50-hour and 500-hour magnetic inspection requirements for increased safety, although no problems had been experienced with these aircraft.

As a result of the FAA issuance of the emergency Airworthiness Directive (AD) of April 17, 1980, and the FAA's air mail letter of April 25, 1980, amending AD 58-10-02, the Board concluded that FAA's actions were fully responsive to the recommendation. Accordingly, Safety Recommendation A-80-26 was classified as "Closed--Acceptable Action", on July 28, 1980.

A-80-27.

The National Transportation Safety Board studied an incident which occurred January 1, 1980, wherein a fuel leak was discovered in the tailcone service area of a Learjet-36 during a postflight inspection. The leak was traced to the left motive flow valve (PN AV16E1182) (SN H46478) which is located in the tailcone service area where the batteries and other electrical components are positioned. The valve had operated about 1,663 hours. It was reported that, when the valve was pressurized, fuel spurted about 5 inches into the air and sprayed into the service area in sufficient quantity to wash soot from installed equipment in the compartment. Portions of the electrical junction box adjacent to the valve were saturated with fuel.

The valve was removed and forwarded to the Gates Learjet Corporation under warranty for replacement, and a Service Difficulty Report, No. 01110043, was prepared. The valve was X-rayed, examined visually, and then bench-tested at the Gates Learjet facility in Wichita, Kansas. The X-ray and the visual examination did not reveal any apparent defects. The screws that attached the valve motor to the valve body were tight and properly safetied. The cure dates of the "O" rings were marked "4th quarter 1974" and the assembly date was September 5, 1974.

The valve was installed in a pressure test device and tested at the normal operating pressures it would experience in the aircraft. Fluid leaked at the mounting plate where the valve motor attached to the valve body. The valve motor was then removed from the valve body. The mating surfaces were clean, and there were no visible defects. The upper "O" ring (MS29513-16) was found to be broken into 3 pieces, and one piece was found between the valve body and the cylinder wall. The lower "O" ring was intact.

Federal Aviation Administration (FAA) service difficulty reports included two additional incidents dated 1975 and 1977, of fuel leaks in motive flow valves installed on Gates Learjet aircraft. The Safety Board expressed concern about the extreme hazard that would be associated with having a relatively high-volume fuel leak in a compartment where there are many potential ignition sources. In its reports of an accident involving a Gates Learjet at Sanford, North Carolina, the Safety Board determined that the probable cause of the accident was "... one or more low-order explosions in the aircraft's aft fuselage which resulted in a fire and loss of control capability. The Safety Board could not determine conclusively the fuel and ignition sources of the initial explosion; however gases from the aircraft's batteries or fuel leaks from fuel system, components, or both, could have been present in the area of the initial explosion." On April 9, 1980, the NTSB recommended that the FAA "Notify all Learjet operators by telegram of the motive flow valve leak found in this incident, and require an immediate and a recurring inspection of these valves under operating pressures to detect and correct any fuel leaks founds."

The FAA reviewed the information gathered during the examination and testing of the motive flow valve involved in Safety Recommendation A-80-27. The Gates Learjet maintenance manual was revised on September 28, 1979, to require a check of the hydraulic and fuel system components in the tailcone of Learjet aircraft for general condition and leaks during postflight inspections following major inspections, repairs, or alteration to the aircraft. Additionally, the FAA issued Airworthiness Directive (AD) 80-09-06, effective May 8, 1980, and required, within 25 hours, a complete initial inspection of the tailcone service area for leaks, sources of ignition, or obstruction of vents and drains immediately after engine shutdown at the conclusion of each flight. Since there was no accident or incident involving ignition of fuel leaks in the tailcone area, and the air in the area is changed 8 to 11 times per minute while in flight, the probability of having a combustible mixture in the area did not appear to justify a telegraphic AD.

On September 8, 1980, the Board expressed pleasure with FAA's actions and classified Safety Recommendation A-80-27 as "Closed--Acceptable Alternate Action."

A-80-32 and A-80-33.

On March 20, 1980, a Sikorsky S-76A, PT-HKB, operating off the coast of Brazil, South America, crashed at sea killing 14 persons. This was the first accident for this model helicopter since its certification in November 1978.

The continuing investigation was under the jurisdiction of the Government of Brazil. On April 21, 1980, a fractured main rotor head spindle section from the accident aircraft was delivered to the United States for examination in order to verify the findings of the Brazilian Government metallurgist.

According to the NTSB's Metallurgical Laboratory, examination of the fractured surface verified the findings of the Brazilian Government metallurgist that there was a fatigue crack with multiple origins. The FAA determined, however, that this finding was not related to the accident cause. Pursuant to verification by metallurgists at NTSB's Metallurgical Laboratory, the FAA initiated, also on April 24, 1980, actions which satisfy the Board's objectives as follows:

1. A telegraphic Airworthiness Directive (AD), T80NE-21, was issued by FAA's New England Regional Office on April 24, 1980. Issuance of the AD adopted the NTSB's recommendation with some minor differences.
2. Within the next 25 hours time-in-service after receipt of AD T80NE-21, the P/N 76102-08000 main rotor blade assemblies were to be modified in accordance with Sikorsky Alert Service Bulletin 76-65-13A, paragraphs G(4) and G(5).
3. Main rotor blade spindles with more than 200 hours time-in-service, unless already accomplished within the last 50 hours time-in-service, were required to be fluorescent penetrant inspected within the next 5 hours time-in-service in accordance with Sikorsky Alert Service Bulletin 76-65-13A, paragraph G(6).

Foreign regulatory agencies were notified of this action in accordance with the Board's Safety Recommendation A-80-33. A listing of all domestic and foreign owners/operators of the Sikorsky Model S-76A was forwarded to FAA's Office of Airworthiness for this purpose at the time the AD was issued. Telegrams were sent to the respective civil aviation authorities or equivalent of foreign-registered aircraft as part of the FAA telegraphic AD procedures.

Additionally, requested background information pertaining to AD T80NE-21 was supplied via air mail to the CAA (Australia) on May 2, 1980, and via telegram to the Brazilian Consulate (Atlanta) and the Technical Airspace Center (CTA) (Brazil) on April 30, 1980.

In response to FAA's decisive action, the NTSB expressed pleasure and classified Safety Recommendations A-80-32 and A-80-33 in a "Closed--Acceptable Action" status on August 25, 1980.

A-80-53 through A-80-55.

On May 6 1980, a Learjet model 23 aircraft crashed while attempting a night landing on runway 33 at Byrd Field, Richmond, Virginia. The skies were clear, visibility was 10 mi, and the wind was calm. Although the Learjet was slightly high on the approach, it descended normally in a landing attitude. But before touching down, the aircraft yawed and rolled, and first the right wingtip fuel tank and then the left tiptank struck the runway. Thereafter, the nose of the aircraft pitched up, the engine thrust increased, the aircraft rolled to the right, and it crashed in a nearly inverted attitude. A fire erupted after impact, and both pilots, the only persons aboard, were killed. The aircraft had been manufactured in 1964. Available optional slow-flight modifications installed on many Learjets had not been installed on this aircraft.

In recent years, several Learjet accidents have been investigated in which the aircraft, while on the landing approach, exhibited similar roll and yaw maneuvers followed by a loss of control and a crash. The other Learjets involved were models 24, and 25 aircraft, with the Century III and Raisbeck slow-flight modifications. The investigation revealed that in each landing accident, the aircraft apparently was flown, as specified, with the yaw damper disengaged, although the altitude at which the yaw damper was disengaged could not be verified. The accident records indicate that turbulence, crosswinds, wing icing, pilot technique, or other conditions had disturbed the aircraft's equilibrium during a flare or go-around maneuver and that erratic roll and yaw maneuvers and a loss of aircraft control ensued. Subsequent flight tests indicated that an increase in engine thrust during an attempt to recover the aircraft may cause roll oscillation to become more pronounced and may reduce the likelihood of recovery.

In February of 1979, the Federal Aviation Administration (FAA), the Gates Learjet Corporation, the National Aeronautics and Space Administration, the National Transportation Board, and other interested parties participated in a "Study of Selected Performance Characteristics of Modified Learjet Aircraft." The objectives of the study were to examine the operation of the stall warning system, to determine the most probable effect of small amounts of ice on stall characteristics, and to study the low-speed handling qualities of the modified aircraft in a landing configuration.

The FAA has been aggressively pursuing corrective actions relative to these Learjet problems for some time. A review of the accident data pertaining to these aircraft was initiated immediately following the May 6 accident at Richmond. On June 9, 1980, the Safety Analysis Division of FAA's Office of Aviation Safety submitted an analysis of Learjet accidents and Service Difficulty Reports to the Office of Flight Operations

The analysis indicated a need for reevaluation of Learjet systems and subsystems concerning stick pusher and shaker, autopilot pitch and roll elevator, aileron and throttle cables.

It was determined that aircraft control was involved in approximately 30 percent of the 49 accidents used in the analysis. Aircraft control involved overshoot, undershoot, runway alignment, and flying speed; but pilot flight-hour experience did not appear to be a factor. In addition to the "Study of Selected Performance Characteristics of Modified Learjet Aircraft" held during February of 1979, a separate investigation was initiated by the FAA on June 17, 1980, designed to accomplish a certification review to include other areas not specifically addressed in the Board's recommendations. Although this review is still in progress, preliminary information developed jointly by FAA and Gates Learjet Corporation indicates flight characteristics at the limits of the operating envelope. These characteristics in combination with presently approved operating procedures could adversely affect safety of flight. In light of the foregoing, on August 1, 1980, the FAA issued by airmail letter an emergency airworthiness directive to Learjet aircraft owners.

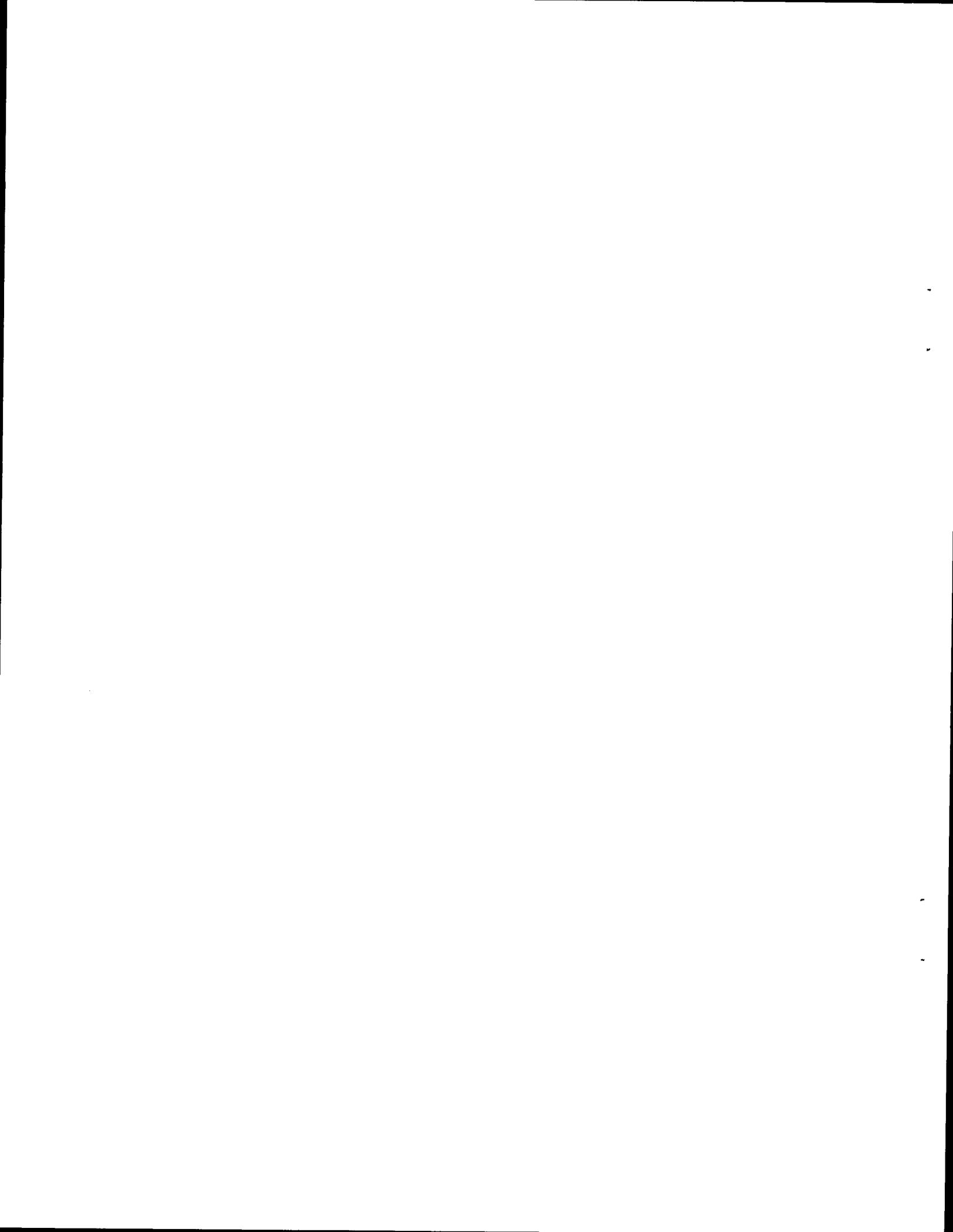
Immediately upon receipt of these Safety Recommendations, a notice, which included the Board's entire transmission, was sent to all Learjet operators. In addition, a GENOT was telegraphed to all FAA General Aviation District Offices (GADO's), Flight Standards District Offices (FSDO's) and Air Carrier District Offices (ACDO's), directing that all Learjet Part 91, 121, and 135 operators be contacted to verify that the operators received the notice and were fully aware of the contents of NTSB's Safety Recommendations.

In addition, FAA's Office of Flight Operations established a separate team to review the adequacy and effectiveness of Learjet crew training. Also, a GENOT was distributed on May 22, 1980, to all GADO's, FSDO's and ACDO's. This GENOT requested the immediate inspection of all Learjet aircraft for installation of mach warning cut-out switches. We noted seven instances of aircraft with unapproved cut-out switch installations, and these all have now been removed. Finally, on June 2, 1980, a special issue of General Aviation Airworthiness Alerts was published. This alert addressed the subject of unapproved alterations of speed warning systems in both air carrier and general aviation aircraft.

On January 8, 1981, the NTSB took note of FAA's continuing investigations which have resulted, thus far, in the FAA's issuance of Airworthiness Directive (AD) 79-12-05 and airmail letter (emergency AD) dated August 1, 1980. Pending the results of the FAA's findings, Safety Recommendations A-80-53 is being maintained in an "Open--Acceptable Action" status.

The Board expressed satisfaction with actions taken by the FAA to fulfill recommendation A-80-54 and the status was classified as "Closed--Acceptable Action" on January 8, 1981.

By letter of January 8, 1981, the Board recognized that the FAA's responsive actions to A-80-53 and A-80-55 were closely related, and are subject to, the FAA's continuing investigation. The NTSB noted the issuance of FAA's GENOT on May 22, 1980, and General Aviation Airworthiness Alert, AC No. 43-16, in June 1980, regarding unapproved alterations to speed warning systems. Pending the results of FAA's continuing investigation, recommendation A-80-55 is now classified in an "Open--Acceptable Action" status.





Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

July 28, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

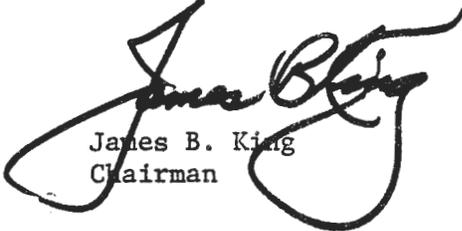
Dear Mr. Bond:

Thank you for your response to National Transportation Safety Board Safety Recommendation A-80-26 issued April 9, 1980. This recommendation stemmed from two Piper PA-22 accidents involving the inflight separation of the right wing. We recommended that the Federal Aviation Administration (FAA):

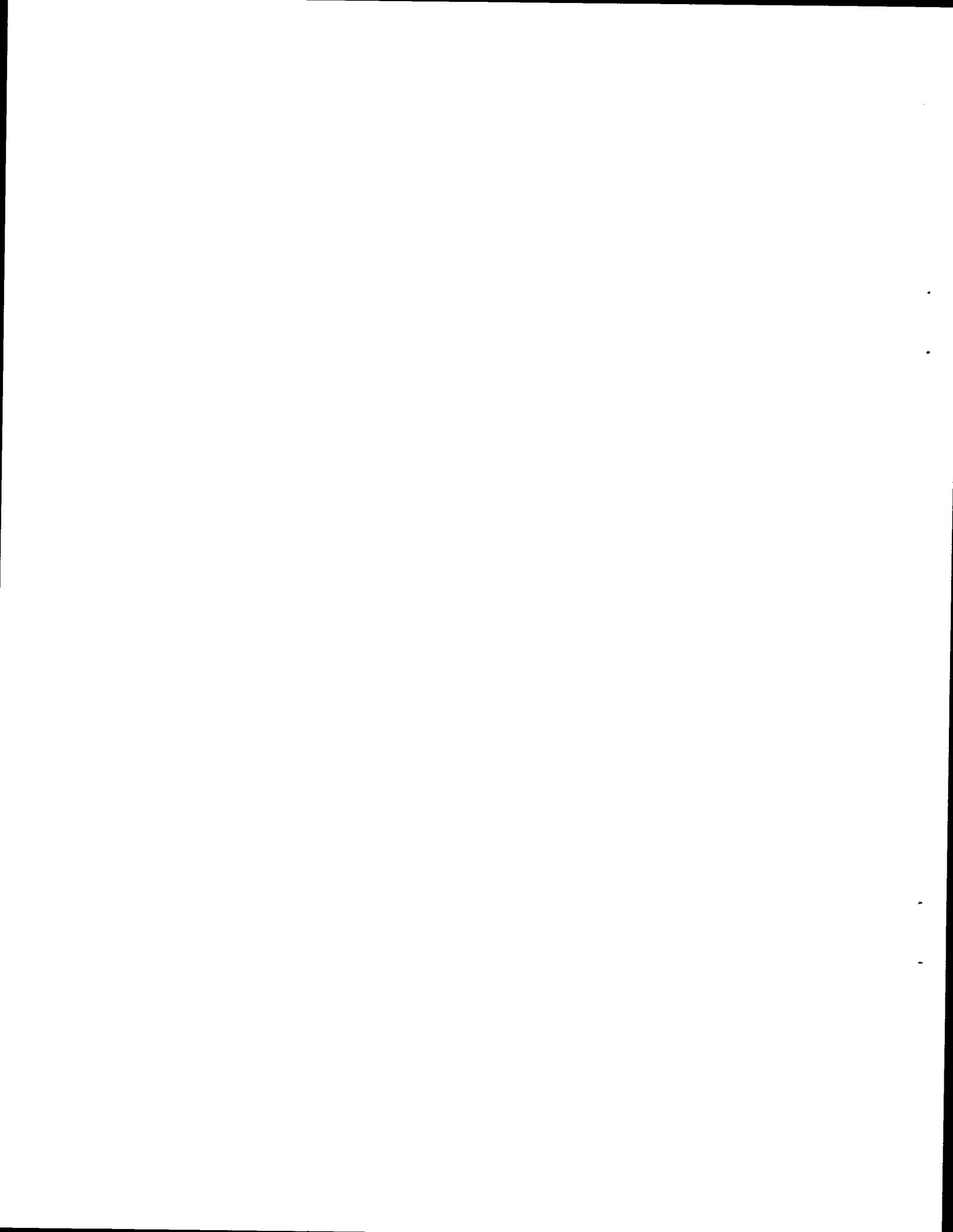
"Issue an Airworthiness Directive requiring an immediate inspection of all lift strut forks on those Piper Aircraft enumerated in Airworthiness Directive 58-10-02 for indications of cracking. Institute fork replacement/inspection intervals more stringent for forks with cut-threads than those specified in Airworthiness Directive 58-10-02. Limit acceptable replacement forks to those with rolled-threads."

We have examined the FAA's emergency Airworthiness Directive (AD) of April 17, 1980, and the FAA's air mail letter of April 25, 1980, amending AD 58-10-02. We find the FAA's actions fully responsive to the recommendation, which is now classified as "Closed--Acceptable Action."

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 1, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Recommendation A-80-26, issued by the Board on April 9, 1980. This recommendation resulted from the Board's investigation of failures of the right front fork assembly due to metal fatigue on selected models of Piper aircraft.

The following are the Federal Aviation Administration's (FAA) comments and actions in response to this recommendation:

A-80-26. Issue an Airworthiness Directive requiring an immediate inspection of all lift strut forks on those Piper Aircraft enumerated in Airworthiness Directive 58-10-02 for indications of cracking. Institute fork replacement/inspection intervals more stringent for forks with cut-threads than those specified in Airworthiness Directive 58-10-02. Limit acceptable replacement forks to those with rolled-threads.

Comment. Airworthiness Directive (AD) 58-10-02 requires 500 hours repetitive inspection of the wing lift strut fork for seaplanes, and 1000-hour and 2000-hour replacement times for seaplanes and landplanes, respectively. This AD has been effective in maintaining a good level of safety since 1958 for an average of about 30,000 airplanes that use wing lift strut fork P/N 14481 and 11431.

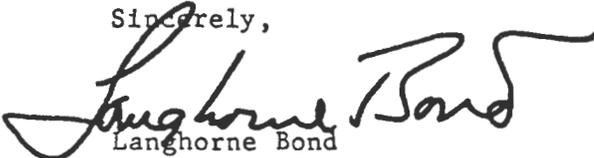
However, it has become evident that some airplane operators/owners are switching forks from one airplane to another. Therefore, the time in service reflected in field records becomes questionable. To avoid reliance upon these questionable records, an emergency AD was issued April 17, 1980, (copy enclosed) which accomplishes the recommendations of NTSB Safety Recommendation A-80-26. This AD also eliminates reliance upon a relatively short repetitive inspection interval for maintenance of the lift strut forks with machine threads. It requires a magnetic inspection of all wing lift strut forks within 5 hours; replacement of machine-threaded forks with forks with rolled threads within 50 hours or 180 days, whichever occurs first; 500-hour repetitive inspection of forks with rolled threads; and continues the existing service life on forks with rolled threads. We have also included in the AD a request for the results of the inspection required by the AD for the purpose of determining if any further action will be required for the forks with rolled threads.

2

AD 58-10-02 was amended April 25, 1980, by airmail letter (copy enclosed). It permits a dye penetrant inspection within 5 hours or 25 days, whichever occurs first. This dye penetrant inspection is permitted at 20-hour intervals, until a maximum of 50 hours or 180 days, whichever occurs first, at which time the magnetic inspection must be accomplished. Additionally, it provides relief for operators who obtained these forks from Piper, or an FAA-approved source. This is accomplished by the provision that states if the parts have less than 195 hours or 3 years in service, whichever occurs first, compliance with the inspection requirements of the AD do not have to be accomplished until the accumulation of 200 hours in service, or 3 years, whichever occurs first. We have also included a number of older models in the 50-hour and 500-hour magnetic inspection requirements for increased safety, although we have not had problems with these aircraft to date.

We believe the preceding action corrects those deficiencies which were of concern to the NTSB in Safety Recommendation A-80-26. Accordingly, the FAA considers action completed on this recommendation.

Sincerely,

  
Langhorne Bond  
Administrator

2 Enclosures

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

ISSUED: April 9, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-26

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On February 2, 1980, a Piper Model PA-22-135, N3747A, crashed at Princeton, Illinois, after the right wing separated in flight. On February 18, 1978, a Piper Model PA-22, N1693P, sustained an inflight failure of the right wing and plummeted to the ground at Camden, Tennessee. In each accident, both persons aboard were killed.

Both investigations disclosed that the right front fork assembly, attaching the front wing lift strut to the fuselage, failed in the threaded portion due to metal fatigue. Both assemblies were cadmium plated, steel fork models and were configured with cut-threads. Forks with rolled-threads are stronger and less prone to metal fatigue. For this reason, Piper Aircraft Corporation currently produces these forks with rolled-threads only, although replacement forks with cut-threads may still be available.

On April 21, 1977, a related, nonfatal accident involving a Piper Model J-5, N38702, occurred at Hindsville, Arkansas. The investigation disclosed that the left rear lift strut fork failed and the strut detached itself from the fuselage. Despite severe control difficulty, the pilot made a successful emergency landing.

Airworthiness Directive 58-10-02, applicable to Piper Models PA-22, -20, -19, -18, -16, -14, and -12, J-4, J-5, AE-1, and HE-1 series aircraft, requires that all lift strut forks be replaced every 1,000 hours on seaplanes and every 2,000 hours on landplanes. Service experience indicates that continual operation on rough terrain or rough water could cause fatigue failure of the fork. The forks, P/N 14481-00, are identical on all models except for the J-4 where it is P/N 11431.

The failed fork from N3747A, a landplane, had been magnetically inspected in 1958 just before being installed in this aircraft. Maintenance records indicate that the fork had accumulated approximately 2,000 flight-hours at the time of the accident. The failed forks from landplanes N1693P and N38702 had accumulated 1,899 flight-hours and 830 flight-hours, respectively.

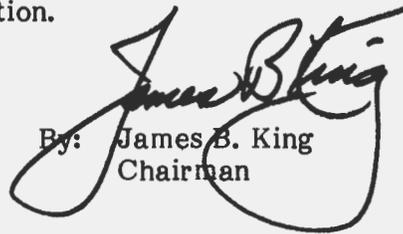
2905

Recently, several incidents of cracking or breaking of these forks have been reported to the Federal Aviation Administration's Maintenance Analysis Center. One of these incidents involved another Piper Model J-5 airplane and occurred in flight. The right rear lift strut fork had broken in half in the threaded area after accumulating only 236 flight-hours.

In view of the above, it would appear that the requirements outlined in Airworthiness Directive 58-10-02 are not conservative enough to ensure an adequate margin of safety under all conditions. Consequently, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive requiring an immediate inspection of all lift strut forks on those Piper Aircraft enumerated in Airworthiness Directive 58-10-02 for indications of cracking. Institute fork replacement/inspection intervals more stringent for forks with cut-threads than those specified in Airworthiness Directive 58-10-02. Limit acceptable replacement forks to those with rolled-threads. (Class I, Urgent Action) (A-80-26)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

  
By: James B. King  
Chairman

**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591

July 8, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594



OFFICE OF  
THE ADMINISTRATOR

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-27 through 29, issued by the Board on April 9, 1980. These recommendations resulted from the Board's investigation of an incident which occurred January 1, 1980, wherein a fuel leak was discovered in the tailcone service area of a Learjet-36 during a postflight inspection.

Following are the Federal Aviation Administration's (FAA) comments and actions in response to these recommendations:

A-80-27. Notify all Learjet operators by telegram of the motive flow valve leak found in this incident, and require an immediate and a recurring inspection of these valves under operating pressures to detect and correct any fuel leaks found.

Comment. Airworthiness Directive (AD) 80-09-06 (copy enclosed) was effective May 8, 1980, and required, within 25 hours, a complete initial inspection of the tailcone service area for leaks, sources of ignition, or obstruction of vents and drains immediately after engine shutdown at the conclusion of each flight. Since there was no accident or incident involving ignition of fuel leaks in the tailcone area, and the air in the area is changed 8 to 11 times per minute while in flight, the probability of having a combustible mixture in the area does not appear to justify a telegraphic AD.

A-80-28. Review the manufacturing processes used in assembling the motive flow valve to determine the cause of this "O" ring failure and take appropriate action to correct any deficiencies detected to preclude future fuel leaks from the motive flow valve during its normal operations.

Comment. Examination of the valve body revealed no apparent cause for "O" ring separation. The bore in the valve body shows evidence of score marks, which coincide with the position of the nylon thermal relief plug on the rotor. The score marks could have been caused by particles of contaminant on the plug when it rotated in the valve body. The "O" ring grooves in the rotor were smooth and there were no rough areas where the "O" ring contacts the valve body. No manufacturing defect which could contribute to the failure could be found. Since the valve had been in operation for over 1,600 hours at the time of failure, it is unlikely that the "O" ring was damaged during assembly.

2

A-80-29. Expedite the development and installation of a method of restraining and venting overboard, fuel and fuel vapors that may leak from the motive flow valve during its normal operations.

Comment. Gates Learjet investigated the possibility of a design change to preclude fuel leaking from the motive flow valve from being sprayed into the tailcone area. To accomplish that objective, the valve manufacturer is processing a design change to enclose the valve in a sheet metal enclosure with a drain line to permit any leakage to be drained overboard. When this design becomes available in the field, AD 80-09-06 will be revised to exempt those airplanes having the change incorporated from the post flight inspection requirement.

We believe the preceding actions will correct the deficiencies which concerned the Board in Safety Recommendations A-80-27 through 29. Accordingly, the FAA considers action completed on Recommendations A-80-27 and 28. We will advise the Board when design change is completed and available in the field, thereby completing action on Recommendation A-80-29.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: April 9, 1980

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

} SAFETY RECOMMENDATION(S)

A-80-27 through -29

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The National Transportation Safety Board has learned of an incident which occurred January 1, 1980, wherein a fuel leak was discovered in the tailcone service area of a Learjet-36 during a postflight inspection. The leak was traced to the left motive flow valve (PN AV16E1182) (SNH46478) which is located in the tailcone service area where the batteries and other electrical components are positioned. The valve had operated about 1,663 hours. It was reported that, when the valve was pressurized, fuel spurted about 5 inches into the air and sprayed into the service area in sufficient quantity to wash soot from installed equipment in the compartment. Portions of the electrical junction box adjacent to the valve were saturated with fuel.

The valve was removed and forwarded to the Gates Learjet Corporation under warranty for replacement, and a Service Difficulty Report, No. 01110043, was prepared. Under the Safety Board's supervision, the valve was X-rayed, examined visually, and then bench-tested at the Gates Learjet facility in Wichita, Kansas. The X-ray and the visual examination did not reveal any apparent defects. The screws that attached the valve motor to the valve body were tight and properly safetied. The cure dates of the "O" rings were marked "4th quarter 1974" and the assembly date was September 5, 1974.

The valve was installed in a pressure test device and tested at the normal operating pressures it would experience in the aircraft. Fluid leaked at the mounting plate where the valve motor attached to the valve body. The test results were:

Pressure	Rate of leakage (gph)
250 psi	5.54
310 psi	5.23
500 psi	6.49
310 psi	5.10
250 psi	4.43

2904

The valve motor was then removed from the valve body. The mating surfaces were clean, and there were no visible defects. The upper "O" ring (MS29513-16) was found to be broken into 3 pieces, and one piece was found between the valve body and the cylinder wall. The lower "O" ring was intact.

A review of Federal Aviation Administration service difficulty reports uncovered two additional reports, dated 1975 and 1977, of fuel leaks in motive flow valves installed on Gates Learjet aircraft.

The Safety Board is concerned about the extreme hazard that would be associated with having a relatively high-volume fuel leak in a compartment where there are many potential ignition sources. In its report of an accident involving a Gates Learjet at Sanford, North Carolina, the Safety Board determined that the probable cause of the accident was ". . . one or more low-order explosions in the aircraft's aft fuselage which resulted in a fire and loss of control capability. The Safety Board could not determine conclusively the fuel and ignition sources of the initial explosion; however gases from the aircraft's batteries or fuel leaks from fuel system components, or both, could have been present in the area of the initial explosion." 1/

The Safety Board is aware that the FAA is reviewing the information gathered during the examination and testing of the motive flow valve involved in this incident. We are also aware that the Gates Learjet maintenance manual was revised on September 28, 1979, to require a check of the hydraulic and fuel system components in the tailcone of Learjet aircraft for general condition and leaks during postflight inspections following major inspections, repairs, or alteration to the aircraft. Finally, we have been informed that the FAA and Gates Learjet are considering the installation of a shroud, with overboard drains, around the motive flow valve assembly. However, we believe the hazard associated with a fuel leak in the tailcone area of these aircraft requires additional corrective action. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Notify all Learjet operators by telegram of the motive flow valve leak found in this incident, and require an immediate and a recurring inspection of these valves under operating pressures to detect and correct any fuel leaks found. (Class I, Urgent Action) (A-80-27)

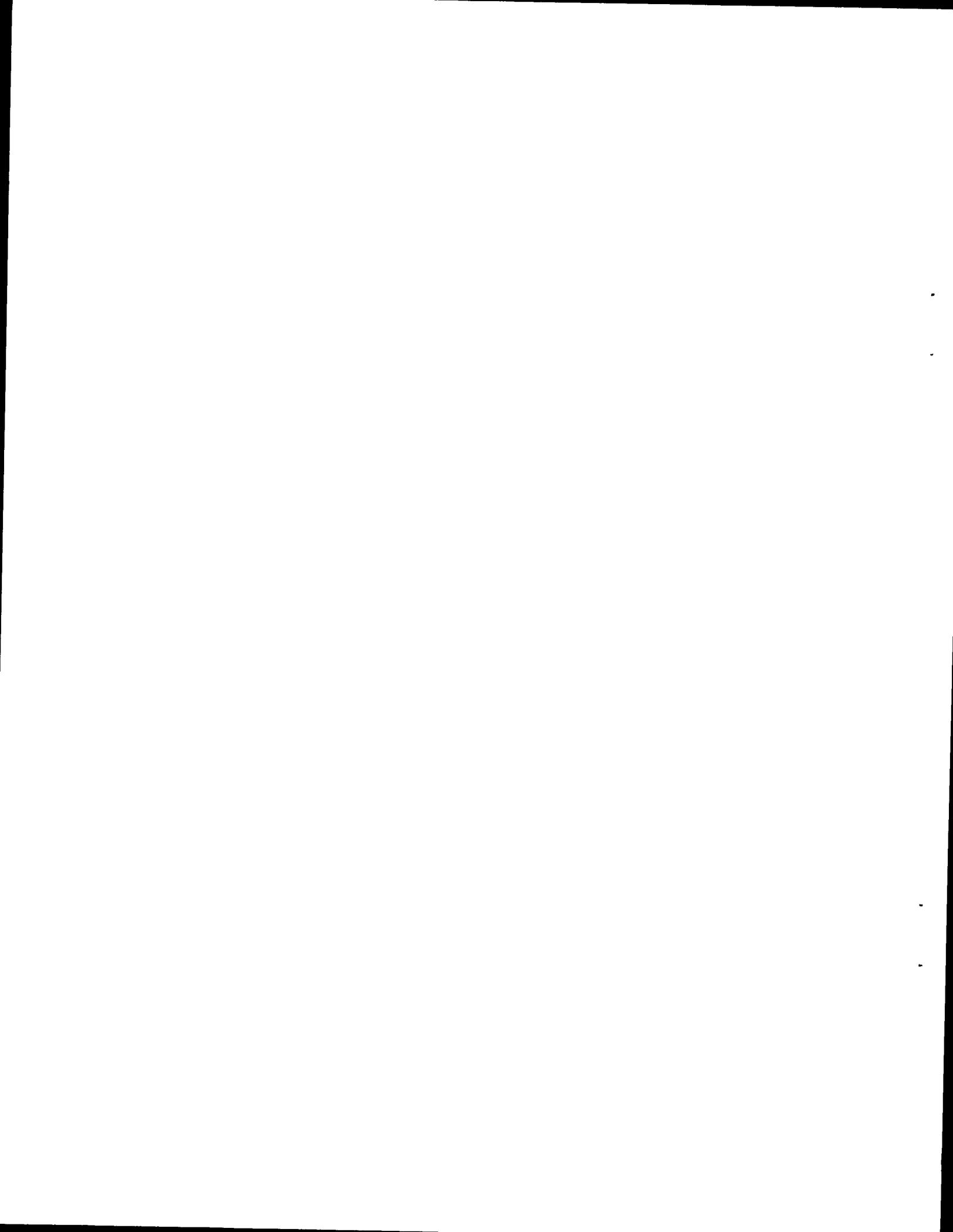
Review the manufacturing processes used in assembling the motive flow valve to determine the cause of this "O" ring failure and take appropriate action to correct any deficiencies detected to preclude future fuel leaks from the motive flow valve during its normal operations. (Class II, Priority Action) (A-80-28)

1/ For more detailed information, read "Aircraft Accident Report — Champion Home Builders Company, Gates Learjet 25B, N999HG, Sanford, North Carolina, September 8, 1977" (NTSB-AAR-79-15)

Expedite the development and installation of a method of restraining and venting overboard, fuel and fuel vapors that may leak from the motive flow valve during its normal operations. (Class II, Priority Action) (A-80-29)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Memt concurred in these recommendations.

  
By: James B. King  
Chairman





## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

August 25, 1980

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter dated July 18, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-32 through 34 issued April 24, 1980. These recommendations stemmed from a Sikorsky-76A helicopter crash off the coast of Brazil, South America, on March 20, 1980. Examination of a fractured main rotor head spindle section from the accident aircraft revealed a fatigue crack with multiple origins initiating in the root of the first thread at the spindle inboard end. The cracks had propagated across 30 percent of the spindle's cross section area. The Safety Board recommended that the Federal Aviation Administration (FAA):

A-80-32. Issue an Airworthiness Directive to require, prior to further flight, a one-time detailed inspection of the inboard threaded area of the main rotor spindles for evidence of cracks on all Sikorsky-76A model helicopters.

A-80-33. Notify Foreign Regulatory Agencies of this action.

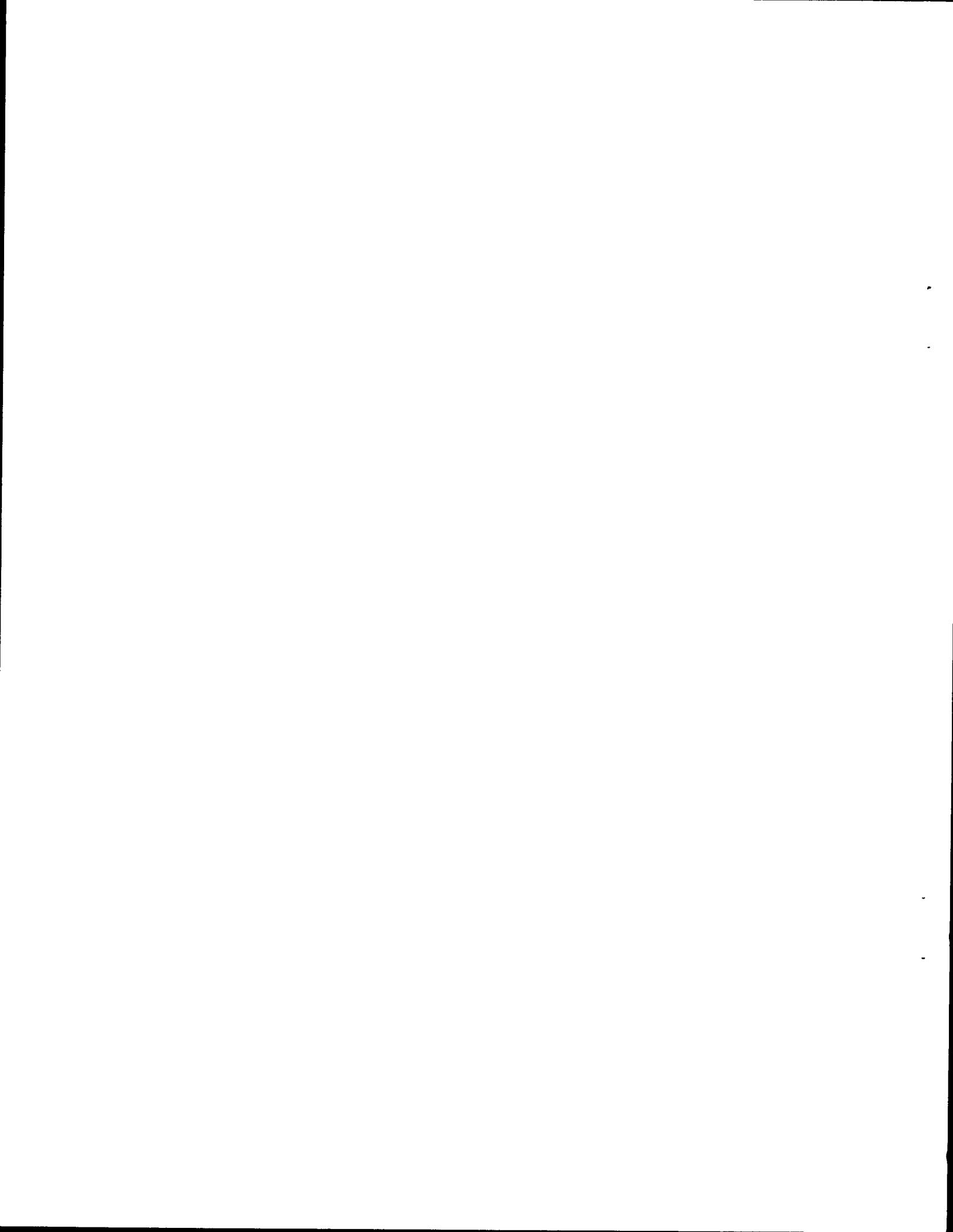
A-80-34. Evaluate the need for a recurring spindle inspection based on the initial inspection results.

We are pleased to note that the FAA issued telegraphic airworthiness directive, T80NE-21 dated April 24, 1980, and has taken appropriate responsive actions to fulfill the three recommendations. Safety Recommendations A-80-32 through 34 are now classified in a "Closed--Acceptable Action" status.

Sincerely yours,

25

  
James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 18, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This letter addresses NTSB Safety Recommendations A-80-32 through 34, issued by the Board on April 24. These recommendations resulted from the Board's review of the crash at sea of a Sikorsky S-76A, PT-HKB, operating off the coast of Brazil, South America, on March 20. Metallurgical examination of the recovered main rotor head spindle section from the accident aircraft revealed a fatigue crack with multiple origins. This finding, as we understand it, was not related to the accident cause. The FAA was also made aware of the problem and, pursuant to verification by metallurgists at NTSB's Metallurgical Laboratory, the FAA initiated, also on April 24, actions which satisfy the Board's objectives, as follows:

A-80-32. Issue an Airworthiness Directive to require, prior to further flight, a one-time detailed inspection of the inboard threaded area of the main rotor spindles for evidence of cracks on all Sikorsky-76A model helicopters.

Comment. A telegraphic airworthiness directive (AD), T80NE-21, was issued by our New England Regional Office on April 24. Issuance of the AD adopts the NTSB's recommendation with some minor differences which are discussed herein. A copy of this AD is enclosed for your review.

Telegraphic AD T80NE-21 action requires:

1. Prior to further flight, inspection of the P/N 76102-08000-041 main rotor blade spindle assemblies in accordance with Sikorsky Alert Service Bulletin 76-65-13A, paragraphs G(1) through G(3), dated April 24.

The aforementioned inspection requires:

a. A one-time visual inspection of each spindle assembly to confirm that the spindle shear bearing inner race (P/N SB 5206-102/-103) is installed per the appropriate instructions found in the Sikorsky Model S-76 Maintenance Manual (Section 5-20-00, page 7, figure 5B, of SA 4047-76-2). If the spindle shear bearing inner race is found missing or is displaced beyond 1/2 inch, the spindle and shear bearing inner race must be removed from service and replaced with a new or serviceable component prior to further flight.

Recent Sikorsky Aircraft laboratory investigations have found that a missing or fully displaced spindle shear bearing inner race will change the load (moment) distribution on the spindle. With a missing or displaced spindle shear bearing inner race, the magnitude of the moment at the spindle threaded area is found to increase significantly above that previously measured in the Sikorsky S-76A certification flight strain survey. This increased moment at the spindle threaded area results in a significant reduction in the service life of the spindle. The visual inspections for missing or displaced spindle shear bearings per AD T80NE-21 confirm that the spindle installation conforms to the type design which has been substantiated by extensive flight strain measurements and corresponding fatigue testing and analysis. The noted 1/2-inch dimension replacement criterion is considered to be conservative since it has been shown by laboratory testing that the spindle shear bearing must be missing or fully displaced to cause a change in the moment distribution of the spindle and a subsequent reduction in the spindle service life.

Further investigations have been conducted to confirm the findings of fatigue of the spindle and to further assess the consequences of a missing or displaced spindle shear bearing inner race.

b. Prior to further flight, any spindle whose shear bearing inner race has previously been displaced (any dimension) will be removed from service.

The agency has elected to require removal of all main rotor spindles which have experienced prior displacement of the subject spindle shear bearing inner race. The lack of, or questionable prior service records with regard to the extent of shear bearing inner race displacement, and/or operational time in service with a displaced inner race, requires this action be taken as a precautionary measure.

c. After each rotor shutdown, the main rotor blade spindle shear bearing inner race inspections contained in Item 103A, Section 5-20-00, page 17, of the S-76 Maintenance Manual (SA 4047-76-2) must be accomplished in lieu of the previous daily inspection requirement.

The spindle installation will be inspected for spindle shear bearing displacement after each rotor shutdown until the spindles are modified by adding "Cable-TY"-spacers which inhibit the displacement of the subject shear bearing. Subsequent to installation of the "Cable-TY" spacers, the installation will be inspected daily in accordance with the aforementioned procedures.

2. Within the next 25 hours time-in-service after receipt of AD T80NE-21, the P/N 76102-08000 main rotor blade assemblies are modified in accordance with Sikorsky Alert Service Bulletin 76-65-13A, paragraphs G(4) and G(5).

This modification is considered an interim action and requires the installation of two "Cable-TY" spacers on the spindle shaft. The "Cable-TY" spacers prohibit full displacement of the subject shear bearing; and as previously noted herein, a missing or fully displaced shear bearing is necessary to change the spindle load (moment) distribution and thus increase the moment in the threaded area of the spindle. Since the addition of the "Cable-TY's" prohibits fully displaced shear bearings and the subsequent moment increase in the spindle threaded area, it is not required to replace the spindle itself if a shear bearing inner race is found displaced after the installation of the "Cable-TY's."

The installation will be inspected daily as noted in paragraph 1c herein, and shear bearings found displaced will be replaced in accordance with the respective procedures found in the Sikorsky S-76 Maintenance Manual (JA 4047-76-2).

3. Main rotor blade spindles with more than 200 hours time-in-service, unless already accomplished within the last 50 hours time-in-service, will be fluorescent penetrant inspected within the next 5 hours time-in-service in accordance with Sikorsky Alert Service Bulletin 76-65-13A, paragraph G(6).

As previously noted in paragraph 1, a missing or displaced shear bearing is necessary to change the load (moment) distribution on the spindle. Telegraphic AD T80NE-21 removes from service, prior to further flight, all spindles on which the shear bearing has been previously displaced or on which the shear bearing is displaced 1/2 inch or more in accordance with the requirements of the AD.

Since all suspect spindles (missing or displaced shear bearing) are removed from service prior to further flight, it was not deemed necessary to fluorescent penetrant inspect the spindles remaining in service prior to further flight. Thus, it was elected to require compliance with the fluorescent penetrant inspection procedures of the AD within the next 5 hours time-in-service after receipt of the AD.

Again, since all suspect spindles were removed prior to further flight, it was not deemed necessary to fluorescent penetrant inspect all the spindles regardless of time-in-service. The cracked spindle found on the Brazilian accident aircraft had accumulated about 650 hours time-in-service. Sikorsky Aircraft has indicated that a mean service life of spindles without a shear bearing inner race may be 500 to 700 hours time-in-service. Utilizing the above data and assuming a worst case (missing shear bearing inner race), which cannot exist in service if compliance with AD T80NE-21 is accomplished, it was concluded that an initial fluorescent penetrant inspection at 200 hours time-in-service would be conservative.

A-80-33. Notify Foreign Regulatory Agencies of this action.

Comment. This action has been accomplished. A listing of all domestic and foreign owners/operators of the Sikorsky Model S-76A was forwarded to our Aircraft Engineering Division in the Office of Airworthiness for that purpose when the AD was issued. Telegrams were sent to the respective Civil Aviation Authorities (CAA) or equivalent of foreign-registered aircraft as part of the FAA telegraphic AD procedures.

Additionally, requested background information pertaining to AD T80NE-21 was supplied via air mail to the CAA (Australia) on May 2 and via telegram to the Brazilian Consulate (Atlanta) and the Technical Airspace Center (CTA) (Brazil) on April 30.

A-80-34. Evaluate the need for a recurring spindle inspection based on the initial inspection results.

Comment. We concur with this recommendation, and this was our intent in issuing AD T80NE-21. Paragraph 3 of AD T80NE-21 requires that all of the results of the inspections required per the AD be reported to our New England Regional Office.

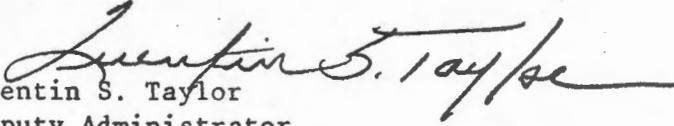
These data, in conjunction with other investigations, will be utilized to make a finding with respect to a need for a recurrent fluorescent penetrant spindle inspection.

As previously noted herein, further investigations have taken place to confirm the existing fatigue substantiation of the spindle and to further assess the consequences of a missing or displaced spindle shear bearing inner race. We have now completed this work and our preliminary findings indicate that there is no requirement for a recurring spindle inspection. This determination is based on our investigation which reveals that the problem lies not with the spindle itself, but rather with the main rotor blade spindle shear bearing inner race. This inner race cracks, then moves out and fully displaces the droop stop ring. Once this happens, the inner race tends to crack more and subsequently fully departs from the spindle, resulting in a very high stress situation which tends to shorten the spindle life. Fatigue of the spindle occurred under loads caused by the bearing inner race having moved out to full displacement, resulting in fatigue and subsequent complete static failure of the spindle. We have worked closely with Sikorsky Aircraft in conducting appropriate laboratory tests to substantiate this sequence of events. Sikorsky Company is currently working on a redesign of the inner race as a result of this investigation and resultant findings. In the interim, AD T80NE-21 ensures that appropriate corrective action relative to the shear bearing inner race is required on a continuing basis.

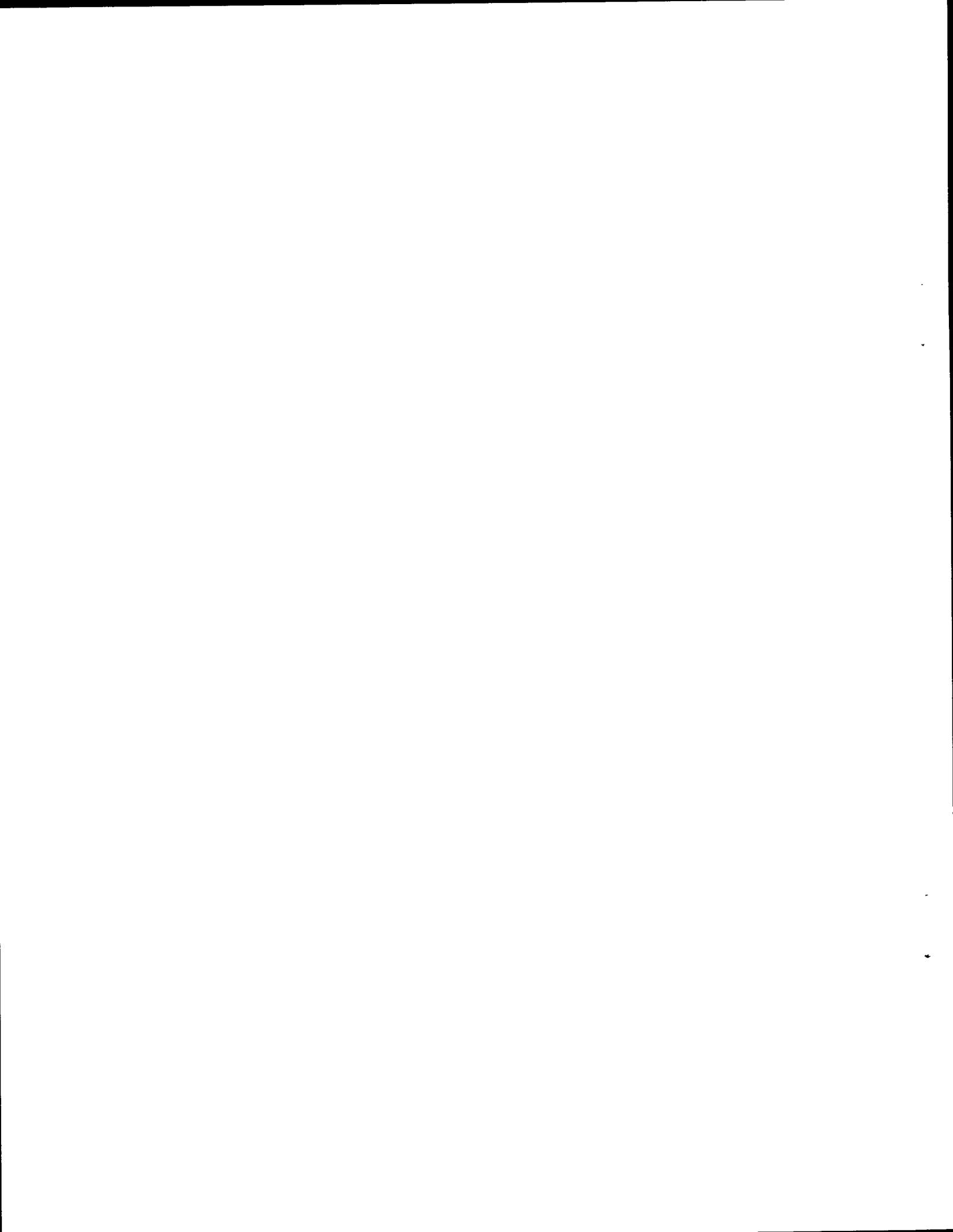
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We believe the preceding actions will resolve the problems noted in NTSB Safety Recommendations A-80-32 through 34.

Sincerely,

  
Quentin S. Taylor  
Deputy Administrator

Enclosure



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: April 24, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-80-32 through -34

On March 20, 1980, a Sikorsky S-76A, PT-HKB, operating off the coast of Brazil, South America, crashed at sea, killing 14 persons. This was the first accident for this model helicopter since its certification in November 1978.

The continuing investigation is under the jurisdiction of the Government of Brazil. On April 21, 1980, a representative of the Brazilian Accident Investigation Team delivered a fractured main rotor head spindle section from the accident aircraft to the National Transportation Safety Board's Metallurgical Laboratory for examination in order to verify the findings of the Brazilian Government metallurgist.

Examination of the fractured surface verified the findings of the Brazilian Government metallurgist -- a fatigue crack was present with multiple origins initiating in the root of the first thread at the spindle inboard end; the cracks had propagated across about 30 percent of the spindle's cross sectional area. The total time on the spindle at the time of the accident was about 650 hours. The fatigued area is not easily inspected without partial disassembly of the main rotor head. Although the metallurgical examination is continuing, the Safety Board believes that immediate action should be taken to minimize the probability of a similar failure.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive to require, prior to further flight, a one-time detailed inspection of the inboard threaded area of the main rotor spindles for evidence of cracks on all Sikorsky-76A model helicopters. (Class I, Urgent Action) (A-80-32).

2935

Notify Foreign Regulatory Agencies of this action. (Class I, Urgent Action) (A-80-33)

Evaluate the need for a recurring spindle inspection based on the initial inspection results. (Class II, Priority Action) (A-80-34)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN and BURSLEY, Members, concurred in these recommendations.

A handwritten signature in cursive script that reads "James B. King". The signature is written in dark ink and includes a stylized flourish at the end.

By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 6, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-80-35 issued by the Board on May 7, 1980. This recommendation resulted from the Board's investigation of an incident involving a Piper Model PA-31-350, at Washington National Airport, Washington, D.C., on September 19, 1978. The incident occurred when the pilot taxied forward a short distance for a brake check. Upon brake application, the nose wheel failed and then cocked against the gear fork assembly, resulting in damage to the gear retract mechanism and subsequent collapse of the nose gear assembly.

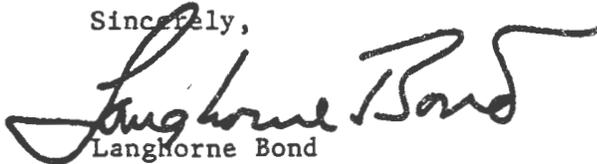
A-80-35. Amend Airworthiness Directive 72-12-06 to require periodic nondestructive inspections of Cleveland P/N 40-76B and P/N 40-120A nose wheels on Piper model PA-31 aircraft.

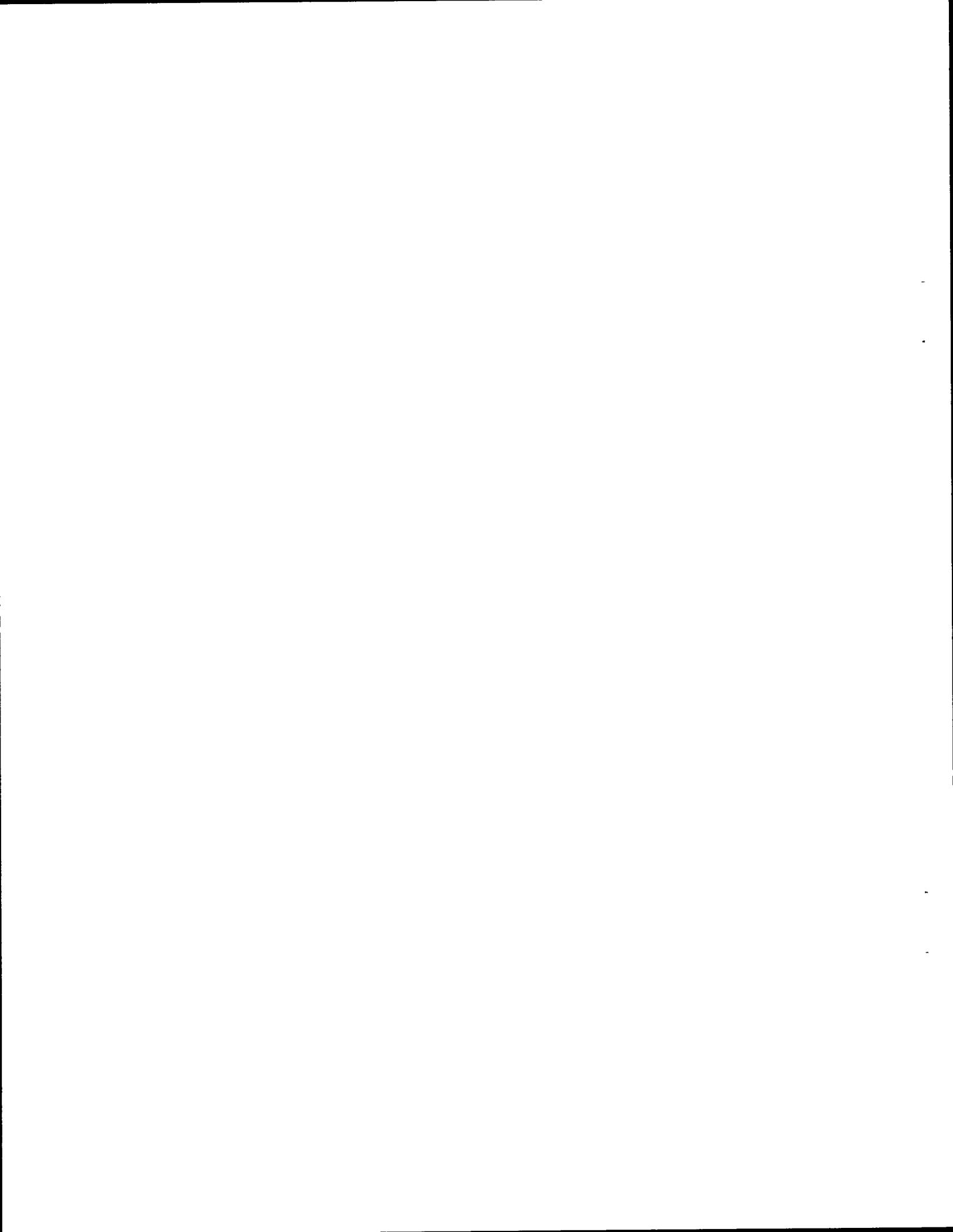
Comment. Airworthiness Directive 78-12-06, which was issued May 9, 1979, required only a visual inspection of Piper Model PA-31T aircraft nose wheel assemblies, Cleveland P/N 40-120A, before each flight. This is in contrast to the Board's recommendation that the Airworthiness Directive be amended to require periodic nondestructive inspections of both Cleveland P/N 40-120A and P/N 40-76B nose wheels on all Piper Model PA-31 aircraft.

The Federal Aviation Administration's (FAA) initial analysis of Service Difficulty Reports related to these parts indicates a variety of causes of the failures experienced, such that additional investigation is required to determine whether some specific corrective action(s) is required and what, if any, that action should be. It might involve an action as recommended by the Board or some alternative action.

We anticipate completing this review and analysis so that a decision as to FAA's course of action can be made within the next 30 days and shall advise the Board of our decision at that time.

Sincerely,

  
Langhorne Bond  
Administrator



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 7, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-35

The National Transportation Safety Board's investigation of an incident involving a Piper model PA-31-350, N59911, at Washington National Airport, Washington, D.C., on September 19, 1978, and subsequent monitoring of pertinent Service Difficulty Reports indicate that corrective action is necessary to reduce the possibility of similar occurrences.

Immediately after receiving clearance to taxi out for a scheduled flight to Elmira, New York, the captain of Commuter Airlines Flight 551 taxied forward a short distance for a brake check. Upon brake application, the nose wheel failed and then cocked against the gear fork assembly. This resulted in damage to the gear retract mechanism and subsequent collapse of the nose gear assembly.

Investigation revealed that the nose wheel, Cleveland P/N 40-76B, had failed in fatigue. The fatigue began from multiple origins adjacent to the holes of three bolts which hold the rim to the wheel. The fatigue area covered about 50 percent of the fracture surface and propagated circumferentially from the multiple origins. Maintenance records indicated that the nose wheel had been disassembled and visually inspected 8.9 operating hours before the failure.

A survey of the FAA Maintenance Analysis Center Records indicated that 36 cracked or failed nose wheel assemblies have been reported over the last 5 years. Six of the reported cases involved the Cleveland P/N 40-120A wheel installed on Piper PA-31T model aircraft; the remaining reports involved the Cleveland P/N 40-76B wheel installed on various models of the PA-31 series aircraft.

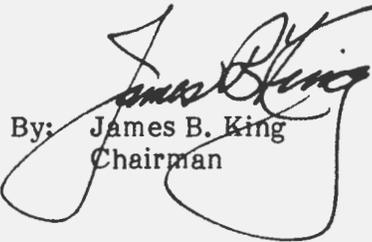
We recognize that the Federal Aviation Administration has been active in alerting owners and operators of cracks in Cleveland P/N 40-76B wheels installed on Piper PA-31-300 model aircraft and that the information was discussed in the August 1977 issue of FAA's General Aviation Inspection Aids Summary.

2931

On May 9, 1979, Airworthiness Directive 78-12-06 was issued which required a visual inspection of Piper Model PA-31T aircraft nose wheel assemblies, Cleveland P/N 40-120A (Piper P/N 551-778), before each flight. This inspection may be accomplished by the pilot. However, the possibility of a nose wheel failure on other Piper PA-31 series aircraft equipped with the P/N 40-76B nose wheel continues to exist. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Amend Airworthiness Directive 78-12-06 to require periodic nondestructive inspections of Cleveland P/N 40-76B and P/N 40-120A nose wheels on Piper model PA-31 aircraft. (Class II, Priority Action) (A-80-35)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 6, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-36 and 37, issued by the Board on May 8, 1980. These recommendations resulted from the Board's investigation of three air taxi/commuter accidents which disclosed significant medical problems involving pilots over 60 years of age.

The following are the Federal Aviation Administration's (FAA) comments and actions in response to these recommendations:

A-80-36. Determine through a study of the operating environment and rules for Part 135 operators whether the working conditions of Part 135 pilots are sufficiently different to warrant an age limitation different from that established for Part 121 pilots.

A-80-37. Amend 14 CFR 135.95 to include as an interim measure, pending completion of an appropriate study, an upper age limit for airmen under this Part which provides a level of safety equivalent to air carrier operations.

Comment. We are in the process of evaluating these recommendations in detail; input from our regional offices has been solicited and is currently under review. The National Institutes of Health (NIH), in consultation with the Secretary of Transportation, is currently conducting a study of pilot aging which is scheduled for completion in late 1980. Public Law 96-171 (copy enclosed) dated December 29, 1979, established the requirement for this research, and a report of the results is to be submitted directly to the Congress within 1 year. This study is being conducted to determine:

--whether an age limitation which prohibits all individuals who are 60 years of age or older from serving as pilots is medically warranted;

--whether an age limitation which prohibits all individuals who are older than a particular age from serving as pilots is medically warranted;

--whether rules governing eligibility for first- and second-class medical certification, as set forth in Part 67 of Title 14 of the Code of Federal Regulations (as in effect on the date of enactment of this Act), are adequate to determine an individual's physical condition in light of existing medical technology;

--whether rules governing the frequency of first- and second-class medical examinations, as set forth in Part 67 of Title 14 of the Code of Federal Regulations (as in effect on the date of enactment of this Act), are adequate to assure that an individual's physical condition is being satisfactorily monitored; and

--the effect of aging on the ability of individuals to perform the duties of pilots with the highest level of safety.

We believe it is prudent to await the results of the study before acting on Safety Recommendations A-80-36 and 37. Accordingly, we propose to withhold further response to the Board on this subject pending publication and our review of the NIH study.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond". The signature is written in black ink and is positioned above the typed name and title.

Langhorne Bond  
Administrator

Enclosure

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 8, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-80-36 & -37

Because of the burgeoning increase in air taxi and commuter carrier operations, the matter of pilot age and physical condition in Part 135 operations has become increasingly important from the standpoint of aviation safety and the protection of the traveling public.

The Safety Board's investigation of three air taxi/commuter accidents disclosed significant medical problems involving pilots more than 60 years of age.

Studies to assess the effects of aging on human performance have generally been inconclusive. However, the progressive degeneration of certain important physiological functions in humans is important to aviation safety when it may cause sudden incapacitation, such as cardiovascular disease, metabolic disease, and central nervous system disorders. These conditions relate to the ability of a pilot to resist fatigue, to adapt to rapidly changing environmental conditions, and to perform under stress.

On the basis of these physiological factors and other considerations, the Federal Aviation Administration, in 1959, promulgated a regulation restricting the use of the services of pilots in air carrier operations to those under age 60 (14 CFR 121.383). Because the air taxi industry at that time was not a significant factor in transportation and was minimally regulated, it was not included in this regulation. Today, the air taxi/commuter industry has attained a scale of operations which rivals that of air carriers.

Because of the nature of air taxi/commuter-type operations -- the shorter flight segments, the numerous approaches, landings and takeoffs, and the relatively low altitudes which subject these flights to more weather-related problems -- the duty day of the pilot in Part 135 operations may be more arduous than that worked by most pilots in Part 121 operations. Even if the flight time and duty time limitations for Part 135 operations are made the same as for Part 121 operations, the equipment and instrumentation of the aircraft often will be less sophisticated. Moreover, pilots may fly certain aircraft in Part 135 operations without a copilot. Consequently, the Safety Board believes that since the rationale used to establish the age limitation in 14 CFR 121 has, in the FAA's opinion, established an acceptable level of safety for commercial operations, this requirement should be equally and immediately applied to Part 135 operations on an interim basis.

Recently, Congress mandated the National Institutes of Health, in consultation with the Department of Transportation, to further study the aging process with respect to a pilot's ability to safely perform his duties, to determine the efficacy of medical certification of pilots, and to determine the medical need for an age limitation for pilots. The results of this study may well require the FAA to reevaluate the present age limitation rule in 14 CFR 121.383. The Safety Board is of the opinion, however, that the operational environment and operating rules for Part 135 operators are sufficiently different from Part 121 operations to warrant a separate study or expansion of the current study to include the effects of fatigue and stress on pilots engaged in air taxi and commuter operations with a view toward establishing the need for a different age limitation in 14 CFR 135.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Determine through a study of the operating environment and rules for Part 135 operators whether the working conditions of Part 135 pilots are sufficiently different to warrant an age limitation different from that established for Part 121 pilots. (Class II - Priority Action) (A-80-36)

Amend 14 CFR 135.95 to include as an interim measure, pending completion of an appropriate study, an upper age limit for airmen under this Part which provides a level of safety equivalent to air carrier operations. (Class II - Priority Action) (A-80-37)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, AND BURSLEY, Members, concurred in this recommendation.

  
By: James B. King  
Chairman



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

September 4, 1980

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

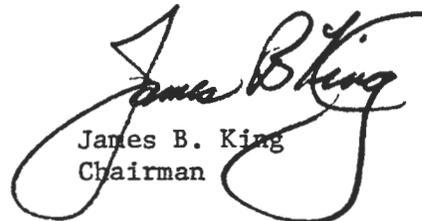
Dear Mr. Bond:

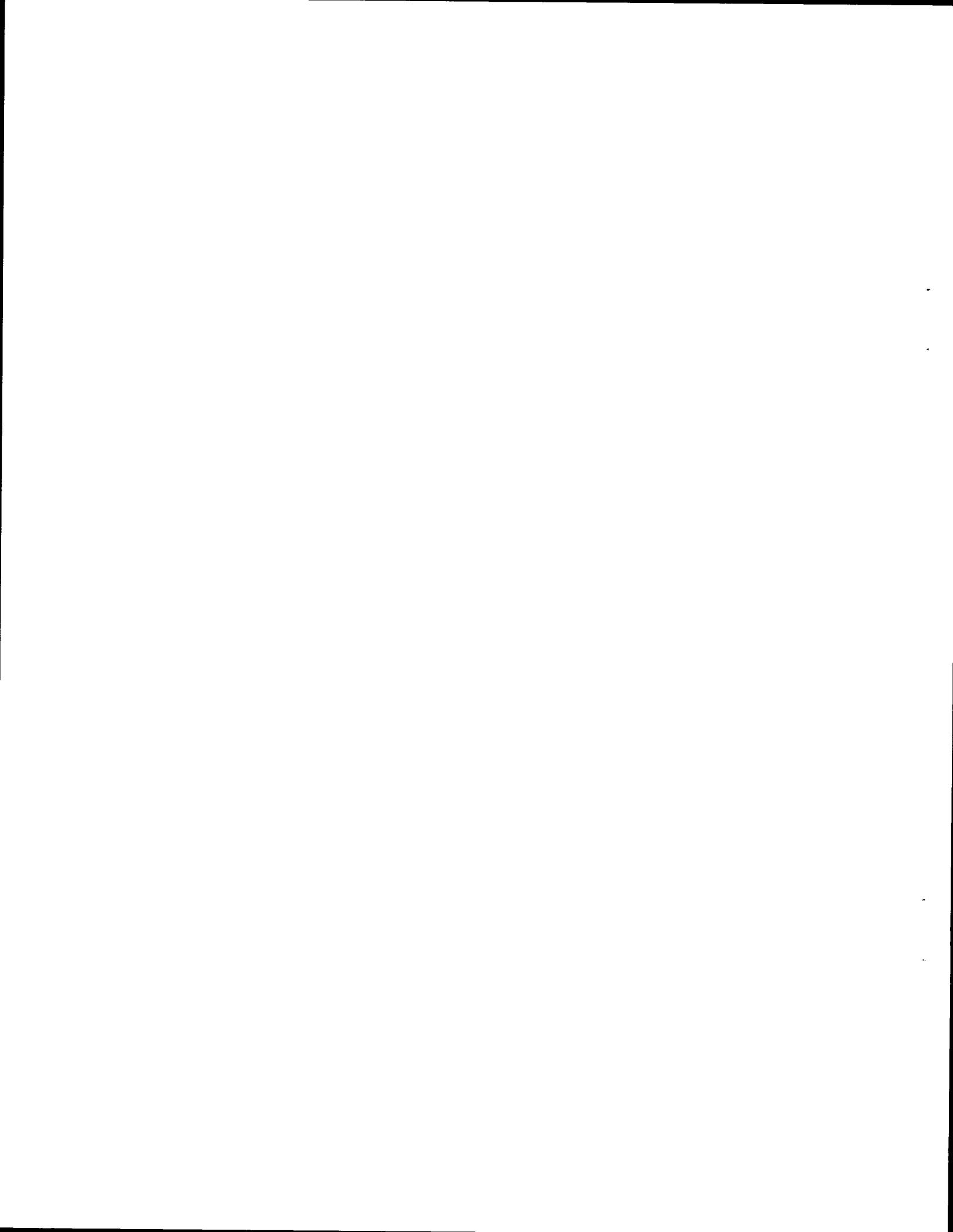
Reference is made to National Transportation Safety Board Safety Recommendation A-80-38 issued May 14, 1980. This recommendation stemmed from a Beech 65-80 incident. During flight the crew saw white smoke and smelled fumes in the cockpit. An emergency landing was made at Dulles International Airport. The Safety Board's investigation revealed that both voltage regulators and both alternator-rectifiers were inoperative and that the nickel-cadmium battery was venting gas overboard. Fire damage was found in the voltage regulators and associated wire bundles under the cockpit floor, and both alternator field windings were burned and shorted. We recommended that the Federal Aviation Administration (FAA):

"Issue a General Aviation Airworthiness Alert describing the effects of damage to the floor-mounted alternator field current breakers and mainline circuit breakers in Beech Model 65-80 aircraft. The advisory should emphasize the desirability of compliance with Beech Service Bulletin No. 67-28, dated December 29, 1967."

The Safety Board is pleased to see that the FAA has included in its General Aviation Alert No. 25 (AC No. 43-16) of August 1980 a cautionary note recommending compliance with Beech Service Bulletin No. 67-28. This action fulfills Safety Recommendation A-80-38, which is now classified in a "Closed--Acceptable Action" status.

Sincerely yours,

  
James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 11, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-80-38 issued by the Board on May 14, 1980. This recommendation resulted from the Board's investigation of an incident on August 7, 1979, involving a Beech 65-80 (Queen Air), N99FA, Serial No. LD-26, which departed Gaithersburg, Maryland. Shortly after reaching 20,000 feet mean sea level, while climbing southbound, the crew saw white smoke and smelled fumes in the cockpit. An emergency was declared and the aircraft was landed without further incident at Dulles International Airport, Washington, D.C.

Investigation revealed that both voltage regulators and both alternator-rectifiers were inoperative and the nickel-cadmium battery was venting gas overboard. Fire damage was found on the voltage regulators and associated wire bundles under the cockpit floor between the pilot seats, and both alternator field windings were burned and shorted.

A Service Bulletin issued on December 29, 1967, by Beech Aircraft Corporation requires the relocation of circuit breakers. This Bulletin, No. 67-28 (copy enclosed), affects Queen Airs such as the incident aircraft model. The purpose of the bulletin is to prevent accidental damage to the alternator field circuit breakers. It gives the procedure to be used to relocate the floor-mounted field circuit breaker bracket to a lower, less vulnerable position. This Service Bulletin was not accomplished on the incident aircraft.

A General Aviation Inspection Aid was issued in August 1968 by the Federal Aviation Administration (FAA) regarding the alternator field circuit breakers floor-mounted location for Beech Model 65-80. Moreover, the Beechcraft Shop Manual, Section VII, Queen Air Series, requires that the circuit breakers be checked for looseness and proper operation during the 100-hour inspection in the pilot's compartment.

FAA records show there are 95 registered Beech Model 65-80 aircraft recorded as of January 10, 1980. The Safety Board believes that Beech Model 65-80 owner-operators and maintenance personnel should again be reminded that floor-mounted circuit breakers can be damaged and made inoperative if they are not protected. Accordingly, the Board recommended that the FAA:

A-80-38. Issue a General Aviation Airworthiness Alert describing the effects of damage to the floor-mounted alternator field current breakers and mainline circuit breakers in Beech Model 65-80 aircraft. The advisory should emphasize the desirability of compliance with Beech Service Bulletin No. 67-28, dated December 29, 1967.

Comment. The FAA concurs with NTSB Safety Recommendation A-80-38, and the following article will appear in the August 1980 issue of the General Aviation Airworthiness Alert, AC No. 431-16:

<u>Model</u>	<u>Subject</u>	<u>Text</u>
Beech Model 65, A65, and 65-80 Series	Alternator Field Circuit Breakers P/N PSM-10N	<p>Cockpit personnel are cautioned to avoid stepping on these circuit breakers.</p> <p>These floor-mounted circuit breakers are subject to damage as a result of heavy foot pressures and inadvertently being struck by persons in the cockpit. If damaged, those circuit breakers may not provide protection for the alternator field circuit and associated aircraft wiring.</p> <p>Beech issued Service Bulletin No. 67-28 in September 1967, to provide information which could be used to relocate the floor-mounted circuit breaker bracket to a lower, less vulnerable position to help prevent accidental damage to the circuit breakers. It is recommended that this Service Bulletin be complied with if not already accomplished.</p> <p>Aircraft affected: Models 65 and A65, S/N's LC-143 thru LC-270, and all airplanes prior to LC-143 that have complied with Model 65 Service Bulletin No. 11; Models 65-80, 65-A80, and 65-B80, S/N's LD-13 through LD-350 and LD-352, and all airplanes prior to LD-13 that have complied with Model 65-80 Service Bulletin No. 2.</p>

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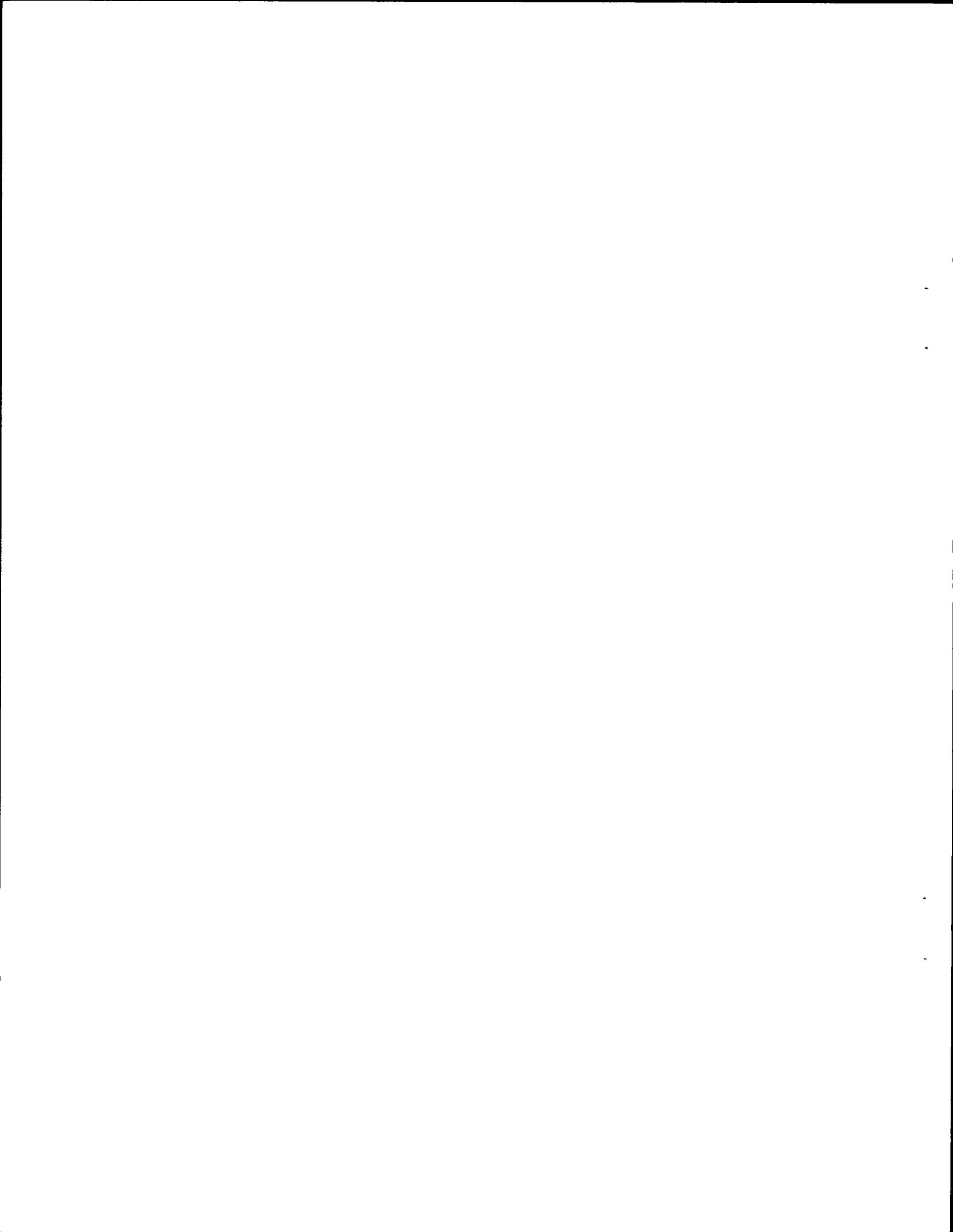
A copy of the August 1980 General Aviation Airworthiness Alert will be forwarded to the Board when published.

We believe the preceding action will correct the deficiencies cited in NTSB Safety Recommendation A-80-38, and the FAA considers action on this recommendation completed.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 14, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

} SAFETY RECOMMENDATION(S)

A-80-38

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On August 7, 1979, a Beech 65-80 (Queen Air), N99FA, serial No. LD-26, departed Gaithersburg, Maryland, and climbed southbound. Shortly after reaching 20,000 feet m.s.l., the crew saw white smoke and smelled fumes in the cockpit. An emergency was declared and the aircraft was landed without further incident at Dulles International Airport, Washington, D.C.

The Safety Board's investigation revealed that both voltage regulators and both alternator-rectifiers were inoperative and the nickel-cadmium battery was venting gas overboard. Fire damage was found on the voltage regulators and associated wire bundles under the cockpit floor between the pilot seats, and both alternator field windings were burned and shorted.

The alternators are protected by two alternator field (10 ampere) circuit breakers which are mounted on the floor, in the aisle, adjacent to the right pilot's seat and by two mainline (105 ampere) circuit breakers which are similarly floor-mounted in the aisle adjacent to the left pilot's seat. Both of the mainline circuit breakers and the adjacent landing gear circuit breaker were mechanically damaged.

Both of the alternator field circuit breakers were also damaged. The housing of one circuit breaker was partially separated from the metal retaining cap which allowed dust and other debris to collect within the housing in the contact point area. There was arcing within the breaker housing across the foreign material at the contact points, which welded both sets of contact points closed. This closed the circuit and left the field without circuit breaker protection. The damaged and inoperable floor-mounted circuit breakers failed to provide protection to the electrical system which resulted in damage to the d.c. alternator system, and an electrical fire.

The Safety Board is aware of a Service Bulletin issued on December 29, 1967, by Beech Aircraft Corporation, which requires the relocation of circuit breakers. This bulletin, No. 67-28, affects Queen Airs such as the incident aircraft model. The purpose of the bulletin is to prevent accidental damage to the alternator field circuit breakers. It gives the procedure to be used to relocate the floor-mounted field circuit breaker bracket to a lower, less vulnerable position. This Service Bulletin was not accomplished on the incident aircraft.

2937

A General Aviation Inspection Aid was issued in August 1968 by the Federal Aviation Administration regarding the alternator field circuit breakers floor-mounted location for Beech Model 65-80. This Inspection Aid states:

These floor-mounted circuit breakers are subject to damage as a result of heavy foot pressures and inadvertently being struck by persons in the cockpit. If damaged, these circuit breakers may not provide protection for the alternator field circuit and associated aircraft wiring.

Cockpit personnel are cautioned to avoid stepping on these circuit breakers.

The Beechcraft Shop Manual, Section VII, Queen Air Series, requires that the circuit breakers be checked for looseness and proper operation during the 100-hour inspection in the pilot's compartment.

Information received from FAA records shows there are 95 registered Beech Model 65-80 aircraft recorded as of January 10, 1980. The Safety Board believes that Beech Model 65-80 owner-operators and maintenance personnel should again be reminded that floor-mounted circuit breakers can be damaged and made inoperative if they are not protected. They should be informed of the importance of complying with Beech Service Bulletin No. 67-28.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a General Aviation Airworthiness Alert describing the effects of damage to the floor-mounted alternator field current breakers and mainline circuit breakers in Beech Model 65-80 aircraft. The advisory should emphasize the desirability of compliance with Beech Service Bulletin No. 67-28, dated December 29, 1967. (Class II, Priority Action) (A-80-38)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 20, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-39 and 40 issued by the Board on May 23, 1980. These recommendations resulted from the Board's investigation of an aircraft accident on August 17, 1979, of a Bell 47G-3-B-1 helicopter which crashed near Rico, Colorado, killing the pilot and his passenger. The accident investigation disclosed that tail rotor thrust was lost during flight because the drive gear (P/N 47-620-568-1) failed. The gear is located within the main rotor transmission.

Based on examination of the components, the Safety Board believes that the higher average thrust loading on the tail rotor systems of Bell 47 helicopters equipped with turbocharged engines can cause deterioration of the tail rotor driven gear shafts in main transmissions with older, unimproved bearings installed. Accordingly, the National Transportation Safety Board (NTSB) recommends that the Federal Aviation Administration (FAA):

A-80-39. Issue an Airworthiness Directive to require replacement of bearing (P/N 47-620-605-1) with the improved bearing (P/N 47-620-929-1) at the next scheduled or unscheduled removal of the main transmission on Bell 47 model helicopters equipped with turbocharged engines.

Comment. The FAA concurs in NTSB's recommendation to require replacement of bearing (P/N 47-620-605-1) with the improved bearing (P/N 47-620-929-1) on BHT Model 47 series helicopters equipped with turbocharged engines. Airworthiness Directive (AD) action is being initiated to require this replacement. A copy of this AD will be forwarded to the Board when issued.

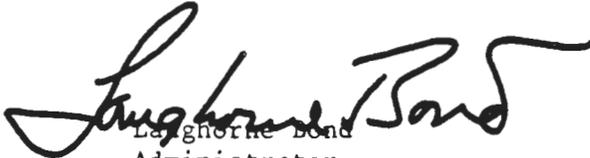
A-80-40. Review and evaluate the need to replace the older bearing (P/N 47-620-605-1) with the improved bearing (P/N 47-620-929-1) on all Bell 47 model helicopters.

Comment. A review of FAA files reveals failures of bearing (P/N 47-620-605-1) on normally aspirated helicopters as well as on turbocharged helicopters. The AD action referenced above will include all BHT Model 47 series helicopters equipped with the bearing (P/N 47-620-605-1).

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We believe the preceding action will correct the deficiencies cited in NTSB Safety Recommendations A-80-39 and 40. Accordingly, after issuance of the above-mentioned AD, the FAA will consider action on these safety recommendations completed.

Sincerely,



Langhorne Bond  
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 23, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-80-39 and -40

On August 17, 1979, a Bell 47G-3-B-1 helicopter, powered by a Lycoming turbo-charged engine, crashed near Rico, Colorado, killing the pilot and his passenger. The accident investigation disclosed that tail rotor thrust was lost during flight because the drive gear (P/N 47-620-568-1) failed. The gear is located within the main rotor transmission.

Metallurgical examination of the parts indicated that damage to the gear teeth resulted from axial misalignment of the gear. The misalignment was caused by a deep groove worn into the gear shaft. The shaft acts as the inner race for a roller bearing (P/N 47-620-605-1) located immediately aft of the damaged gear teeth. The operating time on the main transmission since the last overhaul was 822 hours. However, the gear assembly and bearing are not life-limited components and are replaced based on their condition. The Safety Board, therefore, was not able to determine the total operating time on the failed gear.

Four additional gears (P/N 47-620-568-1) in various stages of deterioration were submitted to the Safety Board's Laboratory for metallurgical examination. Two bearings (P/N 47-620-605-1) remained installed on the gear shafts which had been removed from main rotor transmissions on Bell 47 model helicopters powered by turbocharged engines. The service history on the gears was not available. The damage to the gear shafts ranged from light spalling to severe wear, similar to that found on the gear shaft from the accident aircraft. Metallurgical examination of all five gear shafts indicated that they complied with the engineering drawing requirements for surface hardness in the worn areas.

The helicopter manufacturer reported that, after 1968, Bell Model 47 main transmissions were produced with an improved roller bearing (P/N 47-620-929-1) designed to provide a more uniform load distribution on the shaft. It was also reported that this bearing was used in the 200-hour qualification testing of the helicopter power train during certification of the turbocharged engine installation.

Based on its examination of the components, the Safety Board believes that the higher average thrust loading on the tail rotor systems of Bell 47 helicopters equipped with the turbocharged engine can cause deterioration of the tail rotor driven gear shafts in those main transmissions with the older, unimproved bearings installed.

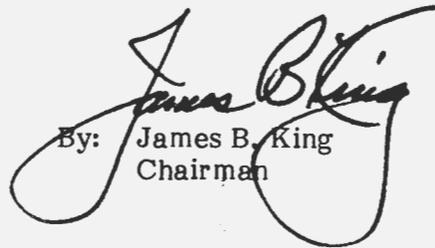
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Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive to require replacement of bearing (P/N 47-620-605-1) with the improved bearing (P/N 47-620-929-1) at the next scheduled or unscheduled removal of the main transmission on Bell 47 model helicopters equipped with turbocharged engines. (Class II, Priority Action) (A-80-39)

Review and evaluate the need to replace the older bearing (P/N 47-620-605-1) with the improved bearing (P/N 47-620-929-1) on all Bell 47 model helicopters. (Class II, Priority Action) (A-80-40)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 20, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-41 through 43 issued by the Board on May 27, 1980. These recommendations resulted from the Board's investigation of the crash of N68DE, a deHavilland DHC-6-200, at the Knox County Regional Airport, Rockland, Maine, on May 30, 1979. Fifteen passengers and both pilots were killed; one passenger was seriously injured. Following its investigation of the accident, the Safety Board concluded that the flightcrew deviated from standard instrument approach procedures and allowed the aircraft to descend below the published minimum decision height, without the runway environment in sight. The accident occurred during a night nonprecision instrument approach.

As a result of investigation of this accident, the Board expressed concern in two areas: maintenance practices and operational factors. Accordingly, the National Transportation Safety Board (NTSB) recommended that the Federal Aviation Administration (FAA):

A-80-41. Publish a Maintenance Bulletin to alert FAA maintenance inspectors to the safety hazard associated with installation of mixed-color cockpit instrument lighting. The bulletin should require that the practice of installing mixed-color lighting be discontinued and that, where this practice has been implemented in the past, the lighting be changed to a uniform configuration.

Comment. The FAA concurs with Safety Recommendation A-80-41 and a maintenance bulletin concerning this recommendation is being prepared. A copy will be forwarded to your office upon issuance.

A-80-42. Require that 14 CFR 135 operators emphasize crew coordination during recurrent training, especially when pilots are qualified for both single-pilot/autopilot and two-pilot operations. These requirements should be outlined in an operators's approved training curriculum.

Comment. Section 135.329 of the FAR, entitled, "Crewmember training requirements," does in fact include provisions which, in our opinion, will result in effective crew coordination. Paragraph (e) of that section states:

"(e) In addition to initial, transition, upgrade and recurrent training, each training program must provide ground and flight training, instruction, and practice necessary to ensure that each crewmember:

- (1) Remain adequately trained and currently proficient for each aircraft, crewmember position, and type of operation in which the crewmember serves; and...."

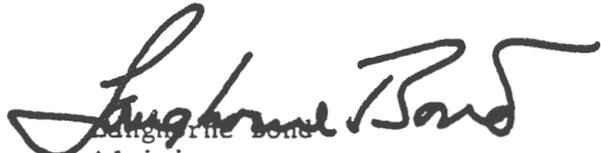
We believe this regulatory requirement adequately satisfies Recommendation A-80-42 and, accordingly, FAA considers action on this recommendation completed.

A-80-43. Upgrade operations manuals of 14 CFR 135 operators to assure standardization by clearly delineating operational duties and responsibilities of all required cockpit crewmembers.

Comment. Similarly, we believe the vehicle to ensure standardization is the operator's training program. Flight manuals currently specify crew duties, but are not considered an appropriate vehicle for imparting the concept of crew coordination. We direct your attention to Order 8430.1B, Inspection and Surveillance Procedures Air Taxi Operators/Commuter Air Carriers and Commercial Operators. Paragraph 111 of this order, entitled, "Altitude Awareness and Flightcrew Procedures During Instrument Approaches" (copy of applicable portion enclosed), speaks specifically to cockpit vigilance during instrument approach operations. FAA inspectors are required to ensure that these provisions are included in operators' training programs.

We believe the preceding action will correct the deficiencies cited in NTSB Safety Recommendation A-80-43 and, accordingly, FAA considers action on this recommendation completed.

Sincerely,

  
Augustine Bond  
Administrator

Enclosure

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 27, 1980

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-41 through -43

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At about 2100 e.d.t., on May 30, 1979, N68DE, a deHavilland DHC-6-200, owned and operated by Downeast Airlines, Inc., crashed on approach to runway 3 at the Knox County Regional Airport, Rockland, Maine. Fifteen passengers and both pilots were killed; one passenger was seriously injured. Following its investigation of the accident, the Safety Board concluded that the flightcrew deviated from standard instrument approach procedures and allowed the aircraft to descend below the published minimum decision height, without the runway environment in sight. The accident occurred during a night nonprecision instrument approach. 1/ The Safety Board's investigation of this accident disclosed two areas of concern: one in maintenance practices and the other in operational factors.

In the area of maintenance factors it was found that there was a potentially hazardous situation regarding cockpit instrument lighting. Pilots who had flown the aircraft involved in the accident testified that the cockpit instrument lighting was poor. The cockpit lights had to be kept dim to prevent windshield/window glare, and there was a mixture of red and white light bulbs in the center instrument panel. Thus, if the rheostat was set low enough to eliminate glare from the white lights, the red bulbs did not provide enough light to properly illuminate the instrument in which they were installed. This problem was the result of a maintenance practice which allowed maintenance personnel to replace burned out light bulbs with new bulbs of either color. With this combination of white and red bulbs, the pilots were forced to choose between setting the white lights at a level that would allow them to read all the instruments, with the resulting glare and possible loss of night vision, or at a lower setting where the white lights did not cause glare but instruments would be unreadable.

In the operational factors investigation it was disclosed that there was a lack of standardized procedures for cockpit management and for two-pilot crew coordination at Downeast Airlines. The only procedures outlined in the company flight manual for the

1/ For more detailed information, read "Aviation Accident Report--Downeast Airlines, Inc., deHavilland DHC-6-200, N68DE, Rockland, Maine, May 30, 1979" (NTSB-AAR-80-5).

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copilot were to maintain aircraft cleanliness, assure passenger comfort, and perform other duties as commanded by the captain. Consequently, there was neither clear delineation of responsibilities or workload in the cockpit nor procedural standardization among captains. The first officers' duties varied at the discretion of each captain.

The captain and first officer of the accident aircraft were qualified for single-pilot/autopilot operations in Piper Navajo aircraft, and for two-pilot operations in deHavilland DHC-6-200 aircraft. When a flightcrew is dual-qualified in this manner, and pilots frequently shift from one aircraft to the other, a clear delineation of duties and responsibilities when operating in the two-pilot crew environment is essential. Otherwise, the safety advantages inherent in the two-pilot crew concept are negated.

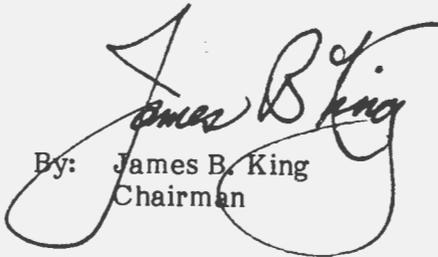
The Safety Board concludes that both areas of concern pose potential hazard to the safe operation of any flight. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Publish a Maintenance Bulletin to alert Federal Aviation Administration maintenance inspectors to the safety hazard associated with installation of mixed-color cockpit instrument lighting. The bulletin should require that the practice of installing mixed-color lighting be discontinued and that, where this practice has been implemented in the past, the lighting be changed to a uniform configuration. (Class II, Priority Action) (A-80-41)

Require that 14 CFR 135 operators emphasize crew coordination during recurrent training, especially when pilots are qualified for both single-pilot/ autopilot and two-pilot operations. These requirements should be outlined in an operator's approved training curriculum. (Class II, Priority Action) (A-80-42)

Upgrade flight operations manuals of 14 CFR 135 operators to assure standardization by clearly delineating operational duties and responsibilities of all required cockpit crewmembers. (Class II, Priority Action) (A-80-43)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 26, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

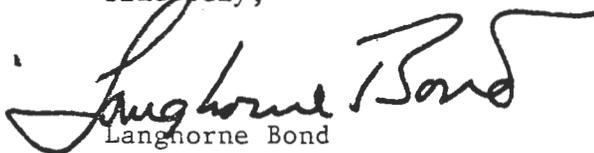
Dear Mr. Chairman:

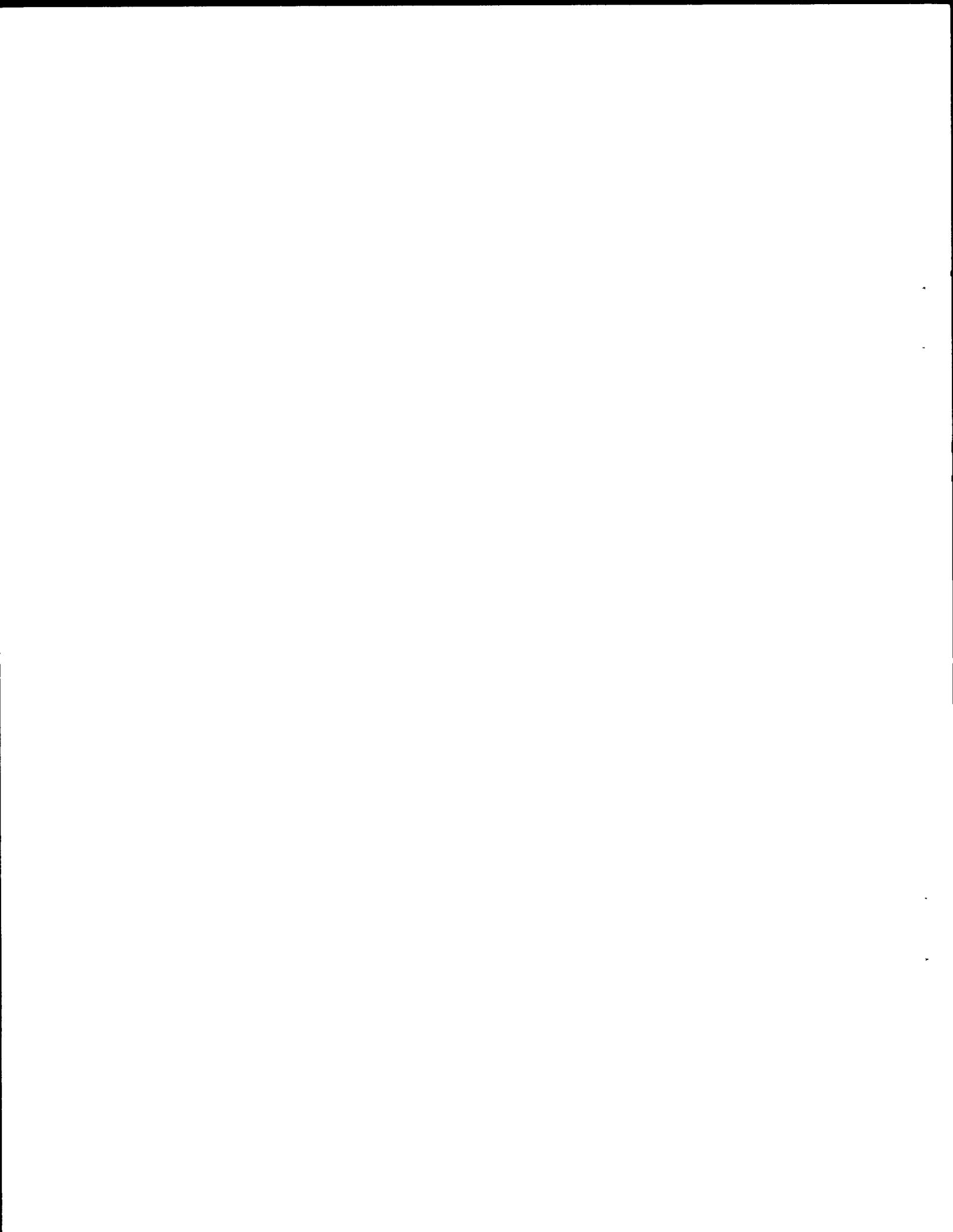
This is in response to NTSB Safety Recommendation A-80-44 issued by the Board on May 28, 1980. This recommendation resulted from the Board's investigation of a bird strike to a Royale Airlines Beech B-99 at Lafayette, Louisiana, on April 5, 1979.

A-80-44. Conduct a study to determine whether the structural characteristics of general aviation aircraft windscreens equipped with heating elements are enhanced by the use of such elements and apprise operators of optimal procedures through inclusion in appropriate flight manuals or issuance of an advisory circular.

Comment. The basis for this recommendation cites an instance of bird penetration of a Beech 99 windscreen. The Federal Aviation Administration is initiating a study of general aviation and commuter airplane accidents to evaluate bird strike history. As a part of the effort, we are reviewing windshield designs to determine the feasibility of developing guidelines for the heating of general aviation airplane windshields. We will advise you of our progress in this effort on or about January 1, 1981.

Sincerely,

  
Langhorne Bond  
Administrator



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 28, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-44

On April 5, 1979, a Royale Airlines Beech B-99, N1922T, being operated under 14 CFR 135, was struck by a flock of birds while descending for a landing at the Regional Airport in Lafayette, Louisiana. One bird penetrated the right windscreen, resulting in minor injuries to the copilot. There were 2 crewmembers and 13 passengers on board the aircraft. The National Transportation Safety Board's investigation of this incident indicates that corrective action is necessary to reduce the possibility of windscreen penetration in this and similar aircraft.

The Beech 99A windscreen is constructed of two-ply plate glass panels, with a single vinyl material sandwiched in between. The windscreen also incorporates a heating element. Investigation revealed that the flightcrew had not activated the windscreen heat during the descent, and the Flight Operations Manual does not specify the use of windscreen heat when descending. Further, according to the aircraft manufacturer's engineers, the manual does not suggest the use of windscreen heat in an area of high bird strike probability, and no bird strike tests have been conducted on the Model 99 aircraft windscreen since there is no requirement for such tests in 14 CFR Part 23.

At the Safety Board's request, the Federal Aviation Administration queried its computer for Service Difficulty Reports over the last 5 years in which bird strikes were reported. The computer run revealed that about 15 bird strikes have been reported involving general aviation aircraft. These strikes occurred not only on windscreens but on other areas of the aircraft as well.

A query of the Safety Board's accident/incident computer revealed that there were 53 bird strikes reported on all types of general aviation aircraft between 1964 and 1978. During the period, 6 aircraft were destroyed, 45 were damaged substantially, and 2 were damaged slightly. In addition, 5 persons were killed and 115 were injured as a result of these accidents.

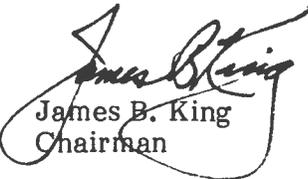
2934

The Beech 99 is used primarily in commuter operations, and it is used extensively in operations around coastal regions and at the lower altitudes where exposure to bird strikes is more likely. The Safety Board believes that the windscreens of the Beech 99 and similar aircraft used in commuter and air taxi operations should be tested to determine their tolerance to bird strikes in both the "hot" and "cold" configurations. Bird strike tests on windscreens have been conducted on many types of aircraft in the "heated" versus "cold" configuration, and the heated windscreen was found less susceptible to breakage or penetration. Tests or studies should be conducted to determine which condition offers the best protection in the event of a bird strike. This information should be incorporated into appropriate flight manuals and appropriate procedures should be made a part of the aircraft checklist.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Conduct a study to determine whether the structural characteristics of general aviation aircraft windscreens equipped with heating elements are enhanced by the use of such elements and apprise operators of optimal procedures through inclusion in appropriate flight manuals or issuance of an advisory circular. (Class III, Longer Term Action) (A-80-44)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

By:  James B. King  
Chairman



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

SEP 12 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter of August 20, 1980, responding to National Transportation Safety Board Safety Recommendation A-80-45 issued May 28, 1980. This recommendation stemmed from an inflight fire aboard a Beech C-18S caused by a ruptured aerosol can. We recommended that the Federal Aviation Administration (FAA):

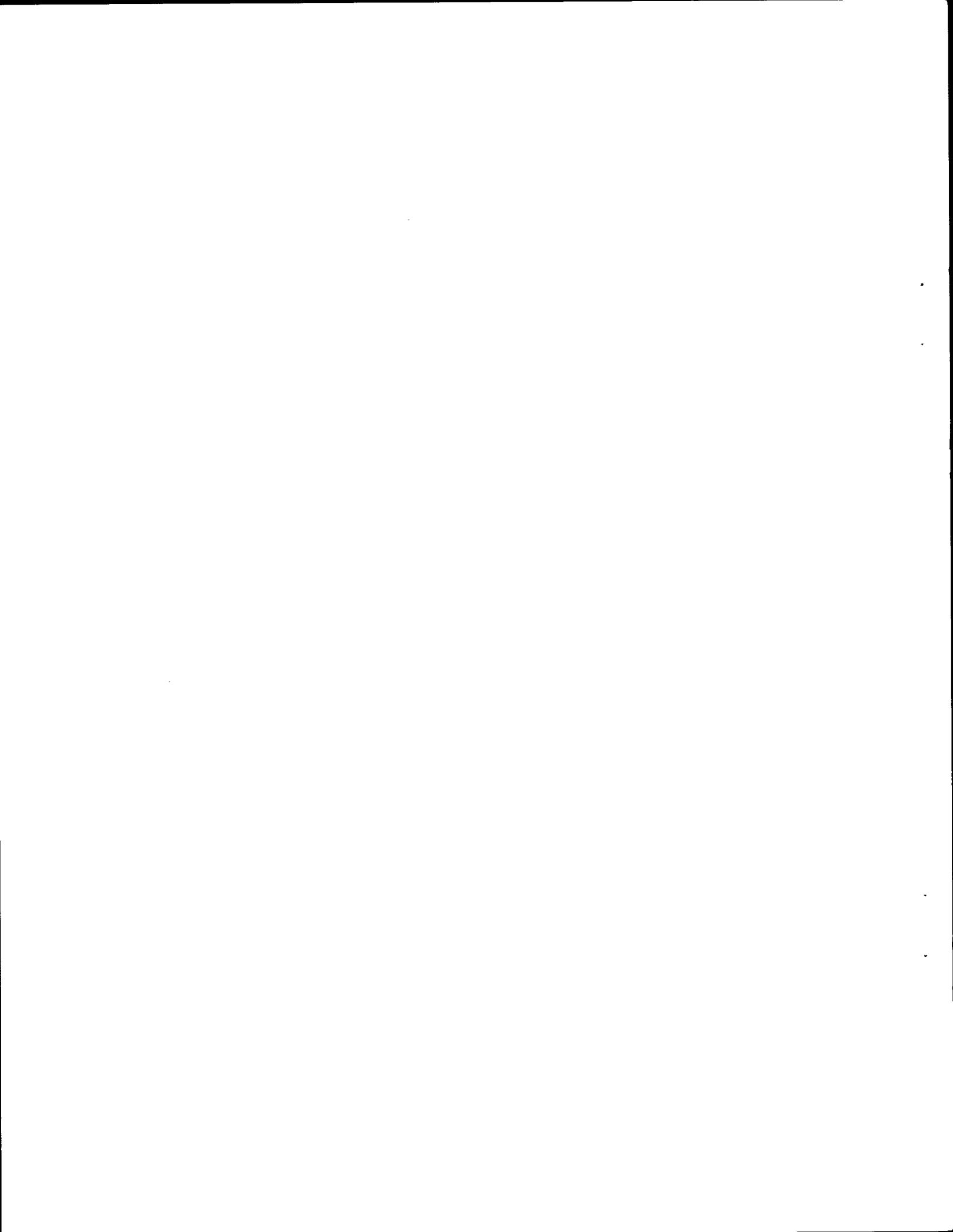
"Publish the circumstances of this incident in the Maintenance Notes Section of the General Aviation Airworthiness Alerts, stressing the fact that pilots and maintenance personnel share a responsibility to insure there are no uncovered or unprotected electrical terminal studs exposed in aircraft. The Maintenance Note should also remind pilots of the danger involved when carrying pressurized aerosol cans in an aircraft."

The Safety Board is pleased to note that the FAA concurs with this recommendation and has included highlights of this incident in the August 1980 issue of the General Aviation Airworthiness Alerts. The status of Safety Recommendation A-80-45 is classified as "Closed--Acceptable Action."

Sincerely yours,

A handwritten signature in cursive script, appearing to read "James B. King".

for  
James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 20, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-80-45 issued by the Board on May 28. This recommendation resulted from the Board's investigation of an onboard fire aboard a Beech C-18S aircraft caused by a ruptured aerosol can.

A-80-45. Publish the circumstances of this incident in the Maintenance Notes Section of the General Aviation Airworthiness Alerts, stressing the fact that pilots and maintenance personnel share a responsibility to insure there are no uncovered or unprotected electrical terminal studs exposed in aircraft. The Maintenance Note should also remind pilots of the danger involved when carrying pressurized aerosol cans in an aircraft.

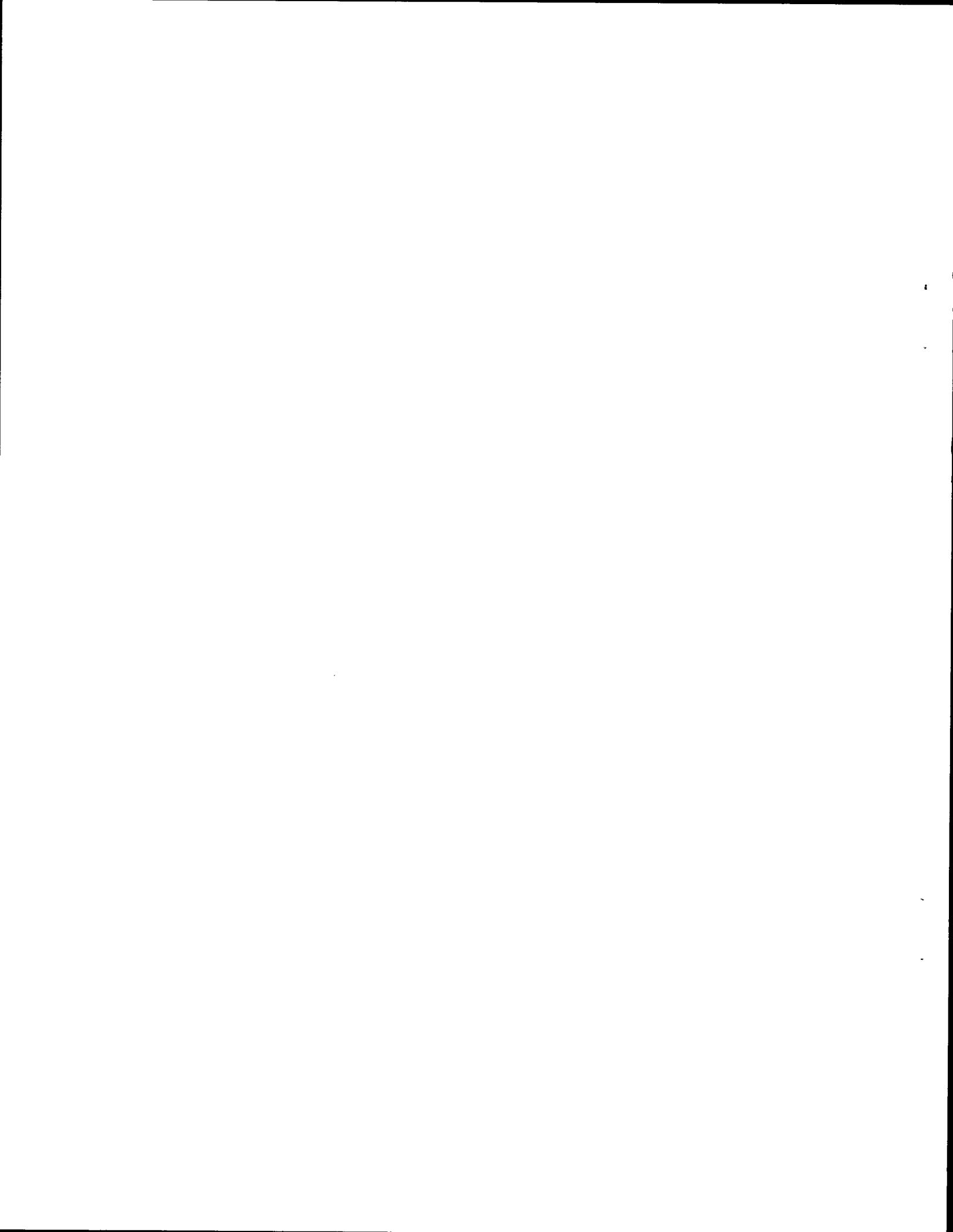
Comment. We concur with the Board's recommendation and have taken appropriate steps to include pertinent highlights of this incident in the August 1980 issue of the General Aviation Airworthiness Alerts. A copy of this publication is enclosed and FAA considers action on this recommendation completed.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond".

Langhorne Bond  
Administrator

Enclosure



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 28, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-45

On July 13, 1979, Ward Air, Juneau, Alaska, dispatched a float-equipped Beech C-18S aircraft on a flight from Juneau to Drake Island, Alaska, and return. The flight was to be conducted under visual flight rules in accordance with 14 CFR 135. The pilot filed a VFR flight plan and was the only occupant on board the aircraft when it departed Juneau. The flight to Drake Island, located in the Glacier Bay area northwest of Juneau, was uneventful. The aircraft landed at Drake Island and the pilot boarded two passengers. One passenger was an ambulatory patient en route to a hospital in Juneau.

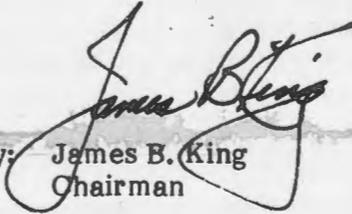
The aircraft had departed Drake Island and was climbing through an altitude of 2,500 feet mean sea level when fire appeared behind the copilot seat. The pilot and one passenger used a handheld portable fire extinguisher to put out the fire. The pilot stated that windows and hatches were opened to exhaust the smoke and the flight continued to its Juneau destination. Neither of the two passengers was injured. The pilot received first-degree burns to his hands while he was extinguishing the fire.

The Safety Board's investigation disclosed that a pressurized aerosol can of furniture polish (used onboard as a window cleaner) had been placed on a shelf directly behind the copilot seat next to an uncovered and unprotected electric terminal strip. The shelf was approximately 14 inches above the floor, and there were seven uncovered electrical terminal studs attached to a bracket on the bulkhead adjacent to the shelf. During the flight the aerosol can apparently became displaced from its original upright position and fell across the terminal studs. The pressurized can contacted the studs which caused a short circuit that burned through the thin aluminum wall of the can and ignited the contents of the container. The can burned like a blowtorch and ignited the upholstery, which was made of fiberglass and plastic. The fire quickly spread up to the emergency escape hatch before it was extinguished with the help of the passenger. Had the pilot been alone in the aircraft when the fire erupted, the outcome could have been catastrophic.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Publish the circumstances of this incident in the Maintenance Notes Section of the General Aviation Airworthiness Alerts, stressing the fact that pilots and maintenance personnel share a responsibility to insure there are no uncovered or unprotected electrical terminal studs exposed in aircraft. The Maintenance Note should also remind pilots of the danger involved when carrying pressurized aerosol cans in an aircraft. (Class II, Priority Action) (A-80-45)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

By:   
James B. King  
Chairman



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

SEP 29 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

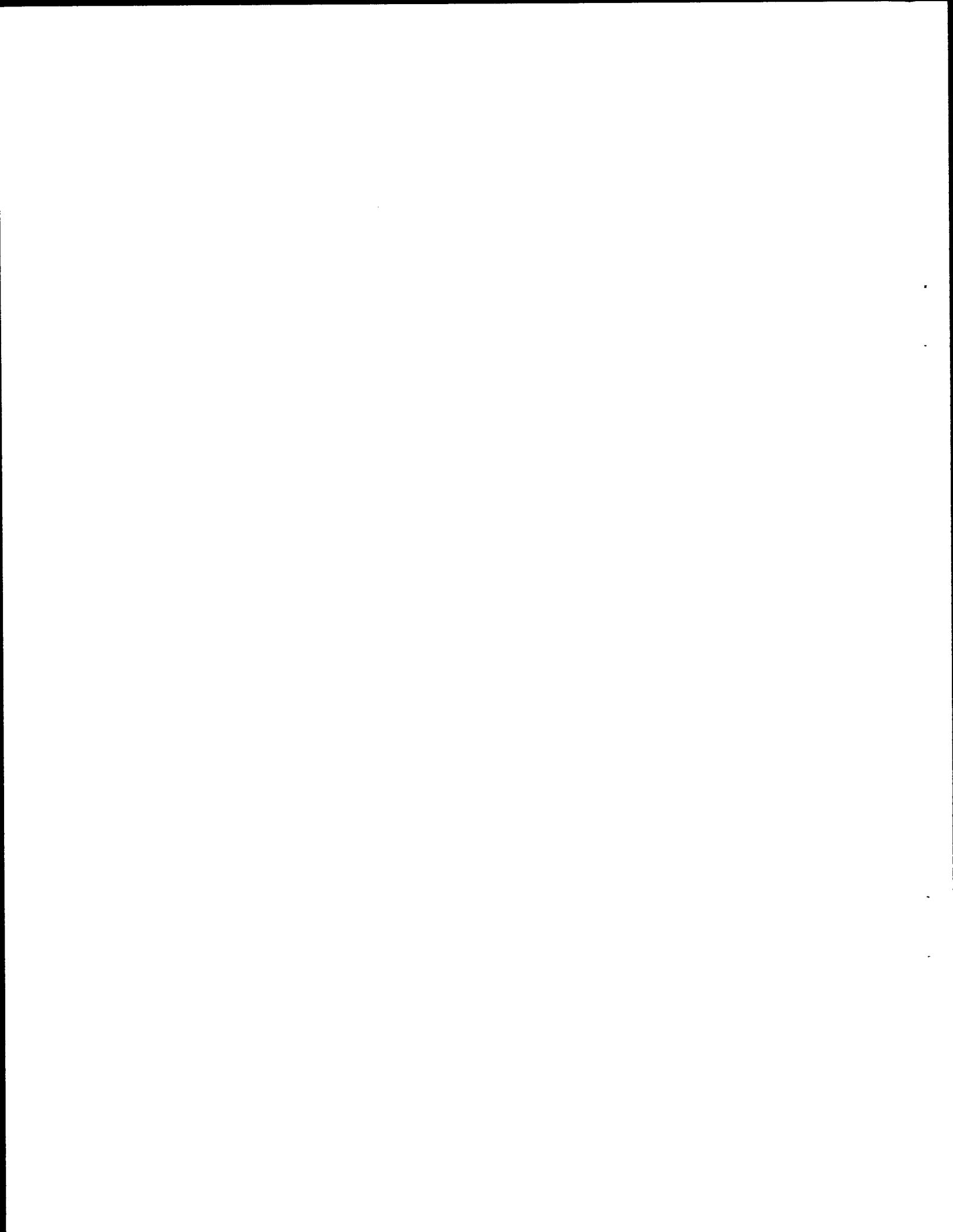
Thank you for your letter dated August 29, 1980, responding to National Transportation Safety Board Safety Recommendation A-80-46 issued June 3, 1980. This recommendation stemmed from our investigation of a Redcoat Air Cargo, Ltd., Bristol Britannia 253, which crashed about 7 minutes after takeoff from Boston's Logan International Airport on February 16, 1980. We recommended that the Federal Aviation Administration (FAA) ensure that the Automatic Terminal Information System (ATIS) advisories contain all essential forecasted meteorological conditions including SIGMET's which are likely to affect aircraft operating in terminal areas served by the ATIS.

The Safety Board has examined the pending revisions to the FAA Facility Operation and Administration Handbook (7210.3E). The revisions include notification of appropriate current SIGMET's and PIREP's in ATIS broadcasts. This satisfies the intent of Safety Recommendation A-80-46, which is now classified in a "Closed--Acceptable Action" status.

Sincerely yours,

A large, stylized handwritten signature in black ink, which appears to read "James B. King". The signature is written over the typed name and title.

James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 29, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-80-46 issued by the Board on June 3, 1980. This recommendation resulted from the Board's investigation of a Redcoat Air Cargo, Ltd., Bristol Britannia 253 which crashed at Billerica, Massachusetts, about 7 minutes after takeoff from Boston's Logan International Airport, on February 16.

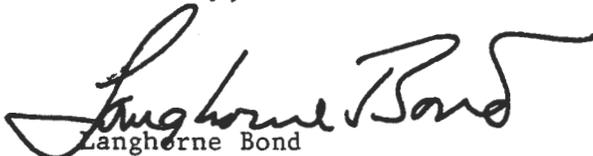
The following is the Federal Aviation Administration's (FAA) comment and action in response to this recommendation:

A-80-46. Ensure that the Automatic Terminal Information System (ATIS) advisories contain all essential forecasted meteorological conditions including SIGMET's which are likely to affect aircraft operating in terminal areas served by the ATIS.

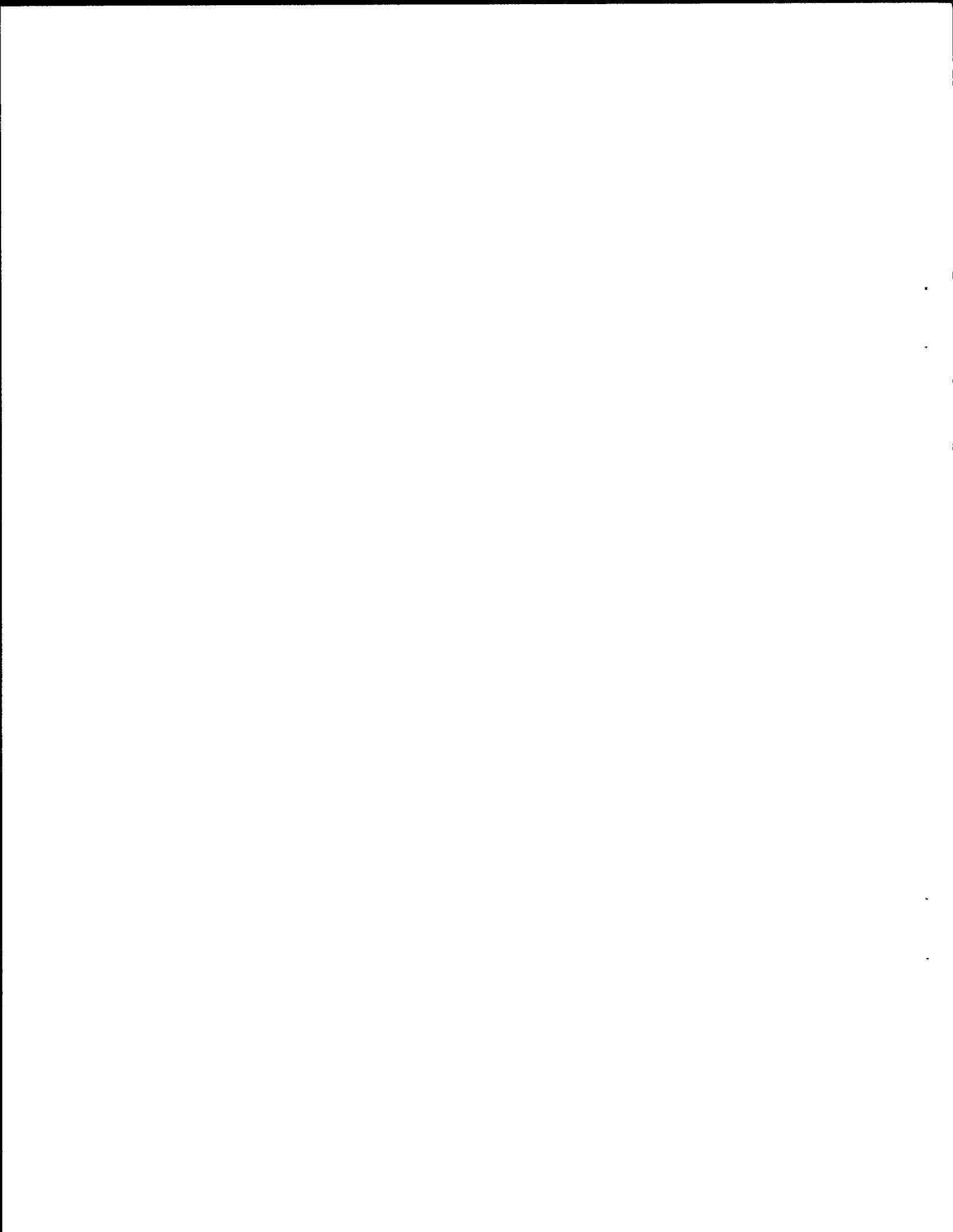
Comment. The FAA Facility Operation and Administration Handbook (7210.3E) is being revised to include notification of appropriate current SIGMETs and PIREPs in ATIS broadcasts. A copy of the revised requirements is enclosed.

The FAA considers action completed with regard to this recommendation.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: June 3, 1980

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

} SAFETY RECOMMENDATION(S)

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A-80-46  
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On February 16, 1980, a Redcoat Air Cargo, Ltd., Bristol Britannia 253 crashed at Billerica, Massachusetts, about 7 minutes after takeoff from Boston's Logan International Airport. Although the flightcrew obtained a weather briefing from the National Weather Service (NWS) more than 2 hours before the aircraft departed Boston, they did not receive a current SIGMET. A SIGMET forecasting severe icing conditions near the surface in the Boston area was valid, but it was not transcribed on the Boston Logan ATIS.

On March 9, 1980, a Cessna 172 crashed shortly after takeoff from Arapahoe County Airport, near Denver, Colorado. The Safety Board's investigation of this accident indicates that the aircraft encountered severe up-and-downdrafts shortly after liftoff from the runway. Since the flight was intended to be a local VFR instruction and pleasure operation, the pilot did not obtain a weather briefing. However, at the time of the accident, a SIGMET forecasting moderate to severe turbulence and up-and-downdrafts for the local area was valid. The pilot monitored the Arapahoe County Airport ATIS channel for local conditions. However, as in the previously cited accident, there was no reference to the currently valid SIGMET on the ATIS report.

The Safety Board has made several safety recommendations in the past regarding the adequacy and timeliness of the transmission of severe weather information to pilots, most recently A-77-65 and A-77-68. The FAA's actions as a result of these recommendations have improved the SIGMET notification procedures for en route operations. However, we believe a significant communications gap still exists for aircraft operations in the terminal environment, when the crew may or may not be monitoring an en route frequency. As you know, in safety recommendation A-77-68, we recommended the formulation of "rules and procedures for the timely dissemination by Air Traffic Controllers of all available severe weather information to inbound and outbound flightcrews in the terminal area." The Safety Board is holding the status of that recommendation "open--acceptable action" pending the finalization of your planned program aimed specifically at disseminating weather data in terminal areas. The Safety Board reiterates its concern expressed in safety recommendation A-77-68 and urges continued efforts to achieve early implementation of your planned solution.

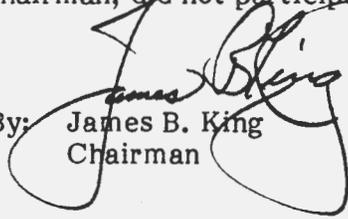
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Notwithstanding the efforts and goals of your agency in response to A-77-68, the Safety Board believes that immediate action can and should be taken to solve part of this problem by transmitting severe terminal weather information to pilots by means of the ATIS broadcast. There is no mandatory provision for weather advisories such as SIGMET's and PIREP's on ATIS broadcasts. The present guidelines for use of the ATIS restricts the broadcast time to about 30 seconds. However, the Safety Board is aware that the existing ATIS equipment has the capability of a 3-minute broadcast. Therefore, it is possible to include a brief notification of current SIGMET's and selected PIREP's on the ATIS broadcast without imposing undue workload on personnel or without additional equipment.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Insure that the ATIS advisories contain all essential forecasted meteorological conditions including SIGMETS which are likely to affect aircraft operating in terminal areas served by the ATIS. (Class II, Priority Action) (A-80-46)

DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation. KING, Chairman, did not participate.

By:   
James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591

August 29, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594



OFFICE OF  
THE ADMINISTRATOR

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-47 and 48 issued by the Board on June 3, 1980. These recommendations resulted from the Board's investigation of a Gulfstream American Model AA-1B aircraft involved in a fatal accident. The investigation revealed that the handle of the fuel selector valve, P/N SP2358B3, was selected to the right tank position; however, the right port of the valve was blocked completely and the left port was blocked partially by the valve's plastic core.

The Federal Aviation Administration's (FAA) Southern Region Engineering and Manufacturing Branch, working directly with Gulfstream American Corporation, was able to induce a failure similar to the one found on the accident airplane by striking the valve handle with a 12-pound hammer and imparting a bending force on the core through the shaft. Based on this testing and our evaluation of data, we believe that the failure on the accident aircraft occurred due to impact damage. Enclosed is a copy of the test results performed by Gulfstream American Corporation.

A survey of the FAA's Maintenance Analysis Center records discloses one other case of a fuel selector valve plastic core failure and nine cases of fuel selector valve binding. The valve core failure occurred on April 11, 1977, on a Gulfstream American Model AA-1. The failure of this valve was due to overtightening of the valve handle and was accomplished by gripping the valve with a device other than the airplane manufacturer's furnished handle, providing a larger moment. One of the nine remaining difficulty reports cited a shaft seal leak. The other eight were all reported during the 1978 winter season in the Long Island, New York, area. Six of these eight reports involve two airplanes and we believe all eight reports only involve three airplanes. We do not consider these reports to define an adverse trend, and our review of these eight reports led us to conclude that no corrective action is warranted at this time.

The valve is in wide use in general aviation airplane manufacture. It is used in most of the Piper PA-28 and PA-38 series airplanes, the Maule M4 and M5, Mooney M20J, and perhaps other series airplanes. The valve is installed in over 27,000 Piper PA-28 airplanes and 1,820 AA-1 airplanes.

The following are the FAA's comments and actions in response to these recommendations:

A-80-47. Issue an Airworthiness Directive for all Gulfstream American model aircraft to require disassembly of the fuel selector valve for inspection, cleaning, and lubrication at 100-hour intervals.

Comment. We do not believe that an airworthiness directive is warranted to require disassembly, inspection, cleaning, and lubrication at 100-hour intervals. We believe that the specified 500-hour interval required in the Aircraft Maintenance Manual is adequate. Shorter disassembly intervals introduce the possibility for faulty reassembly and introduction of contaminants.

A-80-48. Evaluate the design of fuel selector valve, P/N SP2358B3, and require correction of any deficiencies found during the evaluation.

Comment. We have conducted an evaluation of the design and believe it is adequate. This valve is in common use in general aviation small aircraft. The valve has a good service history and was greatly improved by the introduction of the plastic core material in lieu of a bronze material used earlier. We do not find that any corrective action is necessary toward improving the design further. We will continue to monitor the valve and will take corrective actions if our monitoring indicates it is necessary.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

ISSUED: June 3, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-47 and -48

On November 29, 1979, a Grumman American Model AA-1B, N8971L, departed Melbourne Regional Airport, Melbourne, Florida, on an instrument training flight. There were no communications with the flightcrew after it departed Melbourne. The flight failed to return and was reported missing. The wreckage was located on November 30, 1979, about 8 miles west of Melbourne in a level grass pasture. Both pilots were fatally injured.

The Safety Board's investigation revealed that the handle of the fuel selector valve, P/N SP2358B3, was selected to the right tank position; however, the right port of the valve was blocked completely and the left port was blocked partially by the valve's plastic core. Disassembly of the selector valve showed that the plastic core had separated from the valve handle. A survey of the Federal Aviation Administration's Maintenance Analysis Center records indicated that one other case of a fuel selector valve plastic core failure and eight cases of fuel selector valve binding have been reported over the last 5 years.

The service manual for the aircraft requires disassembly of the selector valve every 500 hours for cleaning and lubrication. This maintenance reportedly was performed on the aircraft involved in this accident at its last annual inspection on March 30, 1979, 163 flight-hours before the accident.

The Safety Board recognizes that the FAA has been active in alerting owners and operators of Gulfstream American Models AA-5A, -5B, and -1 of fuel selector valve difficulties by addressing this information in the August 1978 issue of the General Aviation Airworthiness Alerts and in the September 1977 issue of the General Aviation Inspection Aids Summary.

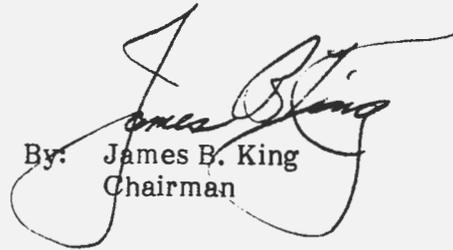
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Because of the circumstances of this accident and the potential for future fatal accidents, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive for all Gulfstream American model aircraft to require disassembly of the fuel selector valve for inspection, cleaning, and lubrication at 100-hour intervals. (Class II, Priority Action) (A-80-47)

Evaluate the design of fuel selector valve, P/N SP2358B3, and require correction of any deficiencies found during the evaluation. (Class II, Priority Action) (A-80-48)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN and BURSLEY, Members, concurred in these recommendations.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

September 9, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-80-49 issued by the Board on June 11, 1980. This recommendation resulted from the Board's investigation of the crash of an Aerospatiale Alouette III helicopter near Ogden, Utah, on December 14, 1978.

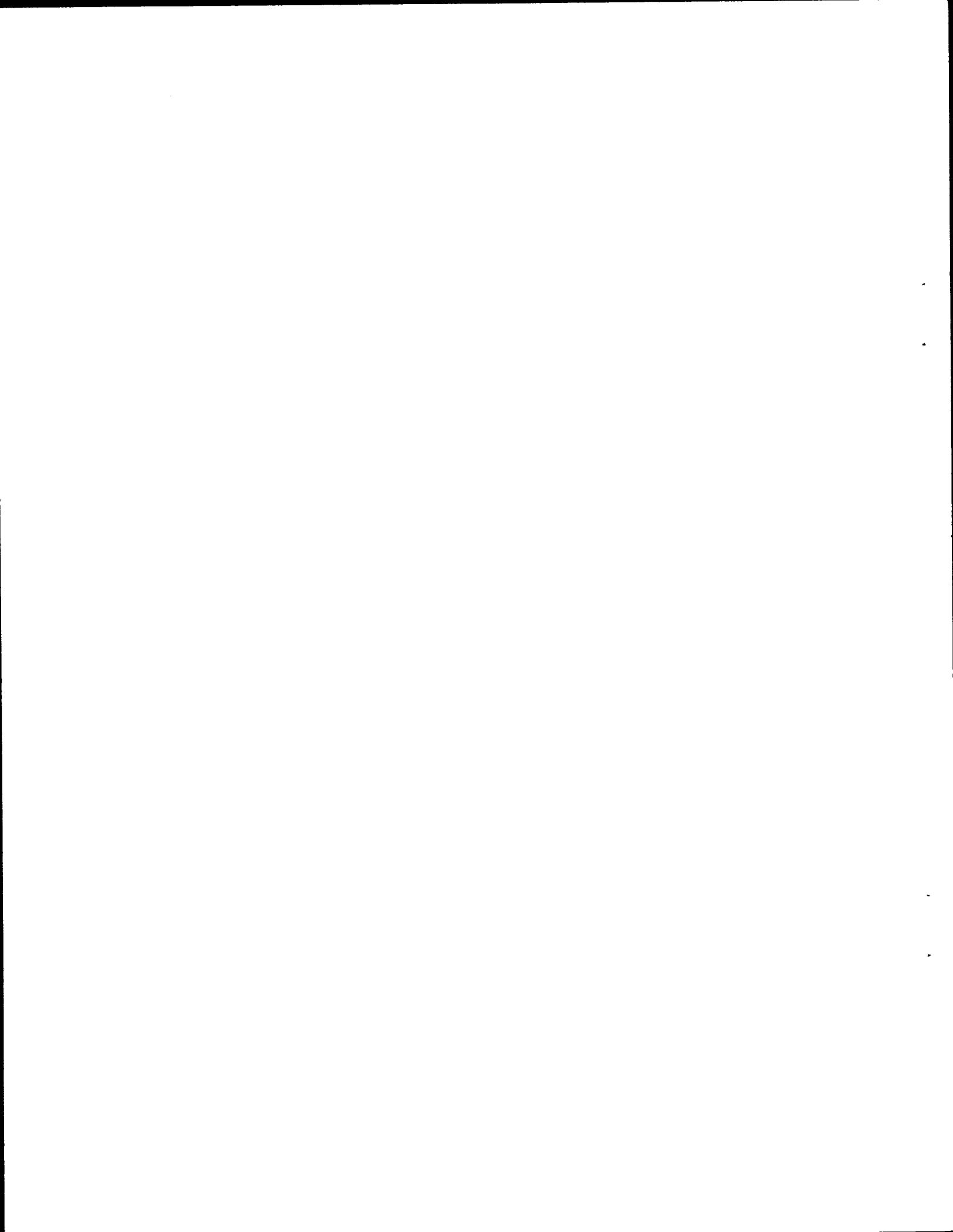
A-80-49. Issue an Operations Alert Bulletin to remind operators of Aerospatiale helicopters of the requirement to set altimeters to read actual altitude above mean sea level for reference during all flight operations below 18,000 feet mean sea level as specified in 14 CFR 91.81.

Comment. The procedure being followed by the Aerospatiale helicopter pilots in computing performance capabilities is satisfactory. However, good operating procedure should be followed by setting the current altimeter setting in the altimeter prior to takeoff. The hazards of operating, especially at night, at low altitudes or when specific altitude information is necessary without accurate altitude data is obvious. An Air Carrier Operations Bulletin, A-80-3, Altimeter Setting, Aerospatiale Alouette III Helicopters, emphasizing proper procedures and the potential safety problem is presently in the coordination process within the Federal Aviation Administration. We will forward a copy of this bulletin to you when it becomes available.

We believe our action satisfies the intent of Safety Recommendation A-80-49.

Sincerely,

  
Langhorne Bond  
Administrator



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: June 11, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-49

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During the early morning hours of darkness on December 14, 1978, an Aerospatiale Alouette III helicopter, which was being operated under 14 CFR 135, crashed into the Great Salt Lake near Ogden, Utah. The helicopter was being used to transport oil rig workers between a shore base and a drilling platform. Though the helicopter was destroyed, the six occupants survived with various injuries.

The National Transportation Safety Board's investigation of the accident revealed that the pilot was flying with an altimeter barometric setting of 1013 millibars (29.92 in Hg standard pressure) rather than the setting which would result in an indication of actual altitude above mean sea level. Although this played no role in the cause of the accident, the Safety Board believes the practice to be unsafe especially when the ambient pressure is below standard. In this case, the practice of setting standard pressure into the altimeter would place an aircraft at a lower altitude than indicated by the instrument. Interviewed after the accident, the pilot stated that he routinely flew the Alouette and Lama helicopters with the altimeter set to standard barometric pressure because the existing pressure altitude had to be entered on a lift computer installed in the helicopter. The lift computer permits the pilot to determine the performance capability of the helicopter for the ambient conditions and load during lifting operations. To use the computer, the pilot enters the ambient pressure altitude and temperature on the computer and reads directly the percentage of performance capability available. The easiest means of obtaining ambient pressure altitude is to set standard barometric pressure into the altimeter and read pressure altitude directly.

The altimeters on other Aerospatiale helicopters parked at the operator's facility also were set to standard barometric pressure. Moreover, the chief pilot for the operator stated that he was aware of other Aerospatiale helicopter operators who conducted flight operations with altimeters set to standard barometric pressure. The Principal Operations Inspector for the air taxi operator was aware of the procedure. In fact, he approved of the procedure because he believed 14 CFR 91.81 (altimeter settings) applied only to flights operating at or above 3,000 feet above the surface. However, the Federal Aviation Administration's Airspace and Traffic Branch views

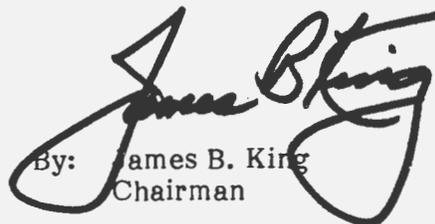
14 CFR 91.81 as clear and unambiguous in the requirement that altimeters be set to read altitude above mean sea level and that these operators are clearly in error by setting altimeters to standard barometric pressure.

The Safety Board believes that an accurate altimeter, set to the nearest station pressure, to read altitude above mean sea level is necessary at all times to assure safety of flight, but especially when operating at low altitude at night under low visibility conditions, or when adhering to the en route altitude restrictions provided on navigational charts or specified by air traffic control facilities.

Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Operations Alert Bulletin to remind operators of Aerospatiale helicopters of the requirement to set altimeters to read actual altitude above mean sea level for reference during all flight operations below 18,000 feet mean sea level as specified in 14 CFR 91.81. (Class II, Priority Action) (A-80-49)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591

September 15, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594



OFFICE OF  
THE ADMINISTRATOR

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-80-50 issued by the Board on June 17, 1980. This recommendation resulted from the Board's investigation of an accident which occurred on March 10, 1979, when a Swift Aire Lines, Inc., Aerospatiale Nord 262, ditched in Santa Monica Bay near Marina Del Ray, California, shortly after takeoff from Los Angeles International Airport.

The Board cited as one of the causal factors in the accident an inadvertent autofeather of the right propeller.

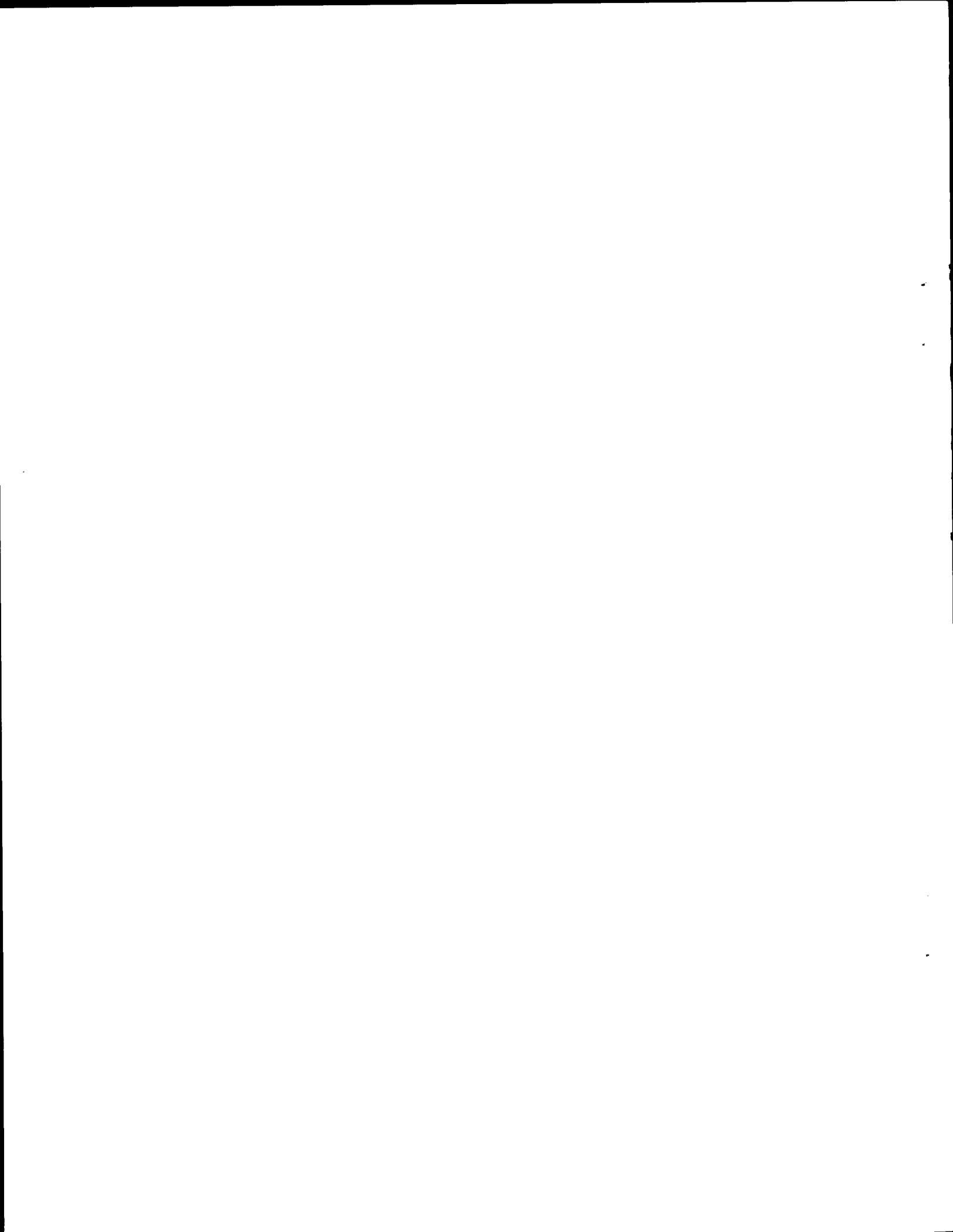
A-80-50. Issue an Advisory Circular or by other appropriate means advise operators of specific illustrations of failures and malfunctions which should be reported to the Service Difficulty Reporting Program under provisions of 14 CFR 121.703(c) and 14 CFR 135.415(c), regardless of phase of ground operation or flight at which they occur, and, as a minimum among those illustrations, include propeller malfunctions, inadvertent autofeather systems activation, and engine component structural failure.

Comment. Several years ago, the FAA recognized the need for updating FAR Sections 121.703 and 135.415 so that the reporting requirements could be made compatible with today's aviation environment. Therefore, a staff study was instituted. This study examined the language for any needed clarification and evaluated items which could be deleted or consolidated with other reportable items. It also considered new items which should be required to be reported. Now that this study has been completed, a regulatory review is planned in order to summarize and evaluate the reporting requirements. When the review is completed, and appropriate sections of the FARs updated, the FAA will evaluate the desirability of publishing an Advisory Circular, as recommended by the Board.

We will inform the Board of our decision relative to publication of an Advisory Circular following completion of a regulatory review.

Sincerely,

  
Langhorne Bond  
Administrator



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: June 17, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-50

On March 10, 1979, a Swift Aire Lines, Inc., Aerospatiale Nord 262, N418SA, ditched in Santa Monica Bay near Marina Del Ray, California, shortly after takeoff from Los Angeles International Airport. The flight was a scheduled commuter operation from Los Angeles, California, to Santa Maria, California. Of the four passengers and two crewmembers aboard the aircraft, two crewmembers and one passenger were killed.

One of the causal factors in the accident was an inadvertent autofeather of the right propeller. During the investigation, the Safety Board learned that another Nord 262 operator had reportedly experienced 50 to 60 inadvertent propeller autofeathers. The Safety Board's investigation of the operator's records confirmed 20 propeller autofeathers, none of which had been reported into your organization's Service Difficulty Reporting Program. The confirmed autofeathers occurred during the time period from September 1, 1978, to May 25, 1979. Apparently, this vital data was not reported to the Service Difficulty Reporting Program because each event occurred either during static engine runups or during the takeoff roll, and, therefore, did not constitute a reportable incident according to 14 CFR 121.703 (b) and 14 CFR 135.415 (b) and did not clearly fall within the ambit of subparagraph (c) of either paragraph which are ambiguous and allow varied interpretations as to their application to the Service Difficulty Reporting Program.

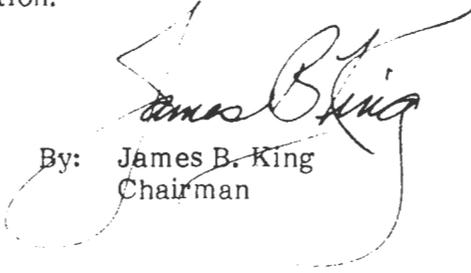
The Safety Board believes that propeller malfunctions, inadvertent autofeather system activations, and engine component structural failures should be reportable items under 14 CFR 121.703 (c) and 14 CFR 135.415 (c) regardless of the phase of ground or flight operation in which they were experienced. These events could clearly endanger the safe operation of an aircraft if they were to occur at a critical phase of takeoff or flight. Therefore, the Safety Board believes that operators should report these specific malfunctions or failures. The assimilation and distribution of the facts and circumstances of such occurrences through the Service Difficulty Reporting Program would enhance the FAA's data base and the consequent ability to identify potential accident causing mechanisms. To accomplish this, the Safety Board believes that the Service Difficulty Board should provide specific illustrations of items operators are to report under 14 CFR 121.703 (c) and 14 CFR 135.415 (c).

2721-B

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Advisory Circular, or by other appropriate means, advise operators of specific illustrations of failures and malfunctions which should be reported to the Service Difficulty Reporting Program under the provisions of 14 CFR 121.703 (c) and 14 CFR 135.415 (c) regardless of the phase of ground operation or flight at which they occur, and, as a minimum among those illustrations, include propeller malfunction, inadvertent autofeather systems activation, and engine component structural failure. (Class II, Priority Action) (A-80-50)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation.



By: James B. King  
Chairman

**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591

September 26, 1980

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594



OFFICE OF  
THE ADMINISTRATOR

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-51 and A-80-52 issued by the Board on June 30, 1980. These recommendations resulted from the Board's review of 14 CFR 91.23 (Full requirements for flight in IFR conditions) and 91.83 (Flight Plan; information required), relative to the requirement that a pilot file for an alternate airport in a flight plan.

A-80-51. Alert pilots to the disparity between the requirements of 14 CFR 91.23 and 91.83 and the approach minimums for certain high altitude airports, by publishing in the Airman Information Manual and on appropriate approved approach charts a specific requirement to file for an alternate airport for those airports where approach minimums are higher than 2,000 feet above airport elevation.

A-80-52. Amend 14 CFR 91.23 and 91.83 to require pilots to file for an alternate airport on an IFR flight plan whenever the ceiling of the destination airport is forecasted to be less than 2,000 feet above the airport or 1,000 feet above the minimum approach altitude or visibility less than 3 miles for a period of 1 hour before to 1 hour after the estimated time of arrival.

We note that these recommendations are related to FAR Parts 91.23 and 91.83, but recent rulemaking actions have also amended Part 121.619 to reflect the requirements stated in Part 91.

The intent of these rulemaking actions was to eliminate the requirements to designate an alternate airport when the weather conditions at the airport were VFR and the approach aids permitted the aircraft to descend into VFR conditions. However, there appears to be a limited number of airports (approximately five) where the amended regulations do not adequately address the primary approach aid for the airport. At these airports, it is possible for a pilot to literally comply with the requirements and not be able to descend to visual conditions or have adequate fuel reserves to divert to an alternate airport. At present, this problem has not, to our knowledge, occurred in operational practice.

To resolve this problem, we intend to amend Parts 91, 121, and 135 as indicated in our enclosure to this letter. This enclosure also includes several examples to illustrate various possibilities we consider pertinent.

In an effort to achieve consistency between various Parts of the FAR, we intend to amend Sections 91.23 and 91.83, so that IFR alternate airport and fuel reserve requirements are the same as those of Part 135. Our Air Transportation Division and General Aviation and Commercial Division will work in close coordination so as to arrive at standardized IFR alternate airport and fuel requirements for Parts 91, 121, and 135. These revised requirements would also eliminate the situation which exists with regard to Sections 91.23 and 91.83.

In response to Safety Recommendation A-80-51, we are exploring various means, including those recommended by the NTSB, to inform pilots of the possible disparity in requirements of Sections 91.23 and 91.83.

We will keep the Board informed of our progress relative to both of the above safety recommendations.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond". The signature is written in dark ink and is positioned above the printed name and title.

Langhorne Bond  
Administrator

**NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.**

ISSUED: June 30, 1980

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-51 and -52

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A Safety Board review of 14 CFR 91.23 (Fuel requirements for flight in IFR conditions) and 91.83 (Flight plan; information required) has revealed a disparity with respect to the requirement that a pilot file for an alternate airport in a flight plan. The regulations state that a pilot is not required to file for an alternate airport on an instrument flight rules (IFR) flight plan if the forecast weather at the intended destination airport, for a period of 1 hour before to 1 hour after the estimated landing time, indicates a ceiling of 2,000 feet above the airport and visibility of 3 miles.

The Safety Board notes there are 11 high-altitude airports in the United States which have instrument approach minimum descent altitudes (MDA's) or decision heights (DH's) higher than 2,000 feet above the airport. <sup>1/</sup> Thus, if the intended destination ceiling is 2,000 feet, the current regulations do not require that pilots flying into these airports file for an alternate destination when the weather is below approach minimums. Although this situation has not contributed to an accident, the Safety Board believes that the hazard potential is sufficient to warrant corrective measures to alert pilots to the disparity in these regulations.

The Safety Board is aware that the Federal Aviation Administration is considering rulemaking action to correct this obvious disparity. The Safety Board endorses such a rule change and urges that it be expedited. Regardless of a rule change, the Board believes that action should be taken also to alert a pilot filing a flight plan for one of these destination airports to the disparity between the requirements specified in 14 CFR 91 and the existing approach minimums. Specific weather minima for alternate requirements for these airports could be specified in the Airman's Information Manual, or in the Special Notice and Bulletin section and on the approach charts published by National Ocean Survey and Jeppesen.

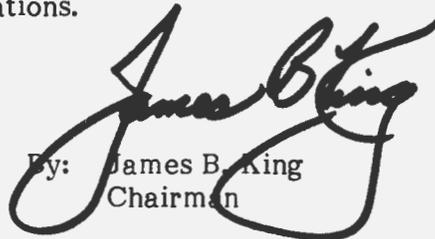
<sup>1/</sup> Bishop, Calif.; South Lake Tahoe, Calif.; Ukiah, Calif.; Butte, Mont.; Helena, Mont.; Missoula, Mont.; Chadron, Nebr.; Ely, Nev.; Klamath Falls, Ore.; Omak, Wash.; and Casper, Wyo.

Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Alert pilots to the disparity between the requirements of 14 CFR 91.23 and 91.83 and the approach minimums for certain high altitude airports, by publishing in the Airman Information Manual and on appropriate approved approach charts a specific requirement to file for an alternate airport for those airports where approach minimums are higher than 2,000 feet above airport elevation. (Class II, Priority Action) (A-80-51)

Amend 14 CFR 91.23 and 91.83 to require pilots to file for an alternate airport on an IFR flight plan whenever the ceiling of the destination airport is forecasted to be less than 2,000 feet above the airport or 1,000 feet above the minimum approach altitude or visibility less than 3 miles for a period of 1 hour before to 1 hour after the estimated time of arrival. (Class II, Priority Action) (A-80-52)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591

September 25, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue  
Washington, D.C. 20594



OFFICE OF  
THE ADMINISTRATOR

Dear Mr. Chairman:

This acknowledges receipt of NTSB Safety Recommendations A-80-53 through 55, delivered by the Board on Friday, June 27, 1980, at 5:40 p.m., after close of official business. These recommendations were based on the Board's investigations of accidents involving Series 20 Learjet aircraft in the low-speed landing configuration and high-speed, high-altitude cruise environment.

The Federal Aviation Administration (FAA) is aware of the facts cited by the Board in its June 27 transmittal letter and has aggressively pursued corrective actions relative to these problems. A review of the accident data pertaining to these aircraft was initiated immediately following the May 6 accident at Richmond. On June 9, 1980, the Safety Analysis Division, Office of Aviation Safety submitted an analysis of Learjet accidents and Service Difficulty Reports to the Air Transportation Division, Office of Flight Operations. The analysis indicated a need for reevaluation of Learjet systems and subsystems concerning stick pusher and shaker, autopilot pitch and roll, elevator, aileron and throttle cables.

The analysis determined that aircraft control was involved in approximately 30 percent of the 49 accidents used in the analysis. Aircraft control involved overshoot, undershoot, runway alignment, and flying speed; but pilot flight-hour experience did not appear to be a factor. Based upon the analysis and the information presently available through the accident investigation, we have initiated actions which address the subject of the recommendations as follows:

A-80-53. Convene a Multiple Expert Opinion Team to evaluate the flight characteristics and handling qualities of Series 20 Learjet aircraft, with and without slow flight modification, at both low- and high-speed extremes of the operational flight envelope under the most critical conditions of weight and balance (and other variable factors) and to establish the acceptability of the control and airspeed margins of the aircraft at these extremes.

Comment. This recommendation has already been encompassed in an earlier investigation involving all Learjets, including the Series 20. This investigation was a followup to the February 1979 "Study of Selected Performance Characteristics of Modified Lear Jet Aircraft" in

which the NTSB, FAA, Learjet Corporation, National Aeronautics and Space Administration, and other interested parties participated. As a result of the investigation, Airworthiness Directive (AD) 79-12-05 was issued (copy enclosed). Also, a separate investigation was initiated by the FAA on June 17, 1980, to accomplish a certification review which will also include other areas not specifically addressed in the Board's recommendations. Although this review is still in its initial stages, preliminary information developed as a result of joint FAA and Gates Learjet Corporation flight evaluations has evidenced characteristics at the limits of their operating envelope which in combination with presently approved operating procedures could adversely affect safety of flight. In light of the foregoing, on August 1, the FAA Central Region issued by airmail letter an emergency airworthiness directive (copy enclosed) to Learjet aircraft owners. Since our investigation and review is incomplete, we will make our findings available to the Board when we complete our research.

A-80-54. Advise all Learjet operators of the circumstances of recent accidents and emphasize the prudence of rigid adherence to the specified operational limits and recommended operational procedures.

Comment. Immediately upon receipt of NTSB Safety Recommendation A-80-54, a notice, which included the Board's entire transmission (copy enclosed), was sent to all Learjet operators. In addition, a GENOT was telegraphed to all FAA General Aviation District Offices (GADO's), Flight Standards District Offices (FSDO's) and Air Carrier District Offices (ACDO's), directing that all Learjet Part 91, 121, and 135 operators be contacted to verify that the operators received the notice and were fully aware of the contents of NTSB Safety Recommendation A-80-54.

A-80-55. Evaluate information contained in the Gates Learjet Service News Letter 49 dated May 1980 pertaining to procedures to be followed if the aircraft inadvertently exceeds  $V_{mo}/M_{mo}$  and, based on this evaluation, require appropriate revisions to the aircraft flight manual.

Comment. This recommendation is included in FAA's investigation described above in our comments relative to NTSB Safety Recommendation A-80-53. Also, FAA's Office of Flight Operations has established a separate team to review the adequacy and effectiveness of Learjet crew training.

In addition to these actions which are being taken in direct response to NTSB Safety Recommendations A-80-53 through 55, a GENOT (copy enclosed) was also distributed on May 22, 1980, to all GADO's, FSDO's, and ACDO's. This GENOT requested the immediate inspection of all Learjet aircraft for installation of mach warning cut-out switches. To date we have noted seven instances of aircraft with unapproved cut-out switch installations, and these all have now been removed.

3

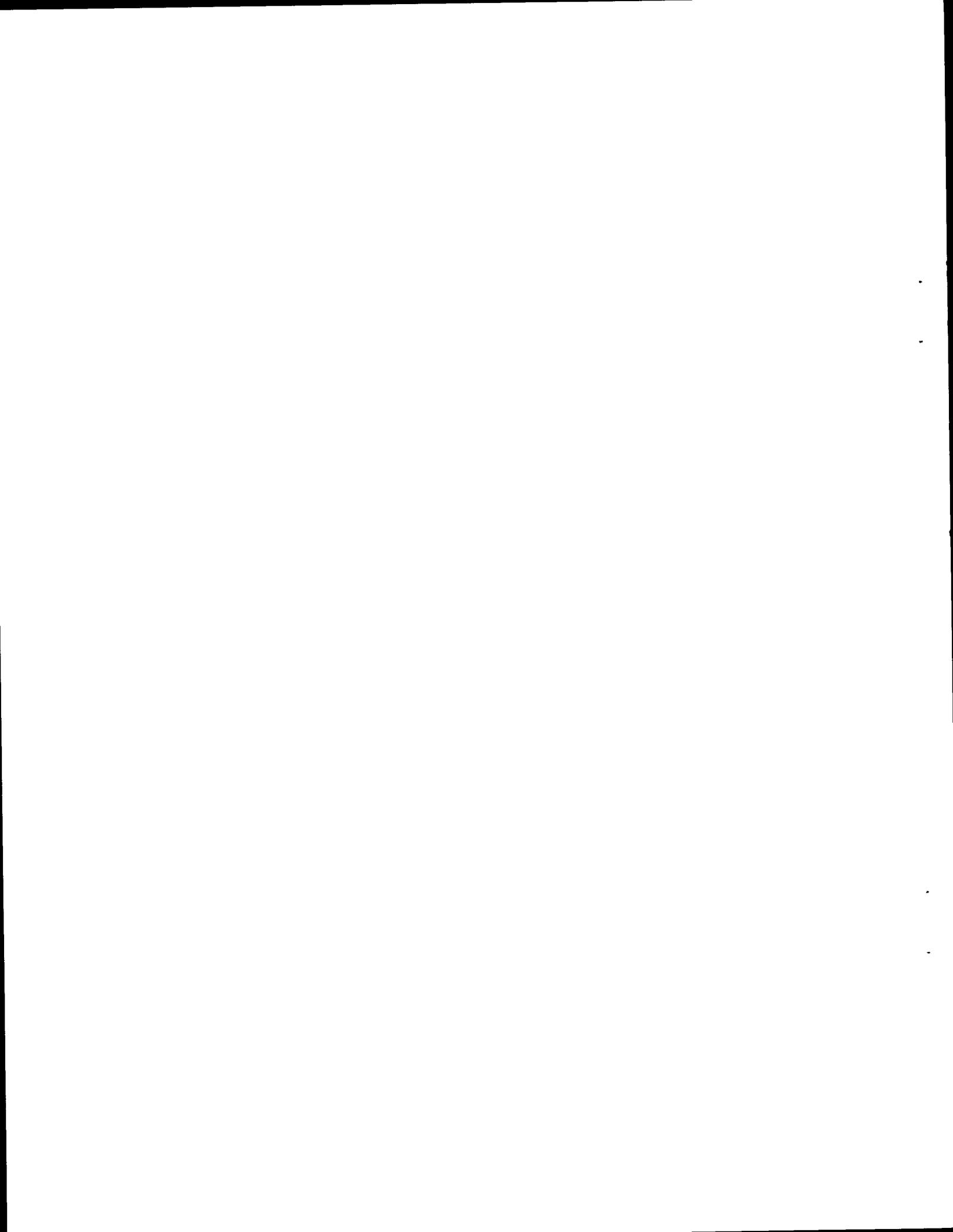
Finally, on June 2, 1980, a special issue of General Aviation Airworthiness Alerts was published (copy enclosed). This alert addressed the subject of unapproved alterations of speed warning systems in both air carrier and general aviation aircraft.

We will continue to keep the Board informed of our findings as the investigation progresses.

Sincerely,

  
Langhorne Bond  
Administrator

4 Enclosures



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: June 27, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-80-53 through -55

On May 6, 1980, a Learjet model 23 aircraft crashed while attempting a night landing on runway 33 at Byrd Field, Richmond, Virginia. The skies were clear, visibility was 10 mi, and the wind was calm. Although the Learjet was slightly high on the approach, it descended normally in a landing attitude. But before touching down, the aircraft yawed and rolled, and first the right wingtip fuel tank and then the left tiptank struck the runway. Thereafter, the nose of the aircraft pitched up, the engine thrust increased, the aircraft rolled to the right, and it crashed in a nearly inverted attitude. A fire erupted after impact, and both pilots, the only persons aboard, were killed. The aircraft had been manufactured in 1964. Available optional slow-flight modifications installed on many Learjets had not been installed on this aircraft.

During the past 2 years, the Safety Board has investigated several Learjet accidents in which the aircraft while on the landing approach exhibited similar roll and yaw maneuvers followed by a loss of control and a crash. The other Learjets involved were models 24, and 25 aircraft, with the Century III and Raisbeck slow-flight modifications. The investigation revealed that in each landing accident, the aircraft apparently was flown, as specified, with the yaw damper disengaged, although the altitude at which the yaw damper was disengaged could not be verified. The accident records indicate that turbulence, crosswinds, wing icing, pilot technique, or other conditions had disturbed the aircraft's equilibrium during a flare or go-around maneuver and that erratic roll and yaw maneuvers and a loss of aircraft control ensued. Subsequent flight tests indicated that an increase in engine thrust during an attempt to recover the aircraft may cause roll oscillations to become more pronounced and may reduce the likelihood of recovery.

In February 1979, the National Transportation Safety Board, the Federal Aviation Administration, the Gates Learjet Corporation, the National Aeronautics and Space Administration, and other interested parties participated in a "Study of Selected Performance Characteristics of Modified Learjet Aircraft." The objectives of the study were to examine the operation of the stall warning system, to determine the most probable effect of small amounts of ice on stall characteristics, and to study the low-speed handling qualities of the modified aircraft in a landing configuration. The study found some limitations in the effectiveness of the anti-ice system and potential problems with premature ice-induced stalls.

Although icing conditions and turbulence were not evident in the Richmond accident, the influences of turbulence and ground effect may have been significant factors in some of the Learjet accidents. Since the accident history of the aircraft indicates that the flight behavior may be unpredictable under certain conditions and loss of control may occur unexpectedly, the Safety Board is concerned that the 1979 study may not have identified all of the factors which can lead to erratic rolling of the Learjet in the landing phase. We also believe that the reasons for the ensuing loss of control have not yet been fully explored.

The Safety Board is also investigating three Learjet accidents which have involved loss of control at high altitude and which terminated in high-speed descents into the ground. One aircraft was on a training flight at 17,000 ft, and another aircraft was cruising en route at 41,000 ft. Both aircraft departed from level flight and entered steep descents from which the crews did not recover. The descents apparently were unexpected and occurred without warning. In the training accident, we believe that the pilots may have been practicing an emergency procedure for runaway stabilizer trim when the aircraft became uncontrollable. In the third accident, which occurred on May 19, 1980, a Learjet crashed into the Gulf of Mexico following an unplanned departure and high-speed descent from the aircraft's cruise altitude of 43,000 ft. The preliminary investigation of this accident disclosed that a cutout switch had been installed which could be used to silence the Mach overspeed warning horn. Similar horn warning cutout switch installations were found in other Learjet aircraft during inspections required following the May 19, 1980, accident.

In the high altitude loss of control situations, the possibilities under consideration are that a malfunction in the flight control system, turbulence, aerodynamic characteristics, or flightcrew action could lead to an upset and further loss of control. Accident records indicate that once high speeds and steep descents have been established, complete loss of control may result and recovery may be impossible.

For the foregoing reasons, we believe that the the flight characteristics of the Learjet aircraft in both the low-speed landing environment and the high-speed, high-altitude cruise environment should be thoroughly examined to gain a better understanding of the aerodynamic factors associated with these accidents. Without this information, we believe that measures to assure safe flight cannot be developed.

In addition, the Board is aware that Gates Learjet Service issued News Letter 49 dated May 1980 pertaining to procedures to be followed if the aircraft inadvertently exceeds  $V_{mo}/M_{mo}$ . These procedures specify that the spoilers should not be extended if a pitch axis malfunction or a runaway trim situation is apparent. The reason stated is that the nosedown pitch change that the spoilers produce may aggravate a nosedown pitch problem. The Board is concerned that this information is not included in the aircraft flight manual and that operators may not be aware of the consequences of spoiler extension in these situations. Furthermore, the procedures for slowing the aircraft from excess speed, as specified in the newsletter, include the extension of the landing gear. It is the Board's understanding that this procedure has not been evaluated during actual flight conditions. The Board believes that it would be appropriate for the FAA to evaluate these procedures and if they are deemed to be effective they should be incorporated immediately in the aircraft flight manual.

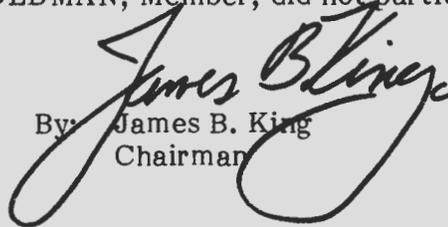
Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

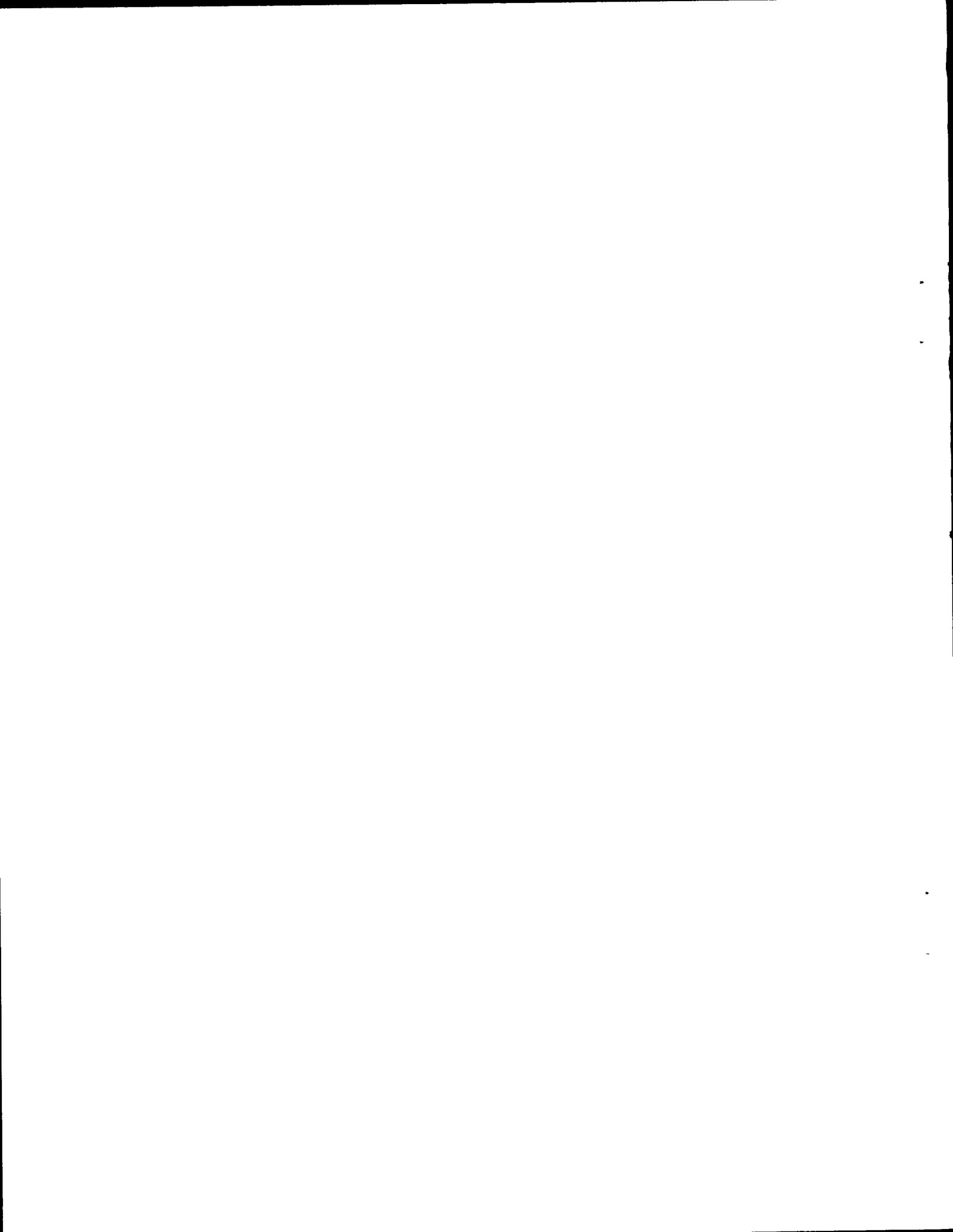
Convene a Multiple Expert Opinion Team to evaluate the flight characteristics and handling qualities of Series 20 Learjet aircraft, with and without slow flight modification, at both low- and high-speed extremes of the operational flight envelope under the most critical conditions of weight and balance (and other variable factors) and to establish the acceptability of the control and airspeed margins of the aircraft at these extremes. (Class I, Urgent Action) (A-80-53)

Advise all Learjet operators of the circumstances of recent accidents and emphasize the prudence of rigid adherence to the specified operational limits and recommended operational procedures. (Class I, Urgent Action) (A-80-54)

Evaluate information contained in the Gates Learjet Service News Letter 49 dated May 1980 pertaining to procedures to be followed if the aircraft inadvertently exceeds  $V_{mo}/M_{mo}$  and, based on this evaluation, require appropriate revisions to the aircraft flight manual. (Class I, Urgent Action) (A-80-55)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and BURSLEY, Members, concurred in these recommendations. GOLDMAN, Member, did not participate.

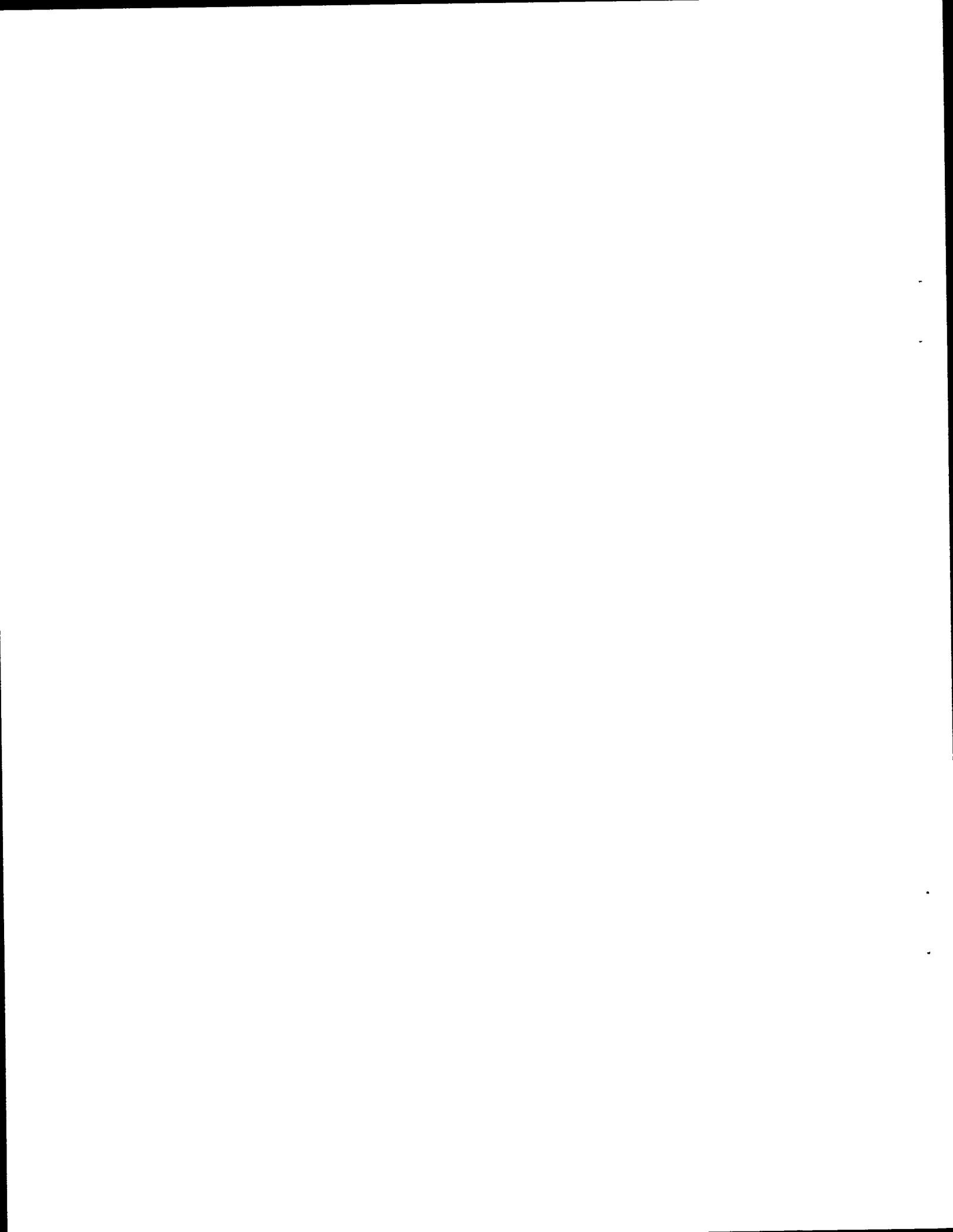
  
By: James B. King  
Chairman



NEW RECOMMENDATIONS

Following is a listing of the 44 new recommendations received during the third quarter of CY 1980:

<u>NTSB Rec. No.</u>	<u>Subject:</u>	<u>Page</u>
A-80-56 thru 58	Inadvertent landing gear retraction gear accidents between 1975 and 1978	101
A-80-59 & 60	Western Airlines, Inc., McDonnell Douglas DC-10-10 crash October 31, 1979	103
A-80-61 thru 63	Beech B58 and B95 accidents involving explosion and fire in aircraft wing during engine start	105
A-80-64 thru 75	Commuter airline safety	107
A-80-76 & 77	Swearingen SA-226AT decompression March 8, 1980	111
A-80-78 & 79	Bell 205A-1 helicopter crash July 18, 1980	113
A-80-80 & 81	Leaking motive flow valves in Learjet aircraft	115
A-80-82 thru 84	Aerospatiale Lama 315B helicopter crash July 28, 1980	117
A-80-85	Aerospatiale SA-330 helicopter fire in passenger compartment August 26, 1980	119
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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: July 16, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-56 through -58

As part of a recently completed special investigation <sup>1/</sup>, the Safety Board reviewed its files for every inadvertent landing gear retraction accident between 1975 and 1978. These accidents typically happened because the pilot was attempting to put the flaps control "UP" after landing, and moved the landing gear control instead. This inadvertent movement of the landing gear control was often attributed to the pilot's being under stress or distracted, and being more accustomed to flying aircraft in which these two controls were in exactly opposite locations.

Two popular light aircraft, the Beech Bonanza and Baron, were involved in the majority of these accidents. The Bonanza constituted only about 30 percent of the active light single engine aircraft fleet with retractable landing gear, but was involved in 16 of the 24 accidents suffered by this category of aircraft. Similarly, the Baron constituted only 16 percent of the light twin fleet, yet suffered 21 of the 39 such accidents occurring to these aircraft.

An examination of cockpits of the Bonanza and Baron revealed four problem areas which can lead to design-induced pilot errors. These problem areas include: (1) A lack of adequate "shape-coding" of the landing gear and flap control knobs to permit the pilot to differentiate between them on the basis of feel alone; (2) an arrangement of these two controls in nonstandard locations which increases the probability that the pilot will actuate one control while intending to actuate the other; (3) the location of the horizontal bar on which the control wheels are mounted so that it obscures the pilot's view and obstructs his reach of these two controls; and (4) the lack of a guard or latch mechanism over the landing gear control to prevent the pilot from activating this control unless the guard/latch is moved first.

<sup>1/</sup> Special Investigation Report.—Design-Induced Landing Gear Retraction Accidents in Beechcraft Baron, Bonanza and other Light Aircraft. (NTSB-SR-80-1)

The human engineering problem areas documented in the report result largely from the fact that their basic instrument panel design is 35 years old. A great deal of knowledge about the effects of good design in preventing human error has been acquired since these aircraft were originally certificated, and more appropriate standards have been established. However, the current FAA regulations permit the continued manufacture of these aircraft under their previously issued type certificates.

On the basis of the evidence, the Safety Board concludes that the number of inadvertent landing gear retraction accidents in the Beech Bonanza and Baron is unacceptably high. Furthermore, these accidents result largely from various combinations of the four cockpit design deficiencies.

Newly manufactured Baron and Bonanza aircraft should be made to comply with the requirements of 14 CFR 23.777 with respect to standardized control locations. In addition, the installation of simple guards on landing gear controls also should be required on all newly manufactured Barons and Bonanzas (including the pressurized Baron). Simple landing gear control guards should also be retrofitted on previously produced Barons and late model Bonanzas, and a wheel-shaped control should be added to earlier model Bonanzas.

As a result of this special investigation, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require after a specified date that all newly manufactured Beechcraft Baron and Bonanza models conform to 14 CFR 23.777 with respect to landing gear and flap control locations and that they have an adequate latch or guard to minimize inadvertent landing gear retraction. (Class II, Priority Action) (A-80-56)

Require that, after a specified date, previously manufactured Beechcraft Baron and Bonanza aircraft which do not conform to the landing gear and flap control arrangements outlined in 14 CFR 23.777 be equipped with an adequate guard or latch mechanism to prevent inadvertent actuation of the landing gear controls. (Class II, Priority Action) (A-80-57)

Require that after a specified date, the landing gear control switch on the pre-1963 model Beechcraft Bonanzas be modified to incorporate a wheel-shaped knob as outlined in 14 CFR 23.781. (Class II, Priority Action) (A-80-58)

KING, Chairman, GOLDMAN and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, and McADAMS, Member, did not participate.



By: James B. King  
Chairman

*for*

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: July 14, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-80-59 and -60

On October 31, 1979, Western Airlines, Inc., McDonnell Douglas DC-10-10, N-903WA, crashed at Mexico City International Airport, Mexico. Although the aircraft was cleared to land by means of a sidestep maneuver <sup>1/</sup> on runway 23R, the crew continued the approach to runway 23L, which had been closed for repairs. The aircraft struck heavy equipment on runway 23L as the crew attempted to execute a missed approach. Of the 76 passengers and 13 crewmembers aboard, 61 passengers and 11 crewmembers were fatally injured, and 13 passengers and 2 crewmembers were seriously injured. One person on the ground was fatally injured.

The crew was advised on at least four occasions by either Mexico City Air Route Traffic Control Center or the tower that they were to make an approach to runway 23L but were to land on runway 23R. However, none of these air traffic control (ATC) communications contained phraseology similar to that used in United States ATC communications regarding a sidestep maneuver. The investigation revealed that both pilots knew that runway 23L was closed and that each had landed aircraft at the airport while the runway was closed.

The Safety Board believes that a good graphic presentation of the sidestep maneuver on the approach chart would have aided the crew. Nowhere on standard United States approach charts is the complete maneuver portrayed, nor is the word "sidestep" shown. The procedure is shown as a straight-in approach to an adjacent runway, as a circling approach to the sidestep runway, or as a note at the bottom of the chart giving ceiling and visibility minima. In the accident case, the Mexico City chart for runway 23 right contained only ceiling and visibility minima.

<sup>1/</sup> A visual alignment maneuver required of a pilot executing an approach to one runway while cleared to land on a parallel runway.

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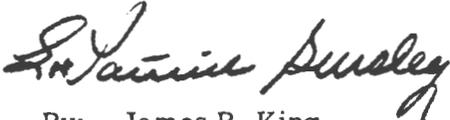
The Safety Board believes that a separate instrument approach chart is needed for the 33 airport runways that utilize the sidestep maneuver in the United States. In addition, we believe there is a need to publish more information on sidestep maneuver procedures.

Accordingly, the Safety Board recommends that the Federal Aviation Administration:

Revise FAA Handbook 8260.19 to require that separate standardized instrument approach charts be published for all airport approaches that require a sidestep maneuver. These charts should clearly indicate the airport approach plan view, the profile view, and the landing minima required. (Class II, Priority Action) (A-80-59)

Publish an Advisory Circular, or amend an existing Advisory Circular, to disseminate information on the sidestep maneuver procedures, terminal ATC communication procedures, radar separation and equipment requirements, and landing minima applicable to the use of the sidestep maneuver by American air carriers at both domestic and foreign airports. (Class I, Urgent Action) (A-80-60)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

  
By: James B. King  
Chairman  


NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: July 21, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-61 through -63

The National Transportation Safety Board has recently investigated two similar accidents which involved explosion and fire in an aircraft wing during engine start. Both occurred in similar Beech airplanes, a Model B58 and a Model B95. Although both occurred on the ground and no injuries resulted, the Board has determined that the unsafe condition which caused the fires could lead to fire in flight.

Our investigations of the April 8, 1980, Beechcraft 95 fire at Tulsa, Oklahoma, and the May 16, 1980, Beechcraft B58 fire at Casper, Wyoming, revealed that in both cases the fuel vent lines were disconnected at B-nut fittings inside the wings.

When the fuel tank is full and the fuel expands, the pressure relief valve allows the expanded fuel and vapors to be expelled overboard through the vent line. When the vent line is disconnected, the fuel will be vented into the interior of the wing and flow inboard toward the engine nacelle because of the wing dihedral. When the fuel reaches the nacelle, it can be ignited by hot engine parts or engine exhaust. Our investigations confirmed that both fires began in this manner. In addition, one other Beechcraft Model 95 was inspected and found to have the vent line disconnected at a B-nut fitting.

On all three aircraft, the fuel tank inspection and leak test required by Airworthiness Directive 78-05-06 had been accomplished a few days before the discovery of the disconnected vent lines. The airworthiness directive requires that the inspection be accomplished in accordance with the manufacturer's instructions. For these aircraft the appropriate document is Beechcraft Service Instruction No. 0895, Revision 1. This Service Instruction states: "plug all pressure relief vents (if equipped) and recessed vents. . . ." The method of plugging these vents is left to the discretion of the person conducting the inspection. It appears that, rather than plugging the vent outlets, the vent lines are being disconnected and fitted with plugs. In the cases cited here it appears the plugs were removed but the vent lines were not properly reconnected. The service instruction procedure does not have specific steps for restoring the system to its original configuration.

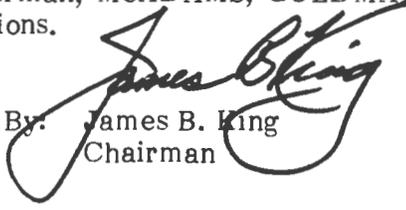
Since the inspection applies to many aircraft, the Safety Board is concerned that the unsafe condition described above could exist in other aircraft and that the condition may recur after future inspections. Therefore, the Safety Board recommends that the Federal Aviation Administration:

Require a one-time inspection of those aircraft that have been inspected in accordance with the requirements of Airworthiness Directive 78-05-06, to ensure the integrity of the fuel vent system. (Class I, Urgent Action) (A-80-61)

Amend immediately Airworthiness Directive 78-05-06 to include a procedure which will assure vent system integrity following the inspection required by the airworthiness directive. (Class II, Priority Action) (A-80-62)

Require that the Beech Aircraft Corporation amend Service Instruction No. 0895 to advise all operators of these airplanes of the possible unsafe condition, and to specify a procedure which will assure that the vent system integrity is restored following fuel tank inspection. (Class II, Priority Action) (A-80-63)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

  
By: James B. King  
Chairman

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: August 8, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-64 through -75

On January 31, 1980, the National Transportation Safety Board completed a 4-day public hearing on commuter airline safety. The hearing followed an extensive 4-month special investigation of the commuter industry and the elements which affect commuter airline safety. The special investigation included an on-site survey of 45 commuter airlines throughout the United States, a study of the role and effectiveness of the Federal Aviation Administration and the Civil Aeronautics Board, the influence of the airport environment, financial posture and management structure on individual airlines and on commuter airline safety, and an evaluation of the operational, maintenance, and training programs of the commuter airline industry. The Safety Board used its 1972 "Air Taxi Safety Study" and its commuter aircraft accident investigation experience as a basis to determine the safety issues which were involved and to evaluate the progress the commuter airline industry and the FAA are making toward correcting the deficiencies.

The Safety Board's study of the FAA's role in the surveillance of the commuter airline industry indicates there is a need for special training of FAA inspectors, to conduct surveillance of commuter airliner. In addition, the staffing levels at FAA offices responsible for commuter airline surveillance and the workload requirements of the individual inspectors generally do not provide for the accomplishment of effective commuter airline surveillance unless other safety-related, general aviation activities are curtailed. The findings concerning FAA workloads were the subject of several Board recommendations in previous years and were an important finding in the recent special investigation and hearing. The Board also received much testimony that the FAA should standardize surveillance procedures so that each region, district office, and inspector has the same interpretation of FAA regulations and procedures. In addition, the Board concluded that procedures should be revised to provide surveillance of maintenance activities during the work shifts when maintenance is performed. For example, there were indications that very little maintenance surveillance was conducted during the night shifts when the bulk of maintenance activities were performed.

The Safety Board believes that the revision of 14 CFR 135 has upgraded safety standards for commuter airlines. However, the Board believes that Part 135 should be amended to strengthen the requirements for the training of pilots, especially for training in emergency procedures, weight and balance, and center of gravity. These safety deficiencies, coupled with a lack of knowledge by some flight operations personnel on dispatch procedures, have contributed to several accidents in recent years. Finally, the Board believes that 14 CFR 135 should be amended to increase the frequency of determining the aircraft empty weight and center of gravity for aircraft used in commuter operations.

In addition to the upgrading of pilot training programs, the Safety Board believes that 14 CFR 135 should be revised to establish a minimum number of multiengine flight hours for a pilot-in-command of a multiengine aircraft used in commuter operations. The Universal Airways accident at Gulfport, Mississippi, on March 1, 1979, and the Comair accident at Cincinnati, Ohio, on October 8, 1979, reinforced the Board's belief that a pilot's inexperience in reciprocating multiengine aircraft can affect performance in emergency situations.

The Board's survey of commuter-served airports revealed that those airports served by certificated route air carriers are better equipped with approach and landing aids. For example, 67 percent of the airports served exclusively by commuter airlines do not have a precision instrument approach facility, while 16 percent of these airports have no instrument approach facility. The Board believes that the safety of the public which travels on commuter airlines requires equivalent levels of service, and that there should not be an appreciable difference in airport facilities. The qualification criteria for instrument approach facilities, approach lights, visual approach slope indicators, and other facilities should be revised to allow commuter-served airports to achieve a level of safety equivalent to those airports served by certificated route air carriers. The Board believes that the funding for many of the commuter airport improvements could come from the Aviation Trust Fund if the ADAP criteria were amended to provide a larger share of the revenues to commuter-served airports.

As a result of its study, the National Transportation Safety Board reiterates the following recommendations to the Federal Aviation Administration:

Require that pilots involved in 14 CFR 135 operations be thoroughly trained on the performance capabilities and handling qualities of aircraft when loaded to their maximum certificated gross weight or to the limits of their c.g. envelope, or both. (Class II, Priority Action) (A-79-80).

Expedite rulemaking which would make the flight time and duty time limitations, and rest requirements for commuter air carriers the same as those specified for domestic air crewmembers under 14 CFR 121. (Class II, Priority Action) (A-79-81)

Develop, in cooperation with industry, flight recorder standards (FDR/CVR) for complex aircraft which are predicated upon intended aircraft usage. (Class II, Priority Action) (A-78-27)

Draft specifications and fund research and development for a low cost FDR, CVR, and composite recorder which can be used on complex general aviation aircraft. Establish guidelines for these recorders, such as maximum cost, compatible with the cost of the airplane on which they will be installed and with the use for which the airplane is intended. (Class II, Priority Action) (A-78-28)

In the interim, amend 14 CFR to require that no operation (except for maintenance ferry flights) may be conducted with turbine-powered aircraft certificated to carry six passengers or more, which require two pilots by their certificate, without an operable CVR capable of retaining at least 10 minutes of intracockpit conversation when power is interrupted. Such requirements can be met with available equipment to facilitate rapid implementation of this requirement. (Class II, Priority Action) (A-78-29)

In addition, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Establish a separate classification of commuter airline inspectors to conduct commuter airline surveillance. (Class III, Longer Term Action) (A-80-64).

Provide specialized training for inspectors assigned to commuter airlines to insure that inspectors are qualified in the equipment operated and are knowledgeable regarding commuter airline operations. (Class II, Priority Action) (A-80-65).

Allocate GADO resources to insure that all commuter surveillance and general aviation requirements can be accomplished. (Class III, Longer Term Action) (A-80-66).

Establish a procedure for distributing surveillance of commuter airline maintenance evenly during all periods when maintenance is performed. (Class II, Priority Action) (A-80-67).

Require that only actual passenger weights be used in weight and balance computations for reciprocative engine aircraft used in Part 135 flights which are certificated for nine or less passengers. (Class II, Priority Action) (A-80-68).

Amend 14 CFR 135.243 to require a minimum number of multiengine flight hours for a pilot-in-command of a multiengine commuter airline flight. (Class II, Priority Action) (A-80-69).

Amend 14 CFR 135 Subpart B to require that dispatch and flight operations duties are supervised by personnel trained in those functions. (Class II, Priority Action) (A-80-70).

Amend 14 CFR 135.185 to require that aircraft empty weight and center of gravity be determined more frequently. (Class III, Longer Term Action) (A-80-71).

Evaluate and revise as appropriate the criteria for the authorization of single-pilot IFR operations for commuter airlines. (Class III, Longer Term Action) (A-80-72).

Expand the ADAP program to support the development of commuter-served airports. (Class II, Priority Action) (A-80-73).

Revise the qualifying criteria to insure that a larger percentage of commuter-served airports are equipped with instrument landing systems. (Class II, Priority Action) (A-80-74).

Insure, to the extent possible, that airports which are served by commuter airlines are equipped with an instrument approach facility. (Class II, Priority Action) (A-80-75).

KING, Chairman, and McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, did not participate.



By: James B. King  
Chairman

# NATIONAL TRANSPORTATION SAFETY BOARD

## WASHINGTON, D.C.

ISSUED: August 14, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20594

SAFETY RECOMMENDATION(S)

A-80-76 and -77

On March 8, 1980, N720R, a Swearingen SA-226AT aircraft, experienced a rapid decompression near Albany, New York, at 16,000 ft after part of the aft cargo compartment door separated in flight. The aircraft cabin had just attained a pressure differential of about 7 psi to maintain a sea level cabin altitude. Some interior furnishings, including an unoccupied passenger seat, were ejected from the aircraft. During the decompression, two passengers were injured slightly by flying debris. The dorsal fin and upper fuselage were damaged slightly when the upper portion of the cargo door rotated upward about its hinge, broke the overcentering arm link attachments, separated, and struck the fuselage. The aircraft landed safely at Glen Falls, New York. The separated portion of the cargo door was recovered on May 14, 1980.

On March 14, 1980, the Safety Board issued Safety Recommendations A-80-20 and -21 which recommended that the Federal Aviation Administration issue airworthiness directives to require an immediate inspection to assure proper adjustment and structural integrity of the door latches, and to assure safe operation of the aircraft by restricting pressurization until appropriate corrective action was taken. Airworthiness Directives T80SW14 and 15, issued by the FAA, and Service Bulletin 52-009, issued by the manufacturer, during March 1980 accomplished these urgent actions.

Our examination of the separated portion of the cargo door confirmed the previous indications that misadjustment of a latch was a major factor in the separation of the door. The examination also revealed that the "click-clacks" (split barrel) on one of the highly loaded latches had been filed or ground down, which reduced the diametrical engagement of the latch in its receptacle. The Safety Board could not determine who had performed the unauthorized maintenance procedure. The airworthiness of the fuselage depends on the integrity of the passenger and cargo door latches to withstand flight and pressurization loads, and it is imperative that the latch components and the sill receptacles be maintained dimensionally so that proper engagement takes place.

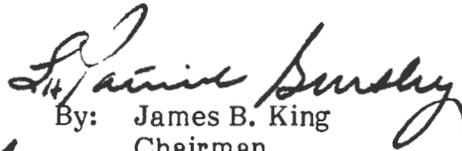
Additionally, the examination revealed a broken latch actuator rod which prevented one latch from being engaged. Our analysis indicated that the rod was probably broken when someone forced the handle to the closed position while the latch was not properly engaged. The compression buckling of the rod caused stress which resulted in the failure of the rod end in its threaded shank.

Since the additional unsafe conditions found on the accident aircraft might be present on other aircraft in the Swearingen fleet, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a telert maintenance bulletin to alert operators of Swearingen Models SA226-AT and SA226-TC aircraft of the dangers of machining or filing any component of the latch or receptacle to ease the engagement. (Class II, Priority Action) (A-80-76)

Issue an addition to the General Aviation Airworthiness Alerts, Advisory Circular 43-16, to alert operators of SA226 aircraft to the unsafe condition which can result from forcing the latching mechanism while the latches are not properly engaged. (Class II, Priority Action) (A-80-77)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

  
By: James B. King  
Chairman  
*for*

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: August 19, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-78 and -79

On July 18, 1980, a Bell 205A-1 helicopter, N6207N, equipped with fixed-type floats (inflated), was returning to the Arcola-Houston, Texas Airport on a flight from an offshore oil rig. Immediately after acknowledging airport advisories on the radio, the pilot, who was the sole occupant, reported that he was in trouble. When the aircraft wreckage was located 3 miles east of the airport, it was inverted and burned. The main rotor system was found 350 yards from the main impact area. The pilot was killed.

Examination of the wreckage by the National Transportation Safety Board revealed that a fatigue crack existed on the right forward cross tube (PN 205-050-114-9) where the support saddle fitting (PN 204-050-011-21) was riveted. The fatigue crack was located between two rivet holes. The remaining fracture in the cross tube diameter was caused by static overload. Separation of the float support in this area would have caused the float to swing outboard as it pivoted around the aft cross tube attachment and to expose a large flat plate drag area to the slip stream, which could have resulted in the pilot losing control of the helicopter.

Airworthiness Directive 76-14-03, Bell Amendment 39-2665, effective August 7, 1976, required that the cross tubes in the float kit installed on this model helicopter be removed before they had been operated 500 hours. The operator of the accident helicopter reported that the aircraft had been operated approximately 440 hours since the float kit had been installed.

The manufacturer reported that replacement cross tubes with clamp-on saddle support fittings are available and they estimated that there are still 35 or more float kits with the riveted saddle support fittings in service.

3029

To prevent recurrence of this type of accident, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a telegraphic airworthiness directive applicable to all Bell 205 and 212 helicopter models equipped with fixed float kits (PN 205-706-050-1 and -7), on which AD 76-14-03 has not been accomplished, to require an immediate one time x-ray or equivalent inspection of all cross tube inner diameters in the areas where the support saddle fittings are riveted for evidence of cracks. (Class I, Urgent Action) (A-80-78)

Issue an airworthiness directive to require the removal of forward and aft cross tubes (PN 205-050-114-1, -3, -5, -7) and cross tube assemblies (PN 205-706-050-5 and -9) from all Bell Model 205A-1 and 212 helicopters within the next 50 hours time in service and replacement with clamp-on saddle support fittings. (Class I, Urgent Action) (A-80-79)

DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. KING, Chairman, did not participate.

*for*  
By: *James B. King*  
Chairman

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 5, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-80 and -81

On April 9, 1980, the Safety Board made three safety recommendations (A-80-27 through -29) to the Federal Aviation Administration regarding leaking motive flow valves, PN AV16E1182, in Learjet aircraft. We have continued to investigate this problem after receiving subsequent reports of leaking motive flow valves.

As part of our continuing investigation, the Safety Board assembled a group of interested parties, including personnel from the Learjet Corporation, the FAA, and ITT General Controls/Aerospace Products, at the ITT plant in Glendale, California, to examine and test motive flow valves which had been removed from Learjet aircraft after leaks were found. Other motive flow valves were also examined and disassembled in an effort to determine the cause of the leaks. The group was advised during this study that no motive flow valve had ever leaked under test pressures at the manufacturer's (ITT) facility unless one or more of the O-rings installed on the valve core were broken. ITT also reported that, in its experience, O-ring failures are extremely rare.

Disassembly and examination of motive flow valves that leaked on the test stand showed that one or both of the O-rings were broken into four pieces. The valve that the Safety Board tested during the investigation which led to Recommendations A-80-27 through -29 was disassembled after the pressure test revealed a leak, and one O-ring was found broken; three pieces of the O-ring were in the valve but another piece or pieces were missing. A demonstration teardown of a new motive flow valve showed that, if the valve was disassembled improperly, removal of the valve core caused one O-ring to be broken into four pieces. When the broken O-rings were compared, it was found that all the breaks had similar characteristics, and the fragments were of similar size. It was determined that if the valve was disassembled by pushing the valve core out so that an O-ring was forced past the ports within the valve body, portions of the O-ring protruded into the ports and were cut off by the edge of the port as the valve core was forced out of the valve body. The O-ring broken in this demonstration had the same characteristics as the ones removed from some of the tested valves which leaked. None of the broken O-rings showed evidence of failure or distress other than that which appeared to have been caused by improper assembly/disassembly of the valve.

It is the opinion of ITT that unauthorized disassembly/assembly had been performed on some motive flow valves which resulted in cutting one or both of the O-rings. ITT pointed out that only ITT is authorized to perform any disassembly or repair on ITT motive flow valves that are installed in Learjet aircraft. The Safety Board is aware that from September to December 1979 there was an amendment to the Learjet Maintenance Manual which authorized field maintenance on these valves. This amendment to the manual was withdrawn when Learjet realized that it could not authorize such maintenance. It is possible that during the time this amendment was in the manual some maintenance personnel may have attempted to perform field repair of motive flow valves and, as a result, may have damaged one or both of the O-rings when they reinstalled the valve core in the valve body. This damage may have led to the leaks that were observed on some aircraft and to the leak that resulted in safety recommendations A-80-27 through -29. Our investigation to date has not revealed any case where field maintenance was performed nor do we believe that evidence of this type of maintenance work is likely to be found. The changing of O-rings in various aircraft components under the provisions of 14 CFR 43 is such a routine matter that it is not likely to be documented.

ITT has proposed that all concerned personnel should be advised that field service or maintenance on the motive flow valve is not authorized. In view of the hazard associated with a fuel leak in the aft section of Learjet aircraft, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a Telegraphic Maintenance Alert to all owners/operators of Learjet aircraft and Federal Aviation Maintenance Inspectors advising them that under no circumstance is any field service to be performed on any ITT General Controls/Aerospace Products motive flow valve installed on a Learjet aircraft. (Class I, Urgent Action) (A-80-80)

In the next issue of the General Aviation Airworthiness Alerts, emphasize that field service is not authorized and describe the risks and hazards associated with unauthorized field service of ITT General Controls/Aerospace Products motive flow valves installed on Learjet aircraft. (Class II, Priority Action) (A-80-81)

KING, Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, did not participate.

  
By: James B. King  
Chairman

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 4, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-82 through -84

On July 28, 1980, an Aerospatiale Lama 315B helicopter, N67103, crashed and burned near Dillon, Montana. The pilot was killed. The aircraft had just lifted a 1,000-lb external sling load and was transitioning to forward flight when directional control was lost. The aircraft descended rapidly while rotating about its vertical axis, and crashed.

Subsequent disassembly and inspection of the main transmission revealed that the lower vertical bevel pinion gear (PN 319A62-01-010-0), which meshes with the tail rotor quill gear, was free to rotate on the vertical shaft (PN 319A62-02-009) splines. The gear and shaft splines were stripped and the pinion gear retaining nut was loose. The stripped splines resulted in loss of continuity in the tail rotor gear train. The transmission had accumulated about 400 hours since its third overhaul. The normal overhaul interval is 1,200 hours. A detailed metallurgical examination of the pinion gear and shaft is planned.

On August 10, 1980, the Safety Board was notified that another 315B helicopter, belonging to the same operator, was reported to have excessive free play in the tail rotor drive gear train within the main transmission. Subsequent disassembly of this transmission, under the supervision of Safety Board field investigators, revealed excessive wear on the pinion gear and shaft splines and a loose retaining nut. The transmission had accumulated about 700 hours since its third overhaul.

The Safety Board is concerned that other main transmissions installed on these model helicopters may have excessive wear in the area of the gear/shaft splines. The manufacturer has indicated that more than 0.25 inch of radial free play measured at the tail rotor drive output flange should be considered excessive, and on August 14, 1980, issued a telegraphic bulletin to all operators of 315 Lama and 316B, 316C, and 319 Allouette III helicopters recommending an inspection procedure that will reveal excessive wear in the area of gear/shaft splines.

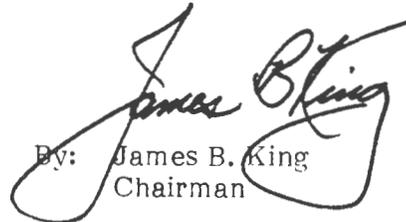
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a telegraphic Airworthiness Directive to require immediate compliance with the tail rotor drive system inspection criteria specified in the telegraphic bulletin issued by the Aerospatiale Helicopter Company on August 14, 1980. The inspection is applicable to the 315 Lama and 316B, 316C, and 319 Alouette III model helicopters. (Class I, Urgent Action) (A-80-82)

Based on the results of the initial inspection specified in the manufacturer's telegraphic bulletin, consider a requirement for an inspection for excessive radial motion in the tail rotor drive system as part of the existing preflight inspection. (Class II, Priority Action) (A-80-83)

Notify all main transmission overhaul facilities of these two occurrences and emphasize the need for strict adherence to the manufacturer's buildup instructions for pinion gear installation and proper torquing of the retaining nut. (Class II, Priority Action) (A-80-84)

KING, Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, did not participate.

  
By: James B. King  
Chairman

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: August 28, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-85

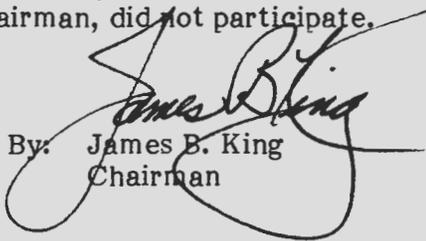
On August 26, 1980, an Aerospatiale SA-330 helicopter, N3596N, owned and operated by Petroleum Helicopters, Inc., of Lafayette, Louisiana, was inbound to Quonset Point, Rhode Island, with a crew of two and seven passengers. About 2 miles east-southeast of Quonset, the crew reported a fire in the passenger compartment. The onboard fire extinguishers were used to put out the fire, and the helicopter landed without further incident.

The continuing investigation of this incident has determined that wire number 1XP2BF contacted or shorted, and burned through hydraulic line 330A75 5311 02 causing a high-pressure hydraulic leak and fire. We believe that a similar incident occurred with a like model helicopter belonging to Petroleum Helicopters, Inc., about 2 years ago causing extensive damage.

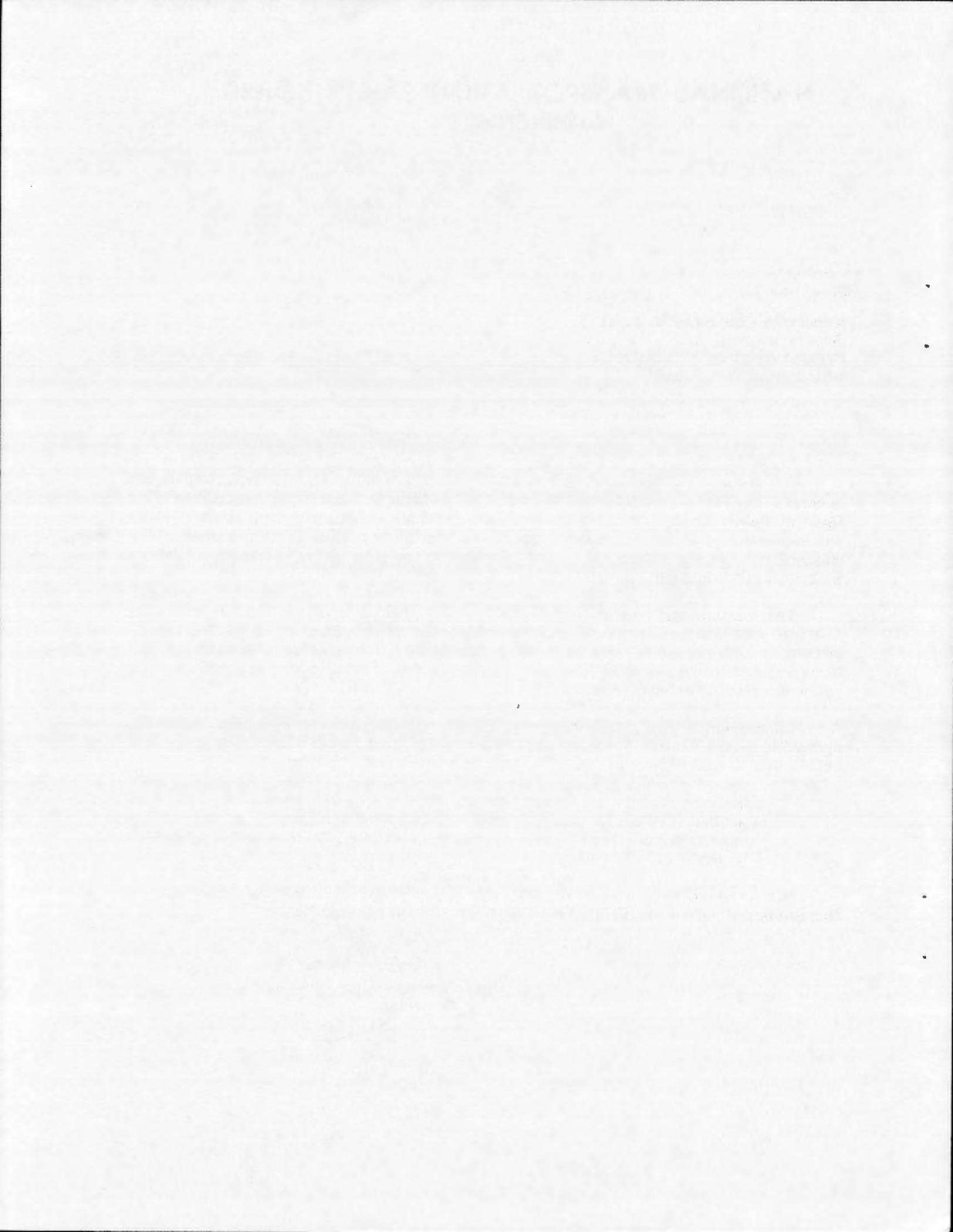
To prevent a fire that might result from friction between electrical wires and hydraulic cables on the Aerospatiale SA-330 helicopter, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an emergency Airworthiness Directive for all Aerospatiale helicopter models SA-330 to inspect, separate, and secure electrical wires that are near hydraulic lines between fuselage stations 5295 and 5600. (Class I, Urgent Action) (A-80-85)

KING, Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in this recommendation. DRIVER, Vice Chairman, did not participate.

By:   
James B. King  
Chairman

3051



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 10, 1980

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

} SAFETY RECOMMENDATION(S)

A-80-86 through -89

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The National Transportation Safety Board is investigating the presumed crash of a Cessna 340, N110RA, in the water near Petersburg, Alaska, on August 20, 1980. The aircraft, pilot, and three passengers are still missing.

The aircraft had been cleared for the approach to Petersburg when the pilot radioed that he was having control difficulties in the pitch axis. He requested and received clearance to climb to altitude and stated that his intentions were to return to Ketchikan, Alaska. Shortly thereafter, the pilot reported that the aircraft was breaking up.

The Safety Board's review of the maintenance records of the accident aircraft revealed a history of empennage structural problems dating back to 1977 when the aircraft had less than 100 hours total time. There were recurrent reports of in-flight empennage vibrations and recurrent findings of stabilizer and elevator structural cracks. Attempted corrective action had included installation of a new horizontal stabilizer at 174 hours and reskinning of the stabilizer at 893 hours. The left outboard elevator hinge bracket was found cracked and was replaced 8 days before the accident. Total time on the aircraft was 1,035 hours.

The Safety Board is aware of the special inspection requirements issued initially in December 1979, by the manufacturer in Cessna Multi-Engine Service Information Letter, ME-79-44, and the two subsequent revisions to the letter. The Board is also aware of Airworthiness Directive 80-18-06, dated August 23, 1980, which made Revision 2 of the Service Letter mandatory.

Recently, the Safety Board was informed by an FAA inspector in a General Aviation District Office that compliance with AD 80-16-06 has disclosed several instances of cracked structure in the elevator hinge area. In one case, a precautionary inspection on an aircraft with less than 40 hours total time revealed a crack in the elevator gusset.

The Safety Board is concerned that, at this time, the problem which is causing the empennage structural cracking on these particular models is not well defined. The service problems have been associated with those aircraft models with the larger

engines installed (greater than 285 maximum continuous horsepower) which were manufactured or modified before a structural change which strengthened the empennage was incorporated in the design. Additionally, the Safety Board is concerned that the 100-hour total time requirement for initial inspection and the 100-hour recurring inspection interval may not be adequate to detect potential failures. Also, structural cracks in low-time aircraft could be indicative of an unpredicted vibratory mode, a production line quality control deficiency, or both.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

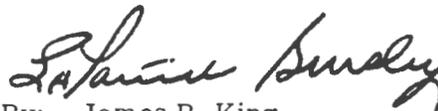
Revise Airworthiness Directive 80-16-06, dated August 23, 1980, to require an initial inspection before further flight, regardless of the aircraft's total time, and restrict the performance envelope of those Cessna models affected by the AD to that of the basic Cessna model 335/340 until the empennage structural cracking problem is resolved. (Class I, Urgent Action) (A-80-86)

Evaluate the 100-hour recurring inspection interval now required in AD 80-16-06 to ascertain the need for a shorter interval, and amend the AD as appropriate. (Class I, Urgent Action) (A-80-87)

Evaluate the design certification data of the Cessna 335/340 empennage structure to ascertain if all possible vibratory modes and structural loads to which it can be exposed have been considered and require retrofit modification to aircraft affected by AD 80-16-06 as indicated to be necessary. (Class II, Priority Action) (A-80-88)

Evaluate the results of the initial inspections performed in compliance with the revised Airworthiness Directive, to ascertain the need for a Quality Assurance Systems Analysis Review (QASAR) of the Cessna 335/340 manufacturing process. (Class II, Priority Action) (A-80-89)

KING, Chairman, GOLDMAN and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, and McADAMS, Member, did not participate.



By: James B. King  
Chairman

*JK*

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 9, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-90 through -95

A study <sup>1/</sup> by the National Transportation Safety Board showed that postcrash fires occurred in approximately 8.0 percent of the 22,002 general aviation accidents during 1974-1978. About 59 percent of the accidents involving postcrash fire resulted in fatalities. However, fatalities were involved in only 13.3 percent of those accidents without fire.

A comparison was made of similar types of accidents in two categories: severe and nonsevere. In the severe accidents, fatalities occurred in about 62 percent of the accidents with postcrash fire and in only 18 percent of the accidents without postcrash fire. In the nonsevere accidents, fatalities occurred in about 19 percent of the accidents with postcrash fire, and in less than 1 percent of the accidents without postcrash fire. Thus, whether severe or nonsevere, accidents with postcrash fire are fatal considerably more often than accidents without postcrash fire.

The study further indicated that of the 1,038 fatal accidents involving postcrash fire, only 235 were fatal because of impact. The remaining 803 were fire-related fatal accidents and would have been survivable had there been no postcrash fire. This would indicate that in these accidents, as many as 1,734 lives could have been saved.

The primary causes of postcrash fires have been known for years. Further, for the last 15 years techniques for the control of postcrash fires have been known, especially in the area of fuel containment. Crash-resistant fuel systems have been in use in U.S. Army aircraft since 1970. A study of Army helicopter accidents from 1970-1973 showed that in 895 accidents involving helicopters without crash-resistant fuel systems, postcrash fire occurred in 80, or 8.94 percent of the crashes. Further, these accidents were responsible for 52 fire fatalities and 31 fire injuries. In helicopters equipped with crash-resistant fuel systems, out of 702 accidents, postcrash fire occurred only 14 times, or 1.99 percent. In these accidents, there were no fire injuries or fatalities.

Postcrash fires are occurring in survivable accidents. Regulations under which most general aviation aircraft were designed and certificated, and are currently being manufactured, do not include considerations for fuel containment in crash conditions.

<sup>1/</sup> For more information read, "Special Study -- General Aviation Accidents: Post Crash Fires and How to Prevent or Control Them." (NTSB-AAS-80-2)

2878A

Regulations developed since that time do include considerations for fuel containment under conditions prescribed for a minor crash landing. However, the Safety Board does not believe that these regulations reflect the current state-of-the-art available for general aviation aircraft.

As a result of its special study, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Amend the airworthiness regulations to incorporate the latest technology for flexible, crash-resistant fuel lines, and self-sealing frangible fuel line couplings at least equivalent in performance to those used in recent FAA tests and described in Report No. FAA-RD-78-28 for all newly certificated general aviation aircraft. (Class II, Priority Action) (A-80-90)

Amend the airworthiness regulations to incorporate the latest technology for light weight, flexible, crash-resistant fuel cells at least equivalent in performance to those used in recent FAA tests and described in Report No. FAA-RD-78-28 for newly certificated general aviation aircraft having nonintegral fuel tank designs. (Class II, Priority Action) (A-80-91)

Require after a specified date that all newly manufactured general aviation aircraft comply with the amended airworthiness regulations regarding fuel system crashworthiness. (Class II, Priority Action) (A-80-92)

Fund research and development to develop the technology and promulgate standards for crash-resistant fuel systems for general aviation aircraft having integral fuel tank designs equivalent to the standards for those aircraft having nonintegral fuel tank designs. (Class II, Priority Action) (A-80-93)

Assess the feasibility of requiring the installation of selected crash resistant fuel system components, made available in kit form from manufacturers, in existing general aviation aircraft on a retrofit basis and promulgate appropriate regulations. (Class II, Priority Action) (A-80-94)

Continue to fund research and development to advance the state-of-the-art with the view toward developing other means to reduce the incidence of postcrash fire in general aviation aircraft. (Class II, Priority Action) (A-80-95)

KING, Chairman, McADAMS, GOLDMAN, BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, did not participate.

  
By: James B. King  
Chairman

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

ISSUED: September 25, 1980

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)  
A-80-101 through -104

The National Transportation Safety Board has studied the air taxi accidents which occurred in Alaska from 1974 through 1978. Accident data from the Safety Board's automated aviation accident data system for that period were analyzed by means of frequency distributions. Safety Board staff also visited Alaska to see the conditions under which the air taxi community operates, to discuss the community's attitudes and needs, and to examine the community's interaction with Federal and State agencies. While in Alaska, the Safety Board staff met with officials of the Federal Aviation Administration (FAA), the National Weather Service (NWS), the Alaska Department of Transportation and Public Facilities (DOT/PF), the Alaska Air Carriers Association, and 17 air taxi operators. <sup>1/</sup>

The State of Alaska is heavily dependent on its air taxi industry to transport food, medicine, mail, and many other necessities of life to rural villages. Alaska, however, has an air taxi safety problem. During the 5-year period 1974-1978, there were 311 air taxi accidents in Alaska, of which 266 were nonfatal and 45 were fatal, compared with 753 air taxi accidents in the rest of the United States, of which 562 were nonfatal and 191 were fatal. More importantly, the nonfatal air taxi accident rate (per 100,000 flying hours) in Alaska is almost five times higher than the nonfatal air taxi accident rate in the rest of the United States, and the fatal air taxi accident rate in Alaska is more than double the fatal air taxi accident rate in the rest of the United States.

The Safety Board study concluded that there are three major factors responsible for the high air taxi accident rate in Alaska: (1) the "bush syndrome," (2) inadequate airfield facilities and inadequate communications of airfield conditions, and (3) inadequate weather observations, inadequate communications of the weather information, and insufficient navigation aids. The "bush syndrome" is an attitude on the part of air taxi operators, pilots, and passengers in Alaska that ranges from a casual acceptance of risks to a willingness to take unwarranted risks. Most of the active airports in Alaska are State owned and maintained, and many of their runways are inadequately maintained. Whiteouts, very rapid weather changes, and a scarcity of navigation aids cause pilots to make many off-airport takeoffs and landings in float-equipped and ski-equipped aircraft. The collection and dissemination of weather information and current runway condition information is hampered by a shortage of trained personnel and an inadequate communications system in rural Alaska.

<sup>1/</sup> For more detailed information read "Special Study--Air Taxi Safety in Alaska" (NTSB-AAS-80-3).

The relationship between the State's air taxi operators and the FAA appears to be strained. Further, because of a lack of permanent FAA inspectors at the rural aviation transportation hubs, there is insufficient opportunity for the FAA to provide guidance to the air taxi operators.

The State of Alaska has recently appropriated, through Chapter 50, SLA 1980, substantial funds for the improvement of the State aviation system, including upgrading of runways and the installation of navigation aids, and weather reporting and communications equipment. A comprehensive State aviation system plan, adequate to implement the intent of Chapter 50, SLA 1980, does not appear to exist. Further, centralized control over, and authority for, developing such a plan does not appear to exist within the current State DOT/PF structure. Cooperation among the State, the FAA, the NWS, and the air taxi operators must be increased if the State is to develop and implement the plan.

Based on the results of this study, the National Transportation Safety Board recommends that the Federal Aviation Administration:

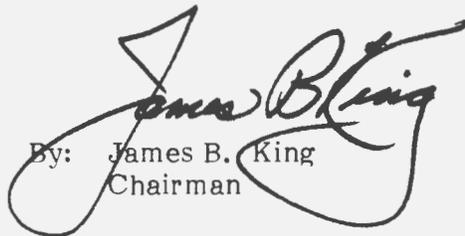
Evaluate, in cooperation with the State of Alaska and the National Weather Service, the feasibility of equipping its flight service stations and the NWS-certified weather observers in rural villages with high-frequency transceivers that have the appropriate frequencies to facilitate the ground-to-ground communication of weather and runway conditions. (Class II, Priority Action) (A-80-101)

Locate and maintain permanently a Principal Operations Inspector and a Principal Maintenance Inspector at Nome, Bethel, Ketchikan, and at as many other regional aviation hubs as possible. (Class II, Priority Action) (A-80-102)

Continue to develop, in cooperation with the National Weather Service, the concept of "meteor burst" technology for transmission of weather observations from rural villages to regional aviation hubs in Alaska. (Class II, Priority Action) (A-80-103)

Continue to develop and improve, in cooperation with the National Weather Service, the technology of the television weather observation system in Alaska. (Class II, Priority Action) (A-80-104)

KING, Chairman, GOLDMAN and BURSLEY, Members, concurred in these recommendations. DRIVER, Vice Chairman, and McADAMS, Member, did not participate.

  
By: James B. King  
Chairman

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DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 28, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendations A-74-38 and 39, issued as a result of a Safety Board Special Study - U.S. General Aviation Accidents Involving Fuel Starvation 1970-1972. This supplements our letter of December 14, 1978, and updates the status of these recommendations as follows:

A-74-38. Amend 14 CFR 23.777 through 23.781 to include specifications for standardizing powerplant control location, visual and tactile appearance, and mode of actuation, similar to the specifications for transport category airplanes appearing in 14 CFR 25.777 through 25.781.

A-74-39. Amend 14 CFR 23 to include specifications for standardizing fuel selector valve handle designs, displays, and modes of operation.

Comment. The research and development project relating to powerplant controls and fuel selector standardization is complete and a report has been published (applicable portion enclosed). The report endorses the General Aviation Manufacturers Association (GAMA) recommendations regarding powerplant controls and fuel selector standardization.

With regard to A-74-38, and the fuel selector valve handle design and display aspects of A-74-39, rulemaking is now being considered. Timing, however, must be in consonance with other agency rulemaking priorities. If approved, the rulemaking will amend 14 CFR 23.777 through 23.781 to require standardized control designs similar to those specified for transport category airplanes in 14 CFR 25.777 through 25.781.

With regard to mode of operation aspects of A-74-39, a Notice of Proposed Rule Making (NPRM), based on the Aircraft Engine Regulatory Review Program, contains proposals to amend Section 23.995. We expect this NPRM to be issued in September 1980. The proposed rules would require a separate and distinct action to place the fuel selector in the "off" position, and make it impossible to pass through the "off" position when changing from one tank to another. This proposed rule also relates to NTSB Recommendation A-79-72.

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We will continue to keep the Board informed of progress relative to these two safety recommendations.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond". The signature is written in dark ink and is positioned above the printed name and title.

Langhorne Bond  
Administrator

Enclosure



NATIONAL TRANSPORTATION SAFETY BOARD  
DEPARTMENT OF TRANSPORTATION

WASHINGTON, D.C. 20591

OFFICE OF  
THE CHAIRMAN

May 6, 1974

Honorable Alexander P. Butterfield  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

Dear Mr. Butterfield:

5/7/74

The National Transportation Safety Board is issuing the enclosed study, "U. S. General Aviation Accidents Involving Fuel Starvation, 1970-1972."

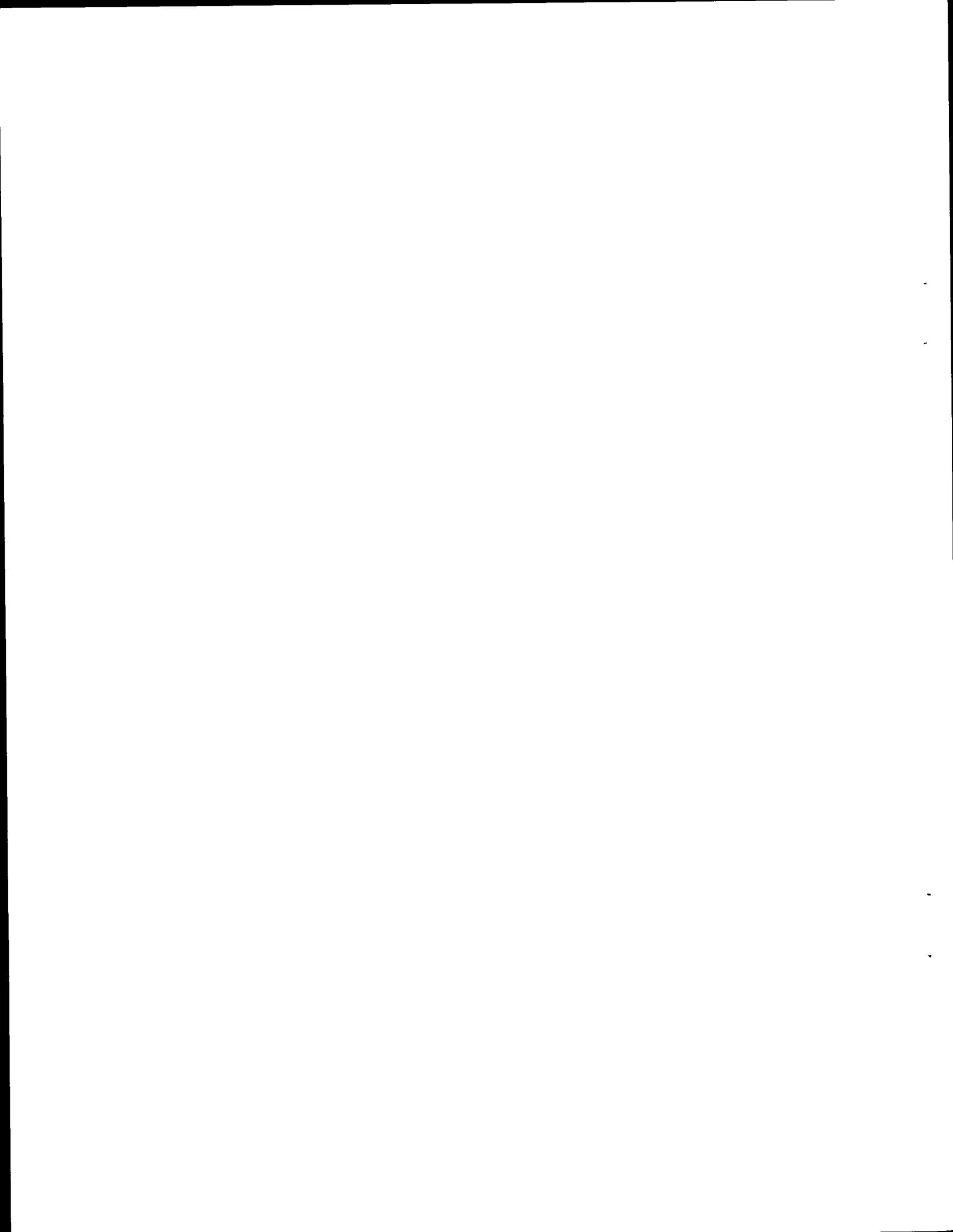
Your attention is invited to the "Recommendations" section of the study, which will be of interest to the Federal Aviation Administration in terms of possible corrective action.

This document will be released to the public on the date stamped on the cover. No public dissemination of this document should be made prior to that date. The purpose of providing this document in advance of the public release is to give you an opportunity to be acquainted with its contents prior to release, so that you can be prepared to answer inquiries.

Sincerely yours,

John H. Reed  
Chairman

Enclosure



Whereas nearly 87 percent of the fuel starvation accidents in this study were attributed to operational problems, these problems are not independent of the factors which influenced or caused them. Therefore, remedial action must be directed at the primary factors which influence fuel system operation. These factors are as follows:

Design-Associated Factors

- Owner manuals which often lack detailed information on fuel management and fuel system purging operations.
- Fuel systems which require tank switching in order to manage the fuel supply properly.
- Fuel selector valves with handle design, mode of operation, or tank display which may be conducive to mispositioning.
- Placement of engine controls and similarity of appearance which may be conducive to improper use.

Pilot-Associated Factors

- Instructional techniques for emergency simulation by deliberate fuel starvation at low altitude.
- Lack of knowledge or concern for good fuel management procedures and techniques, including the need for thorough preflight fuel system inspection and purging.

RECOMMENDATIONS

The National Transportation Safety Board believes that the number of U. S. General Aviation fuel starvation accidents can be substantially reduced by constructively changing the above conditions. Accordingly, the Safety Board recommends that the Federal Aviation Administration:

1. Issue an Advisory Circular, which augments the information presented in Federal Aviation Administration Advisory Circular No. 20-43B "Aircraft Fuel Control," (a) to alert general aviation pilots of the primary difficulties causing fuel starvation; and (b) to warn certificated flight instructors of the danger associated with simulation of emergency engine failure by positioning the fuel selector valve to "off" or the mixture control to "idle cutoff." (Recommendation A-74-35)
2. Amend 14 CFR 23.1581 so that an approved Airplane Flight Manual is required for all airplanes regardless of weight,

thereby assuring greater consistency and attention to detail than is currently available in most owner manuals for airplanes which weigh less than 6,000 pounds.  
(Recommendation A-74-36)

3. Promote awareness of fuel starvation problems among those individuals who are beginning careers as student pilots by:
  - a. Requiring a written test as part of student pilot flight requirements in 14 CFR 61.63, similar to that required for private pilots in 14 CFR 61.87.
  - b. Structuring written tests so that an applicant's knowledge of fuel system operating principles and factors which cause fuel starvation can be determined.  
(Recommendation A-74-37)
4. Amend 14 CFR 23.777 through 23.781 to include specifications for standardizing powerplant control location, visual and tactile appearance, and mode of actuation, similar to the specifications for transport category airplanes appearing in 14 CFR 25.777 through 25.781. (Recommendation A-74-38)
5. Amend 14 CFR 23 to include specifications for standardizing fuel selector valve handle designs, displays, and modes of operation. (Recommendation A-74-39)

In addition, the Safety Board recommends that the General Aviation Manufacturers Association (GAMA) establish industry-wide recommended design practices for fuel systems of future general aviation airplanes, and where practicable apply these same practices to existing models through system modifications. Application of these practices to all existing airplanes may be impossible for reasons of cost or physical constraints; however, the following practices could be applied to the design of future airplanes at a minimum cost: (Recommendation A-74-40)

- a. Specifications for a low fuel warning device which operates independently of the fuel gage system.
- b. Specifications for a water contamination warning system.
- c. Specifications for more accurate type of fuel quantity gaging system.
- d. Specifications for multiple fuel tank vents and nonicing tank vents to minimize the possibility of vent obstruction.
- e. Simplification of the fuel system through the use of the balanced, single-tank design concept.



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

SEP - 3 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your followup letter of July 28, 1980, responding to National Transportation Safety Board Safety Recommendation A-77-12 issued March 14, 1977. We recommended that the Federal Aviation Administration (FAA):

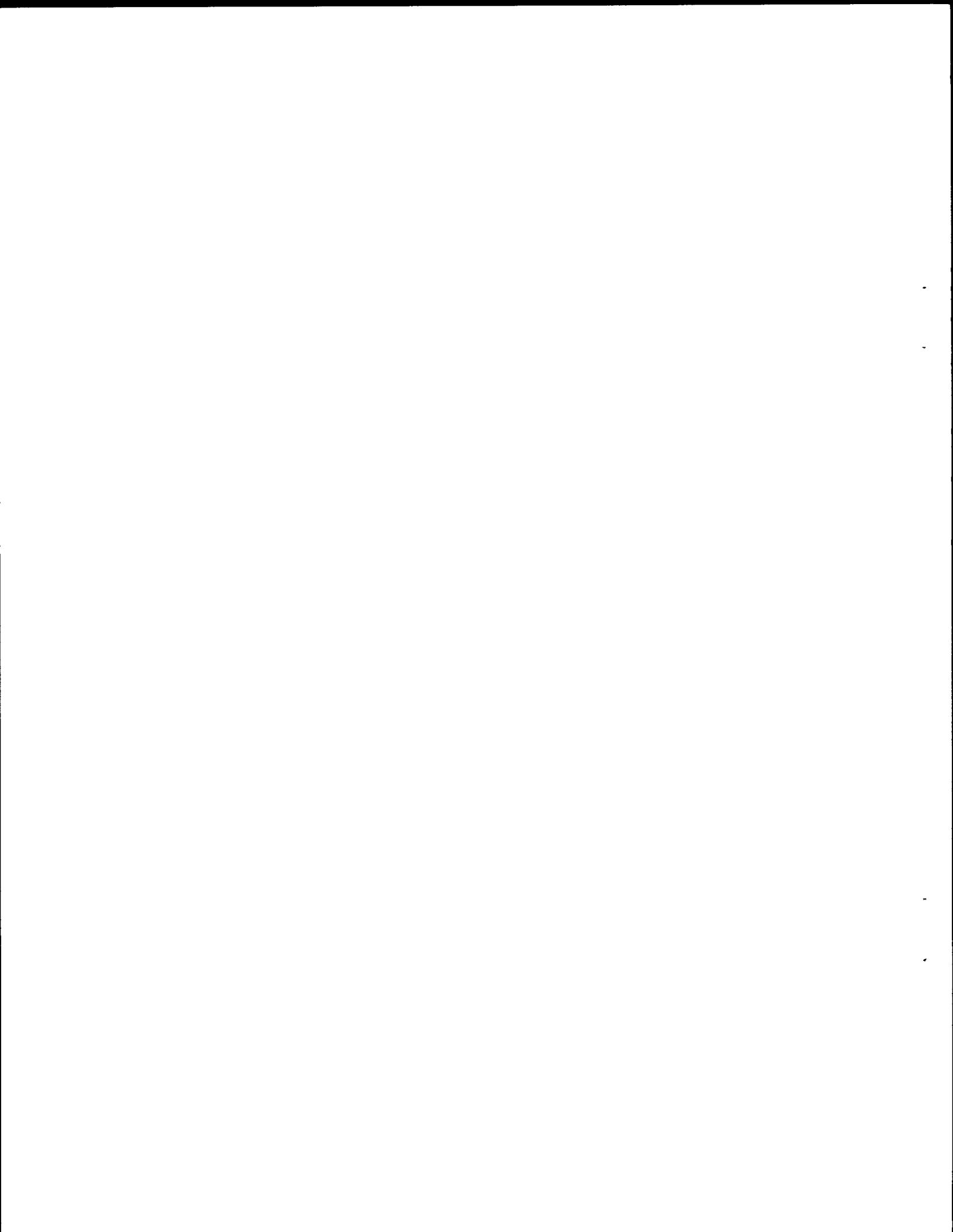
"Formulate, in cooperation with the National Fire Protection Association, a training program for use by local fire departments as a minimum standard for firefighting personnel involved in CFR activities at noncertificated airports."

The Safety Board has examined the National Fire Fighter Protection Association's (NFFPA) "Standard for Airport Fire Fighter Professional Qualifications," (NFFPA 1003-1978). We note that this document specifies, in terms of performance objectives, the minimum standard of professional competence required for service as an airport firefighter. We believe that this standard, combined with the FAA's Advisory Circulars (AC) 139.49-1 and AC 150/5210-6B, satisfies the intent of A-77-12 which we now classify in a "Closed--Acceptable Action" status.

Sincerely yours,

A handwritten signature in cursive script that reads "James B. King".

James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 28, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is to bring you up to date on the action taken on the National Transportation Safety Board's (NTSB) Recommendation A-77-12:

Formulate, in cooperation with the National Fire Protection Association, a training program for use by local fire departments as a minimum standard for firefighting personnel involved, in CFR activities at noncertificated airports. (A-77-12) (Class II, Priority followup)

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5210-6B, Aircraft Fire and Rescue Facilities and Extinguishing Agents, dated January 26, 1973, contains, in Chapter 3, the recommended scales of protection (in terms of equipment and agent) for airport firefighting and rescue services at general aviation (noncertificated) airports. As previously stated in our response to A-77-13, AC 139.49-1, Programs for Training of Fire Fighting and Rescue Personnel, dated November 12, 1973, contains the FAA's recommended minimum training program for airport firefighters at both certificated and noncertificated airports. The potential usefulness of these two documents has been strengthened by the recent adoption by the National Fire Fighter Protection Association (NFFPA) of a new "Standard for Airport Fire Fighter Professional Qualifications," (NFFPA 1003-1978). This standard, which became available to the public in 1979, identifies the professional level of competence that should be attained by an airport firefighter. As a national consensus standard, it specifies in terms of performance objectives the minimum level of professional competence required to serve as an airport firefighter. AC 150/5200-27 dated August 27, 1979, announces the availability of NFFPA Standard 1003-1978 to the public.

We believe that this now constitutes a complete system; i.e., the recommended level of protection equipment has been identified (AC 150/5200-6B), the equipment operator's (airport firefighter) level of competence has been specified (AC 150/5200-27), and a training program outline has been provided (AC 139.49.1).

We note that Safety Recommendation A-77-13 was classified as "closed-acceptable action" on November 23, 1977. Accordingly, FAA now considers action on Safety Recommendations A-77-12 and 13 complete.

Sincerely,



Langhorne Bond  
Administrator

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

June 2, 1977

Honorable Webster B. Todd, Jr.  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to the National Transportation Safety Board (NTSB) recommendations regarding the formulation and dissemination of a training program for fire fighting personnel involved in crash, fire and rescue (CFR) activities at noncertificated airports.

A-77-12. Formulate, in cooperation with the National Fire Protection Association, a training program for use by local fire departments as a minimum standard for firefighting personnel involved in CFR activities at noncertificated airports.

CONCUR. Advisory Circular (AC) 139.49-1 presents the Federal Aviation Administration's (FAA) recommended training program for aircraft fire fighting and rescue personnel. It covers the two primary areas of training, i.e., the operation of airport fire fighting and rescue equipment and the principles of aircraft fire fighting and rescue techniques. It includes a basic program for practical training, subjects for classroom or individual study, information on the availability of courses/course material, and safety procedures for hot fire training.

The AC was published in November 1974 to furnish airport operators of certificated airports guidance in fulfilling their responsibilities under FAR Part 139. However, it is also considered very useful as a training program guide for use by local fire departments and noncertificated airport personnel involved in CFR activities. This training AC will be updated as required to reflect advances in fire fighting technology and techniques, and to include new sources for training and training aids as they are identified.

The FAA considers AC 139.49-1 as a first effort to define meaningful CFR training standards and to develop a CFR training curriculum that can be accepted nationally by all interested and affected parties. We have discussed our current efforts in this area in our letter of May 18 concerning recommendation A-76-142. To briefly summarize that response:

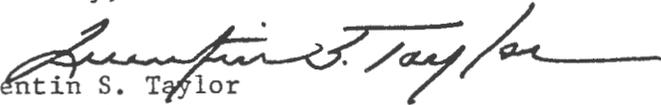
The FAA is working with the National Fire Protection Association (NFPA) in developing a national standard for hiring selection criteria, and job performance evaluation. Upon completion of such a standard, we will consider a regulatory change to FAR 139.

The FAA is currently evaluating some commercially prepared training outlines for possible use as guidance for firefighters. Additionally, the FAA is working with the National Fire Prevention and Control Administration (NFPCA) which has a statutory requirement to develop training standards and a National Training facility.

A-77-13. Disseminate the training program, in coordination with the Commuter Airlines Association of America, the National Fire Prevention and Control Administration, and the American Association of Airport Executives, to State and local governments and airport operators and urge them to adopt it in the interest of passenger safety.

CONCUR. The FAA's recommended training program, as presented in AC 139.49-1, was originally disseminated through the use of the AC 150 series (Airport Compliance Program and Airport Safety - General) distribution list. The total subscribers vary from month to month, but normally run between 15 and 17 thousand on an initial distribution. A much broader audience was reached than recommended. This AC continues to be listed in the Federal Register as available to the general public free of charge. The NFPCA, which was in its formative stage in November of 1974, was not involved in this action. However, we expect to be working with the NFPCA during any future developments in the aircraft firefighter training area. The FAA strongly recommends implementation of the advice contained in AC 139.49-1 at noncertificated airports. We concur with this recommendation from the point that our advisory circular distribution already includes the majority of the listed groups. We do not believe any additional distribution through these groups is warranted at this time.

Sincerely,

  
Quentin S. Taylor  
Deputy Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

FOR RELEASE: 6:30 A.M., E.S.T., MARCH 14, 1977  
(202) 426-8787

ISSUED: March 14, 1977

-----  
Forwarded to:

Honorable John L. McLucas  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-77-12 and 13

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It has come to the attention of the National Transportation Safety Board that increasing numbers of noncertificated airports in the 48 contiguous states are receiving passenger service by commuter air carriers. Civil Aeronautics Board statistics indicate that the number of passengers carried by commuter air carriers has risen from about 4 million in fiscal year 1970 to well over 7 million in fiscal year 1975. It may be deduced also from these statistics that the number of noncertificated airports serving commuter air carriers with passenger service only may be as high as 150. Many of these airports are general aviation airports and some serve more flights each day than do certificated airports with the lower traffic levels.

The Safety Board's accident investigation experience has shown that many noncertificated airports have either rudimentary crash/fire/rescue (CFR) capabilities or are entirely dependent on firefighting equipment from nearby communities. Often, a community firefighting force is composed of volunteer personnel, who may not be trained in the CFR techniques associated with aircraft accidents. Thus, the Safety Board is concerned that commuter air carrier passengers are not being protected adequately.

While the Safety Board is aware that the Federal Aviation Administration is studying the feasibility of certificating airports serving the commuter air carrier industry (thereby improving the CFR capability of such airports) interim measures must be taken to raise the current level of safety for commuter air carrier passengers. The Safety Board believes that such measures should include appropriate training for

A-77-12 and 13

Honorable John L. McLucas - 2 -

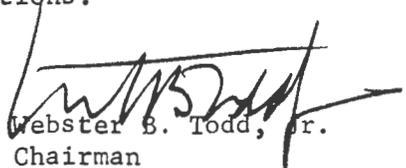
firefighting personnel in CFR techniques associated with aircraft accidents. Advisory Circular (AC) 139.49-1, and the 150/5210 series Advisory Circulars contain excellent material for the formulation of a training curriculum for firefighting personnel responsible for safety at noncertificated airports.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Formulate, in cooperation with the National Fire Protection Association, a training program for use by local fire departments as a minimum standard for firefighting personnel involved in CFR activities at noncertificated airports. (A-77-12) (Class II, Priority followup)

Disseminate the training program, in coordination with the Commuter Airlines Association of America, the National Fire Prevention and Control Administration, and the American Association of Airport Executives, to State and local governments and airport operators and urge them to adopt it in the interest of passenger safety. (A-77-13) (Class II, Priority followup)

TODD, Chairman, BAILEY, Vice Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendations.

By:  Webster B. Todd, Jr.  
Chairman

THIS RECOMMENDATION WILL BE RELEASED TO THE PUBLIC ON THE ISSUE DATE SHOWN ABOVE. NO PUBLIC DISSEMINATION OF THIS DOCUMENT SHOULD BE MADE PRIOR TO THAT DATE.

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

September 30, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendations A-77-24 and 25 issued May 3, 1977, and supplements our letter of September 11, 1979.

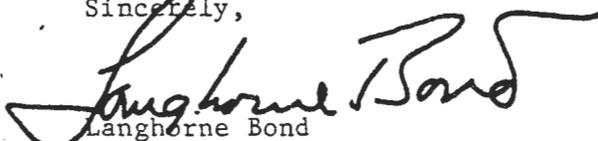
A-77-24. Amend 14 CFR 61.3 to include an implied consent clause which would be a condition for the issuance of a pilot certificate.

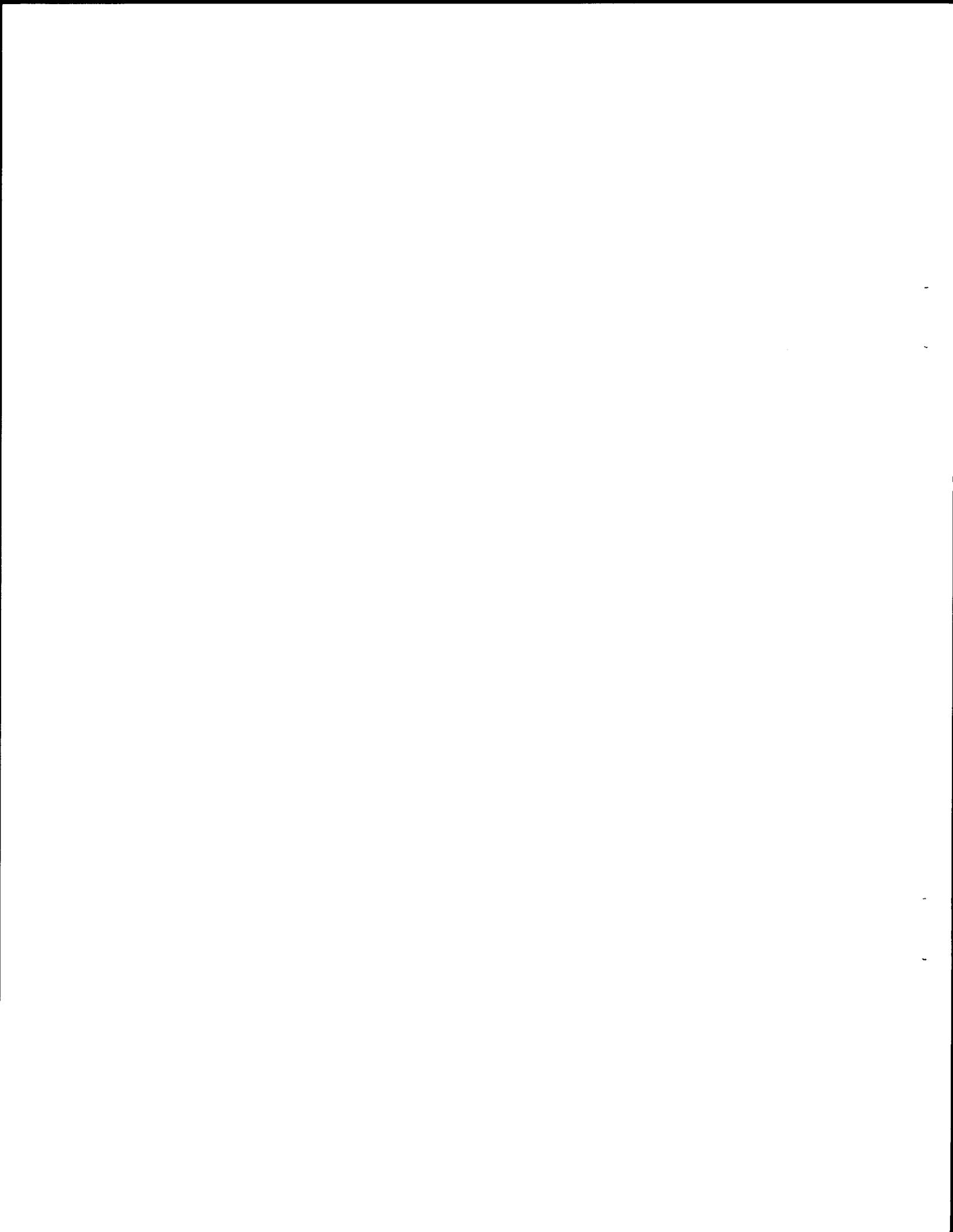
A-77-25. Amend 14 CFR 91.11 to specify alcohol levels at which a pilot is considered to be under the influence of alcohol.

Comment. A Notice of Proposed Rule Making, which will amend Parts 61, 63, 65, and 91 of the Federal Aviation Regulations, has been drafted and is currently in the coordination process. We had intended to issue this notice in late 1979, but a number of highly controversial aspects of this action have required further in-depth study and additional deliberation in formulating the final version of the proposed rule.

Accordingly, this will provide you an interim report relative to the status of Safety Recommendations A-77-24 and 25. We recognize the potential for delay in issuance of this proposed rule due to its controversial nature. However, we plan to issue the proposed rule prior to January 1, 1981, and we will keep you informed of significant progress as we move toward final action on these safety recommendations.

Sincerely,

  
Langhorne Bond  
Administrator





# National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

July 21, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Reference is made to National Transportation Safety Board Safety Recommendations A-77-24 and 25 issued May 13, 1977. We proposed that the Federal Aviation Administration:

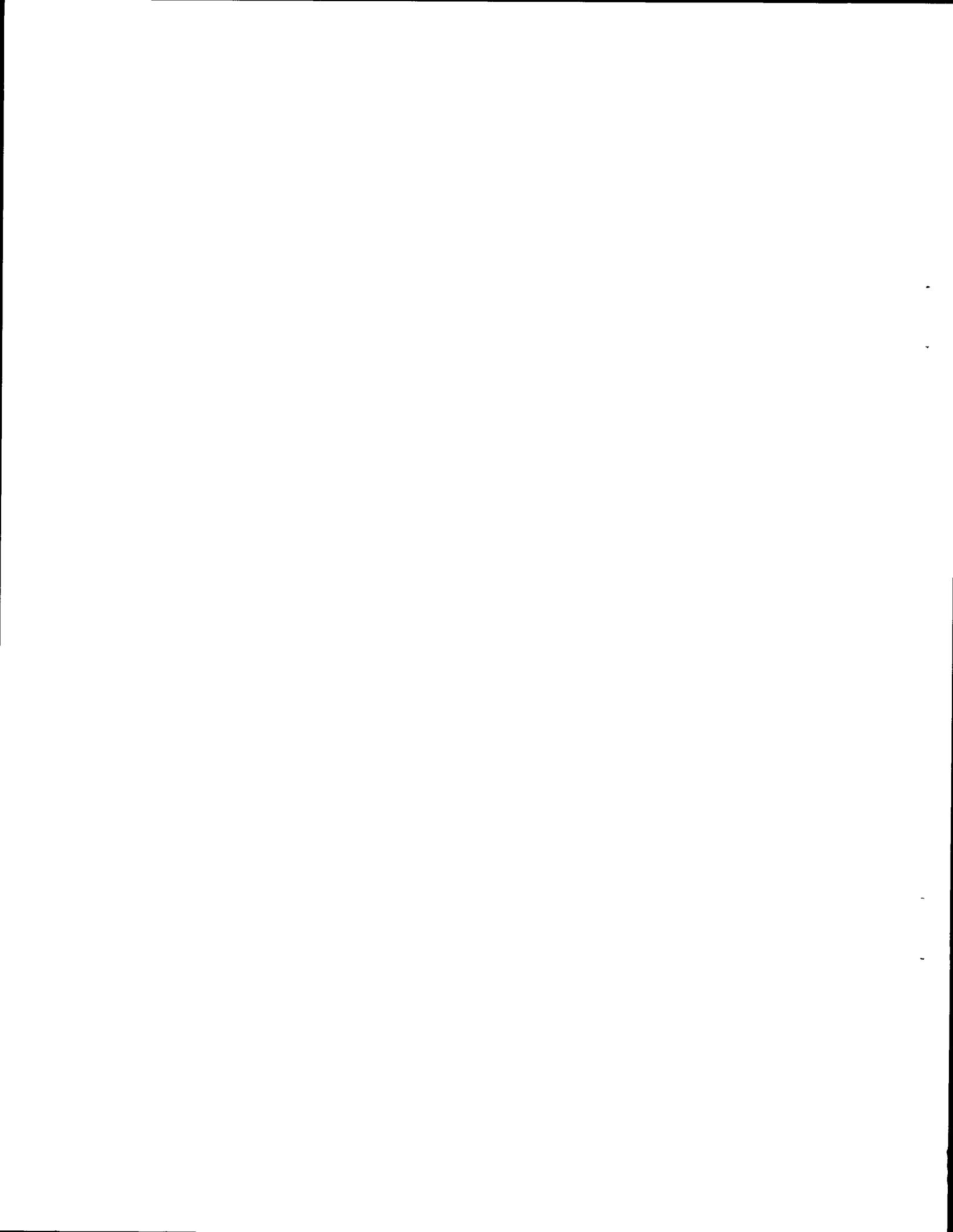
A-77-24 Amend 14 CFR 61.3 to include an implied consent clause which would be a condition for the issuance of a pilot certificate.

A-77-25 Amend 14 CFR 91.11 to specify alcohol levels at which a pilot is considered to be under the influence of alcohol.

Your response of September 11, 1979, indicated that the target date for the issuance of a NPRM was November 1979. In order to evaluate the progress of these recommendations and update the public docket, we would appreciate an updated status report.

Sincerely yours,

  
James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

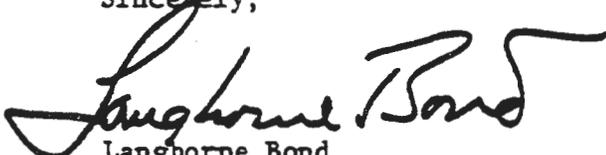
September 11, 1979

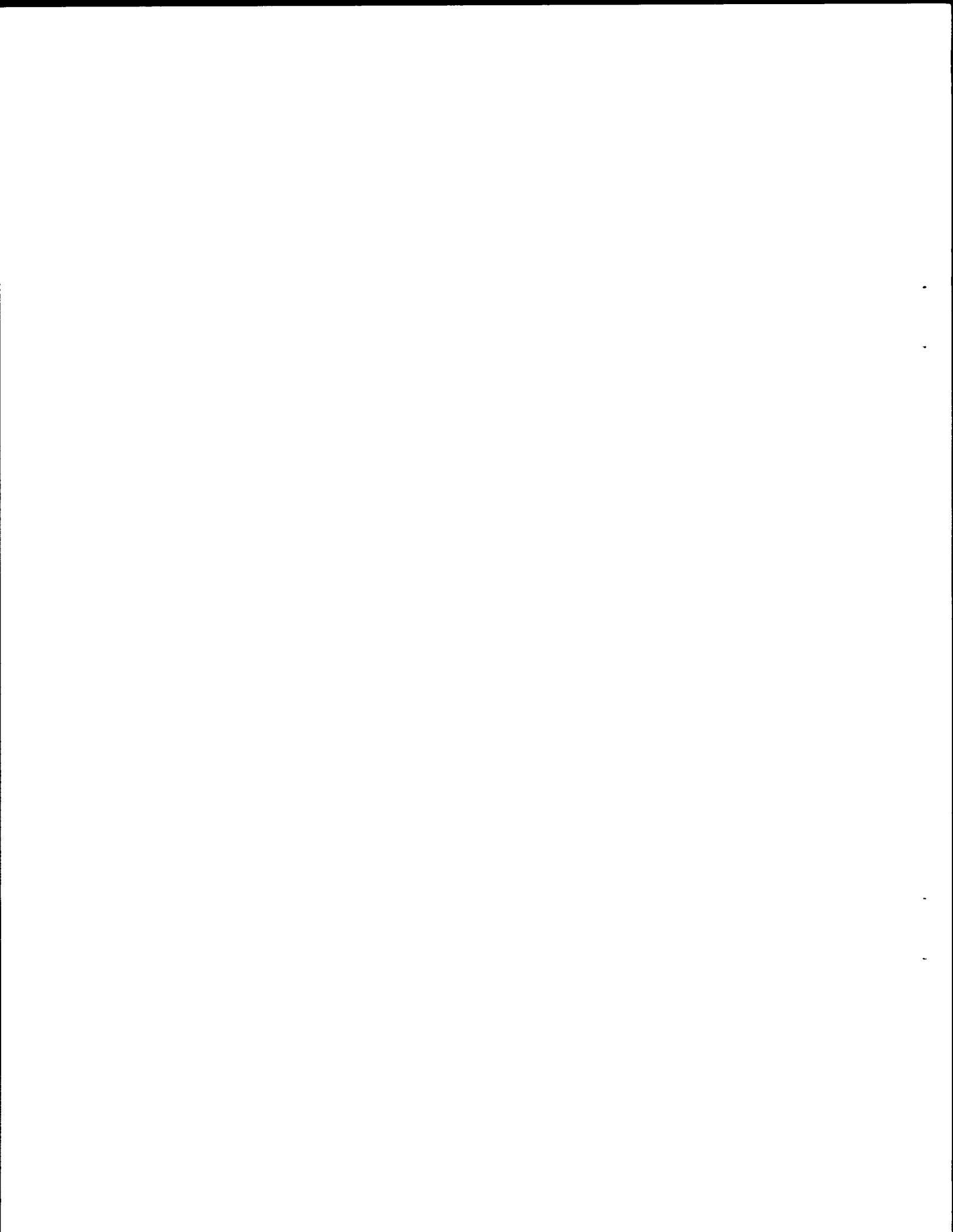
Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

In response to your July 27 letter concerning the status of our actions on Safety Recommendations A-77-24 and A-77-25, a project is being reviewed by the Office of the Chief Counsel for drafting of a Notice of Proposed Rule Making. The target date for issuance is November 1979.

Sincerely,

  
Langhorne Bond  
Administrator





# National Transportation Safety Board

Washington, D.C. 20594

Office of the  
Chairman

July 27, 1979

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

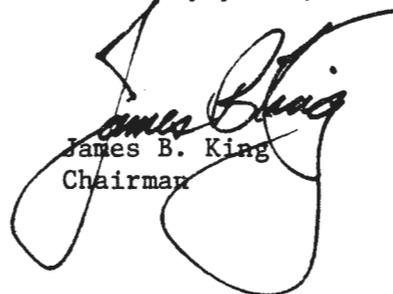
On May 13, 1977, the National Transportation Safety Board issued Safety Recommendations A-77-24 and 25. These recommendations stemmed from our investigation of Piper Cherokee Cruiser (PA-28-140) accident at the Baltimore Memorial Stadium, Baltimore, Maryland, on December 19, 1976. The Safety Board recommended that the Federal Aviation Administration (FAA):

A-77-24 Amend 14 CFR 61.3 to include an implied consent clause which would be a condition for the issuance of a pilot certificate.

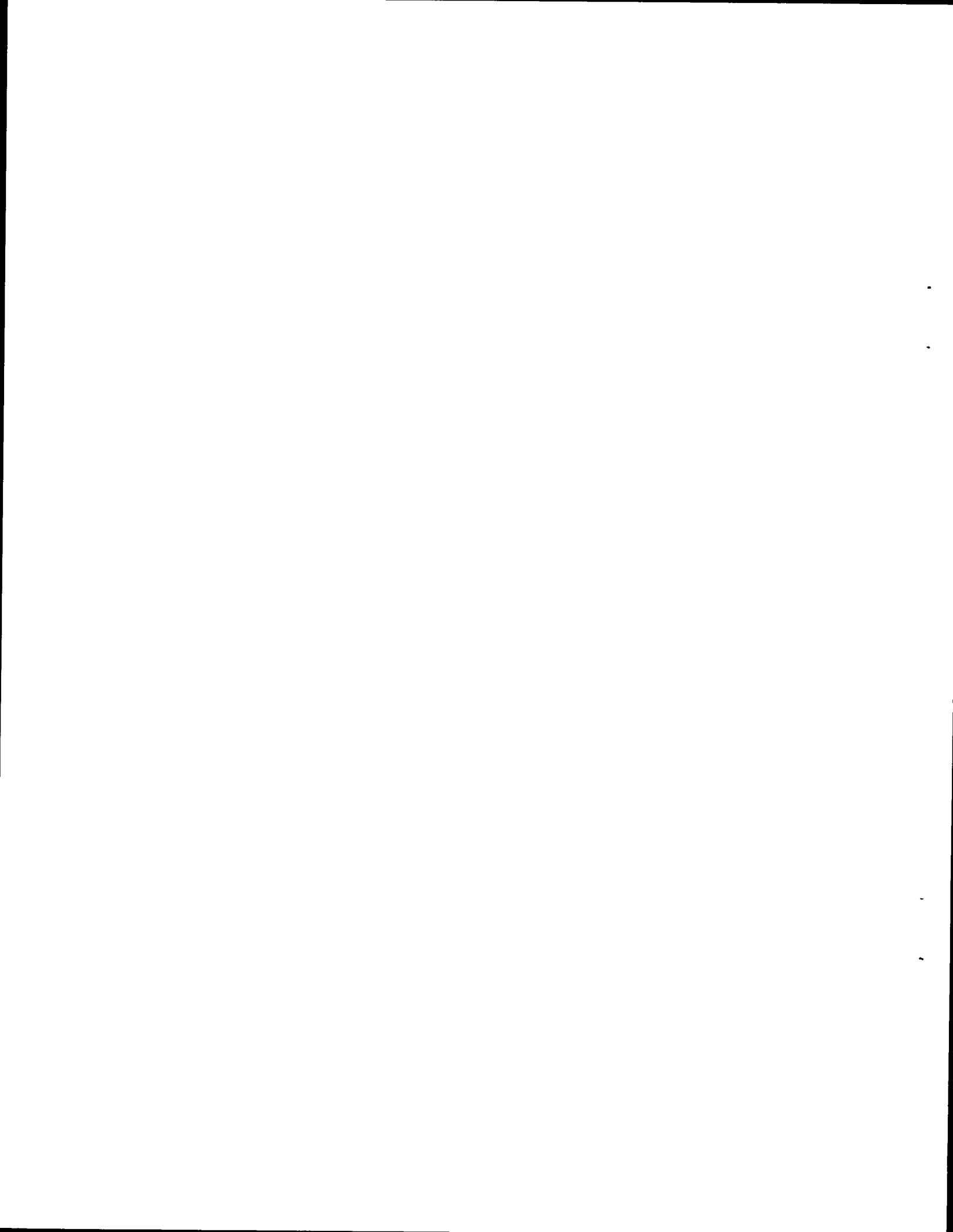
A-77-25 Amend 14 CFR 91.11 to specify alcohol levels at which a pilot is considered to be under the influence of alcohol.

The FAA's response of June 30, 1977, indicated that a regulatory project aimed at promulgating rules for "implied consent" to alcohol tests by airmen engaged in aircraft operations had been initiated. I am advised by my staff that these recommendations are under review by the FAA's General Counsel. For the information of Board Members, and for the Public Docket record, I would appreciate an updated status report.

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

June 30, 1977

Honorable Webster B. Todd, Jr.  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

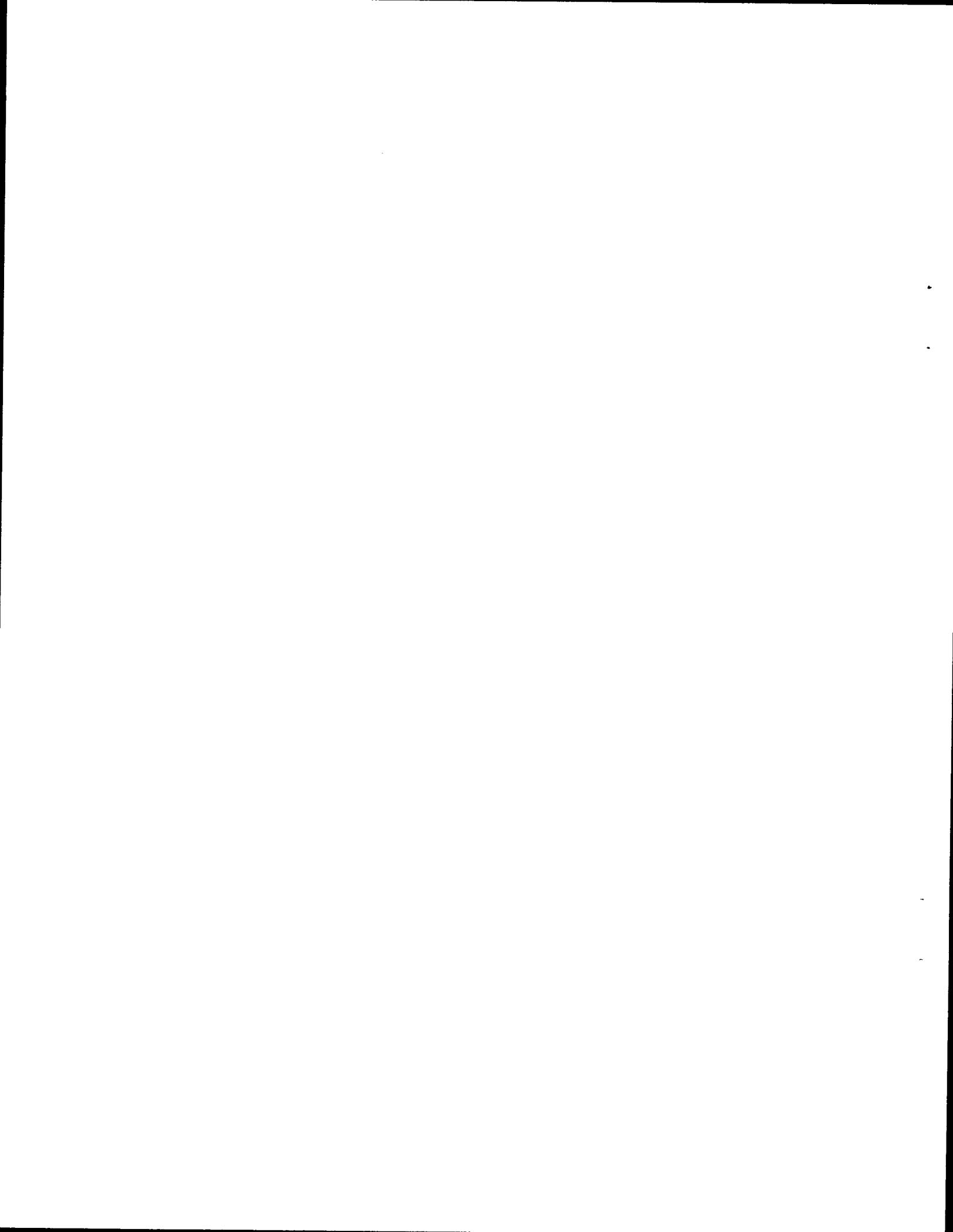
This is in response to NTSB Safety Recommendations A-77-24 and 25.

We believe that the recommendations have merit. The authority to obtain and use alcohol tests could be helpful in the enforcement of present rules relating to the use of alcohol and could also be a deterrent.

Accordingly, we have initiated a regulatory project aimed at promulgating rules for "implied consent" to alcohol tests by airmen engaged in aircraft operations including penalties for refusal to submit to tests. In addition, the alcohol level at which a pilot is considered to be under the influence will be included.

Sincerely,

  
Quentin S. Taylor  
Acting Administrator



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 13, 1977

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-77-24 and 25

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During the National Transportation Safety Board's investigation of a Piper Cherokee Cruiser (PA-28-140) accident at the Baltimore Memorial Stadium, Baltimore, Maryland, on December 19, 1976, the Safety Board and the City of Baltimore had difficulty obtaining a blood sample which had been taken from the pilot when he was admitted to the hospital. A court order was required to obtain samples for alcohol testing.

Each year, the Safety Board determines alcohol to be a cause or a factor in about 40 aircraft accidents, almost all of which are fatal. However, in many accidents in which a pilot survives, the Safety Board is unable to obtain a blood alcohol test because the pilot must consent to the testing. Because of the consent limitations, there is currently no method for determining the number of alcohol-related survivable aircraft accidents. We are concerned that many more aviation accidents may be alcohol-related than is currently known.

14 CFR 91.11(1) and (2) specify that no person may act as a crew-member of a civil aircraft within 8 hours after the consumption of any alcoholic beverage or while under the influence of alcohol. While each of the 50 States has established minimum alcohol levels in highway transportation at which drivers are considered to be under the influence of alcohol, the Federal Aviation Regulations contain no minimum alcohol level at which a pilot is considered to be under the influence of alcohol.

The Safety Board surveyed the 50 States to determine which ones can require a pilot to submit to a blood alcohol test. This survey

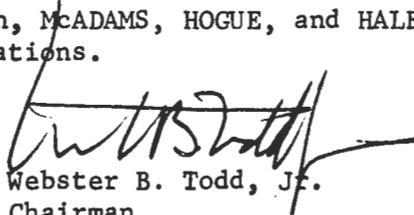
showed that, of the 33 States which responded, 12 can require testing and 4 have implied consent laws pertaining to pilots. We believe that implied consent in aviation should be expanded to include all licensed pilots.

In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Amend 14 CFR 61.3 to include an implied consent clause which would be a condition for the issuance of a pilot certificate. (A-77-24) (Class II - Priority Followup)

Amend 14 CFR 91.11 to specify alcohol levels at which a pilot is considered to be under the influence of alcohol. (A-77-25) (Class II - Priority Followup)

TODD, Chairman, BAILEY, Vice Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendations.

  
By: Webster B. Todd, Jr.  
Chairman



OFFICE OF  
THE ADMINISTRATOR

August 13, 1980

The Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This letter is in response to your June 6 letter requesting the present status of NTSB Recommendation A-77-68. That recommendation is for the Federal Aviation Administration (FAA) to "Formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flightcrews in the terminal area."

In our January 11, 1978, initial response to your recommendation, we mentioned a task group was addressing the problem of disseminating weather data in terminal locations. The recommendation of this group resulted in activating a Center Weather Service Unit (CWSU) in 13 of our air route traffic control centers (ARTCC) in April 1978. By October 1980, we will have our planned total of 21 of these CWSU's in the 20 ARTCC's in the contiguous 48 states and in the Anchorage, Alaska, ARTCC.

The CWSU staffing is made up of an FAA weather coordinator and a National Weather Service meteorologist. This unit is under the direction of the assistant chief in charge of the ARTCC. The mission of the unit is to: "Function as a team to detect, screen, and disseminate aviation weather intelligence in sufficient detail to permit Air Traffic Control personnel and pilots to make appropriate decisions, which are pertinent to flight safety/operations." The dissemination of the weather intelligence includes the terminal facilities within the ARTCC's area of responsibility. The information provided includes hazardous (severe) weather information.

In addition to this procedural change, another program we have instituted has changed our terminal wind shear procedures. The program title is: Low Level Wind Shear Alert System. This system is being

installed at major airports to detect approaching low level wind shear conditions. Four to six wind speed and direction sensors are installed around the periphery of each airport, and the outputs of these sensors are monitored continuously by the system. If a significant wind shift (shear) is detected, the system activates a visual and audible alarm in the air traffic control tower cab. The controller in the tower cab then provides this wind shear information to inbound and outbound flight-crews. We have installed these systems at 24 major airports, have 34 more under contract which will be installed by the end of fiscal year 1981, and have plans to install these systems at a total of 110 airports by the end of fiscal year 1984.

The draft plan, mentioned in our earlier reply, is presently under revision. It is being revised to cover all of our aviation weather requirements, including the terminal one involved in your recommendation. The existence of the plan in either draft or final form did not deter us from implementing the two terminal area procedural changes mentioned above.

We are confident that the introduction of the CWSU's and the Low Level Wind Shear Alert Systems are responsive to and satisfy your Recommendation A-77-68.

Sincerely,

  
Langhorne Bond  
Administrator



## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

June 6, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

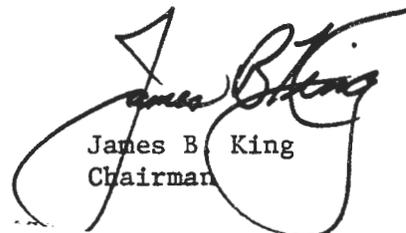
Reference is made to your letter dated January 11, 1978, responding to National Transportation Safety Board Safety Recommendation A-77-68 issued October 28, 1977. This recommendation stemmed from the Southern Airways DC-9 accident at New Hope, Georgia, on April 4, 1977. We recommended that the Federal Aviation Administration (FAA):

"Formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flightcrews in the terminal area."

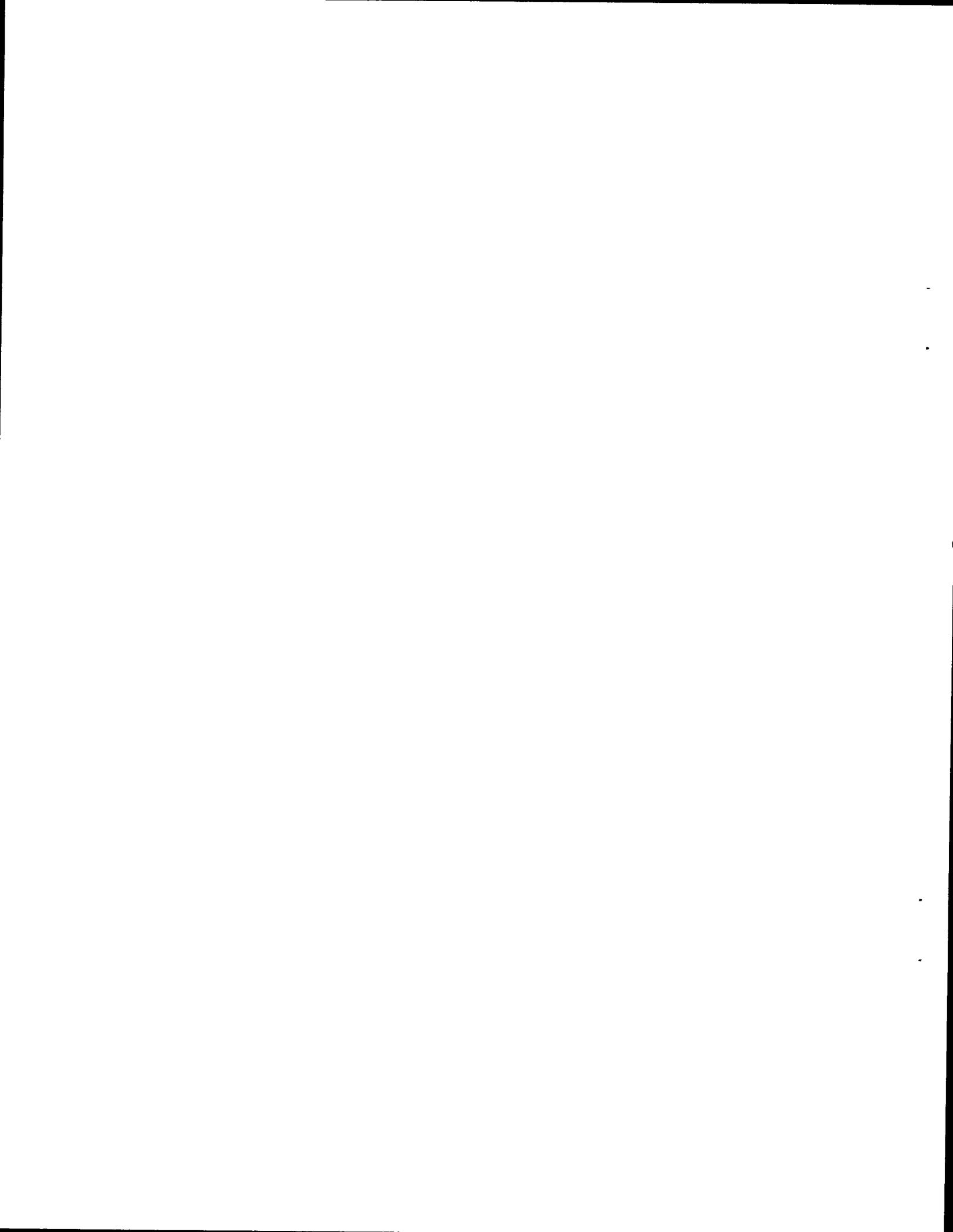
Your response indicated that the FAA had a draft plan for analyzing and disseminating severe weather data in terminal areas and that the final plan would include a means of delivery that could be accomplished without derogating the controllers' primary responsibility for preventing midair collisions.

We were subsequently advised through staff sources that the draft report mentioned in your letter of January 11, 1978, had been approved and that an FAA Weather Program Manager had been established to execute and maintain the "Aviation Weather System Program Plan." For our information and Public Docket record, we would now like to be advised of the present status of this recommendation.

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

January 11, 1978

Honorable Kay Bailey  
Acting Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Miss Bailey:

This is in response to NTSB Recommendation A-77-68.

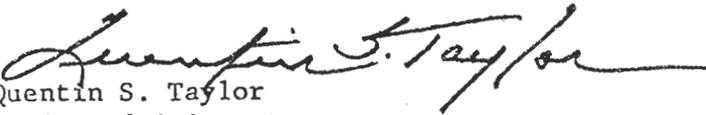
Recommendation A-77-68. Formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flight crews in the terminal area.

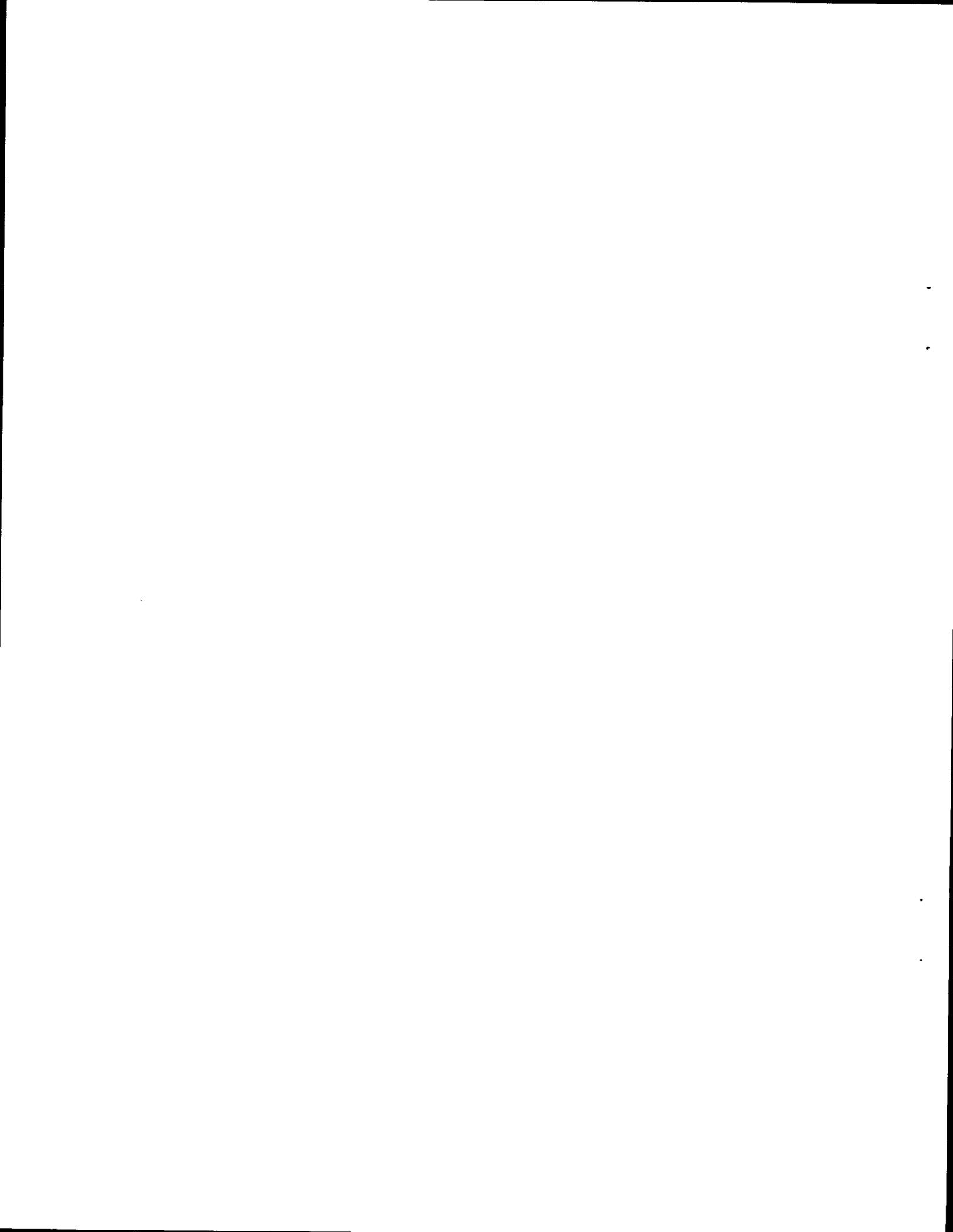
Comment. In June, the FAA began work on a study to achieve a more effective method of collecting and disseminating weather information throughout the air traffic control (ATC) system. That study has resulted in a draft report "Aviation Weather System Program Plan" which is now being evaluated.

This document prepared by the Aviation Weather System Planning Team presents the FAA plan for developing and implementing improvements to its current capability for providing hazardous and routine weather information to pilots and controllers. Hazardous weather is defined therein as weather conditions that pose an unacceptable threat to the flight of aircraft.

The plan includes actions to review and possibly modify existing procedures and the qualification of personnel responsible for analyzing and disseminating weather. As a result of this plan, an FAA task group is presently working on a program aimed specifically at disseminating weather data in terminal locations. The final plan for terminal severe weather advisories will include a means of delivery that can be accomplished without derogating the controllers' primary responsibility, the separation of aircraft.

Sincerely,

  
Quentin S. Taylor  
Acting Administrator



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: October 28, 1977

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-77-68

The National Transportation Safety Board has noted with concern your recent issuance of Amendment 121-134, Additional Weather Information, to the Federal Aviation Regulations. As you know, this amendment requires that domestic and flag air carriers adopt an approved system for obtaining forecasts and reports of adverse weather conditions that may affect safety of flight while en route and at each airport to be used. Prior to a flight, the aircraft dispatcher would be required to provide the pilot-in-command with all available weather reports and forecasts of weather conditions for each route to be flown and each airport to be used. During a flight, the aircraft dispatcher would be required to provide the pilot-in-command with any additional available information of meteorological conditions that might affect safety of flight.

Although the Safety Board agrees with the intent of the amendment to reduce the number of accidents resulting from adverse weather, we have serious reservations concerning certain aspects of the amended requirement.

Our investigations of several severe weather-related air carrier accidents in the terminal area indicate that the timely transmission of severe weather information by the company dispatcher to a flight in the terminal area is generally not feasible because he realistically cannot keep abreast of rapidly developing terminal area weather. The Safety Board is convinced of the need for the development and implementation of a system for controllers to relay severe thunderstorms and tornado bulletins to aircraft in the terminal area. We continue to believe that the responsibility for transmission of such information necessarily devolves to the controller and that the provisions of Amendment 121-134, as they apply to the terminal area, are unrealistic.

Although the weather information relay problem may not be as critical for en route flights as it is for flights in the terminal area, the Safety Board's investigation and public hearing concerning the recent Southern Airways, Inc., DC-9-30 accident at New Hope, Georgia, revealed that there may be deficiencies in the relay of adverse weather information during the en route phase as well. However, the Safety Board believes that the problem is more urgent in the terminal area and that direct and immediate action is needed to improve the current terminal-area weather-dissemination system.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Formulate rules and procedures for the timely dissemination by air traffic controllers of all available severe weather information to inbound and outbound flightcrews in the terminal area. (Class II-Priority Followup) (A-77-68).

BAILEY, Acting Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendation.



By: Kay Bailey  
Acting Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 27, 1980

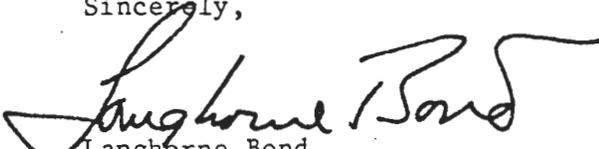
The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

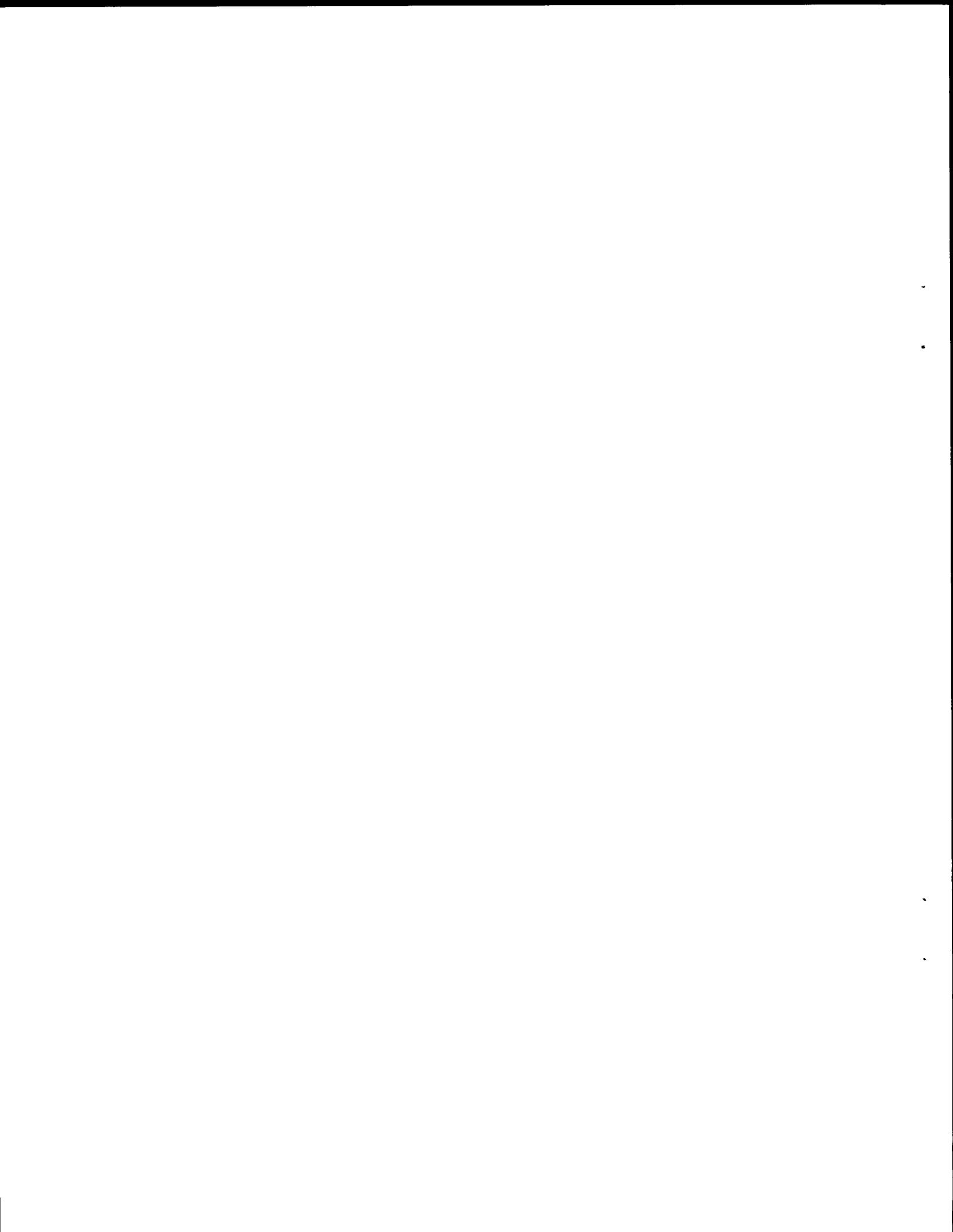
Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendation A-78-4 issued February 16, 1978, and your request of May 5, 1980, that the Federal Aviation Administration (FAA) reevaluate the recommendation. This recommendation was issued as a result of the Board's investigation of the Piper PA-31 Navajo crash shortly after takeoff from Lake Minchumina, Alaska, on September 24, 1977.

The FAA Central Region, the lead region for certification of small aircraft, has initiated a study to evaluate the problems associated with the nose baggage door locking mechanisms of all small multiengine aircraft. As requested in your letter of May 5, we will ensure a reassessment of the door lock problems associated with the Piper Cheyenne, Navajo, and Aztec airplanes. We will inform the Board of the results of the study and subsequent action.

Sincerely,

  
Langhorne Bond  
Administrator





## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

May 5, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

On February 16, 1978, the National Transportation Safety Board issued Safety Recommendation A-78-4, recommending that the Federal Aviation Administration issue an Airworthiness Directive applicable to the forward baggage door locks on Piper Cheyenne, Navajo, and Aztec airplanes. This Airworthiness Directive, the Board stated, should require inspection of these door locks and the establishment of repair or replacement requirements to insure that the door lock tang will not disengage from the door handle. Since the FAA did not take the prescribed remedial action or adequate alternative action, the status of this recommendation remains: "Open-unacceptable action."

In his letter of May 5, 1978, the Deputy Administrator indicated that the FAA had reviewed the design and had physically examined the latch and lock mechanisms of the door. He further stated that the FAA did not believe that the door, in good condition, would open in flight if it had been properly latched and locked. The key words here are in good condition and reflect the essential concern of NTSB to insure that the locks are in good condition. This is precisely why the Board recommended that they be inspected and repaired or replaced as necessary.

On June 9, 1978, the Piper Aircraft Corporation issued Service Bulletin No. 604 dealing with modification of the forward baggage door locking systems installed on the above-mentioned airplanes. On June 8, 1979, Piper issued Service Bulletin No. 604A which superseded Bulletin No. 604. The new bulletin revised serial numbers of the affected aircraft models, added kit information, and provided for modification of the door locking system as well as an inspection of the door lock arm assembly. Compliance with this bulletin to insure that the door is in good condition requires the installation of one or more kits, the availability of lock engagement tolerance data, and the non-routine removal of the baggage door lock arm assemblies.

Honorable Langhorne M. Bond

- 2 -

In connection with the purpose of Bulletin 604A Piper states, in part, that:

"...it is possible to close the door and turn the lock to the locked position without the lock tang actually engaging the door handle. As a result, the door would not be properly secured and could possibly come open in flight; this could adversely affect the flight characteristics of the airplane."

This stated purpose or concern clearly reflects the essential theme enunciated in Safety Board Recommendation A-78-4.

In view of the continuing potential hazards associated with faulty baggage door lock systems on the above aircraft, and in context with the manufacturer's recognition of this problem, the Safety Board requests that the FAA reevaluate Recommendation A-78-4.

Sincerely yours,

  
James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

May 5, 1978

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-78-4.

A-78-4. Issue an Airworthiness Directive applicable to Piper Cheyenne, Navajo, and Aztec airplanes to require a periodic inspection of the forward baggage door locks, and to establish an inspection procedure and repair or replacement requirements. The inspection should insure that the baggage door lock tang will not disengage from the door handle, and that the latching load imposed during handle operation is a specified minimum consistent with dynamic loads which can be encountered during all ground and flight operations.

Comment. We have reviewed the design and physically examined the latch and lock mechanisms of the door. We do not believe that the door, in good condition, will open in flight if it has been properly latched and locked.

We have taken the following actions dealing with the operation and maintenance of nose baggage/cargo doors.

Handbook 8430.1A, Change 10, Part 135, Operations Alert 72-2 issued on October 12, 1973, directed inspectors to contact all air taxi operators and request that procedures for flight crew checks of the security of all baggage and cargo doors be established and included in the carriers' operations manuals.

The 1976 General Aviation Inspection Aids Summary contains an item which emphasizes the necessity for proper locking and maintenance of nose cargo doors.

The January 1978 supplement to the General Aviation Inspection Aids contains an item involving an inflight nose cargo door opening and describes the condition of the lock, as found, along with recommendations for inspections.

Copies of the issuances noted above are enclosed.

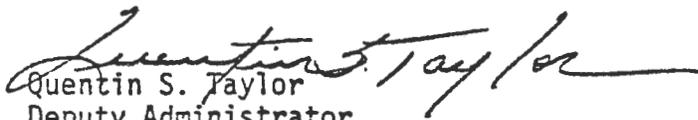
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We also exhibit a Service Difficulty Film at safety seminars. This film contains material relative to the maintenance and operation of baggage doors.

Available records of unwanted door openings on these airplanes do not support mandatory action as recommended, therefore, we do not plan such action at this time.

If you have any additional information which can be used to support further action we will appreciate your forwarding it to us.

Sincerely,

  
Quentin S. Taylor  
Deputy Administrator

3 Enclosures

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: February 16, 1978

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-78-4

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On September 24, 1977, a Piper PA-31 Navajo crashed shortly after takeoff from Lake Minchumina, Alaska, after the forward baggage door popped open. Cargo had been loaded into the forward baggage compartment just before this flight, and the pilot indicated that he had latched and locked this baggage door during the preflight inspection. Takeoff was made on a relatively rough gravel-dirt surface and some turbulence was encountered during climbout. The door came open shortly thereafter. The pilot attempted to return immediately to the airport but the airplane impacted Lake Minchumina before he could do so. The pilot and the five passengers aboard were rescued by a fishing boat. Later, the pilot stated that after the baggage door opened, it remained open, and he could not maintain control of the airplane.

As a result of its investigation of this accident, the Safety Board believes that this baggage door was latched and locked during the preflight inspection. However, the door apparently became unlocked and then opened sometime during the takeoff or climb.

This outward opening baggage door is hinged at the top and may be latched by rotating a bar handle into a recess in the plane of the door. The door may then be locked by inserting the key into the lock and turning it 90° counterclockwise. This action positions the locking tang into a slot in the door handle. However, because the lock mechanism or door handle may be loose or because the locking tang may rotate excessively, the door may not lock securely. This is particularly true in older

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airplanes or those with high service time. If, as a result of any applied forces, the locking tang is rotated upward and out of the slot in the door handle, the door may become unlatched inadvertently. Subsequent to the accident, an inspection of another Navajo airplane disclosed that the locking tang on that airplane could be easily lifted from below by inserting a small nail file. The ease of unlocking this door prompts concern that normal vibrational and inertial forces on the tang might produce the same result. (A similar locking device is installed on Piper Aztec and Cheyenne airplanes.)

To prevent a recurrence of this inadvertent door opening, the operator of the accident airplane (who also operates several other Piper aircraft with similar baggage door installations) has installed supplemental safety straps across the door handles to assure that they are latched and locked during flight.

In view of the potential hazards created by in-flight openings of these baggage doors--adverse aerodynamic effects on airplane controllability and ejection of cargo into propellers or adjacent structure--the Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive applicable to Piper Cheyenne, Navajo, and Aztec airplanes to require a periodic inspection of the forward baggage door locks, and to establish an inspection procedure and repair or replacement requirements. The inspection should insure that the baggage door lock tang will not disengage from the door handle, and that the latching load imposed during handle operation is a specified minimum consistent with dynamic loads which can be encountered during all ground and flight operations. (Class II, Priority Action) (A-78-4)

BAILEY, Acting Chairman, McADAMS, HOGUE, and KING, Members, concurred in the above recommendation.



By: Kay Bailey  
Acting Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 29, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

In response to your request of May 1, 1980, to formalize earlier staff communications regarding Federal Aviation Administration (FAA) actions related to NTSB Safety Recommendations A-78-27 through 29, we submit the following update for the Board's information and the public docket.

A-78-27. Develop, in cooperation with industry, flight recorder standards (FDR/CVR) for complex aircraft which are predicated upon intended aircraft usage.

Comment. During August 1979 FAA received a proposed standard for a composite cockpit voice recorder/flight data recorder (CVR/FDR) from one of the major manufacturers of both CVRs and FDRs. Working with this proposed standard and other example standards as a base, FAA has developed a proposed draft standard for a composite CVR/FDR.

A new public procedure to expedite the issuance of standards for specified materials, parts, processes, and appliances used on civil aircraft was issued by FAA on June 2, 1980, with September 9 as its effective date (copy enclosed). FAA will publish its proposed standard for a composite CVR/FDR under this new procedure. A copy of the latest draft of the CVR/FDR Standard and a copy of the new TSO procedures are enclosed.

A-78-28. Draft Specifications and fund research and development for a low cost FDR, CVR, and composite recorder which can be used on complex general aviation aircraft. Establish guidelines for these recorders, such as maximum cost, compatible with the cost of the airplane on which they will be installed and with the use for which the airplane is intended.

Comment. Although initially the FAA had planned to establish a regulatory project to develop an Advance Notice of Proposed Rule Making (ANPRM) for identification of appropriate standards, further review of the matter indicated that this regulatory procedure was not necessary. Research and development previously accomplished by the U.S. Army and by NASA was already being incorporated by several equipment manufacturers in their own development plans.

A-78-29. In the interim, amend 14 CFR to require that no operation (except for maintenance ferry flights) may be conducted with turbine-powered aircraft certificated to carry six passengers or more, which require two pilots by their certificate, without an operable CVR capable of retaining at least 10 minutes of intracockpit conversation when power is interrupted. Such requirements can be met with available equipment to facilitate rapid implementation of this requirement.

Comment. In partial fulfillment of this recommendation, 14 CFR 135 was amended, as published October 10, 1978, in Vol. 43 FR 46742, to require under Section 135.151 (copy enclosed) that no person may operate a turbojet airplane having a passenger seating configuration, excluding any pilot seat, of 10 seats or more, unless it is equipped with an approved cockpit voice recorder.

In further fulfillment of this recommendation, the FAA currently is drafting an NPRM which would require under Part 91, General Operating and Flight Rules, several additional equipment items, including a CVR on all multiengine turbojet airplanes. This would expand the coverage under Section 135.151 since there would be no minimum seating requirement specified.

The FAA will keep the Board advised as to progress relating to these recommendations.

Sincerely,



Langhorne Bond  
Administrator

3 Enclosures



## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

May 1, 1980

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

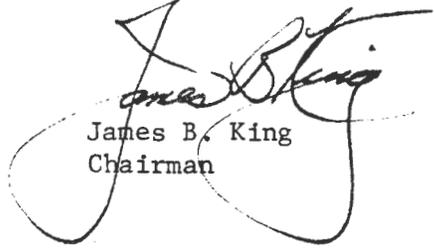
Dear Mr. Bond:

On May 30, 1979, a Downeast Airlines deHavilland DHC-6-200 crashed while approaching the Knox County Regional Airport, Rockland, Maine. Both flight crewmembers and 15 of the 16 passengers were killed. The investigation of this accident was made more difficult by the lack of definitive information concerning the aircraft's actual flightpath and the flightcrew's actions and procedural conduct. A flight data recorder (FDR) and a cockpit voice recorder (CVR) would have provided invaluable information for the investigation.

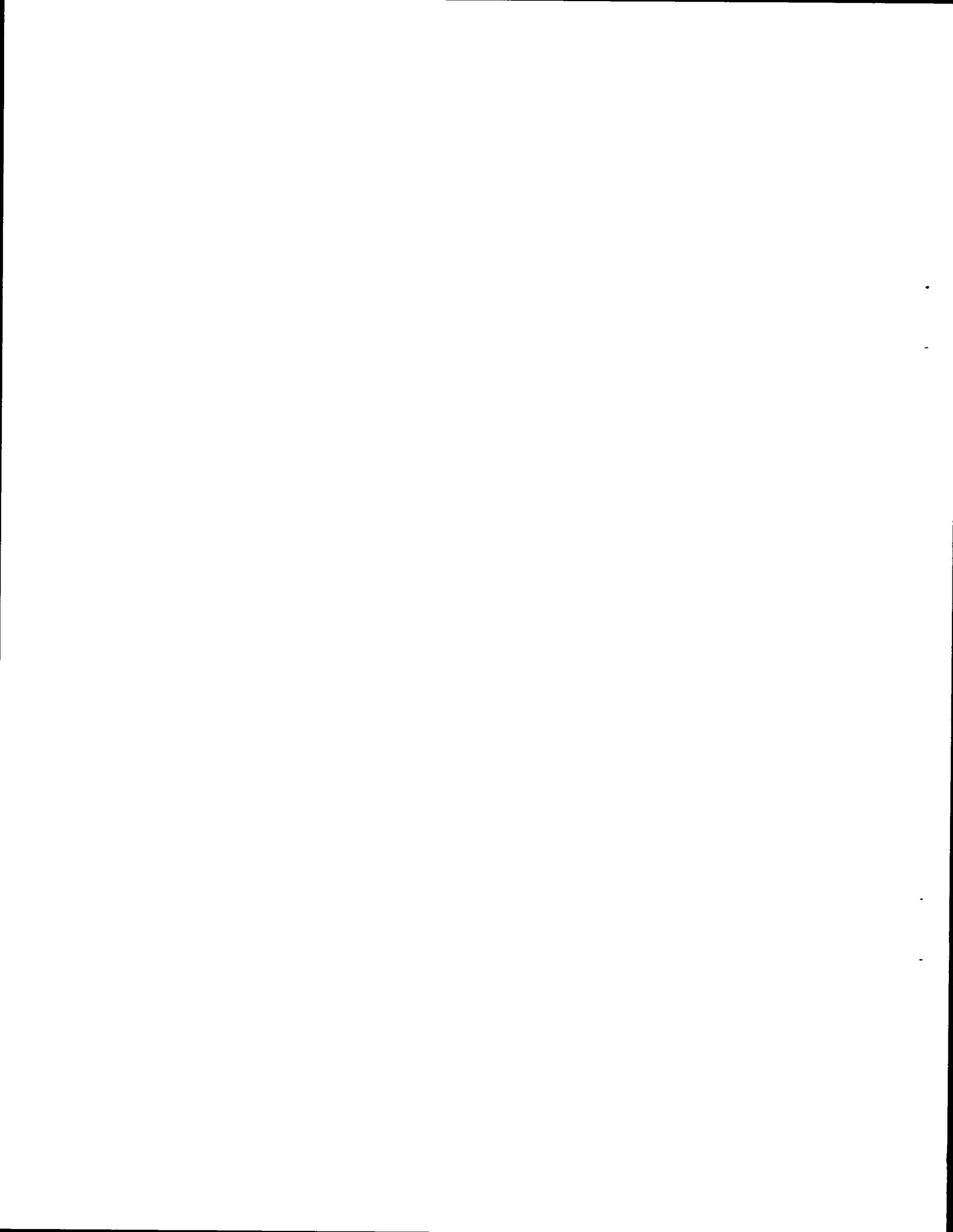
On April 13, 1978, the National Transportation Safety Board issued Safety Recommendations A-78-27 through A-78-29, calling for the development and installation of low-cost CVR's and FDR's on complex, fixed-wing, multiengine aircraft. By letter dated October 2, 1979, we informed the Federal Aviation Administration (FAA) that A-78-27 and 28 were being maintained in an "Open--Unacceptable Action" status, and that A-78-29 was being held in an "Open--Acceptable Action" status, until such time as the FAA took some positive action toward their resolution. We requested an updated status report on all three recommendations.

Although staff sources have advised us of many actions being taken, progress towards resolution of these recommendations remains unclear. The Downeast Airlines accident reemphasizes the need for the CVR and FDR as an invaluable tool in aircraft accident investigation. In order to evaluate the progress of these recommendations and to update the public docket, we request a written response describing actions taken by the FAA to resolve them.

Sincerely yours,



James B. King  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

October 2, 1979

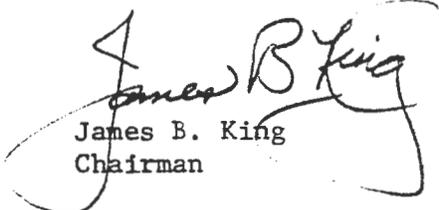
Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

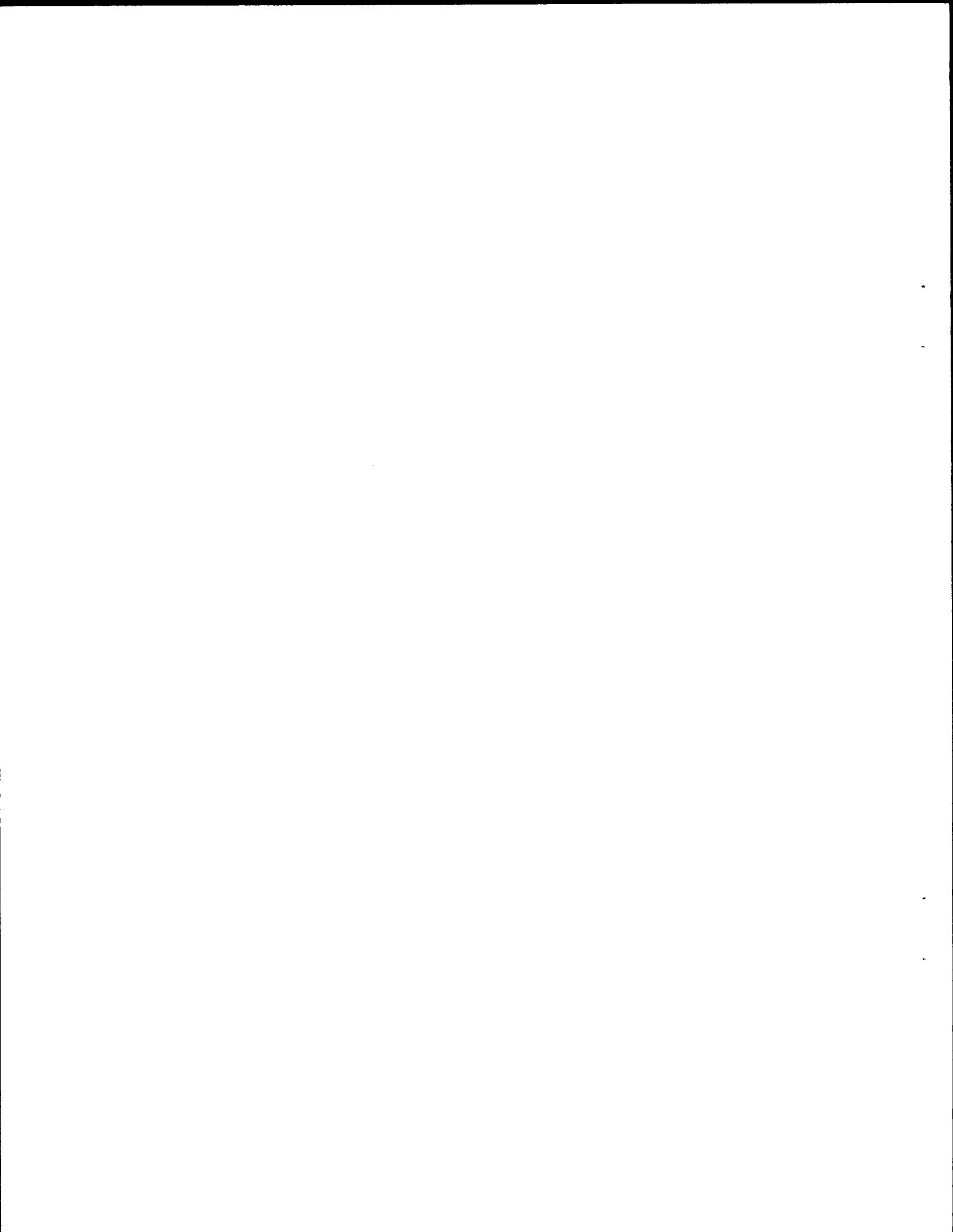
Dear Mr. Bond:

Reference is made to the National Transportation Safety Board's recommendations A-78-27 through 29 issued April 13, 1978. These recommendations stemmed from the Safety Board's concern with the number of accidents involving complex multiengine general aviation aircraft about which the accident circumstances remain unknown. These recommendations dealt with the development and installation of low-cost Cockpit Voice Recorders (CVR's) and Flight Data Recorders (FDR's) for use on complex fixed wing multiengine aircraft.

Recommendations A-78-27 and 28 are being held in an "Open--Unacceptable Action" status until the FAA takes some positive action toward their resolution. Recommendation A-78-29 is being held in an "Open--Acceptable Action" status because we understand that regulatory action has been initiated. Since the Safety Board considers CVR's and FDR's to be invaluable tools in accident investigation, we would appreciate receiving an updated status report on all three recommendations.

Sincerely yours,

  
James B. King  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

Office of the  
Chairman

30 OCT 1978

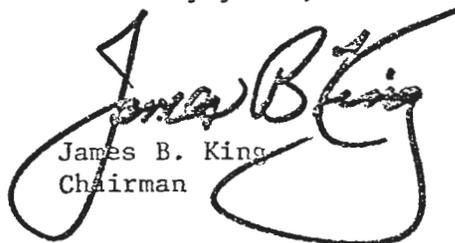
AOA#:	HSF-1
ACTION INFORMATION:	
DUE DATE(S):	
FOR SIGNATURE OF:	
COORDINATION WITH/THRU:	
INFORMATION COPY:	

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

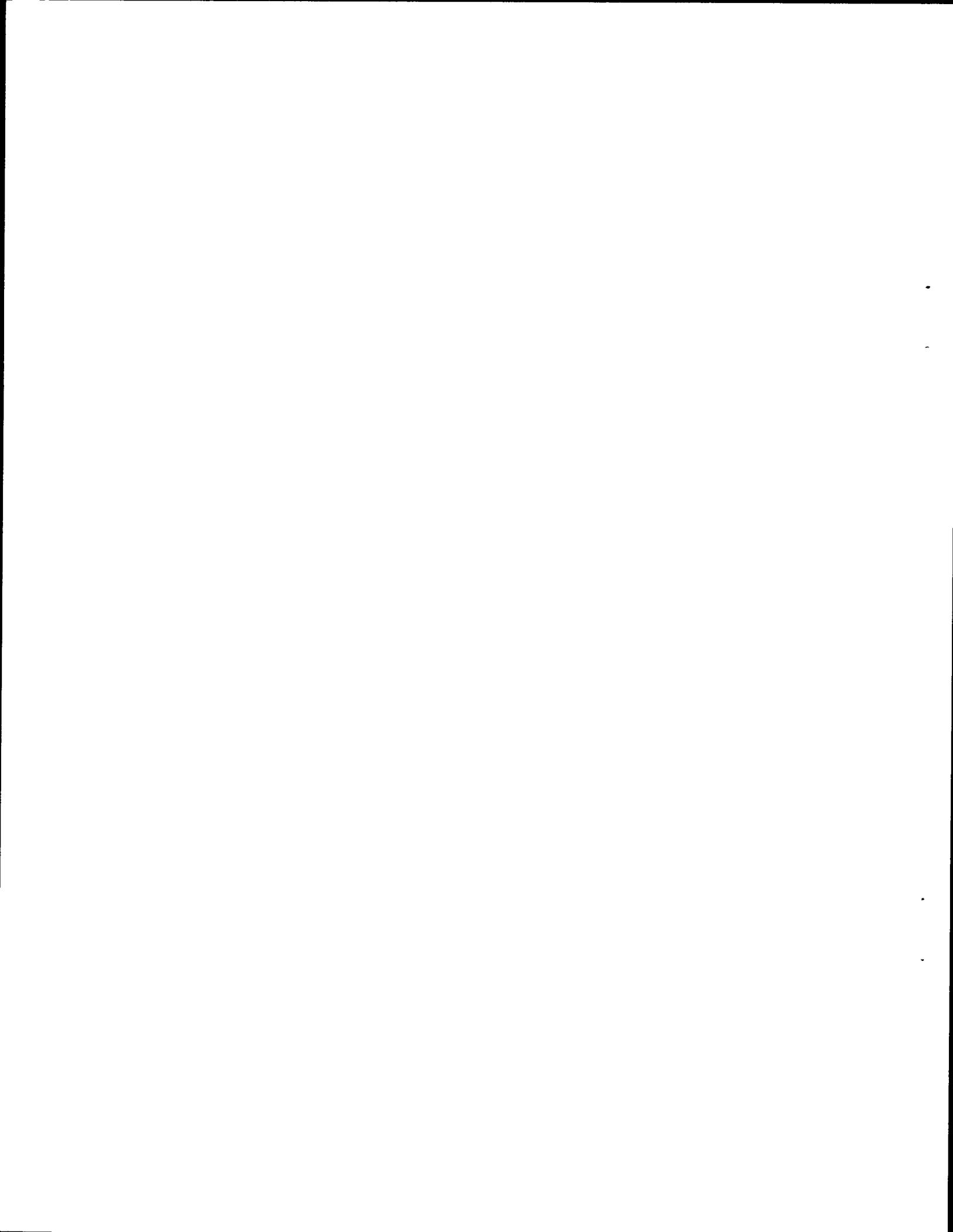
Reference is made to the Federal Aviation Administration's (FAA) letter of September 11, 1978, pertaining to Safety Recommendations A-78-27 and 28. These recommendations dealt with the development and installation of low-cost Cockpit Voice Recorders (CVR's) and Flight Data Recorders (FDR's) for use on complex multi-engine aircraft. It is noted that although the FAA does not disagree with the recommendations, it does not consider this a matter of priority for expeditious research and regulatory action. Since CVR's and FDR's have proved invaluable tools in accident investigation, we consider these priority recommendations and intend to hold these recommendations in an "Open - Unacceptable Action" status until some positive action is taken toward their resolution.

Sincerely yours,

  
James B. King  
Chairman

DISPATCHED

NOV 1 10 11 PM '78  
CIV  
ADM  
FEDERAL AVIATION  
ADMINISTRATION



**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591

September 11, 1978



OFFICE OF  
THE ADMINISTRATOR

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in reply to your August 10 letter requesting the FAA to accelerate rulemaking action in response to Safety Recommendations A-78-27 and 28.

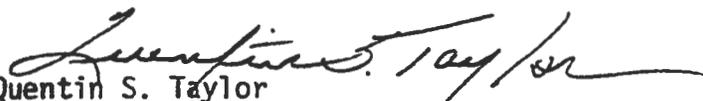
FAA regulatory proposals are now subject to the criteria contained in Executive Order 12044, "Improving Government Regulations," and the proposed Department of Transportation Regulatory Policies and Procedures, "Improving Government Regulations," as published in the Federal Register on March 24 and June 1 (copies enclosed). A major impact of these documents on the agency regulatory process is the emphasis placed on the procedures employed to determine: (1) what are significant regulatory projects and (2) what priority these projects will be assigned when the Department regulatory agenda is developed.

The results of the recorder research projects presently being undertaken by the National Aeronautics and Space Administration and other government agencies should be useful in helping the FAA accomplish its regulatory goals in developing crash recorder requirements.

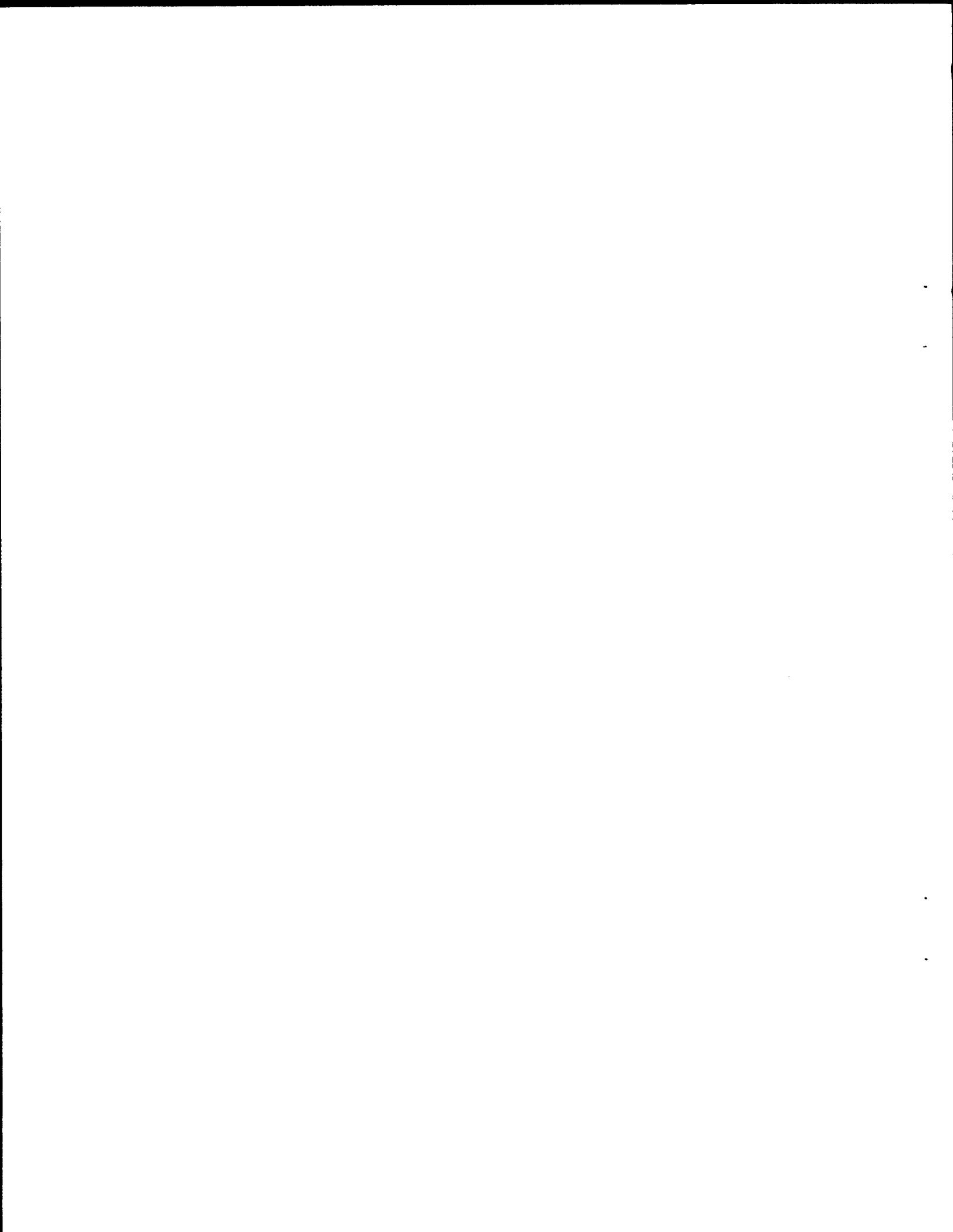
In this respect, the FAA is now in the process of completing final action on major amendments to 14 CFR 135 which, if adopted as anticipated, will require that cockpit voice recorders be installed on turbojet airplanes with 10 or more passenger seats.

At this time, we do not believe there is sufficient research data available to justify changing the regulatory agenda. However, we will consider such action should sufficient data become available prior to our issuance of an Advance Notice of Proposed Rule Making.

Sincerely,

  
Quentin S. Taylor  
Deputy Administrator

Enclosures 2





Office of the  
Chairman

## National Transportation Safety Board

Washington, D C 20594

August 10, 1978

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

Dear Mr. Bond:

On April 13, 1978, the National Transportation Safety Board forwarded three recommendations (A-78-27 through -29) to the FAA that discussed the need for the development and installation of cockpit voice recorders (CVR) and flight data recorders (FDR) in complex general aviation and air taxi/commuter aircraft. The first two recommendations addressed the need for FAA and industry cooperative development of FDR/CVR standards and drafting specifications, funding research and development of low-cost general aviation recorders, and establishing recorder cost guidelines. Our concerns are based on the current scarcity of government and industry economic and technical information that is directly related to low-cost aircraft recorders. For that reason, we cited the U.S. Army program that will develop and install low-cost recorders on several thousand aircraft based on emerging technology that appears to have almost direct and timely civil application.

Your response of June 30 states the FAA intention to carry out recommendations A-78-27 and A-78-28 through advanced rulemaking action (ANPRM). Further, the ANPRM action was cited as obviating the need for government-sponsored research and development based on preliminary work already done by industry.

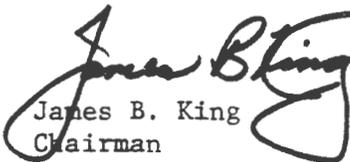
On July 12, our Bureau of Technology hosted a U.S. Army/FAA/NASA meeting to brief FAA and NASA representatives, at the technical level, on the Army program to include safety and technical requirements, cost effectiveness, and goals for the next several years. The Army program is now moving from the feasibility study phase to hardware development for laboratory and flight test evaluations. The FAA Flight Standards spokesman stated that the Army's program was interesting and the ANPRM effort, targeted for September 1979, could benefit from it.

Honorable Langhorne M. Bond (2)

NASA has also undertaken research to develop solid-state recording devices. One of the NASA objectives is to demonstrate the feasibility of utilizing advanced low-cost digital systems to provide a solid-state general aviation crash recorder that would retain critical accident investigation parameters in a nonvolatile storage system. Another goal is to provide in FY 1978, a solid-state data storage system suitable for replacing electromechanical tape recorders in aerospace vehicles. This data recorder will use bubble memory technology. NASA has also indicated interest in conducting economic studies of new recorder technology as it relates to aircraft size and use.

Considering the rapid developments in the state of the art, as evidenced by the NASA and Army programs, it would be appropriate for the FAA to accelerate the proposed ANPRM action to inform users and the technical community of the FAA's intentions. In so doing, the early development of hardware design and operating requirements and specifications could be initiated. Exchanges of economic and technical information between the FAA, Army, and NASA could also be accomplished prior to and during the ANPRM comment period. We therefore request the FAA to accelerate the ANPRM action.

Sincerely yours,

  
James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

JUN 30 1973

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-78-27 through 29.

A-78-27. Develop, in cooperation with industry, flight recorder standards (FDR/CVR) for complex aircraft which are predicated upon intended aircraft usage.

Comment. We shall establish a regulatory project to develop an Advance Notice of Proposed Rule Making (ANPRM) for identification of appropriate standards to be applied to certain general aviation aircraft operations.

In view of the wide range of use of the aircraft involved and the several kinds of recorders viewed as feasible by the NTSB, we believe that this is the most practical course of action.

A-78-28. Draft specifications and fund research and development for a low cost FDR, CVR, and composite recorder which can be used on complex general aviation aircraft. Establish guidelines for these recorders, such as maximum cost, compatible with the cost of the airplane on which they will be installed and with the use for which the airplane is intended.

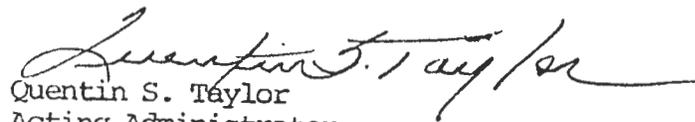
Comment. The ANPRM will solicit comments and information which we believe will obviate any need for government sponsored research and development, since several equipment manufacturers have already done preliminary work along the lines of the NTSB recommendation.

A-78-29. In the interim, amend 14 CFR to require that no operation (except for maintenance ferry flights) may be conducted with turbine-powered aircraft certificated to carry six passengers or more, which require two pilots by their certificate, without an operable CVR

capable of retaining at least 10 minutes of intracockpit conversation when power is interrupted. Such requirements can be met with available equipment to facilitate rapid implementation of this requirement.

Comment. We have recently established a regulatory project to upgrade FAR 91. The substance of the recommendation will be considered for inclusion in the Notice of Proposed Rule Making. We plan to issue the NPRM by December 31, 1978.

Sincerely,

  
Quentin S. Taylor  
Acting Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: April 13, 1978

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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} SAFETY RECOMMENDATION(S)  
} A-78-27 through 29

The National Transportation Safety Board is concerned about the number of accidents involving complex fixed wing, multiengine aircraft in air taxi and corporate/executive operations in which the accident circumstances remain unknown. Of the 194 fatal accidents in these operations from 1970 to 1977, cause has not been determined for 34 of the accidents. (See Attachment 1.) In addition to the accidents reflected in the data in Attachment 1, the Safety Board has recently investigated or is investigating five other accidents in the corporate/executive fleet alone<sup>1/</sup> in which there appears to be little hope of determining definitive cause. These accidents, which have occurred within the past 18 months, have resulted in 26 fatalities.

With the continued growth in the numbers of complex multiengine aircraft in general aviation, particularly in corporate/executive operations and air taxi/commuter service, and the frequent operation in unfavorable

1/ Accidents under recent investigation:

Grumman Gulfstream II (G1159), N500J, Johnson & Johnson, Inc., Hot Springs, Virginia, September 26, 1976.

Lear 23, N332PC, Jet Avia Limited, Flint, Michigan, January 6, 1977.

Falcon 10, N60MB, Mountain Bell Co., near Denver, Colorado, April 3, 1977.

BH 125-600A, N40PC, Southern Company Services, Inc., McLean, VA, April 28, 1977.

Lear 25, N999HG, Champion Homes, near Sanford, NC, September 8, 1977.

environments, we believe that recorders are urgently needed. In fact, we believe that these recorders are as justified as those installed in the air carrier fleet in 1959. At that time, high speed, increased reliance on avionic equipment, and lack of eye witnesses combined to limit the investigative evidence and often eliminated chances of determining cause. These same factors are hindering today's investigations of accidents involving complex multiengine aircraft in air taxi and corporate executive operations.

Accident investigation experience with air carrier aircraft has proven that cockpit voice recorders (CVR) and flight data recorders (FDR) have been invaluable tools in identifying aircraft design deficiencies, common operational problems, shortcomings in the air traffic control system, and the effects of meteorological phenomena on aircraft performance. In almost every accident investigation involving these aircraft during the past 10 years, one or both of these recorders provided investigators with the clues necessary to piece together the circumstances of the accident. To its credit, the aviation community has always responded to these accident findings by instituting immediate remedial actions, or at the very least, by researching identified problem areas. The result has been continued improvement in aviation safety.

The value of the FDR, and in particular of the digital FDR, has become evident in the investigation of a number of air carrier accidents in which wind shear was a primary causal factor. The recorded data have provided a means for accurately determining the flight profiles and the direction and magnitude of winds. They have also provided sufficient information for programming aircraft simulators so that the condition encountered by the pilots could be reproduced in real time. Simulation based on FDR data has made it possible to explore human factors such as restricted visual cues which hinder prompt recognition of a developing descent rate and accurate assessment of the pitch attitude change required to arrest the descent before impact.

At least one manufacturer of corporate/executive aircraft has recognized the long-term value of the FDR and CVR and is providing space and power for the FDR and installing a CVR in every aircraft of this category manufactured. As corporate flying becomes an ever-increasing part of the transportation system, corporate operators are also discovering that it is to everyone's advantage to install CVR's and FDR's aboard their aircraft. A corporate flight department's operation is invariably suspect in the eyes of general aviation antagonists after an accident for which the precise cause is unknown.

The economic benefits of the FDR and CVR are becoming apparent as well. The inability to properly determine the cause of an accident can be costly, not only because of the failure to determine proper preventive measures, but also because of liability of the manufacturers, the operator, and the Government.

In addition, corporations and air taxi operators are providing transportation in lieu of available Part 121 air carrier transportation. These passengers are not being afforded a level of safety equivalent to that of air carriers. The Safety Board believes an equivalent level can now be effected in the long term by the installation of flight recorders.

The Safety Board believes that an industry which has made the micro-computer a household tool could develop a reasonably priced, light weight, small-volume, solid state digital flight data recorder and an equally inexpensive cassette type cockpit voice recorder which would serve the intent of the flight recorder requirement. In fact, one manufacturer is developing a very small digital flight data recorder under contract for the U.S. Army which will employ the latest electronic technology and will be capable of recording over 30 minutes of data for more than 15 parameters.

This system is to use a microprocessor to decide which data should be stored and when, and a nonvolatile solid-state memory instead of recording tape. Because no recording tape is used, the system will be virtually maintenance free. Whereas, current FDR's of the scribed metal foil variety record only four variable parameters, cost \$15,000 to \$20,000 to install, and weigh 40 pounds, the U.S. Army plans for their new unit to cost \$10,000, including installation, on a limited production schedule and weigh about 7 pounds.

Although the unit being developed under this contract does not have voice recording capability, discussions with equipment suppliers indicate that the technology is available to produce a similar recorder capable of recording both voices and digital data on aircraft performance.

In addition to new flight recorder standards for certain aircraft operating under 14 CFR 91 and 14 CFR 135, the Safety Board believes that the current standards for aircraft operating under 14 CFR 121 should be revised and updated to reflect modern needs and the technological state of the art. Although the data that they presently provide are extremely valuable, FDR's could record additional parameters with more useful accuracy and CVR's could produce better quality voice recordings at minimal cost if modern technology were employed. A list of requirements which we believe to be feasible is attached. (See Attachment 2)

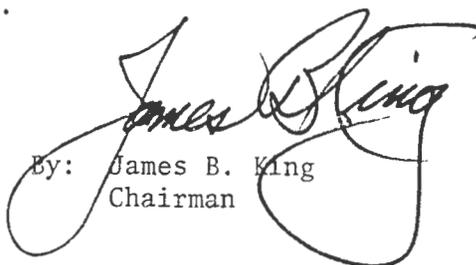
In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Develop, in cooperation with industry, flight recorder standards (FDR/CVR) for complex aircraft which are predicated upon intended aircraft usage. (Class II, Priority Action) (A-78-27)

Draft specifications and fund research and development for a low cost FDR, CVR, and composite recorder which can be used on complex general aviation aircraft. Establish guidelines for these recorders, such as maximum cost, compatible with the cost of the airplane on which they will be installed and with the use for which the airplane is intended. (Class II, Priority Action) (A-78-28)

In the interim, amend 14 CFR to require that no operation (except for maintenance ferry flights) may be conducted with turbine-powered aircraft certificated to carry six passengers or more, which require two pilots by their certificate, without an operable CVR capable of retaining at least 10 minutes of intracockpit conversation when power is interrupted. Such requirements can be met with available equipment to facilitate rapid implementation of this requirement. (Class II, Priority Action) (A-78-29)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendations.

  
By: James B. King  
Chairman

## ATTACHMENT 1

FATAL ACCIDENTS  
U.S. GENERAL AVIATION  
MULTI-ENGINE FIXED WING  
1970-1977

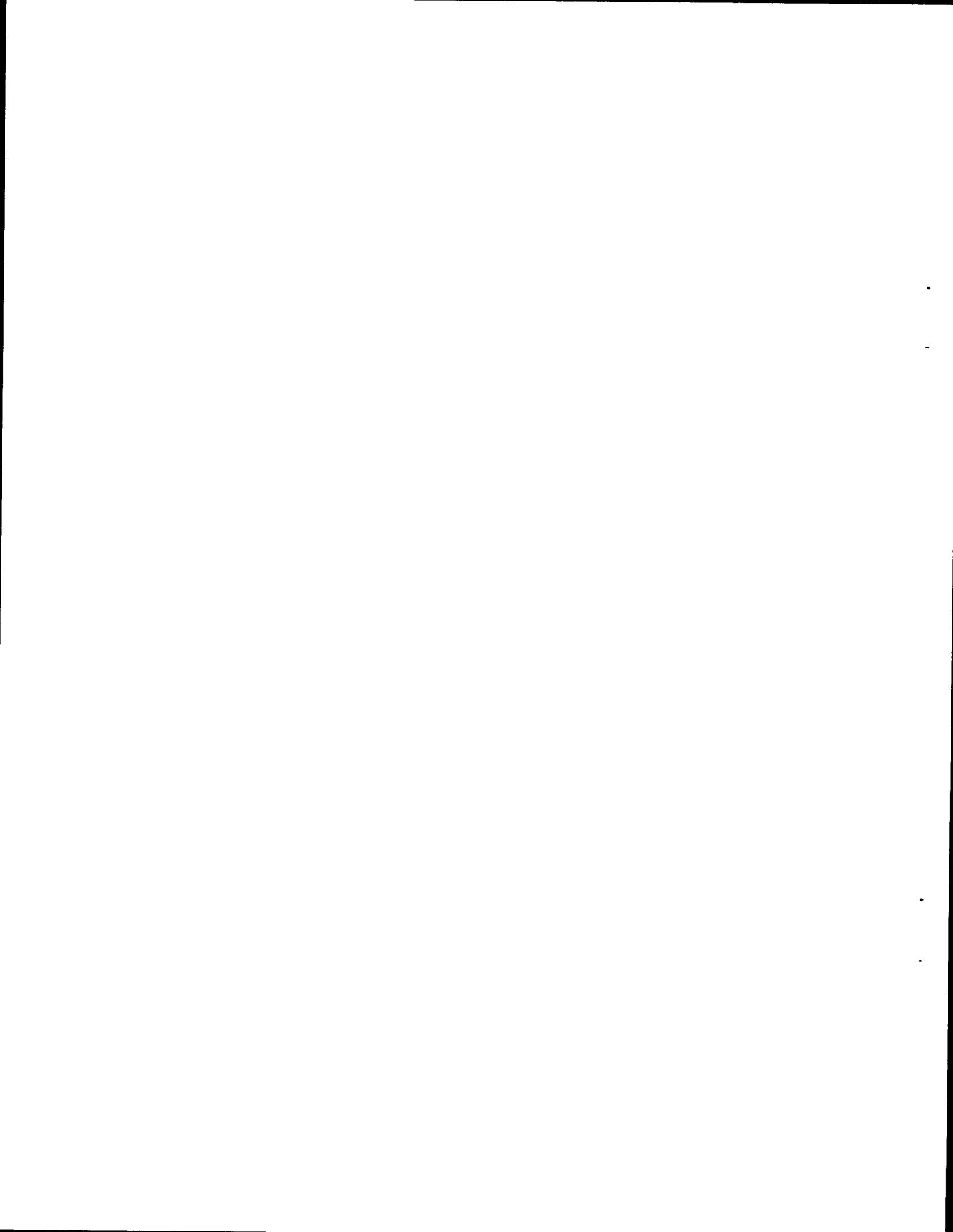
EXCLUDES ACCIDENTS WITH NO CAUSAL ASSIGNMENT  
AS OF 3/14/78

<u>BROAD</u> <u>Cause/Factor</u>	<u>FATAL ACCIDENTS</u>		
	<u>Cause</u>	<u>Factor</u>	<u>Total</u>
Pilot	766	169	779
Personnel	76	37	111
Airframe	19	3	22
Landing Gear	1	1	2
Powerplant	110	15	120
Systems	20	6	26
Instruments/ Equipment & Accessories	3	7	10
Airport/Airways/Facilities	3	10	13
Weather	37	416	442
Terrain	24	160	184
Miscellaneous	22	9	31
Undetermined	91	0	91

Total No.  
Fatal Accidents 917

FATAL ACCIDENTS  
OF  
UNDETERMINED CAUSE  
GENERAL AVIATION  
MULTI-ENGINE FIXED WING  
1970-1977

<u>Category</u>	<u>Number of Undetermined Accidents</u>	<u>Number of Fatalities</u>
Air Taxi	21	80
Corporate/Executive	13	47
Business	16	37
Pleasure/ Personal Transport	28	79
Miscellaneous (Ferry/Instruction/Unknown)	13	36
Total	91	279



ATTACHMENT 2

FLIGHT RECORDER STANDARDS VIEWED AS FEASIBLE  
BY NATIONAL TRANSPORTATION SAFETY BOARD

COCKPIT VOICE RECORDER to record intra-cockpit voice communications with retention of at least 10 and preferably 15 minutes of recorded data at time of power interruption.

- Require on turbine-powered aircraft carrying 6 passengers or more, certificated for two-pilot operation that are in present service operating under 14CFR91 or 14CFR135.

MINI FLIGHT DATA RECORDER to record at least 5 variable parameters and one binary signal as a function of time. The minimum parameters are: Indicated Airspeed, Pressure Altitude, Magnetic Heading, Vertical Acceleration, Longitudinal Acceleration and the keying of any air/ground communication equipment. Recording media or memory should retain the last 10 minutes of data at time of power interruption.

- Require on newly manufactured multi-engine aircraft certificated to carry 6 to 9 passengers and single-pilot operation under 14 CFR91 or 14CFR135.
- Require on newly manufactured multi-engine aircraft certificated to carry 10 passengers or more and single-pilot operation under 14CFR91.

COMPOSITE FLIGHT DATA and COCKPIT VOICE RECORDER or individual installation of Cockpit Voice Recorder and Mini Flight Data Recorder which will satisfy the requirements for both equipment as described above.

- Require on newly manufactured turbojet aircraft certificated to carry 6 passengers or more and two pilot operation under 14CFR91 or 14CFR135.
- Require on all multi-engine aircraft, including those presently in service, certificated to carry 10 passengers or more and operating under 14CFR121, 14CFR127, or 14CFR135, except for those larger air carrier aircraft required to have recorders by the present rule 14CFR121.343.

BASIC EXPANDED PARAMETER FLIGHT DATA RECORDER as described in 14CFR 121.343 paragraph (a) (2), and COCKPIT VOICE RECORDER as described in 14CFR121.359.

- Require on all newly manufactured large aircraft certificated for operations above 25,000 feet altitude or that are turbine engine powered regardless of the date of issue of the aircraft's type certificate that operate under 14CFR121.

EXPANDED PARAMETER FLIGHT DATA RECORDER recording parameters described in Enclosure 1 to Safety Recommendations A74-15 thru 17 dated March 1, 1974, plus any dedicated parameters which may be desirable because of unique features of the specific aircraft configuration and type design, and COCKPIT VOICE RECORDER as described in 14CFR 121.359.

- Require on all large aircraft certificated for operations above 25,000 feet altitude or that are turbine engine powered for which a new type certificate is issued that operate under 14CFR121.



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

SEP 3 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

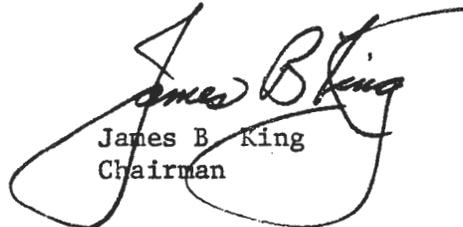
Dear Mr. Bond:

Thank you for your letter of July 29, 1980, responding to National Transportation Safety Board Safety Recommendation A-78-54 issued August 11, 1978. This is one of three recommendations that stemmed from our investigation of a Beech 99 accident at Richland Airport, Richland, Washington, on February 10, 1978. We recommended that the Federal Aviation Administration:

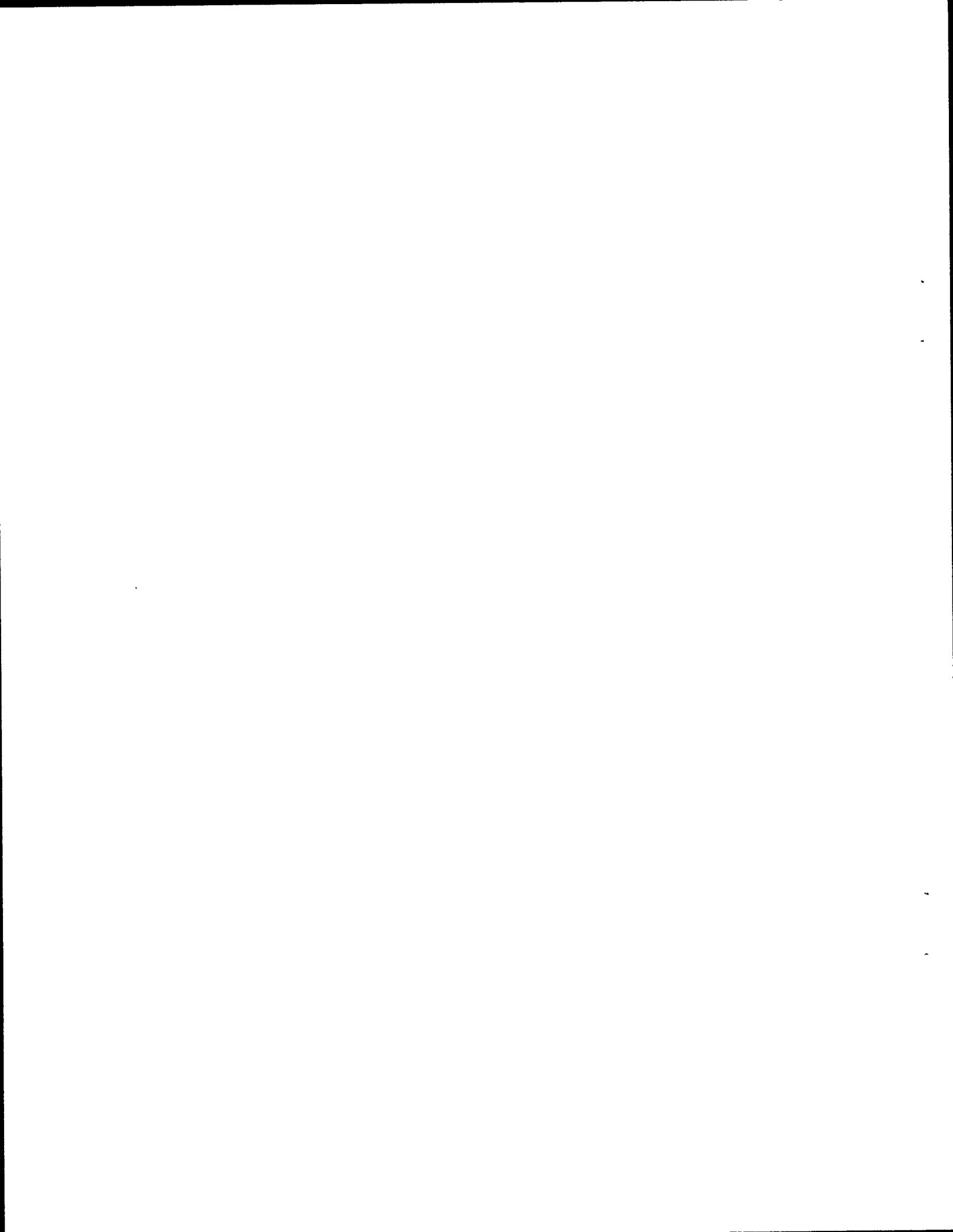
"Require an inspection to insure that the primary and secondary mode of the horizontal stabilizer actuator are capable of deflecting the stabilizer under specified airloads. The exact instructions should be furnished by the Beech Aircraft Company. The inspection should be made as soon as the Beech instructions are available and repeated at 2,000-hour intervals."

The Safety Board is pleased to note that Beech Aircraft Company has amended the Maintenance Manuals for both the Beech 99 and 100 by revision 1A8 dated July 27, 1979, thus fulfilling the recommendation. Safety Recommendation A-78-54 is now classified in a "Closed--Acceptable Action" status.

Sincerely yours,



James B. King  
Chairman



**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591

July 29, 1980



OFFICE OF  
THE ADMINISTRATOR

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendation A-78-54, issued August 11, 1978, and supplements our letters of November 9, 1978, and May 23, 1979.

A-78-54. Require an inspection to insure that the primary and secondary mode of the horizontal stabilizer actuator are capable of deflecting the stabilizer under specified airloads. The exact instructions should be furnished by the Beech Aircraft Company. The inspection should be made as soon as the Beech instructions are available and repeated at 2,000-hour intervals.

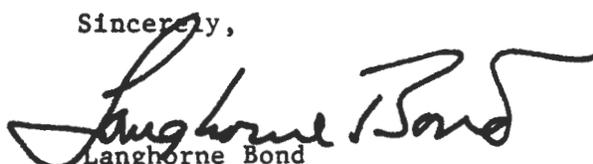
Comment. Beech Aircraft Company has amended the Maintenance Manuals for both the Beech 99 and 100 by revision 1A8 dated July 27, 1979 (copy enclosed).

The revision identifies a kit, which is now available, designed to satisfy the inspection requirements as described by the NTSB in Recommendation A-78-54. Pictures, instructions, and sketches are included in the kit for use in preventing damage to the aircraft. These kits have been distributed and are now in the field for general use.

Test Instructions provide that "After the first 2,000 actuator hours of service and every 2,000 actuator service hours thereafter, the horizontal stabilizer trim actuator must be load tested. This consists of both a tension and compression load test. The load test is to be accomplished by obtaining the required Instructions Kit No. 99-5012-15 . . . ." Federal Aviation Administration (FAA) inspectors will, of course, monitor owner/operator actions for compliance with this requirement.

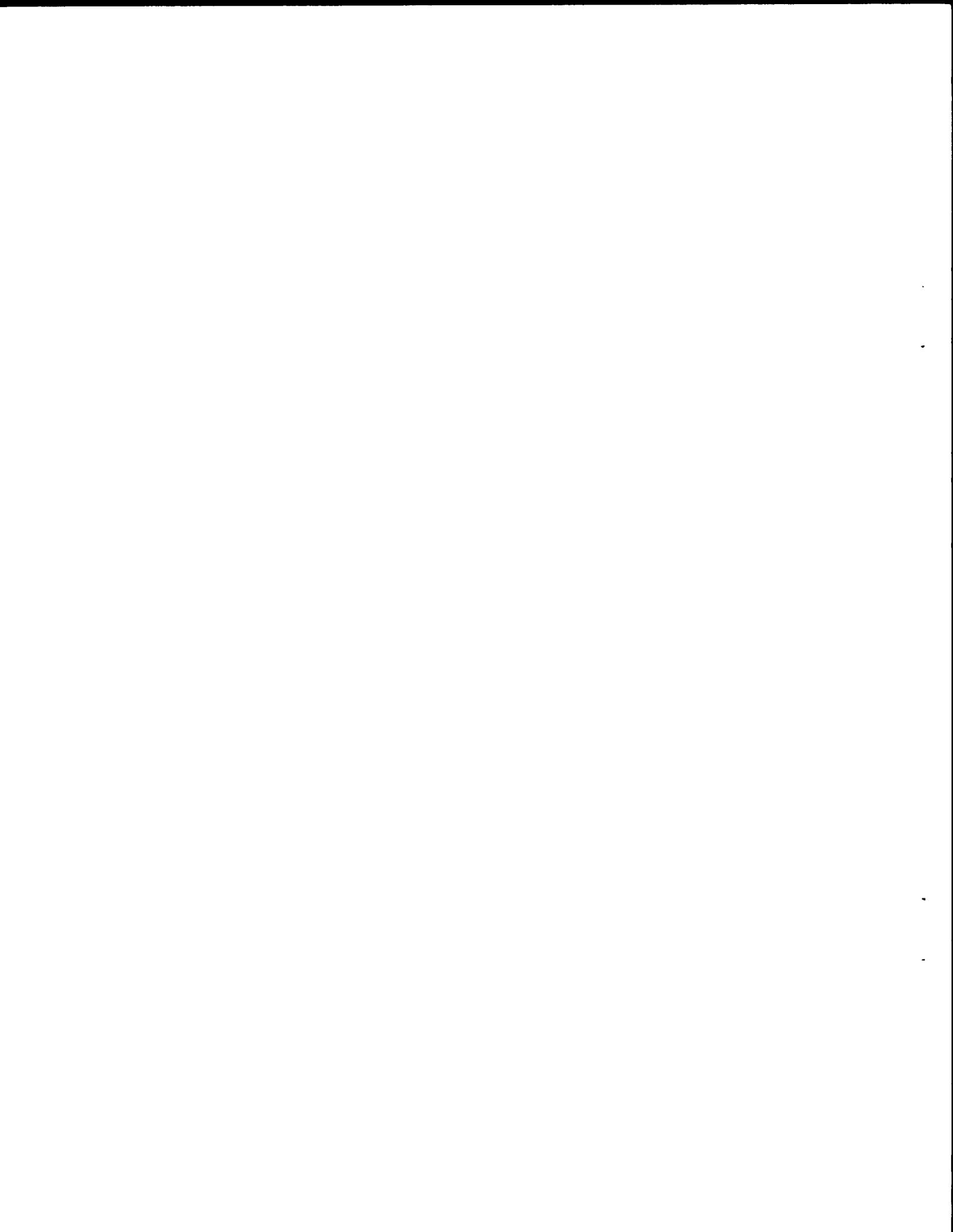
FAA considers action on this recommendation completed.

Sincerely,

  
Langhorne Bond  
Administrator

195

Enclosure





Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

April 9, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

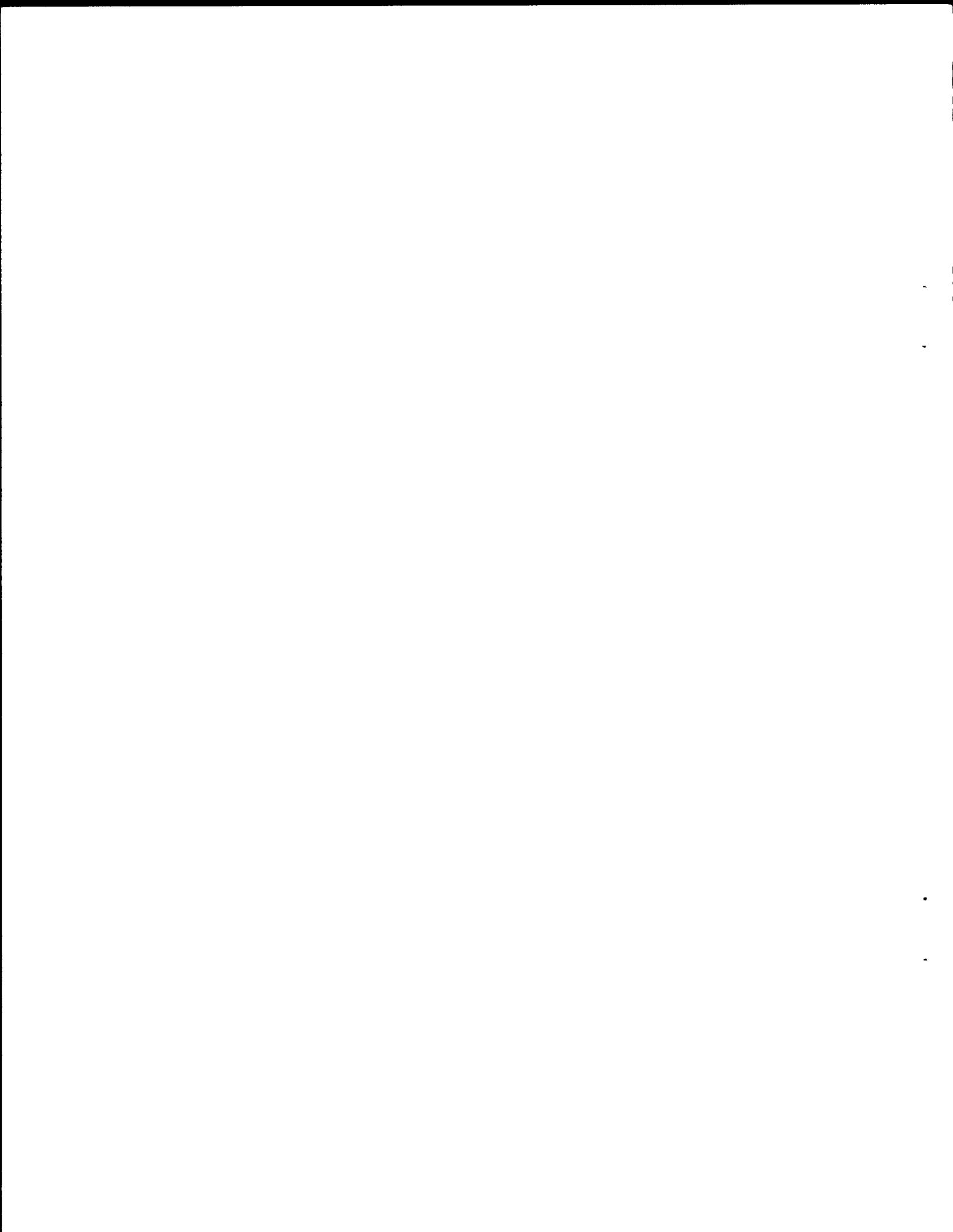
Reference is made to the National Transportation Safety Board's Safety Recommendation A-78-55 issued August 11, 1978. This is one of three recommendations that stemmed from our investigation of a Beech 99 accident at Richland Airport, Richland, Washington, on February 10, 1978. We recommended that the Federal Aviation Administration (FAA):

"Change the minimum equipment list to make the out-of-trim warning system a mandatory requirement for flight."

It was indicated in FAA's letter of May 23, 1979, that a Master Minimum Equipment List (M MEL) for multiengine aircraft used in operations conducted under FAR Part 135 was being developed. We are pleased to see that a M MEL for Beech Models 99, 99A, A99A, and B99 operating under Part 135 has since been published and includes the "Out-of-Trim Aural Indicator" as a mandatory requirement for flight. Safety Recommendation A-78-55 is now classified in a "Closed--Acceptable Action" status.

Sincerely yours,

  
James B. King  
Chairman





Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

July 9, 1979

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

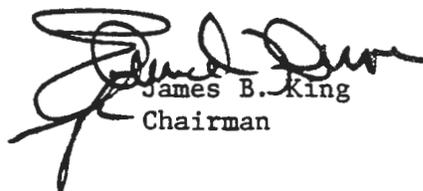
Dear Mr. Bond:

Thank you for your letter of May 23, 1979, received in response to the National Transportation Safety Board's letter of March 7, 1979. The subject deals with recommendations A-78-53 through 55. These recommendations stemmed from our investigation of a Beech 99 accident at Richland Airport, Washington, on February 10, 1978. Our comments are as follows:

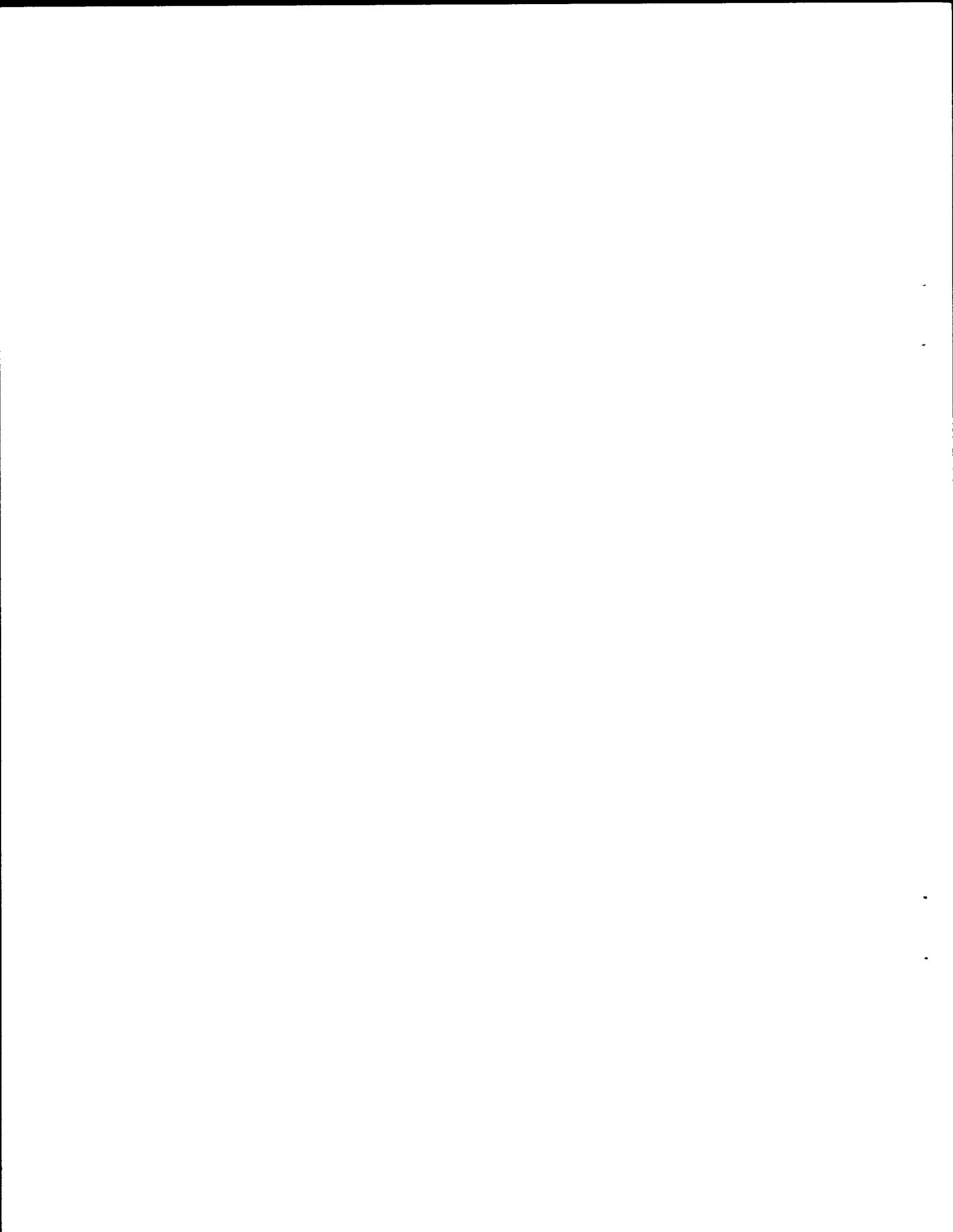
A-78-53. We note that the Federal Aviation Administration (FAA) has issued Advisory Circular No. 43-16, "General Aviation Airworthiness Alert No. 9," dated April 1979. The alert recommends that the manufacturer's inspection program be rigidly followed to preclude operating the aircraft with an unsafe horizontal stabilizer trim indicating and/or warning system. The status of this recommendation is now classified as "Closed--Acceptable Alternate Action."

A-78-54 and 55. We note that actions are underway by the manufacturer and the FAA to fulfill both these recommendations. Pending confirmation that FAA actions have been completed, they are being maintained in an "Open--Acceptable Action" status.

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

MAY 23 1979

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to your letter of March 7 which requests reconsideration of the Federal Aviation Administration position with respect to National Transportation Safety Board Safety Recommendations A-78-53 through 55.

A-78-53. Issue an Airworthiness Directive applicable to all Beech 99, 99A, A99, A99A, and B99 model aircraft to require an immediate one-time inspection of the horizontal stabilizer trim system to ascertain that all components of the system and its associated position-indicating and -warning circuits are operational within specified tolerances.

Comment. We have reevaluated the horizontal trim system on the Beech 99 airplanes and current service history. We do not have the required evidence of an unsafe condition to support airworthiness action at this time.

Advisory Circular No. 43-16, "General Aviation Airworthiness Alerts, Alert No. 9," dated April 1979 contains an item recommending rigid adherence to the manufacturer's inspection program. A copy of this alert is enclosed.

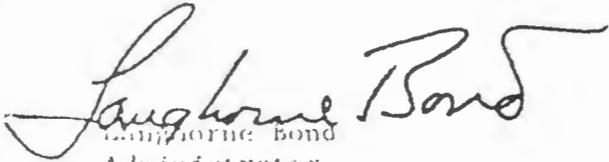
A-78-54. Require an inspection to insure that the primary and secondary mode of the horizontal stabilizer actuator are capable of deflecting the stabilizer under specified airloads. The exact instructions should be furnished by the Beech Aircraft Company. The inspection should be made as soon as the Beech instructions are available and repeated at 2,000-hour intervals.

Comment. The manufacturer has developed a test procedure and expects to add this to the maintenance manual in approximately 90 days.

A-78-55. Change the minimum equipment list to make the out-of-trim warning system a mandatory requirement for flight.

Comment. A Master Minimum Equipment List (MMEL) for multiengine aircraft used in operations conducted under FAR Part 135 is being developed. We will reevaluate all of the items on the current MEL to determine if they meet the requirements of FAR Section 135.179. We expect to complete the Beech 99 MMEL in July 1979.

Sincerely,

  
Laughton Bond  
Administrator

Enclosure



Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20591

March 7, 1979

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Your letter of November 9, 1978 stated the Federal Aviation Administration's (FAA) response to our recommendations A-78-53, A-78-54, and A-78-55. The National Transportation Safety Board has reviewed your evaluation of these recommendations and wishes to express its views regarding the adequacy of that response.

In Safety Recommendation A-78-53, we recommended that an Airworthiness Directive be issued to require an immediate one-time inspection of the Beech 99 stabilizer trim system and its associated position-indicating and out-of-trim warning circuitry. While we agree with your fault analysis that two faults must occur to cause unwanted trim movement, we do not view the possibility of such occurrence as the major problem. Rather, we believe that a faulty position indicator or out-of-trim warning system alone can induce a pilot to initiate a take-off with an undesirable trim setting. While the flight test investigation of Beech 99, Serial No. U-126, did indeed verify that the airplane is controllable under the full nose-up trim, aft center of gravity loaded condition, it indicated such controllability was contingent upon immediate awareness and action on the part of the pilot. As is obvious from the February 10, 1978 accident, such expectations may not be realized. While a review of aircraft service records did not reveal adverse service history of trim system components, our own investigation of only a few aircraft indicated a problem. We, therefore, believe that faulty systems, particularly the trim-position-indicating portion, do exist and are potential accident causation factors. We believe that an Airworthiness Directive is justified. We will continue to monitor the service history of the Beech 99 trim system.

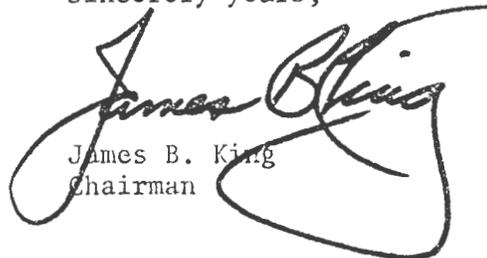
Safety Recommendation A-78-54 was to require an inspection at 2,000-hour intervals to ensure that the primary and secondary mode of the horizontal stabilizer actuator are capable of deflecting the stabilizer under specified airloads. Our previous comments apply regarding the controllability of the aircraft when grossly out of trim. Since slippage of the clutch will affect the operation of both the main and the standby trim modes, we continue to believe that a periodic inspection is justified and that the FAA should reconsider issuing a requirement for such action following development of the Beech Aircraft Company procedure.

In the case of Safety Recommendation A-78-55, which was to change the Minimum Equipment List (MEL) to make an operable out-of-trim warning system mandatory for flight, we must question the rationale of the FAA's rejection. If the out-of-trim warning system had been operational on the Beech Model 99 on February 10, 1978, the accident which took 17 lives would not have occurred. The simplicity of the design engineering of the system is such that even the most flagrant of violators of pre-flight inspection requirements would have been warned that their aircraft was out of trim for takeoff. Instead of requiring this system, the MEL states that the aircraft may be flown with an inoperable out-of-trim warning, but that the pilot must visually check the position of the horizontal stabilizer.

Although pilots are expected to preflight their aircraft and comply with the visual inspection provision of the MEL, we all know that pressures for on-time departures and failure to deplane at mid-station stops can influence the thoroughness of such inspections. We do not believe that such a provision is an acceptable substitute. The general public who place their trust in the integrity of scheduled supplemental airlines deserve to be protected in the most positive manner.

We are hopeful that you will reconsider your response to our recommendations. The recommendations A-78-53, A-78-54, and A-78-55 will be held in an open-unacceptable action status pending completion of your further review.

Sincerely yours,



James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

November 9, 1978

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-78-53 through 55.

A-78-53. Issue an Airworthiness Directive applicable to all Beech 99, 99A, A99, A99A, and B99 model aircraft to require an immediate one-time inspection of the horizontal stabilizer trim system to ascertain that all components of the system and its associated position-indicating and -warning circuits are operational within specified tolerances.

Comment. The fault analysis of the trim system shows that two electrical faults must occur before unwanted trim movement can occur. This meets the regulatory design requirement. In the event of a mechanical fault, such as a failed clutch, the airplane can be safely flown in any trim configuration at critical load conditions. NTSB's June 12 Report of Investigation of the Flight Characteristics of Beech Model 99, Serial No. U-126, verified that the airplane is controllable with full nose up trim at gross weight and maximum aft center of gravity loading.

A review of the service records of 398 Model 99 and Models A100 and B100, which have the same trim system, did not reveal adverse service history. We do not believe that airworthiness directive action is justified at this time. However, arrangements have been made with the FAA Central Region for the development of an item to be published in Advisory Circular 43-16, General Aviation Airworthiness Alerts. This information will emphasize the importance of proper inspection and maintenance of the horizontal stabilizer trim system. It will be circulated throughout the FAA, to all certificated repair stations, to all mechanics holding an inspection authorization, and to all air taxi certificate holders.

A-78-54. Require an inspection to insure that the primary and secondary mode of the horizontal stabilizer actuator are capable of deflecting the stabilizer under specified airloads. The exact instructions should be furnished by the Beech Aircraft Company. The inspection should be made as soon as the Beech instructions are available and repeated at 2,000-hour intervals.

Comment. The stabilizer actuators are capable of deflecting the stabilizer under heavier airloads than can be encountered within the travel limits. The airplane can be safely flown with the trim in any position. Airworthiness directive action cannot be supported; however, the Beech Aircraft Company has advised that they plan to develop an inspection procedure. This procedure will provide a means to evaluate the clutch drive assembly under airload conditions.

A-78-55. Change the minimum equipment list to make the out-of-trim warning system a mandatory requirement for flight.

Comment. At the time the present stabilizer trim items were added to the minimum equipment list, consideration was given as to whether the out-of-trim warning system should be mandatory for takeoff. It was determined that an equal level of safety could be provided, without placing an undue burden on the operator, by requiring the pilot to visually check the stabilizer to determine that it is in the neutral position prior to takeoff and the stabilizer position indicator is operative. The minimum equipment list for these aircraft permits flight with the Out-of-Trim Aural Warning Indicator inoperative provided the alternate procedure of specified visual checks is accomplished prior to each takeoff. If the alternate procedure is used, the minimum equipment list also requires the discrepancy to be brought to the attention of the flight crew either by placarding or flight log sheet entry and requires, further, that the appropriate procedures be established by the operator and complied with, if flight is accomplished with the item inoperative.

We do not believe that changing the minimum equipment list, on the assumption that the alternate procedures could be inadvertently omitted, would be justified. Therefore, we plan no further action in response to this recommendation at this time.

Sincerely,



Langhorne Bond  
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: August 11, 1978

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-78-53 through -55

On February 10, 1978, a Columbia Pacific Airlines Beechcraft Model 99 attained an excessively steep climb immediately after takeoff from the Richland Airport, Washington. The aircraft stalled and crashed, killing its 15 passengers and 2 crewmembers. As a result of its investigation of the crash, the National Transportation Safety Board believes that certain corrective action is warranted. Examination of airplane components disclosed several faults within the airplane's horizontal stabilizer trim system which cannot be related to impact damage and are thus believed to have existed before the crash--a result of inadequate maintenance.

The trim actuator is a twin jackscrew driven by an electric motor; it includes a clutch mechanism designed to slip if electrical power is applied to the motor after the jackscrew reaches the end of its travel or encounters excessive stabilizer air loads. The clutch consists of two plates separated by six ball bearings which are restrained in detents by a spring load. Torque is transmitted through the ball bearings during normal operation. If an excessive load is imposed on the jackscrew, it will react against the spring load, separate the plates, and allow the ball bearings to move freely; thus, torque cannot be transmitted. In the actuator from the accident airplane, four ball bearings were found loose in the actuator case--all exhibited little or no wear. The design of the clutch is such that the balls could not have been displaced during operation. The two balls which were still installed between the plates of the clutch were worn to an oval shape.

During bench tests of the actuator, the clutch slipped in both the main and standby trim modes under load conditions well below the minimum value specified. This slippage would have slowed or stopped the movement of the stabilizer when it was subjected to certain air loads. Thus, the pilot's ability to retrim the airplane would have been affected adversely.

Honorable Langhorne M. Bond

In addition, examination revealed that the stabilizer trim position indicator was faulty because of a possible electrical defect. The defect caused an erroneous indication on the instrument which could have led the pilot to believe that trim was neutral, when in fact it could have been in an extreme airplane noseup position. Review of the maintenance records disclosed that the trim-in-motion system was malfunctioning. Furthermore, examination showed that an improperly positioned microswitch would have prevented operation of the out-of-trim warning horn.

The trim position indicator and trim-in-motion and out-of-trim warning systems are minimum equipment list items. Only one of these items can be inoperative if the airplane is to be used to carry passengers. If the out-of-trim warning system is inoperative, pilots must visually check the stabilizer position before flight. Since the check must be done from outside the airplane and may not be part of a pilot's normal routine, it may be inadvertently omitted.

The foregoing conditions could result in a crew's initiating a takeoff with full noseup trim and becoming unable to reduce control forces while using the trim system. Recent flight tests have shown that the airplane performance and corrective control forces which would be encountered after takeoff with a full airplane-noseup trim could result in a stall at low altitude from which the crew could not recover.

The examination of two other Beechcraft 99 airplanes operated by the same company disclosed similar discrepancies in their horizontal stabilizer trim indicating and warning systems.

The Safety Board, therefore, concludes that timely action is needed to insure that other Beechcraft Model 99 aircraft do not have discrepancies which can induce a crew to take off in an out-of-trim condition. Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive applicable to all Beech 99, 99A, A99, A99A, and B99 model aircraft to require an immediate one-time inspection of the horizontal stabilizer trim system to ascertain that all components of the system and its associated position-indicating and -warning circuits are operational within specified tolerances. (Class I, Urgent Action) (A-78-53)

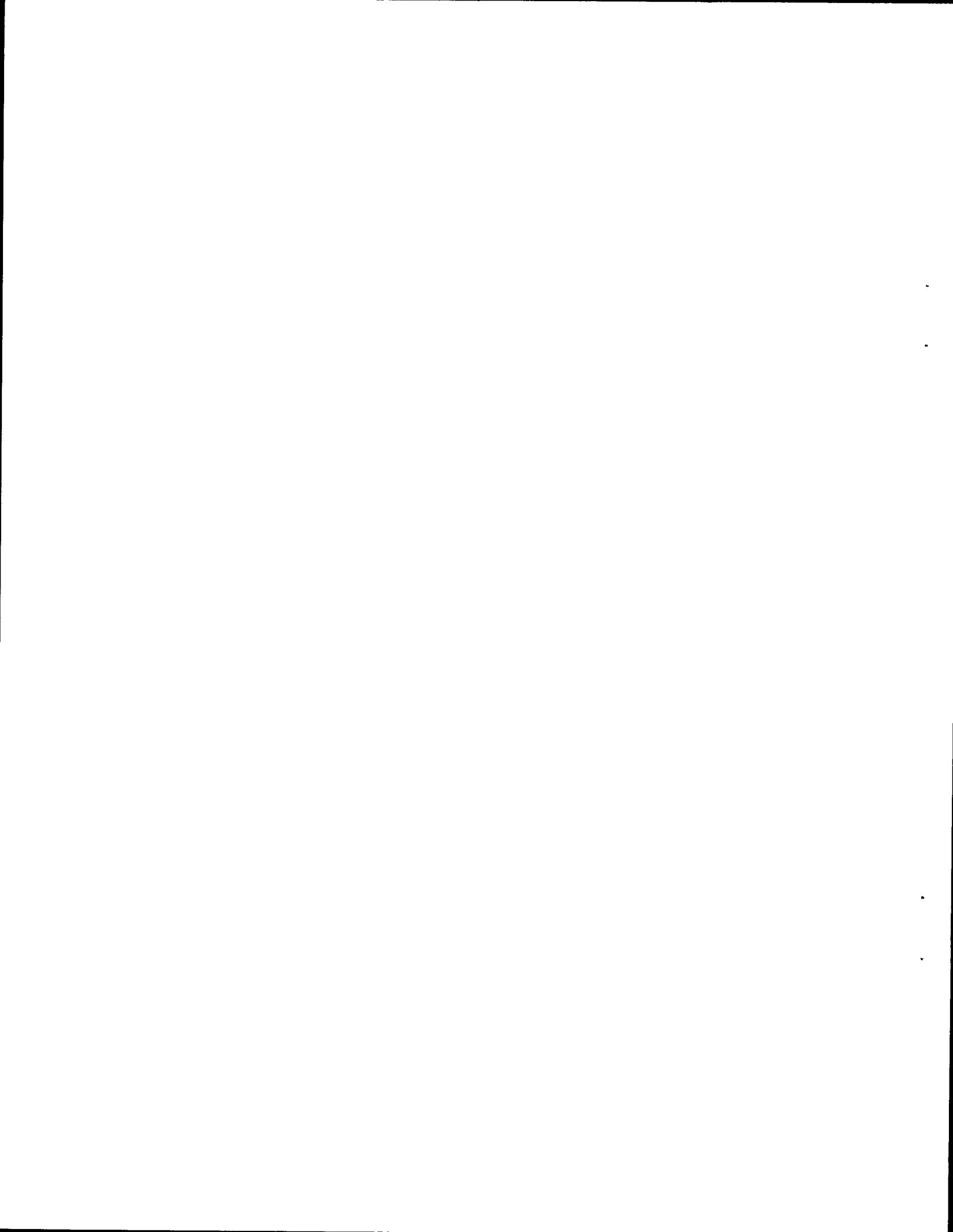
Require an inspection to insure that the primary and secondary mode of the horizontal stabilizer actuator are capable of deflecting the stabilizer under specified airloads. The exact instructions should be furnished by the Beech Aircraft Company. The inspection should be made as soon as the Beech instructions are available and repeated at 2,000-hour intervals. (Class II, Priority Action) (A-78-54)

Honorable Langhorne M. Bond

Change the minimum equipment list to make the out-of-trim warning system a mandatory requirement for flight.  
(Class II, Priority Action) (A-78-55)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendations.

  
By. James B. King  
Chairman





## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

SEP 24

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

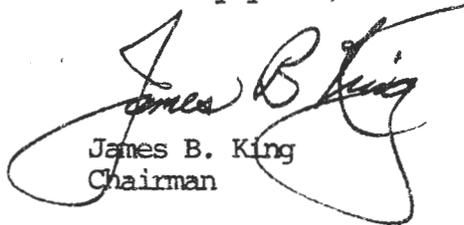
Dear Mr. Bond:

Thank you for your letter dated August 22, 1980, responding to National Transportation Safety Board Safety Recommendation A-78-56 issued August 22, 1978. The recommendation stemmed from the Safety Board's investigation of a Semco Model T hot air balloon accident near Mosquero, New Mexico, on November 6, 1977. We recommended that the Federal Aviation Administration (FAA):

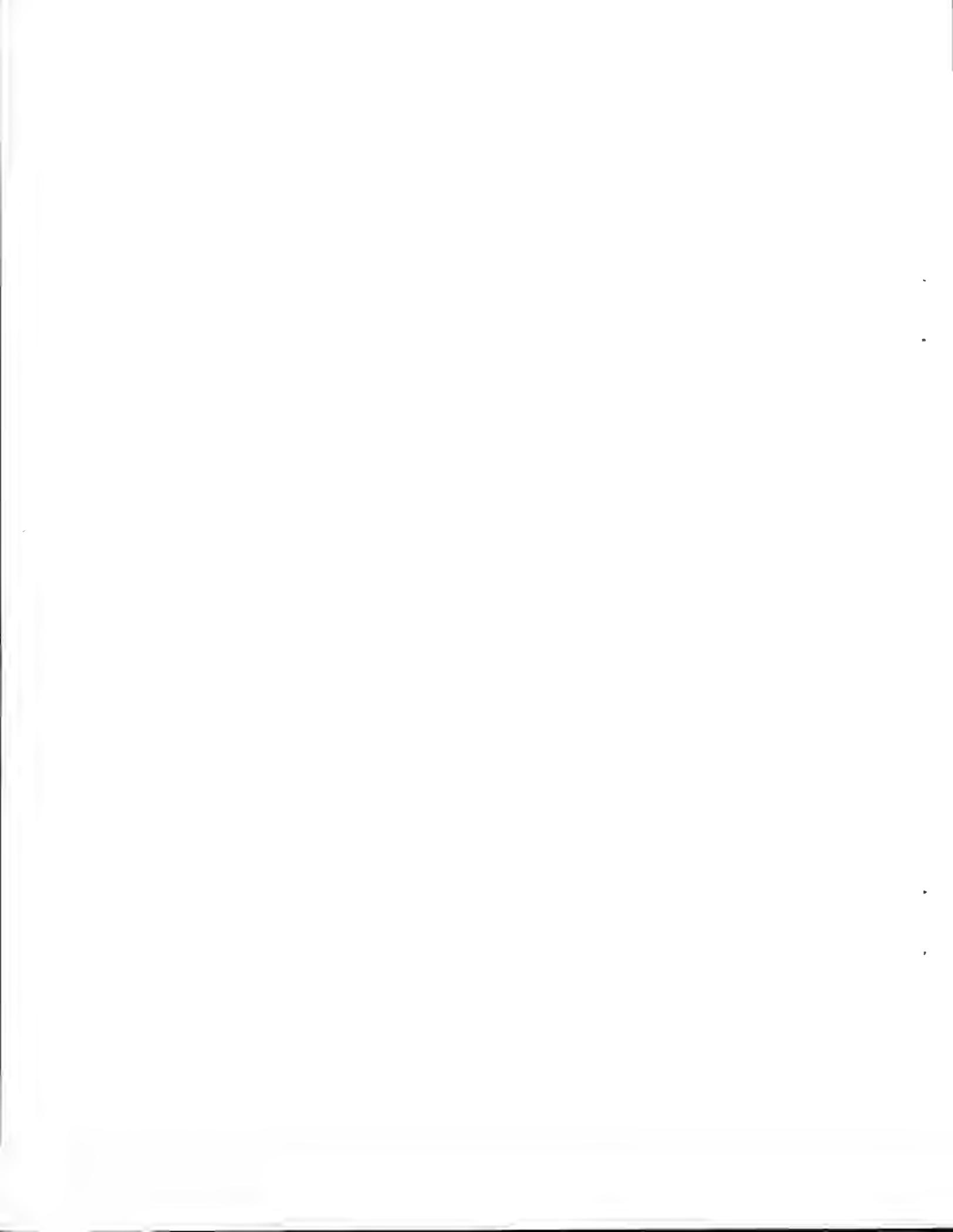
"Issue an Airworthiness Directive to require means for securing the canvas dodger to the deck or require other means for eliminating the existing gap between the dodger and the deck on the Semco Model T and Challenger AX-7 balloons."

The Safety Board is pleased to note that the FAA issued Airworthiness Directive AD 80-14-09 on July 1, 1980, in addition to the General Aviation Airworthiness Alert (AC-43-16) which was published in the August 1979 issue. Safety Recommendation A-78-56 is now classified in a "Closed—Acceptable Action" status.

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 22, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

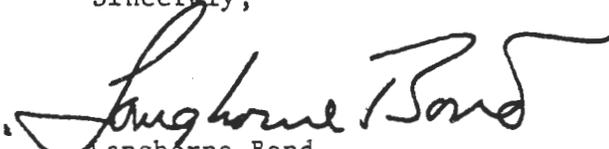
This is in further response to NTSB Safety Recommendation A-78-56, issued August 22, 1978, and supplements our letter of January 4, 1980. This recommendation was one of three issued as a result of a November 6, 1977, Semco Model T hot air balloon accident near Mosquero, New Mexico.

A-78-56. Issue an Airworthiness Directive to require means for securing the canvas dodger to the deck or require other means for eliminating the existing gap between the dodger and the deck on the Semco Model T and Challenger AX-7 balloons.

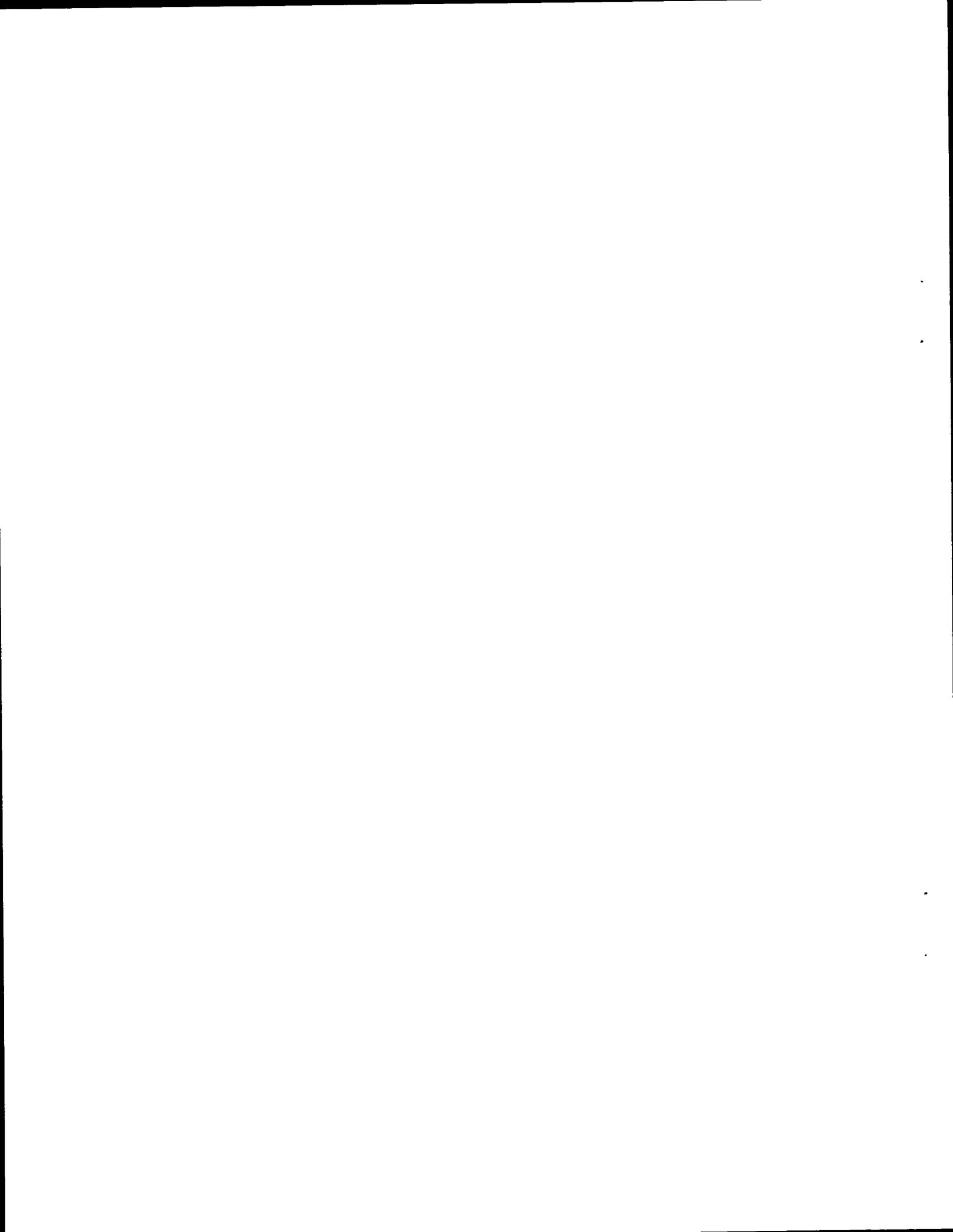
Comment. We issued Airworthiness Directive AD 80-14-09, (copy enclosed) on July 1, 1980, effective July 7, 1980. This Airworthiness Directive is in addition to the General Aviation Airworthiness Alert (AC-43-16) which was published in the August 1979 issue as stated in our January 4 letter.

The Federal Aviation Administration believes these actions satisfy the intent of Safety Recommendation A-78-56.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure





## National Transportation Safety Board

Washington, D.C. 20594

January 29, 1980

Office of  
Chairman

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your recent response of January 4, 1980, regarding the reconsideration of recommendations A-78-56 and A-78-57, which were issued as the result of a Semco Model T hot air balloon accident near Mosquero, New Mexico, on November 6, 1977.

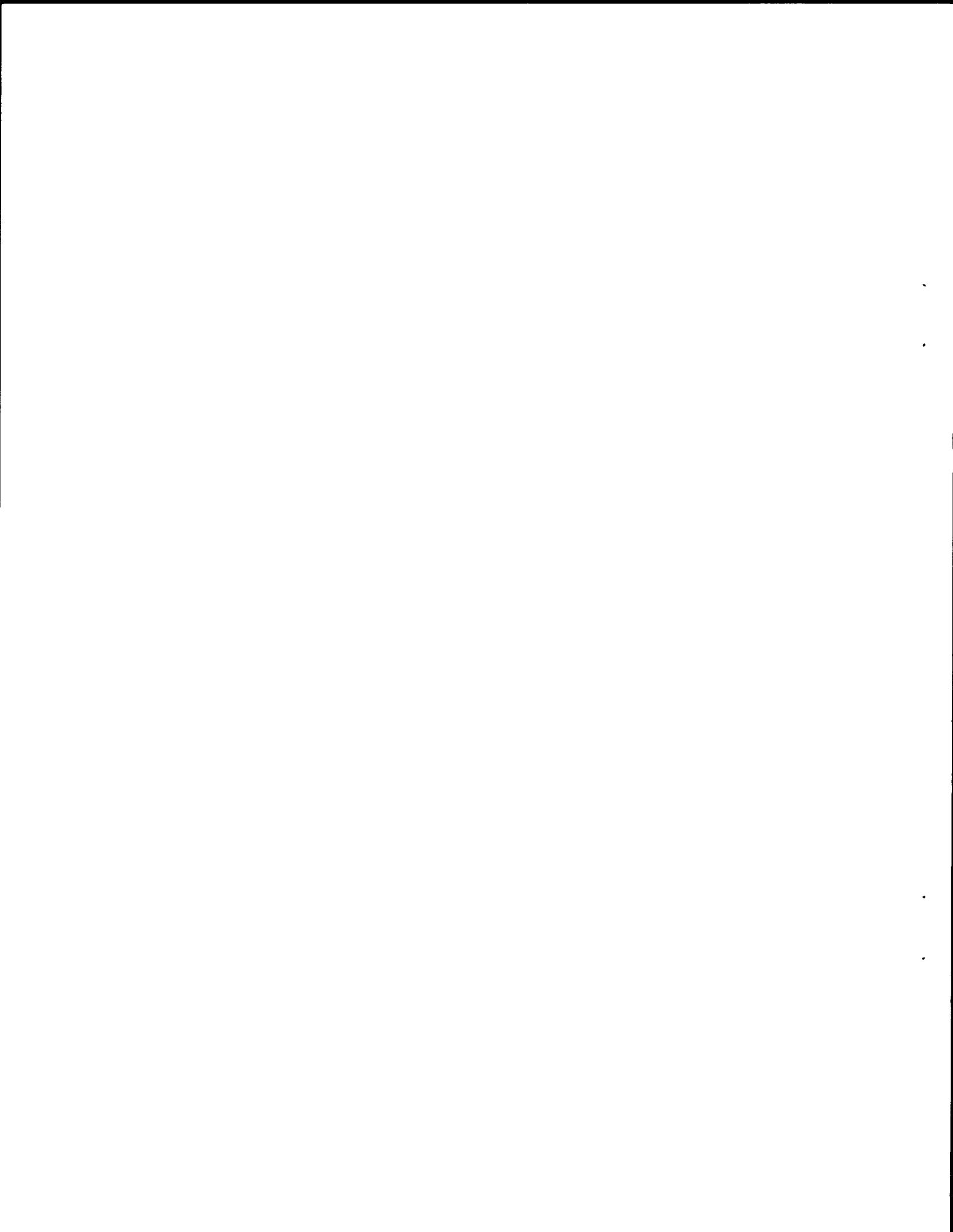
The National Transportation Safety Board was pleased to learn of the General Aviation Airworthiness Alert (AC 43-16) issued by the Federal Aviation Administration (FAA) in August 1979, after reconsidering recommendation A-78-56, which called for an Airworthiness Directive (AD) requiring a means of securing the canvas siding to the gondola floor. Since your reply also stated that the recommended AD was being issued, we have classified A-78-56 as "Open--Acceptable Action" until the AD becomes effective.

Safety recommendation A-78-57 called for regulatory changes to 14 CFR 31 which would require that occupant enclosures for manned free balloons be designed to prevent protrusion of lower extremities under test conditions of 14 CFR 31.27(c). Your recent decision to include this recommendation as part of the FAA's current review of 14 CFR 31 has caused us to classify your reply to this recommendation "Open--Acceptable Action." The recommendation will remain open until the results of the regulatory review can be evaluated by our staff.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "James B. King".

James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

January 4, 1980

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to your letter of February 22 which requests reconsideration of the Federal Aviation Administration position with respect to NTSB Safety Recommendations A-78-56 and 57.

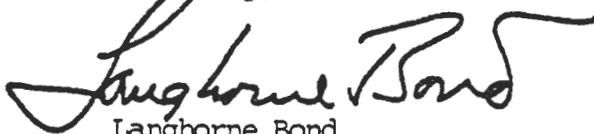
A-78-56. Issue an Airworthiness Directive to require means for securing the canvas dodger to the deck or require other means for eliminating the existing gap between the dodger and the deck on the Semco Model T and Challenger AX-7 balloons.

Comment. We have issued a General Aviation Airworthiness Alert (AC 43-16) which was published in the August 1979 issue (copy enclosed). Also, the certification responsibility for the Semco Model T, TC-4A, and Challenger AX-7 balloons has been recently transferred to the FAA Eastern Region. They are issuing an Airworthiness Directive requiring a modification to eliminate the existing gap between the canvas siding and the deck on these balloon models.

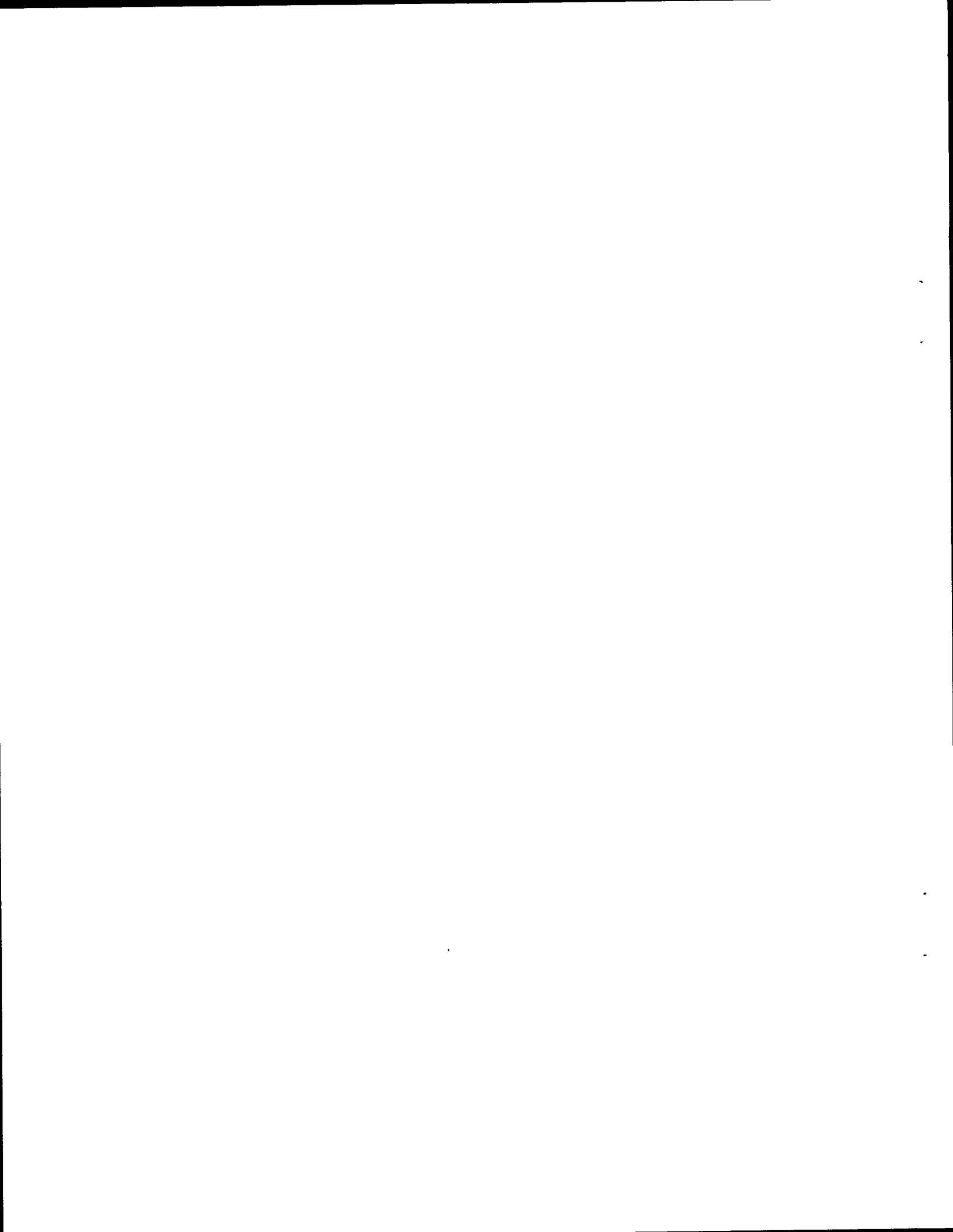
A-78-57. Amend 14 CFR 31.59 to require that baskets, gondolas, or other enclosures for occupants of manned free balloons be designed to prevent lower extremities from protruding from the provided enclosure when the enclosure is subjected to the test conditions outlined in 14 CFR 31.27(c).

Comment. The test required by CFR 31.27(c) is a strength test and does not take human factors into account. We are currently reviewing 14 CFR 31 and will include this recommendation as part of that review.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure





Office of the  
Chairman

## National Transportation Safety Board

Washington, D C. 20594

February 22, 1979

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

Dear Mr. Bond:

This letter is in response to your correspondence dated October 12, 1978, on the matter of Safety Recommendations A-78-56 through 58. These safety recommendations were issued by the National Transportation Safety Board on August 22, 1978, as a result of a hot air balloon accident near Mosquero, New Mexico, on November 6, 1977.

The Safety Board is pleased to learn that Notice of Proposed Rule Making (NPRM) 75-31 will be issued in February of this year. We will place Recommendation A-78-58 in an "Open - Acceptable Action" status. With regard to Safety Recommendations A-78-56 and 57, the Federal Aviation Administration (FAA) rejected these recommendations. Accordingly, the Board has put these recommendations in an "Open - Unacceptable Action" category and we will discuss these two recommendations in our next Quarterly Safety Recommendation meeting with the FAA.

The Board made Recommendations A-78-56 and 57 because it discovered a significant unsafe design feature in the Semco Model T hot air balloon. Safety Recommendation A-78-56 calls for the issuance of an Airworthiness Directive (AD) to require means for securing the canvas dodger to the deck or other means for eliminating the existing gap between the dodger and the deck of Semco Model T and Challenger AX-7 balloons. The present design of the canvas dodger presents a proven hazard and evidence exists that owners have improperly reinstalled the dodger after removal because there are no maintenance instructions on its proper installation.

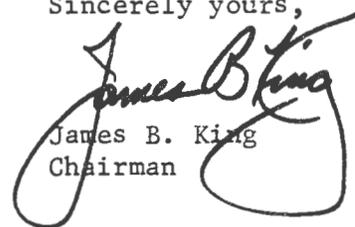
Since a simple and practical alteration to correct this hazardous condition was submitted to and approved by your Southwest Regional Office, the Safety Board is of the opinion that an AD or other suitable positive directive is the simplest solution and will serve as an interim safety measure until NPRM 75-31 becomes a rule.

Safety Recommendation A-78-57 seeks amendment of 14 CFR 31.59 to require baskets, gondolas, or other enclosures for occupants of manned free balloons to be designed to prevent lower extremities from protruding from the provided enclosure when the enclosure is subjected to the test conditions outlined in 14 CFR 31.27(c). The intent of this safety recommendation is to enhance the safety of gondola enclosures by ensuring the containment of occupants and by preventing more serious injuries than have been experienced to date. The FAA appears to have misinterpreted this recommendation in that the structural test required by 14 CFR 31.27(c), while maintaining integrity of the enclosure, quite clearly does not adequately insure containment of the occupant, as evidenced by the two cases cited in the preamble to our recommendations.

The Board considers Safety Recommendations A-78-56 and 57 feasible and cost effective solutions to the potentially hazardous features of the Semco Model T and Challenger AX-7 balloon gondolas and it believes that the FAA should eliminate similar design features in the future through regulatory change.

As stated in the Board's safety recommendation letter of August 22, 1978, records indicate that over a 4-year period there have been 11 balloon landing accidents, not including the Mosquero, New Mexico accident. These accidents resulted in 1 fatality and 17 injuries. Of the 12 balloons involved in these accidents, 5 were manufactured by Semco. This indicates that Semco balloons were involved in 41.7 percent of all balloon landing accidents in the past 4 years. This is a significant involvement by one manufacturer. The Safety Board believes that a major improvement to balloon safety can be achieved by the implementation of Safety Recommendations A-78-56 and 57 and that these recommendations deserve further consideration.

Sincerely yours,



James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-78-56 through 58.

A-78-56. Issue an Airworthiness Directive to require means for securing the canvas dodger to the deck or require other means for eliminating the existing gap between the dodger and the deck on Semco Model T and Challenger AX-7 balloons.

Comment. Semco balloons have been operating since 1965. To our knowledge these two are the only accidents in which occupants were injured due to sliding off the gondola floor. In view of this service record, we do not believe that issuance of an airworthiness directive is justified at this time.

A-78-57. Amend 14 CFR 31.59 to require that baskets, gondolas, or other enclosures for occupants of manned free balloons be designed to prevent lower extremities from protruding from the provided enclosure when the enclosure is subjected to the test conditions outlined in 14 CFR 31.27(c).

Comment. Federal Aviation Regulations Section 31.27(c) requires that a drop test of the basket, trapeze, etc., be conducted at various angles to the surface, with the stipulation that no structural failure or distortion be allowed which could cause serious injury to the occupants. Service experience does not indicate that a change in regulations with regard to injuries to extremities is justified. We believe that the rule is satisfactory.

A-78-58. Expedite the adoption of the 14 CFR 31 rule changes contained in NPRM 75-31, specifically, in regard to the requirements for a Manual

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of Instructions for Continued Airworthiness which is proposed in Appendix A of these rule changes.

Comment. Final action on NPRM 75-31 is expected by the end of February 1979.

Sincerely,

  
LANGHORNE Bond  
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: August 22, 1978

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-78-56 through 58

On November 6, 1977, a Semco Model T hot air balloon was involved in an accident near Mosquero, New Mexico. The National Transportation Safety Board's investigation of the accident disclosed an unsafe design characteristic associated with the gondola which should be corrected.

After a routine flight, the balloon made a normal landing approach. The landing was made in a southwesterly surface wind of 5 to 15 knots. When the balloon bounced during the landing, the gondola was turned on its side and was dragged 30 feet by the wind. When the gondola turned over, the pilot's right foot slipped off the gondola deck and was trapped between the edge of the deck and the ground. As a result, the pilot's ankle was fractured.

A similar accident occurred on January 24, 1976, near Death Valley, California, involving another Semco balloon, the Challenger AX-7. This accident resulted from an encounter with high winds and turbulence just before landing. When the pilot executed an emergency rip landing in rough terrain, the gondola turned on its side immediately after hitting the ground. The pilot's legs slipped off the deck and became trapped between the deck and the ground. The high winds dragged the gondola for 300 yards. The pilot suffered multiple compound fractures of both legs.

The gondolas on the Semco Model T and the AX-7 balloons are similar in design and construction. They have a plywood deck with tubular aluminum corner posts, rails, and diagonal supports. The gondola is enclosed by a one-piece canvas "dodger" which surrounds the structure. The dodger, when properly installed, is woven between the diagonal supports and the corner posts and the ends laced together securely. However, the dodger extends only to within 2 to 4 inches of the deck; this space between the dodger and the gondola deck allows the feet of occupants to slip through and become trapped. Furthermore, the condition of the canvas dodgers is affected by usage, age, and exposure to adverse weather conditions which can cause the canvas to stretch and work loose, thereby increasing the accident potential of this installation.

Evidence indicates that the canvas dodger in the Semco Model T accident in Mosquero, New Mexico, was improperly installed on the gondola frame. The pilot, who also owned the balloon, had removed the dodger for cleaning and had replaced it improperly. The Safety Board's review of the maintenance manual for this balloon disclosed that it did not contain instructions on the proper installation or the maintenance of the dodger.

The applicable standards governing balloons are contained in 14 CFR 31. Although these standards relate to the airworthiness of balloons, little is required in the way of maintenance information. In fact, a manufacturer's maintenance manual is not required by this Part. The Safety Board is aware of the proposed changes to 14 CFR 31 which are contained in Notice of Proposed Rule Making (NPRM) 75-31, Notice No. 8, issued on July 11, 1975. This NPRM proposes to require manufacturers to provide the necessary service, maintenance, and repair information for manned free balloons. Even though these maintenance information requirements might have provided sufficient information for the Model T owner to install the canvas dodger correctly, had they been adopted expeditiously by FAA, this design still most probably would have provided a potential hazard to the pilot.

The Safety Board has learned of corrective measures taken by one Semco Model T owner to eliminate the hazardous gap in the gondola by lashing a nylon dodger to the deck proper. This simple alteration was submitted to and approved by the FAA's Southwest Regional Office on a Major Repair and Alteration Form 337. The Board understands also that this Regional Office has been in contact with Semco Balloon, Inc., concerning their gondola design.

Ballooning is a rapidly growing sport in the United States. There were only 158 certificated hot air balloons in 1973; as of December 1976, there were 824 certificated balloons -- more than a five-fold increase. The Board's accident data indicate that in the past 4 years, 11 balloon accidents have resulted in 1 fatality and 17 injuries.

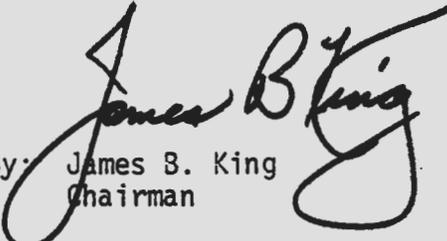
In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

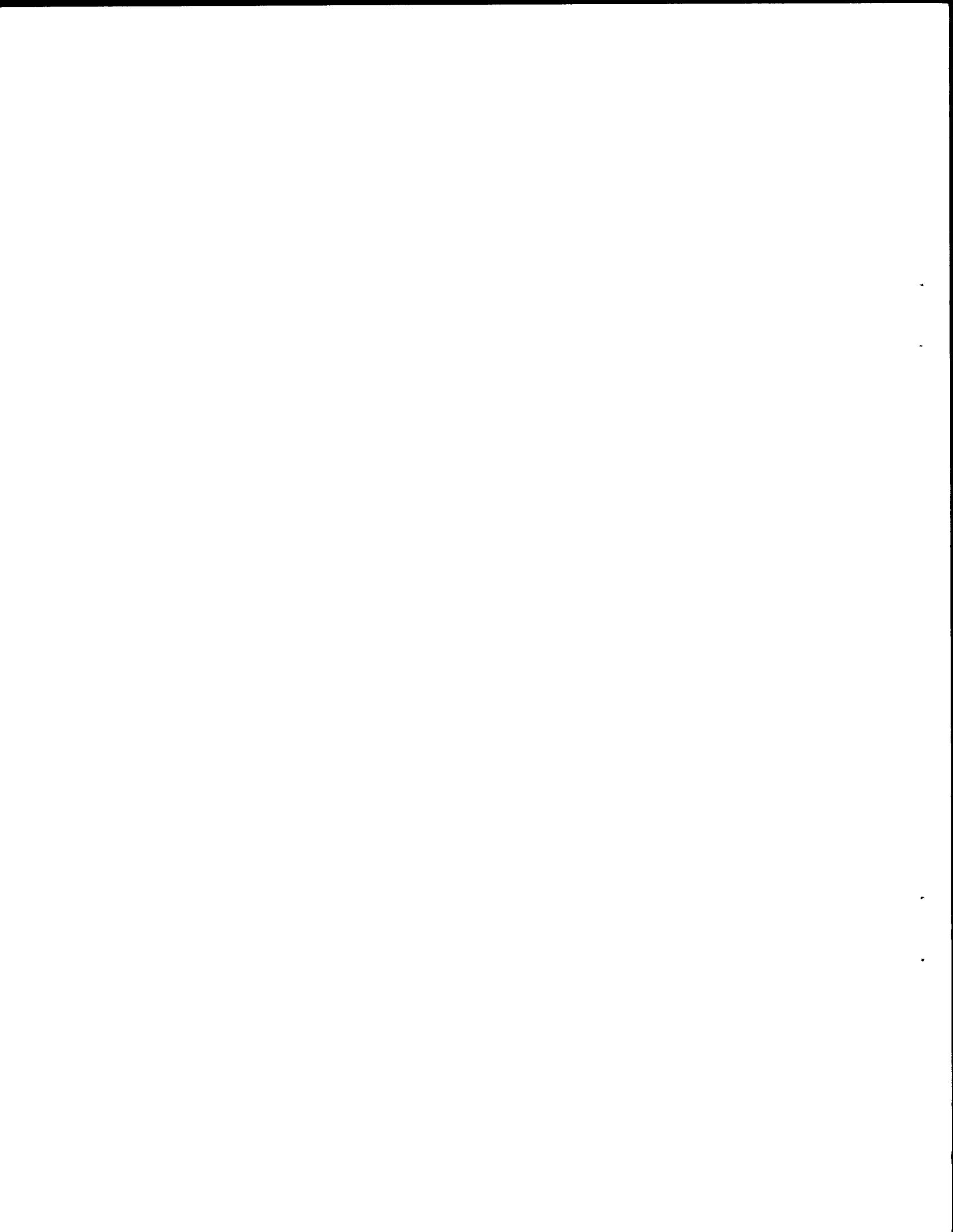
Issue an Airworthiness Directive to require means for securing the canvas dodger to the deck or require other means for eliminating the existing gap between the dodger and the deck on Semco Model T and Challenger AX-7 balloons. (Class II - Priority Action) (A-78-56).

Amend 14 CFR 31.59 to require that baskets, gondolas, or other enclosures for occupants of manned free balloons be designed to prevent lower extremities from protruding from the provided enclosure when the enclosure is subjected to the test conditions outlined in 14 CFR 31.27(c). (Class II - Priority Action) (A-78-57).

Expedite the adoption of the 14 CFR 31 rule changes contained in NPRM 75-31, specifically in regard to the requirements for a Manual of Instructions for Continued Airworthiness which is proposed in Appendix A of these rule changes. (Class II - Priority Action)(A-78-58).

KING, Chairman, McADAMS, HOGUE and DRIVER, Members, concurred in the above recommendations.

  
By: James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 1, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is an updated response to NTSB Safety Recommendations A-78-82 and A-78-83.

During the last year, we have studied and reevaluated our policy on the present application of visual separation. We have also solicited comments from the aviation community and our regions concerning this subject.

The conclusion reached through these efforts was that visual separation is a viable concept in most situations. Concern was expressed regarding the impact on airport capacity and delay levels if more stringent separation methods were used. In addition, there was strong sentiment that visual separation is efficient, practical, and, if all parties are aware of their responsibilities, safe.

We also concluded that procedural modifications that would reinforce the safety aspects of visual separation without significantly impacting the many positive aspects of the concept were possible.

Therefore, the procedure is being revised to require controllers to: (1) receive pilot acknowledgment that the traffic is in sight prior to the application of visual separation, (2) advise the pilot of the other aircraft's intentions if they are not obvious, and (3) warn the pilot if the radar targets may converge.

In addition, we are developing a pilot training film which addresses frequent pilot questions pertaining to their roles and responsibilities while operating within the air traffic control system. One of the topics is the pilot's role in visual separation procedures.

2

We are also amending the Airman's Information Manual to update, emphasize, and clarify those paragraphs which explain the pilot's authority and responsibility for refusing visual separation procedures if their application is not desired for any reason.

We are confident that these measures meet the intent of your recommendation.

Sincerely,

  
Langhorne Bond  
Administrator

26 FEB 1979

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Reference is made to your letter of January 9, 1979, responding to safety recommendations A-78-79 through A-78-83. These recommendations stemmed from the midair collisions between a Falcon Jet and a Cessna 150 at Memphis, Tennessee, on May 18, 1978, and between a Boeing 727 and Cessna 172 at San Diego, California, on September 25, 1978. Our comments to the Federal Aviation Administration's responses are as follows:

Recommendation A-78-79

We are pleased to note that procedures for handling consecutive approaches at Memphis have been established to fulfill the intent of the recommendation. The status of this is now classified as "Closed - Acceptable Action."

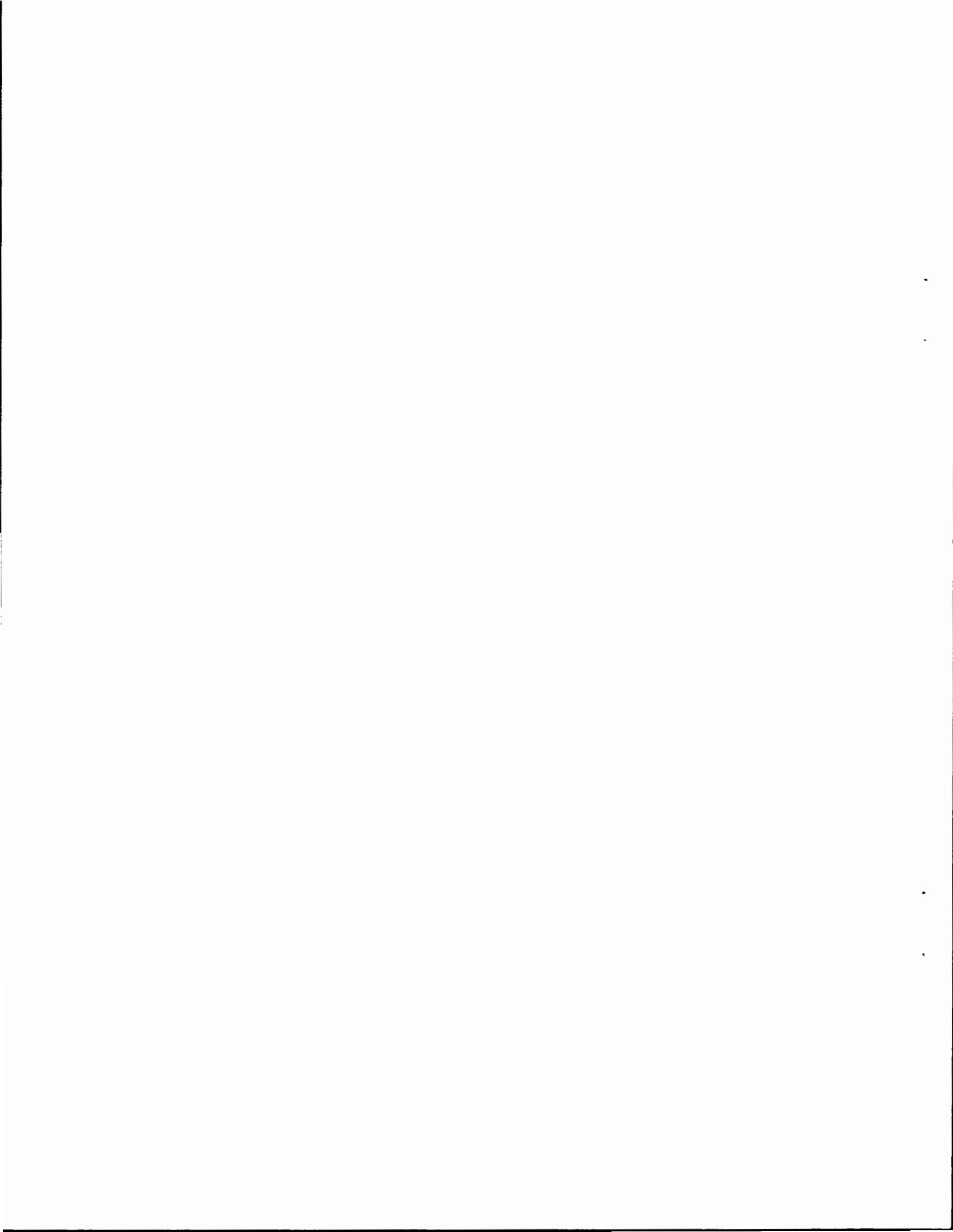
Recommendations A-78-80 through A-78-83

We appreciate the ongoing actions to satisfy these recommendations. They will be maintained in an open status pending their resolution.

Sincerely yours,

ORIGINAL SIGNED BY/ JAMES B. KING

James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

January 9, 1979

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Ave., S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to your safety recommendations A-78-79 through A-78-83.

Recommendation A-78-79. Evaluate the closed traffic pattern operations conducted at Memphis International Airport and consider establishment of a procedure whereby high performance or turbine jet aircraft conducting multiple approaches for training purposes be assigned an altitude of 2,500 feet or above, which would place responsibility for control of the aircraft with TRACON personnel.

Comment. Procedures for handling consecutive approaches at Memphis have been formalized and instituted to:

1. Require coordination of any consecutive approach prior to the aircraft crossing the approach end of the runway. In the event coordination is not approved, the aircraft is climbed to 3000 feet and handled as a departure.
2. Require aircraft conducting multiple practice approaches to climb straight ahead to 3500 feet with control responsibility transferred to the TRACON, unless otherwise coordinated.

Recommendation A-78-80. Evaluate operational data for each TRSA location and establish two categories of TRSA's. Those locations handling the largest volume of traffic with automated ATC equipment available should be designated TRSA I locations. The remaining areas would be designated TRSA II locations.

Comment. We have issued a Notice of Proposed Rule Making (NPRM), which we believe will meet or exceed the intent of your recommendation without adding additional categories of airspace or control services. We believe the latter is necessary to facilitate pilot and public understanding of the system and the various levels of service provided.

Recommendation A-78-81. Require Mode "C" transponder equipment for operations within a TRSA I and Group II TCA and require that a pilot of a VFR flight traversing a TRSA I establish radio contact with the appropriate ATC facility before entering the designated airspace.

Comment. We will be issuing an advanced NPRM in the near future in order to upgrade altitude encoding requirements. Our Notice of Proposed Rule Making discussed under Recommendation A-78-80 will permit us to accomplish the intent of this recommendation.

Recommendation A-78-82. Use visual separation in terminal control areas and terminal radar service areas only when a pilot requests it, except for sequencing on the final approach with radar monitoring.

Comment. The total use of visual separation which is permitted only in the terminal environment is currently under study by a task group composed of FAA headquarters, field personnel and Department of Defense (DOD) representatives. All recommendations for changes resulting from this group will be submitted to all aviation interests, including the NTSB, prior to May 1, 1979.

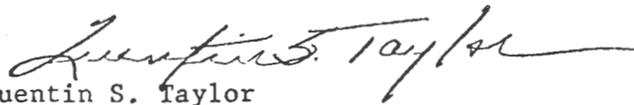
Recommendation A-78-83. Reevaluate its policy with regard to the use of visual separation in other terminal areas.

Comment. The study referred to in comment to Recommendation A-78-82 includes a reevaluation of our policy regarding use of visual separation in other terminal areas.

We will keep you apprised of our progress in:

1. The upgrading and expansion of TCAs.
2. The modification of our policy relative to visual separation in terminal areas.

Sincerely,

  
Quentin S. Taylor  
Acting Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: October 26, 1978

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-78-82 and 83

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On September 25, 1978, Pacific Southwest Airlines Flight 182, a Boeing 727-214, and N7711G, a Cessna 172, collided in midair over San Diego, California; 144 persons died as a result. Both aircraft were communicating with air traffic control (ATC) on different frequencies. Stage II service (radar advisory and sequencing for VFR aircraft) was being provided. In response to one of several traffic advisories issued by ATC, the pilot of Flight 182 commented, "Think he's passing off to our right."

On June 28, 1974, Rocky Mountain Airways Flight 323, a deHavilland DHC-6 Twin Otter, and N8105R, a Beech BE-35 Bonanza, collided in midair over Denver, Colorado; there were no fatalities. Both flights were communicating with the Denver tower at the time. The tower cab was equipped with a BRITE-1 video display, and the controller had both airplanes in visual contact when they collided in the Denver terminal control area. Immediately before the collision, the Bonanza pilot assured ATC that he had the Twin Otter in sight.

On December 4, 1971, Eastern Airlines Flight 898, a McDonnell-Douglas DC9-31, and N2110F, a Cessna 206, collided in midair near Raleigh-Durham Airport, North Carolina. The two occupants of the Cessna 206 were killed. Both flights were communicating with Raleigh-Durham tower when they collided. The tower cab was not equipped with radar. In response to a traffic advisory issued by the tower, the air carrier pilot commented, "We just went over the top of him there."

2503B

Although the circumstances surrounding these midair collisions were different, they have one element in common -- in each case, controllers were applying visual separation. Visual separation is a means which may be employed by ATC to separate aircraft in terminal areas. Upon instruction from ATC, a pilot who sees another involved aircraft provides his own separation by maneuvering his aircraft, if necessary, to avoid the other aircraft. When ATC instructs a pilot to employ visual separation, he must keep the other aircraft in sight until it is no longer a factor, as should have been the case at San Diego, or he must follow in line behind another aircraft, as should have been the case at Denver and Raleigh-Durham.

The Safety Board realizes that the visual separation technique is usually effective; however, because of the human limitation and other restrictive factors, it can never be considered completely reliable.

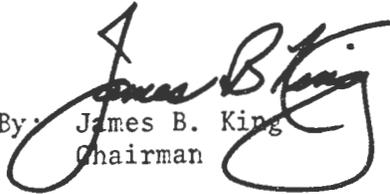
In the three accidents cited, visual separation could have been supplemented by more positive separation methods if controllers had chosen to use them. The Safety Board concludes that more positive separation methods must be used to the maximum extent possible in terminal control areas and in terminal radar service areas.

Consequently, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Use visual separation in terminal control areas and terminal radar service areas only when a pilot requests it, except for sequencing on the final approach with radar monitoring. (Class I, Urgent Action) (A-78-82)

Reevaluate its policy with regard to the use of visual separation in other terminal areas. (Class II, Priority Action) (A-78-83)

KING, Chairman, DRIVER, Vice Chairman, and McADAMS and HOGUE, members, concurred in the above recommendations.

By:   
James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

September 29, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This will supplement our initial response of July 16, 1979, to National Transportation Safety Board (NTSB) Safety Recommendations A-79-21 and 22, related to the malfunction of a magnetic clutch assembly used in the autopilot pitch axis servos of aircraft manufactured by Gates Learjet Corporation.

A-79-21. Initiate a program immediately to expedite the determination of cause for the clutch malfunction in JET Electronic part No. 2380066, servo drive unit, devise a means to detect potential problems, and define corrective action.

Comment. In our initial response to this recommendation, we indicated that the Gates Learjet Corporation was testing an improved magnetic clutch in preparation for a retrofit program. In letters directed to its Service Centers and to Owners and Operators during November 1979, (copies enclosed) Gates Learjet urged compliance with Airplane Modification Kit No. AMK 79-4, "Replacement of Clutch Assemblies in the Autopilot Pitch Axis Servo." This kit provides for replacement with an improved magnetic clutch assembly for in-service Model 23, 24 and 25 airplanes having the autopilot servo actuator with the older magnetic clutches. AMK 79-4 called for compliance within the next 75 flight hours. This kit does not remove the 600-hour overhaul compliance of the pitch servo. A copy of 79-4 is enclosed.

On January 8, 1980, Gates Learjet advised our Central Region that there were sufficient numbers of the DC torquer/capstan used on later production airplanes to make them available as replacements for the magnetic clutch assemblies. Gates Learjet subsequently issued its Airplane Modification Kit No. AMK 80-3, "Replacement of Pitch Servo Actuator and Capstan," copy of which is enclosed.

Installation of either of these Airplane Modification Kits is voluntary on the part of the operator since the possibility of Airworthiness Directive action by the Federal Aviation Administration (FAA) was ruled out earlier in the investigation related to this NTSB recommendation. The investigation showed that on Gates Learjet airplanes the stall warning stick pusher system is preflight tested prior to each flight,

which verifies the integrity of the magnetic clutches. In addition, should the magnetic clutch "freeze" and lock the continuously running autopilot/stick pusher servo motor to the elevator cable drum, a mechanical slip clutch is provided in the cable drum to permit the pilot to override the malfunction. Power can then be removed from the servo motor by turning off the autopilot and stall warning systems. The Airplane Flight Manual provides emergency procedures for operation of the airplane with the stall warning systems off. Based on the above, the FAA could not identify any unsafe condition that would result from a magnetic clutch becoming frozen and, therefore, could not justify mandatory corrective action under the requirements of 14 CFR 39 "Airworthiness Directives."

A-79-22. If defining and implementing the corrective action described above will require prolonged effort, restrict the operation of all Learjet aircraft equipped with this servo drive unit.

Comment. In our initial report, we stated that we did not consider it necessary to restrict operations in this case, and that a Temporary Airplane Flight Manual Supplement had been issued, specifying emergency procedures in the event of autopilot pitch axis malfunction or complete stall warning failures. These identified temporary revisions are being incorporated into permanent revisions as they are made to the various flight manuals.

We believe these actions have fulfilled the intent of Safety Recommendations A-79-21 and 22.

Sincerely,

  
Langhorne Bond  
Administrator

4 Enclosures



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

December 5, 1979

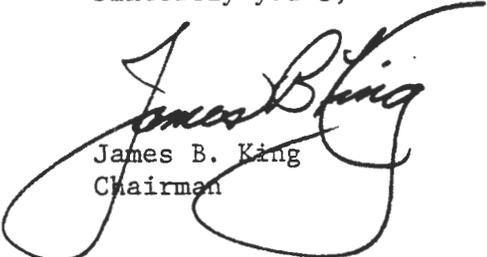
Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

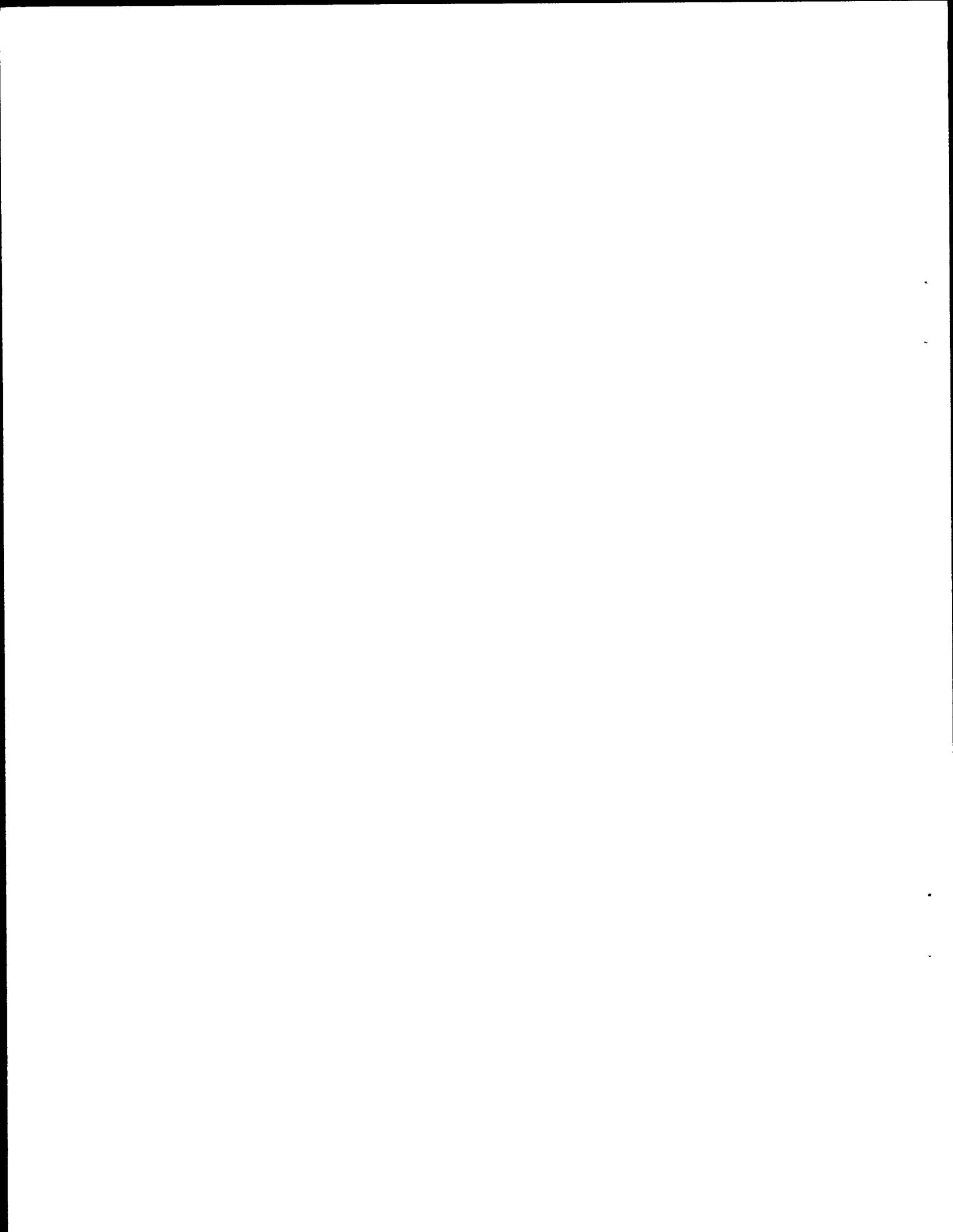
Thank you for your letter of November 13, 1979, in which you advised the National Transportation Safety Board of further action taken by the Federal Aviation Administration (FAA) to meet the intent of safety recommendation A-79-23. This recommendation was one of four recommendations that stemmed from the Safety Board's investigation of an incident involving a Learjet Model 24B, while en route between Greensboro, North Carolina and Nashville, Tennessee, on March 9, 1979.

The Safety Board is pleased to note that the FAA has issued Change 17 to Order 8440.5A containing General Aviation Operations Bulletin No. 79-2, "Servo Drive Unit - Installed on Learjet Aircraft," and Change 33 to Order 8430.1A which transmits new Part 135 Operations Bulletin No. 79-3, "Malfunction of Servo Drive Unit Installed on Learjet Aircraft." Therefore, we have classified A-79-23 as "CLOSED--ACCEPTABLE ACTION."

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

November 13, 1979

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is to further advise you of Federal Aviation Administration (FAA) action with respect to NTSB Safety Recommendation A-79-23 which recommended that the FAA:

"Issue immediately an Operations Alert Bulletin to FAA inspectors and notify operators of Learjet aircraft equipped with this type of servo drive unit to advise the pilots of these aircraft of the possible control difficulties which can be encountered as a result of clutch malfunction."

Change 17 to Order 8440.5A containing General Aviation Operations Bulletin No. 79-2, "Servo Drive Unit - Installed on Learjet Aircraft," was issued on June 28, 1979. We have also issued Change 33 to Order 8430.1A which transmits new Part 135 Operations Bulletin No. 79-3, "Malfunction of Servo Drive Unit Installed on Learjet Aircraft," dated September 10, 1979. We have enclosed a copy of each of these changes for your information.

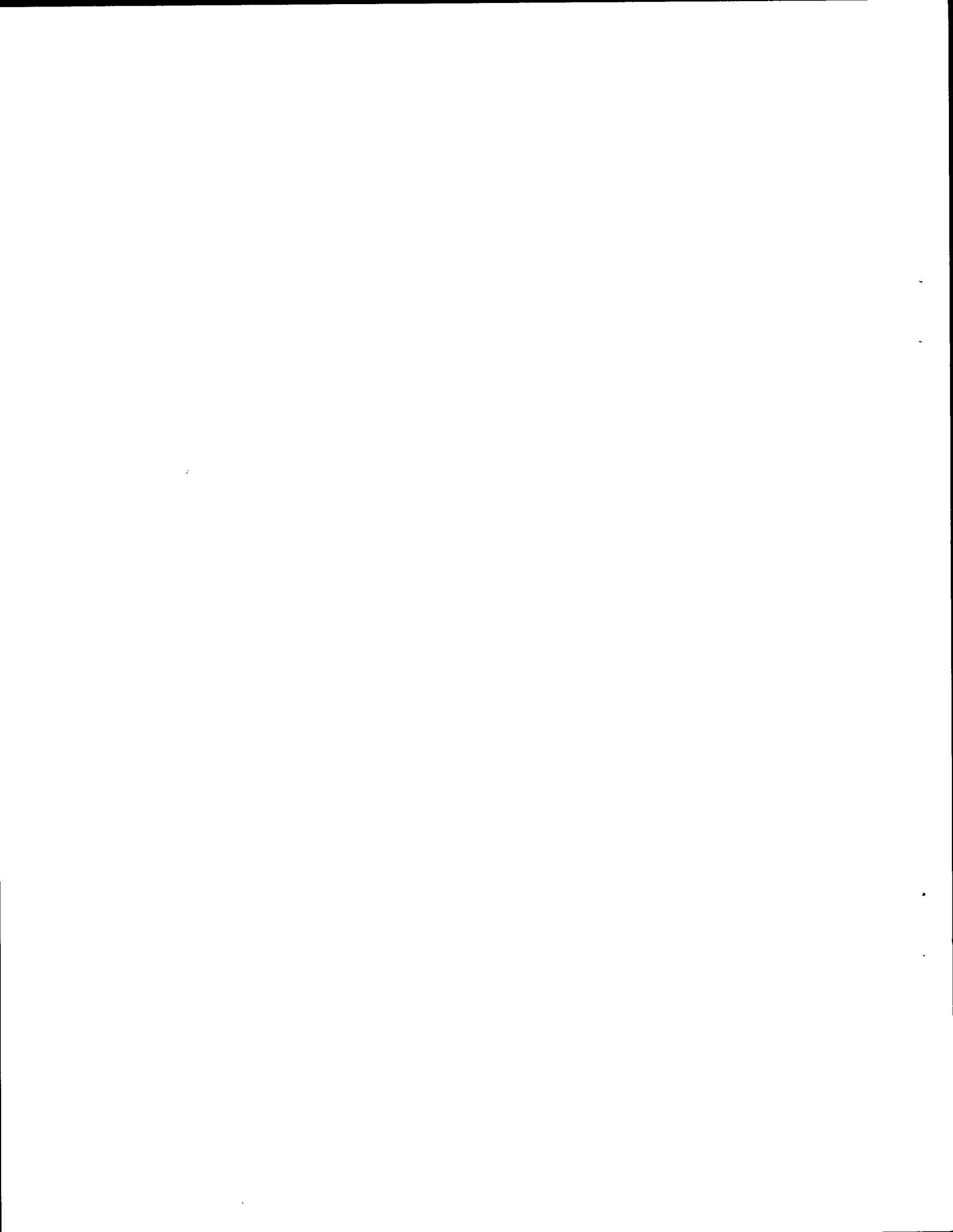
We believe these actions meet the intent of the recommendation.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond".

Langhorne Bond  
Administrator

2 Enclosures





Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

August 14, 1979

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter of July 16, 1979, responding to National Transportation Safety Board Recommendations A-79-21 through 24. These recommendations stemmed from our investigation of a Learjet Model 24B incident on March 9, 1979. While en route between Greensboro, North Carolina and Nashville, Tennessee, the pilot experienced longitudinal control problems. He declared an emergency and returned to Greensboro. Postflight examination of the aircraft disclosed a resistance to motion of the longitudinal control system, which was traced to the pitch axis servo drive unit. In view of the potential catastrophic results of control difficulties caused by jammed servo drive unit clutches, the Safety Board made four recommendations to prevent pitch axis malfunction. Our comments to the Federal Aviation Administration's (FAA) response are as follows:

A-79-21. We are pleased to note that the FAA is preparing an Airworthiness Directive for a retrofit program to incorporate an improved magnetic clutch. Pending such action, this recommendation is being maintained in an "Open--Acceptable Action Status."

A-79-22. We note that the FAA does not consider it necessary to restrict the operation of all Learjet aircraft equipped with the present servo drive unit. Instead, the FAA plans to issue "A Temporary Airplane Flight Manual Supplement" for all Learjet airplanes. Based on the FAA's belief that this action is adequate, the status of this recommendation has been evaluated as "Open--Acceptable Alternate Action."

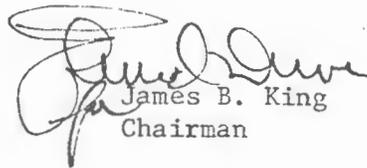
A-79-23. We note that the Safety Board's recommendation letter has been sent to all FAA Flight Standards Offices and that operations bulletins are being prepared dealing with the problem. The status of this recommendation is evaluated as "Open--Acceptable Action."

Honorable Langhorne Bond

- 2 -

A-79-24. The FAA's response indicates that this recommendation is in process of fulfillment. Further evaluation will be made after we receive a further response. The status of this recommendation is classified as "Open--Acceptable Action."

Sincerely yours,



James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 16, 1979

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to National Transportation Safety Board (NTSB) Safety Recommendations A-79-21 through 24.

A-79-21. Initiate a program immediately to expedite the determination of cause for the clutch malfunction in JET Electronic part No. 2380066, servo drive unit, devise a means to detect potential problems, and define corrective action.

Comment. The clutch malfunction in JET Electronic part Number 2380066 was caused by the magnetic powder in the clutch packing to the extent that it essentially locked the continuous operating servo motor to the cable drum. It has been determined by Gates Learjet that the powder packs because the individual particles are worn smooth from constant agitation by the continuous running motor and an excessive amount of unlubricated powder in the clutches.

Gates Learjet is testing an improved magnetic clutch which they plan to certify as a replacement clutch and is preparing the necessary information for a retrofit program.

The Federal Aviation Administration (FAA) is considering airworthiness directive action for the retrofit program. We will further advise the NTSB of this action in 30 days.

A-79-22. If defining and implementing the corrective action described above will require prolonged effort, restrict the operation of all Learjet aircraft equipped with this servo drive unit.

Comment. We do not believe that it is necessary to restrict operations of Learjet airplanes equipped with the Jet Electronic Part Number 2380066 servo drive unit to assure safe operation. A Temporary Airplane Flight Manual Supplement for all Learjet airplanes equipped with the above servo drive units has been issued. It contains emergency procedures in the event of an autopilot pitch axis malfunction or complete stall warning failures.

A-79-23. Issue immediately an Operations Alert Bulletin to FAA Inspectors and notify operators of Learjet aircraft equipped with this type of servo drive unit to advise the pilots of these aircraft of the possible control difficulties which can be encountered as a result of clutch malfunction.

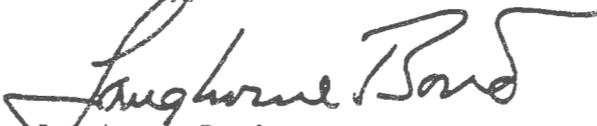
Comment. Copies of this recommendation have been sent to all FAA Flight Standards Offices as an initial notification of the problem. Two operations bulletins dealing with the problems are being prepared. We expect to issue one by June 30 and the other by July 15.

A-79-24. Determine whether other model aircraft use the same servo drive unit clutches and take appropriate action to advise the operators of those aircraft of the potential problem.

Comment. The same stick pusher/puller/autopilot pitch servo, P/N 2380066, is used on all Learjet Model 23 airplanes, S/N 23-003 through 23-009; Model 24 airplanes, S/N 24-100 through 24-229 except 24-218; and Model 25 airplanes, S/N 25-002 through 25-067 except 25-061. The service information being prepared by Gates Learjet Corporation will be applicable to all of the above affected models. Similarly, any operations alert bulletin that might be issued will be applicable to the above model airplanes. This servo drive clutch unit is used only in Gates Learjet aircraft.

A copy of a typical Temporary Flight Manual Supplement Change is enclosed.

Sincerely,



Langhorne Bond  
Administrator

Enclosure

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: April 18, 1979

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-79-21 through -24

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The National Transportation Safety Board has recently investigated an incident which caused concern about the continued safe operation of certain Learjet aircraft.

The pilot of a Learjet Model 24B, N14BC, reported longitudinal control problems on March 9, 1979, while en route from Greensboro, North Carolina, to Nashville, Tennessee. While cruising at altitude, the aircraft abruptly pitched nosedown. The pilot regained control and deactivated the aircraft's stall warning system and automatic flight control system. After the aircraft was configured for landing, during an instrument approach to Nashville, it became longitudinally unstable. The pilot, who was unable to control the pitching oscillation, aborted the approach. As airspeed was increased, the aircraft became controllable. The pilot declared an emergency and returned to Greensboro where better weather existed. Similar problems were encountered while attempting to land at Greensboro. Three approaches were aborted before the aircraft was landed. The fourth approach was conducted without flaps, at a higher-than-normal airspeed, and with stabilizer trim for pitch control.

Postflight examination of the aircraft disclosed a resistance to motion of the longitudinal control system which was traced to the pitch axis servo drive unit. The unit was replaced and the aircraft was test flown without the control problems.

2631

The National Transportation Safety Board took custody of the malfunctioning servo drive unit, and it was examined at the Gates Learjet plant in Wichita, Kansas. This unit consists of an electric motor which runs continuously in one direction when either the automatic pilot or the stall warning stickpusher system is energized. The output shaft of the motor drives a pair of electromagnetic friction drive clutches. These clutches rotate in opposite directions and their output shafts are connected to a common output, which in turn drives the elevator control surface. The clutches contain ferrous powder. Normally, this ferrous powder coagulates into a solid mass only when a magnetic field is introduced electrically by inputs from the autopilot or stall warning stickpusher system. The clutch, which is energized, will transmit torque to the elevator control system in the appropriate direction. The powder normally decoagulates and the clutch rotates freely when electrical power is removed.

Examination of the servo drive unit removed from N14BC revealed that the ferrous powder in the clutch which transmitted motion in the elevator trailing edge down direction was solid, although there was no electrical input. With the aircraft's autopilot or stall warning system activated, this condition would produce a nosedown pitching moment which could require as much as 80 pounds force on the control wheel to counter. With power removed from the servo motor, the jammed clutch would still affect the breakout force and force gradient of the longitudinal control system.

The other clutch of the servo was examined and it was free to rotate.

Gates Learjet personnel theorized that the powder coagulated and caused the clutch to jam because of moisture contamination. Reportedly, various degrees of moisture contamination and clutch engagement have been found on other servos that have been overhauled at Gates Learjet in the past.

The ferrous material of both clutches of the servo was later examined at the Safety Board's metallurgical laboratories; no foreign substance was found. The material in both clutches was determined to be of the same approximate chemical composition. However, some of the particles of the ferrous powder from the jammed clutch continued to coagulate into small hard lumps. The reason for this is unknown and indicates that some undetermined property of the ferrous clutch material is causing the clutch to jam without the magnetic field.

The Safety Board was informed by the operator that the same aircraft experienced a lateral control problem on March 29, 1979. This time the aileron servo drive unit, identical to the pitch servo, was found to have a defective clutch. This unit has not yet been disassembled for detailed examination.

The Safety Board is aware that Gates Learjet has discontinued the use of this JET Electronic's part No. 2380066 in new aircraft. However, we have been informed that there are approximately 220 Learjet aircraft equipped with these servo drive units in operation. Furthermore, the pitch servo drive unit is a mandatory item for flight since it is an integral part of the stall warning stick pusher system which was required by the certification of the aircraft.

Two recent fatal accidents involved loss of control of Learjet model 25 aircraft which were equipped with the same type of servo drive units. These accidents are still under investigation. Additionally, a review of our accident files indicates to us that 10 other accidents since 1964 involving Learjet aircraft, which we believe were equipped with these servo drive units, may have been caused by control problems. However, the lack of postaccident evidence precluded identification of such a problem. Our investigation into this matter is continuing.

In view of the potential catastrophic results of control difficulties caused by jammed servo drive unit clutches, the Safety Board is extremely concerned and believes expedited action is justified. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

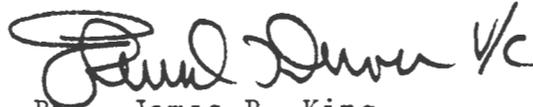
Initiate a program immediately to expedite the determination of cause for the clutch malfunction in JET Electronic part No. 2380066, servo drive unit, devise a means to detect potential problems, and define corrective action. (Class I--Urgent Action) (A-79-21)

If defining and implementing the corrective action described above will require prolonged effort, restrict the operation of all Learjet aircraft equipped with this servo drive unit. (Class I--Urgent Action) (A-79-22)

Issue immediately an Operations Alert Bulletin to FAA inspectors and notify operators of Learjet aircraft equipped with this type of servo drive unit to advise the pilots of these aircraft of the possible control difficulties which can be encountered as a result of clutch malfunction. (Class I--Urgent Action) (A-79-23)

Determine whether other model aircraft use the same servo drive unit clutches and take appropriate action to advise the operators of those aircraft of the potential problem. (Class I--Urgent Action) (A-79-24)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, and HOGUE, Members, concurred in the above recommendations.

  
By: James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 20, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

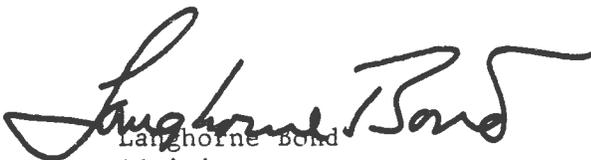
This is to advise you of actions completed by the Federal Aviation Administration (FAA) in further response to NTSB Safety Recommendation A-79-31. This recommendation was issued as a result of the Antilles Air Boats, Inc., Grumman G21A crash on September 2, 1978, in the Virgin Islands.

A-79-31. Strengthen surveillance and enforcement programs directed toward Part 135 operators to: (1) Provide adequate staffing for FAA facilities charged with surveillance of Part 135 operators; (2) assure uniform application of surveillance and enforcement procedures; (3) upgrade enforcement procedures and actions in order to provide a viable deterrent to future violations.

Comment. Our letter of August 9, 1979, outlines previous actions the FAA has taken on this subject. Additionally, we transmitted Order 8430.1B, Inspection and Surveillance Procedures - Air Taxi Operators/Commuter Air Carriers and Commercial Operators, through staff channels on March 18, 1980. The following action has also been completed: On May 16, Order 2150.3, Compliance and Enforcement Program was issued (copy enclosed). This order consolidates guidance material formerly contained in four separate orders. It is designed as a ready reference for use at all levels of the agency in the investigation, reporting, and legal processing of enforcement cases. All FAA employees involved in the compliance and enforcement program are directed to read and become familiar with applicable provisions of this order.

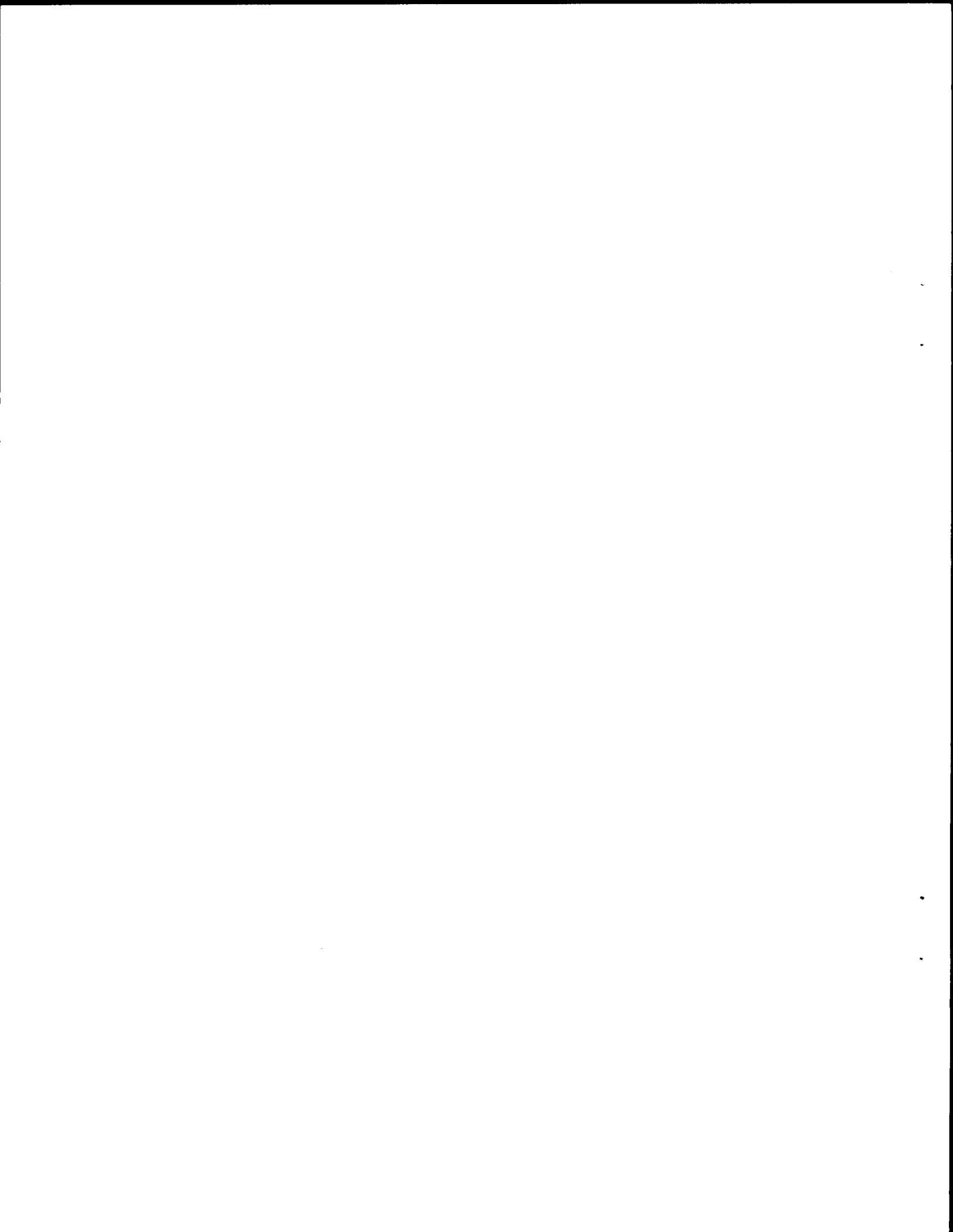
We believe the actions taken by the FAA have sufficiently enhanced surveillance and enforcement programs relative to Part 135 operators and have met the intent of Safety Recommendation A-79-31. Accordingly, FAA considers action completed on Recommendation A-79-31.

Sincerely,

  
Langhorne Bond  
Administrator

249

Enclosure





## National Transportation Safety Board

Washington, D.C. 20594

Office of the  
Chairman

November 8, 1979

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

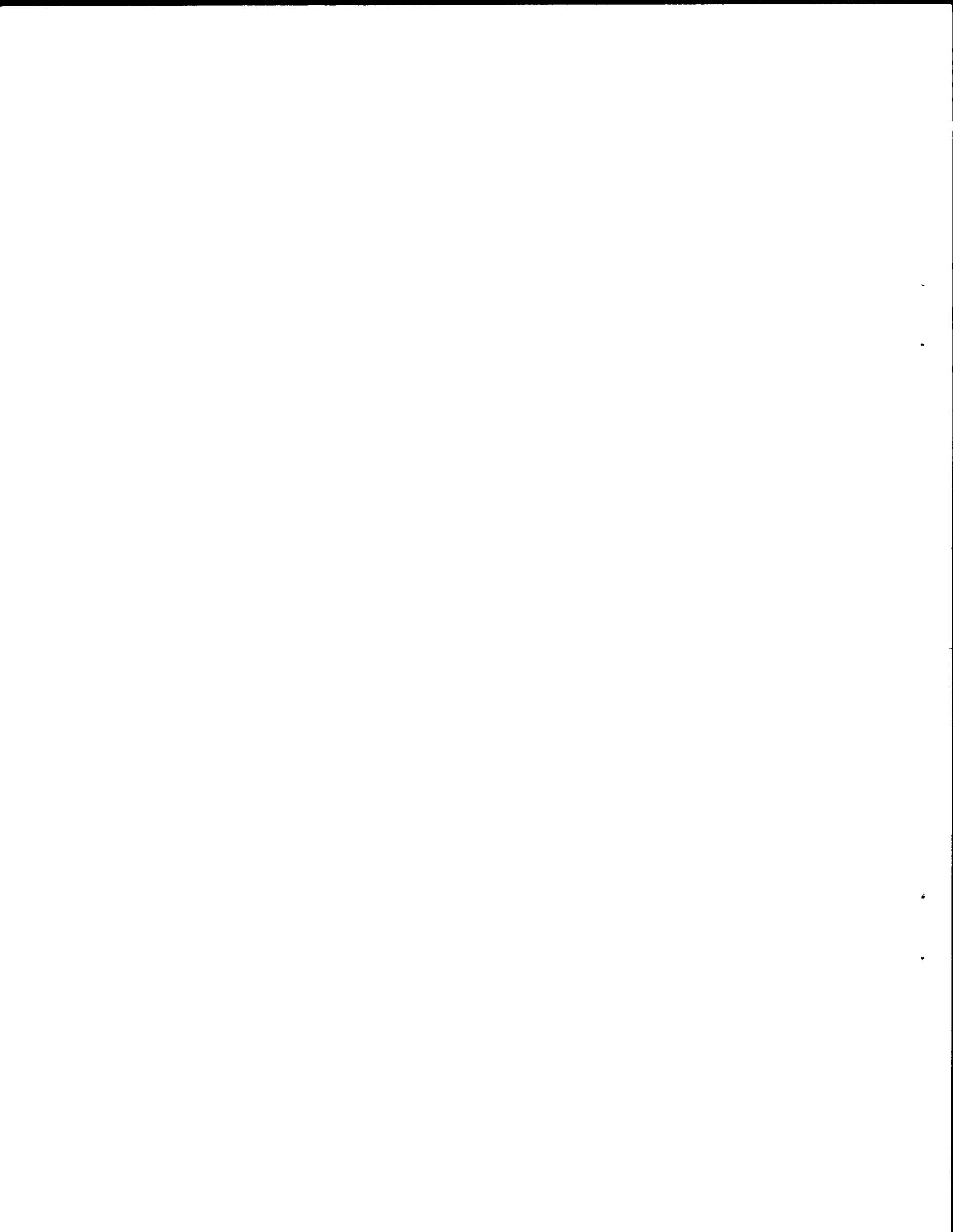
Thank you for your letter of August 9, 1979, responding to the National Transportation Safety Board's recommendation A-79-31. This recommendation stemmed from the Antilles Air Boats, Inc., Grumman G-21A accident on September 2, 1978. The aircraft crashed into the ocean while en route from St. Croix to St. Thomas, Virgin Islands.

We are pleased to note the issuance of the Federal Aviation Administration's (FAA) Notice N8000.176, Increased Surveillance for Operators under New Part 135, dated April 25, 1979, and Order 1000.9C, Enforcement Policy, dated April 26, 1979. We also note that the Air Taxi Operations Handbook is being rewritten, that the Air Taxi Maintenance Handbook has been incorporated into the Air Carrier Maintenance Inspector's Handbook, and that the FAA Enforcement Handbooks are being combined into one. These actions, together with FAA's organizational changes placing the responsibility of the air taxi program under the Air Carrier Division, are responsive to this recommendation.

We have, therefore, classified this recommendation and other FAR Part 135 related recommendations in an "OPEN--ACCEPTABLE ACTION" status, and will be evaluating the effectiveness of these FAA actions to improve the safety of Part 135 operations during fiscal year 1980.

Sincerely yours,

  
James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 9, 1979

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to National Transportation Safety Board Safety Recommendation A-79-31.

A-79-31. Strengthen surveillance and enforcement programs directed toward Part 135 operators to: (1) provide adequate staffing for FAA facilities charged with surveillance of Part 135 operators; (2) assure uniform application of surveillance and enforcement procedures; and (3) upgrade enforcement procedures and actions in order to provide a viable deterrent to future violations.

Comment. 1. The implementation of revised 14 CFR 135 has generated increased manpower requirements. This has resulted in some realignment at the headquarters, regional and district office levels to use air carrier and general aviation personnel to accomplish this program more efficiently. Responsibility for the air taxi program at the headquarters level was transferred to the Air Carrier Division from the General Aviation Division on December 1, 1978. Responsibility for the program at the regional level now rests with the air carrier or combined air carrier/general aviation branches. Notice N 8000.176, "Increased Surveillance for Operators Under New Part 135," dated April 25 directs field division chiefs and district office managers to use all available resources to ensure continuing emphasis on the air taxi/commuter program.

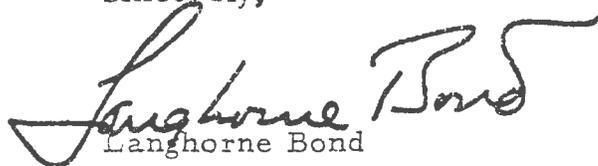
2. The Air Taxi Operations Handbook has been rewritten and is in the final review process. The Air Taxi Maintenance Handbook has been incorporated into the Air Carrier Maintenance Inspector's Handbook. The FAA Enforcement Handbooks are being combined into one. Headquarters personnel have met with personnel from regional and district offices to discuss uniform application of surveillance and enforcement procedures during FY 1979.

Page 2

3. I have recently reemphasized and reoriented the FAA enforcement policy. I met with the Chiefs of all Flight Standards Field Offices on March 15 to personally express this policy in order to achieve nationwide understanding and acceptance. I issued Order 1000.9C, "Enforcement Policy," on April 26 which instructs the Regional Directors to keep personally informed on regional enforcement policies and to review all major cases. This policy will upgrade enforcement actions as a deterrent to future violations.

Copies of Order 1000.9C and Notice N 8000.176 are enclosed.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond". The signature is written in dark ink and is positioned above the typed name and title.

Langhorne Bond  
Administrator

2 Enclosures

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: May 9, 1979

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-79-31

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On September 2, 1978, Antilles Air Boats, Inc., Flight 941, a Grumman G21A, crashed into the ocean while en route from St. Croix to St. Thomas, Virgin Islands. The pilot and 3 of the 10 passengers died in the accident. The National Transportation Safety Board's investigation of the accident revealed that the operator committed poor operational and maintenance practices, falsification of aircraft and aircraft component logbooks, and management practices which often condoned or encouraged the violation of Federal regulations in the interest of company requirements.

The Safety Board reviewed the Federal Aviation Administration's (FAA) surveillance and enforcement program for Antilles Air Boats, Inc., and discovered that this commuter air carrier had a history of violations and management deficiencies which were often repetitive in nature. After a June 1978 FAA special inspection, the FAA Southern Regional Counsel sent a letter to the President of Antilles Air Boats, Inc., listing 13 findings that were being evaluated by the FAA for violation proceedings. Many of the findings were similar to a March 1977 FAA surveillance investigation which concluded that "Antilles Air Boats operated unairworthy aircraft in its air taxi operation." In May 1977, the FAA stated in an enforcement letter to Antilles Air Boats, Inc., that a March 4, 1977, inspection had revealed several discrepancies and that "It appears that most of these deficiencies are similar to discrepancies noted during the last SWAP (special) inspection," which was conducted in May 1975.

2491-E

The FAA Flight Standards District Office (FSDO) at San Juan, Puerto Rico, was responsible for the surveillance of Antilles Air Boats, Inc. Although the company had 3 maintenance bases, 15 to 18 aircraft, and transported about 266,000 passengers annually, only two part-time FAA inspectors were assigned to monitor the commuter air carrier's activities. While the surveillance activities of the two inspectors were conscientious and thorough, their activities were ineffective because of the amount of surveillance that was required and because their findings were not acted upon by higher levels of FAA enforcement authority. As a result, the Safety Board found corrective action by the operator was slow or nonexistent. In many cases, the deficiencies were repeated.

The Safety Board's investigation determined that when enforcement action in the form of civil penalties was recommended by the FSDO, the final settlement among the FAA Southern Region Flight Standards Division, the Regional Counsel, and the company ended in a compromise which was favorable to the company. In the past 2 years, almost every enforcement action was settled for a minimal civil penalty. After the September 2, 1978, accident, FAA Southern Region Flight Standards and Regional Counsel representatives met with the management of Antilles Air Boats, Inc., to settle five investigative reports. An agreement was reached and a \$100,000 civil penalty was levied. According to FAA correspondence, "Ten thousand is to be paid and \$90,000 will be held in abeyance, providing they (Antilles Air Boats) continue to comply with the Federal Aviation Regulations referenced in the investigative reports to the satisfaction of FAA inspectors."

The facts and history of the investigation establish that there was ample evidence over recent years to alert FAA personnel at the FSDO, Area Manager, and Southern Region offices to the problems existing with Antilles Air Boats, Inc. The results of inspections, the numbers of enforcement actions, and the accident/incident record should have demanded immediate corrective action by the FAA. Instead, the Safety Board discovered that compromises of violation action were so common that the enforcement program was rendered ineffective. In addition, there was no indication that the recurring nature of many of the violations was considered by the Regional Counsel when a compromise was considered.

In September 1972, the Safety Board adopted an Air Taxi Special Study which concluded that "The FAA surveillance and enforcement varied and in most cases was minimal due to two factors: insufficient numbers of assigned inspectors and the varied interpretations of the applicable rules." The study recommended that the FAA assign a principal inspector(s) to commuter airlines with primary duties of surveillance, and that the FAA standardize air taxi surveillance procedures. However, in several recent aircraft accident investigations, <sup>1/</sup> the Safety Board has continued to find inadequate FAA surveillance. For example, in its report of the February 10, 1978, accident involving a Columbia Pacific Airlines Beech 99 at Richland, Washington, the Safety Board concluded that "The FAA's certification and surveillance of the airline's maintenance procedures were ineffective and (the) certification and surveillance of flightcrew training in the aircraft were deficient...." On May 17, 1978,--3 1/2 months before the Antilles Air Boats, Inc., accident--the Safety Board issued Safety Recommendations A-78-37 through -41 which again addressed the issues of inadequate FAA surveillance, ineffective company management, and the need to review the maintenance programs for commuter/air taxi operators. These recommendations also applied to many circumstances existing prior to the Antilles Air Boats accident, since there had been no significant action by the FAA to implement the Safety Board's recommendations.

The Safety Board continues to be concerned with the quality of the FAA's surveillance and enforcement program for 14 CFR 135 operators. The facts revealed by our investigations and studies underline the deficiencies of the FAA's surveillance program, yet the quality and effectiveness of the program have not improved. The development of the air taxi/commuter industry demands that acceptable levels of safety be maintained. Obviously, a significant factor in this development is the role of the FAA and the enforcement of the Federal aviation regulations. We believe that the FAA must improve the structure, quality, and promptness of the 14 CFR 135 surveillance program to provide the public with the necessary assurances of air transportation safety.

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1/ "Aircraft Accident Report: Air East, Inc., B99A, Johnstown-Cambria County Airport, Johnstown, Pennsylvania, January 6, 1974" (NTSB-AAR-75-3).

"Aircraft Accident Report: Atlantic City Airlines, Inc., DHC-6, Cape May County Airport, New Jersey, December 12, 1976" (NTSB-AAR-77-12).

"Aircraft Accident Report: Alaska Aeronautical Industries, Inc., DHC-6-200, near Iliamna, Alaska, September 6, 1977" (NTSB-AAR-78-5).

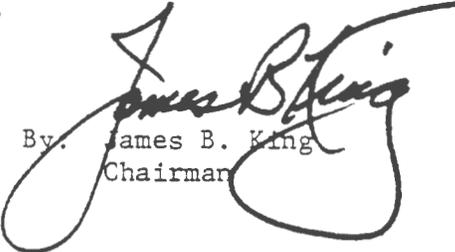
"Aircraft Accident Report: Columbia Pacific Airlines, Beech 99, Richland, Washington, February 10, 1978" (NTSB-AAR-78-15).

Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Strengthen surveillance and enforcement programs directed toward Part 135 operators to: (1) Provide adequate staffing for FAA facilities charged with surveillance of Part 135 operators; (2) assure uniform application of surveillance and enforcement procedures; and (3) upgrade enforcement procedures and actions in order to provide a viable deterrent to future violations.

(A-79-31) (Class II - Priority Action)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members, concurred in the above recommendations.

  
By. James B. King  
Chairman



# National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

SEP 24 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

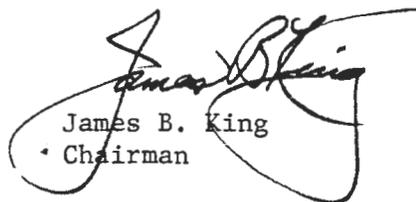
Dear Mr. Bond:

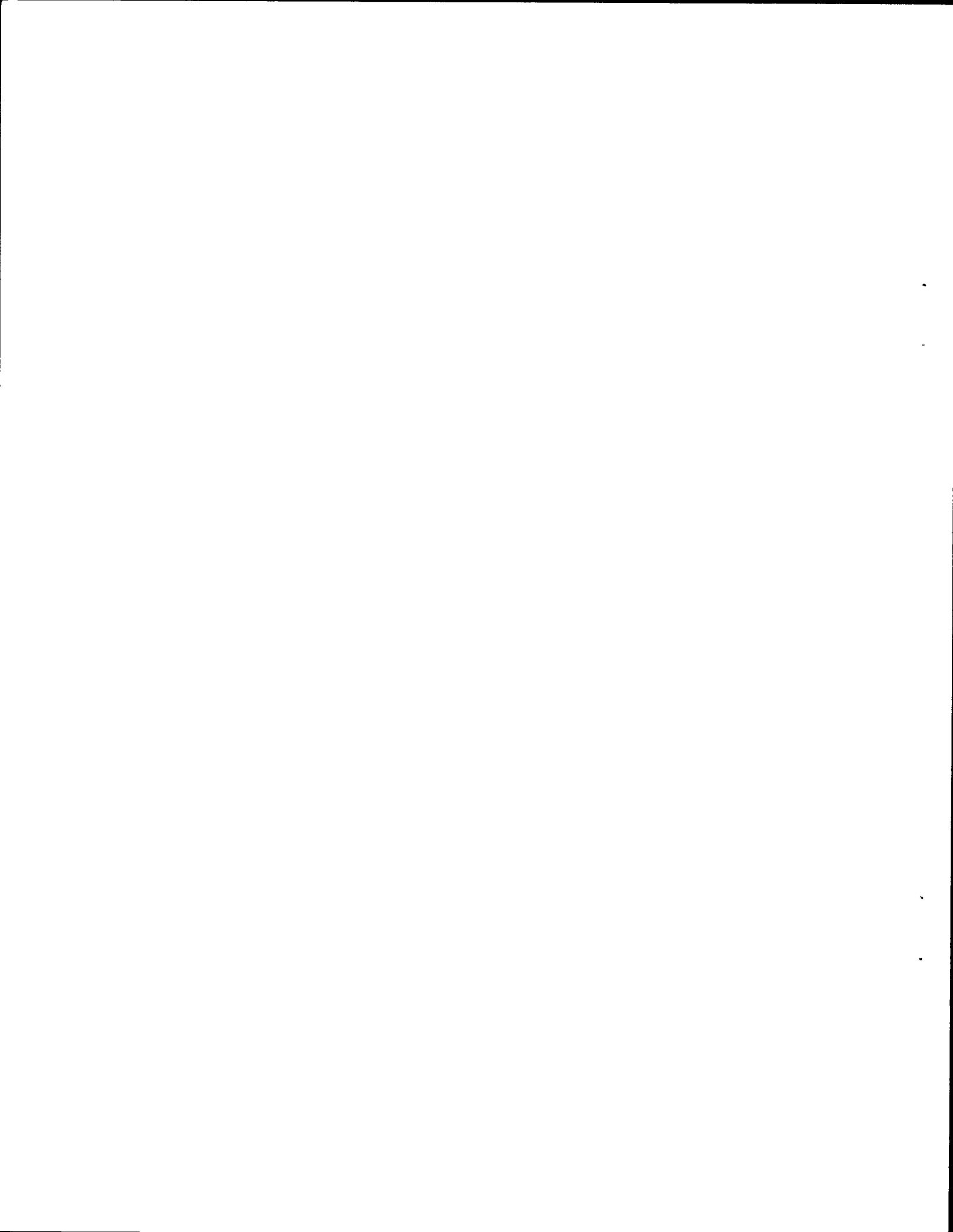
Thank you for your letter of August 20, 1980, responding further to National Transportation Safety Board Safety Recommendation A-79-60 issued July 17, 1979. This recommendation stemmed from our investigation of a DHC-6 Twin Otter accident at Steamboat Springs, Colorado, on December 4, 1978. We recommended that the Federal Aviation Administration (FAA):

"Issue an operations bulletin directing all operations inspectors who are responsible for the surveillance of 14 CFR 135 operators to assure that 14 CFR 135.159 (new 14 CFR 135.165) is complied with uniformly in accordance with the official legal interpretation of this regulation by the FAA."

The Safety Board has examined the FAA's letter of September 14, 1979, addressed to all Regional Flight Standards Divisions for distribution to FAA field offices forwarding an interpretation of 14 CFR 135.159(a)(5) (new 14 CFR 135.165). We have also examined the revised FAA Order 8430.1B of January 29, 1980, titled Inspection and Surveillance Procedures - Air Taxi Operators/Commuter Air Carriers and Commercial Operators. We note that the revised order clarifies 14 CFR 135.165 and should facilitate understanding of this regulation. The intent of Safety Recommendation A-79-60 has been met and its status is now classified as "Closed--Acceptable Alternate Action."

Sincerely yours,

  
James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 20, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

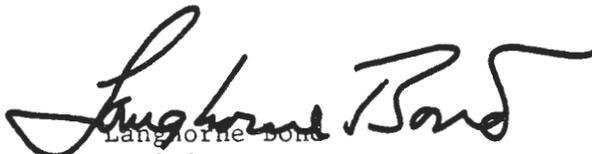
This is in further response to NTSB Safety Recommendation A-79-60, issued as a result of the Rocky Mountain Airways, Inc., deHavilland DHC-6 crash near Steamboat Springs, Colorado, on December 4, 1978.

A-79-60. Issue an operations bulletin directing all operations inspectors who are responsible for the surveillance of 14 CFR 135 operators to assure that 14 CFR 135.159 (new 14 CFR 135.165) is complied with uniformly in accordance with the official legal interpretation of this regulation by the FAA.

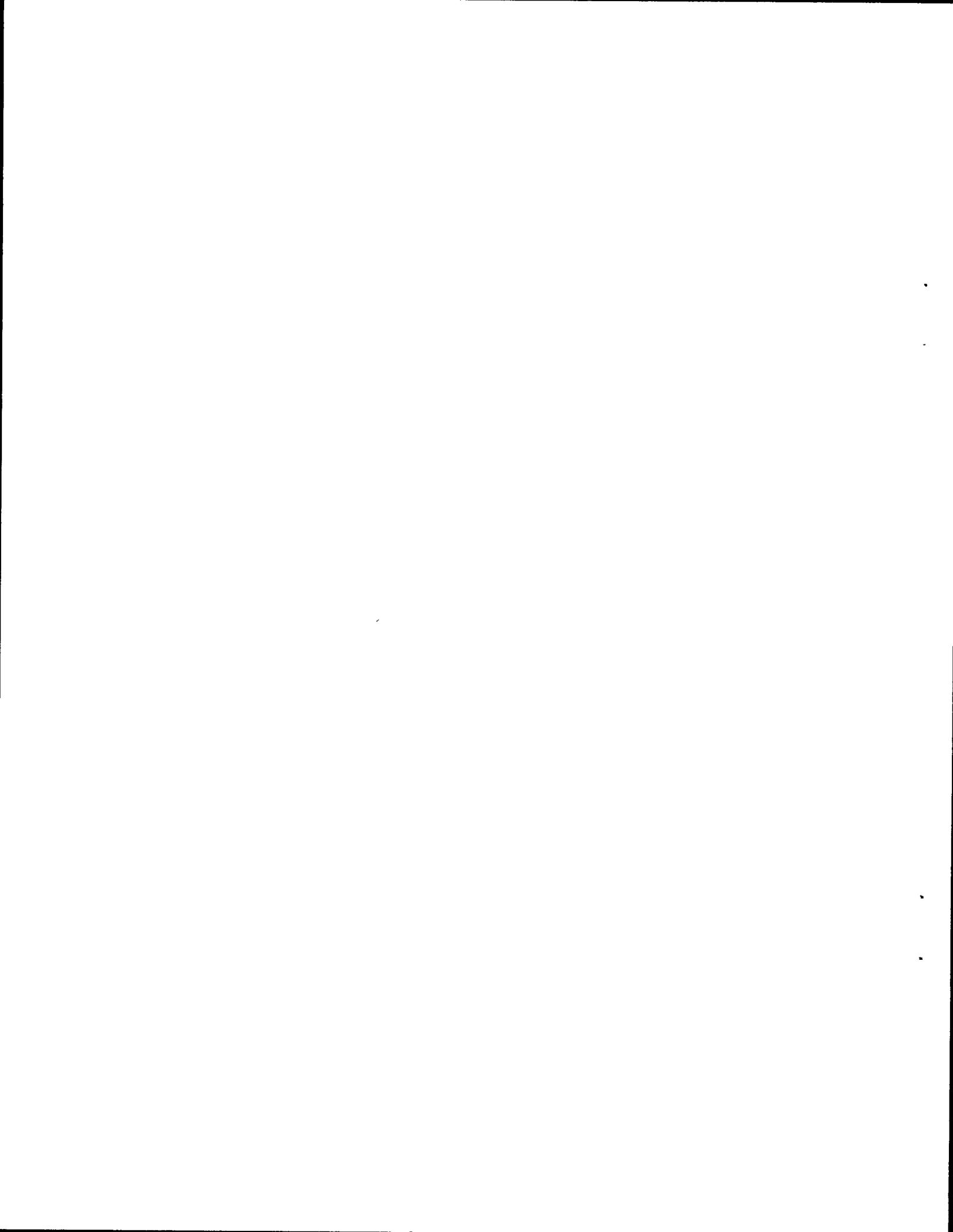
Comment. As outlined in our letter of October 12, 1979, Order 8430.1B, Inspection and Surveillance Procedures - Air Taxi Operators/Commuter Air Carriers and Commercial Operators, was issued January 29, 1980, to revise Order 8430.1A. A copy of the revised order is enclosed. The revision provides guidance on the revised 14 CFR 135 and discusses navigation equipment requirements.

We believe this revision meets the intent of this recommendation in providing guidance to operations inspectors, and accordingly, the Federal Aviation Administration considers action completed on Recommendation A-79-60.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure





# National Transportation Safety Board

Washington, D.C. 20594

Office of the  
Engineer

November 27, 1979

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

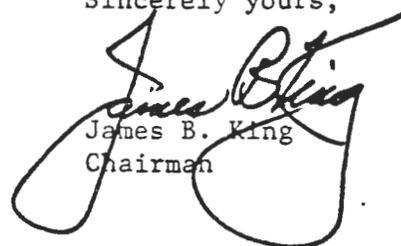
Dear Mr. Bond:

Thank you for your letter dated October 12, 1979, responding to the National Transportation Safety Board's Safety Recommendation A-79-60. This recommendation stemmed from the Safety Board's investigation of a DHC-6 Twin Otter accident at Steamboat Springs, Colorado, on December 4, 1978, and a DHC-6 Twin Otter accident near Iliamna, Alaska, on September 6, 1977. Our investigation revealed that, according to the FAA's official interpretation of 14 CFR 135.159, both airplanes were improperly equipped with navigation equipment.

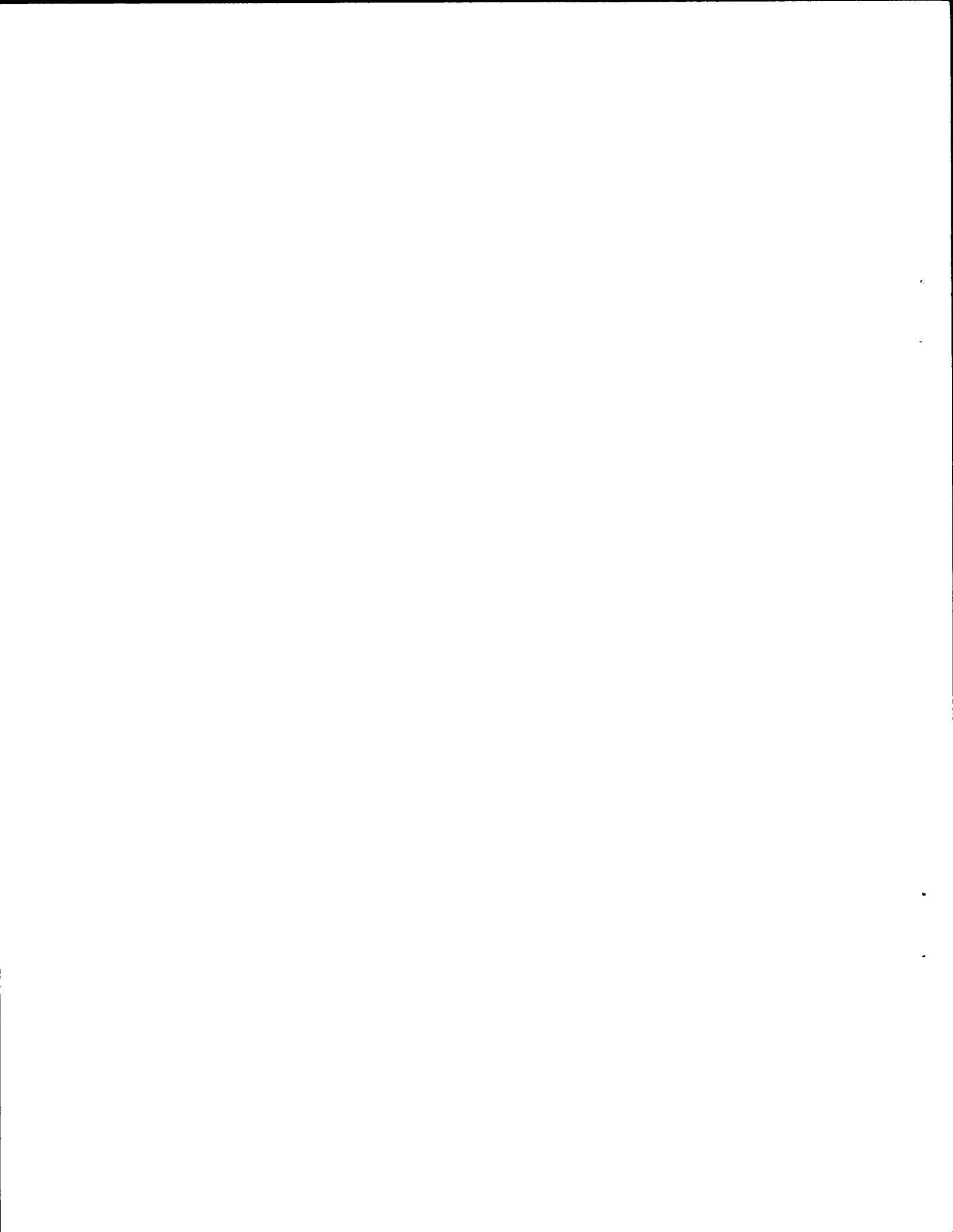
The Safety Board is pleased to note that the Federal Aviation Administration (FAA), in response to the Safety Board's recommendation, forwarded an interpretation of 14 CFR 135.159(a)(5) on September 14, 1979, to all Regional Flight Standards Divisions for distribution to FAA field offices. We are also pleased to note that FAA Order 8430.1A, "Operations Inspection and Surveillance Procedures - Air Taxi Operators and Commercial Operators of Small Aircraft," is being rewritten to provide guidance on the revised 14 CFR 135 and a discussion on navigation equipment requirements.

However, since the handbook will include other subjects related to Part 135 and will very likely take over 6 months to publish, it will not meet the intent and urgency of the recommendation. Therefore, we request that the FAA, in addition to actions already taken and proposed, issue an operations bulletin as recommended. Pending the resolution of this recommendation, we are maintaining A-79-60 in an "Open--Unacceptable Action" status.

Sincerely yours,



James B. King  
Chairman



**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591

October 12, 1979

Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594



OFFICE OF  
THE ADMINISTRATOR

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-79-60.

A-79-60. Issue an operations bulletin directing all operations inspectors who are responsible for the surveillance of 14 CFR 135 operators to assure that 14 CFR 135.159 (new 14 CFR 135.165) is complied with uniformly in accordance with the official legal interpretation of this regulation by the FAA.

Comment. This recommendation implies that Federal Aviation Administration (FAA) inspectors are not uniformly enforcing 14 CFR 135.159 (new 14 CFR 135.165). We wish to advise that inspectors assigned to Rocky Mountain Airways, Inc., and Alaska Aeronautical Industries, Inc., were aware of the FAA legal interpretation and had discussed the navigation equipment requirements with those operators. The operators either had properly equipped aircraft or provisions in their operations manuals for cancellation of flights if the navigation facility which provided signals to one of the two navigation receivers became inoperative.

We believe that the FAA has adequately emphasized the navigation equipment requirements in the past. Because of the importance of the subject, we recently forwarded the FAA interpretation of 14 CFR 135.159(a)(5) to all Regional Flight Standards Divisions for redistribution to FAA field offices. This interpretation is contained in a letter to Mr. James W. Kuehl, Senior Hearing Officer, NTSB, dated November 4, 1977. A copy of this letter is enclosed.

Order 8430.1A, "Operations Inspection and Surveillance Procedures - Air Taxi Operators and Commercial Operators of Small Aircraft," is being rewritten to provide guidance on the revised 14 CFR 135. A discussion of the navigation equipment requirements will be included in this handbook.

We believe that our actions meet the intent of the recommendation.

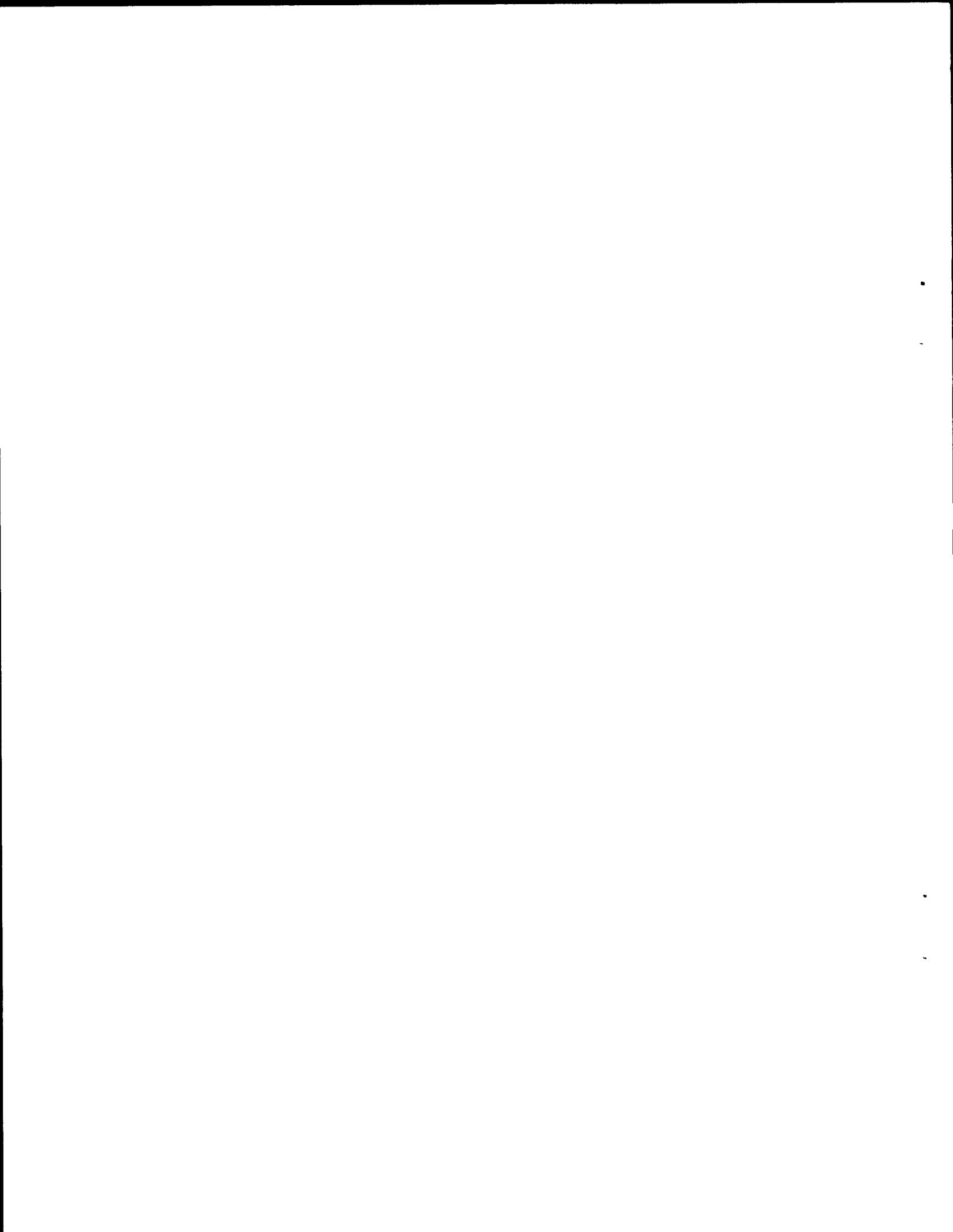
Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond".

Langhorne Bond  
Administrator

Enclosure

265



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: July 17, 1979

-----  
Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
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SAFETY RECOMMENDATION(S)

A-79-60

Rocky Mountain Airways, Inc., Flight 217, a DeHavilland DHC-6, crashed on a mountain about 8 nmi east-northeast of Steamboat Springs, Colorado, on December 4, 1978.

According to an official Federal Aviation Administration interpretation 1/ of 14 CFR 135.159 (new 135.165), the airplane was not properly equipped with navigation equipment. The official interpretation of the regulation had been provided at the Safety Board's request during the Board's earlier investigation of an accident involving a DeHavilland DHC-6-200, operating as Alaska Aeronautical Industries, Inc., Flight 302, on September 6, 1977. In this earlier case the airplane was also improperly equipped with navigation equipment.

Although the lack of proper equipment did not contribute to the cause of either accident, the Safety Board is concerned about this recurring noncompliance with the requirements for suitable navigation equipment. Evidently, FAA inspectors responsible for the surveillance of 14 CFR 135 operators are not uniformly assuring compliance with the regulation.

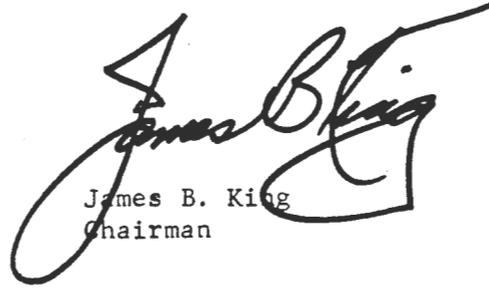
Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an operations bulletin directing all operations inspectors who are responsible for the surveillance of 14 CFR 135 operators to assure that 14 CFR 135.159

1/ Letter from Acting Assistant Chief Counsel, Regulations and Enforcement Division, Office of the Chief Counsel, FAA, November 4, 1977.

(new 14 CFR 135.165) is complied with uniformly in accordance with the official legal interpretation of this regulation by the FAA. (Class II, Priority Action) (A-79-60)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and GOLDMAN, Members, concurred in this recommendation.



James B. King  
Chairman



## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

12 12

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter dated August 20, 1980, responding further to National Transportation Safety Board Safety Recommendations A-79-68 and A-79-69 issued September 6, 1979. In these recommendations, we asked the Federal Aviation Administration (FAA) to:

A-79-68. Amend 14 CFR 135.331 and 121.417 to require that each certificate holder provide a survival training program for its crewmembers that would include the basic information on sea, desert, winter, and mountain survival.

A-79-69. Issue an Advisory Circular which outlines acceptable means of compliance with such a survival training program requirement.

The Safety Board notes that in response to these recommendations the FAA has issued a change to Air Carrier Operations Bulletin (ACOB) No. 8-80-2, Crewmember Survival Training. The change will require inspectors to assure that carriers include in recurrent crewmember training survival instruction appropriate to route structure. The ACOB also includes a suggested outline for survival training.

These recommendations are now classified in a "Closed--Acceptable Alternate Action" status.

Sincerely yours,

  
for James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 20, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

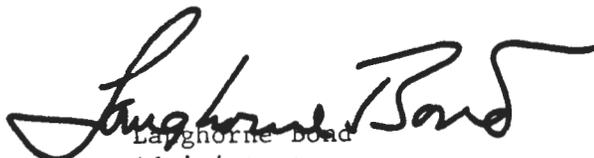
Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendations A-79-68 and 69 and supplements our letter of December 5, 1979. These recommendations were issued as a result of the Board's investigation of Rocky Mountain Airlines DeHavilland DHC aircraft accident near Steamboat Springs, Colorado, on December 4, 1978.

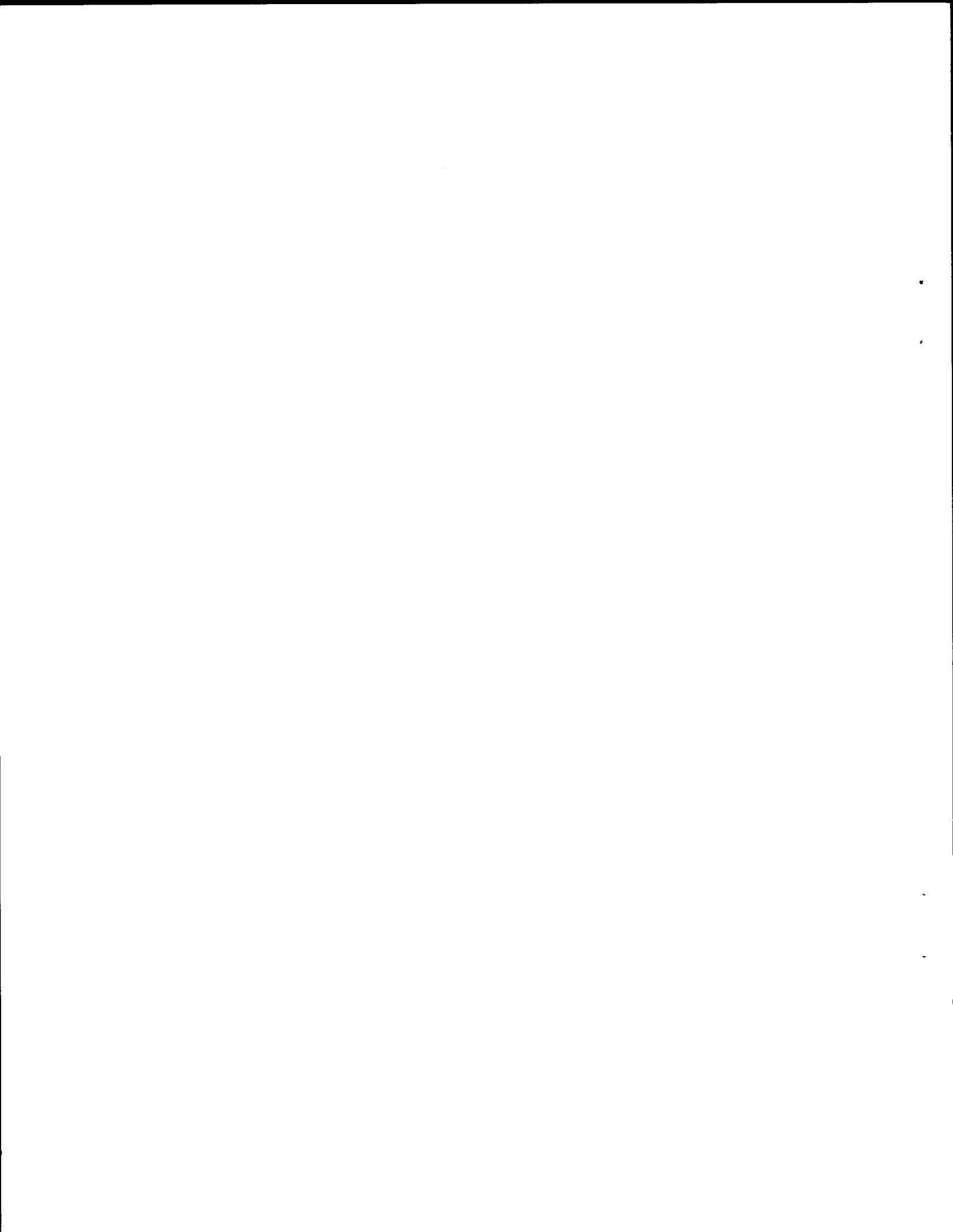
As stated in our December 5, 1979, letter, we have issued a change to Order 8430.17, Change 15, to Air Carrier Operations Bulletin No. 8-80-2, Crewmember Survival Training (copy enclosed). The bulletin was revised to include Part 135 operators.

As a result of this action, the Federal Aviation Administration considers action relative to Recommendations A-79-68 and 69 completed.

Sincerely,

  
Lainghorne Bond  
Administrator

Enclosure



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

March 11, 1980

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

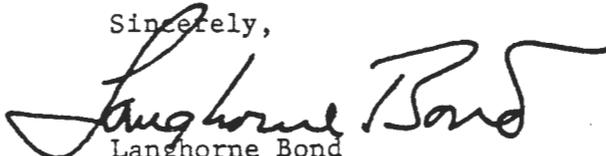
Dear Mr. Chairman:

This is in response to your letter of January 4 requesting a summary of extensions granted by the Federal Aviation Administration (FAA) in relation to NTSB Safety Recommendation A-79-70. The recommendation called for strict enforcement of the compliance date for shoulder harness installation required by 14 CFR 135.171.

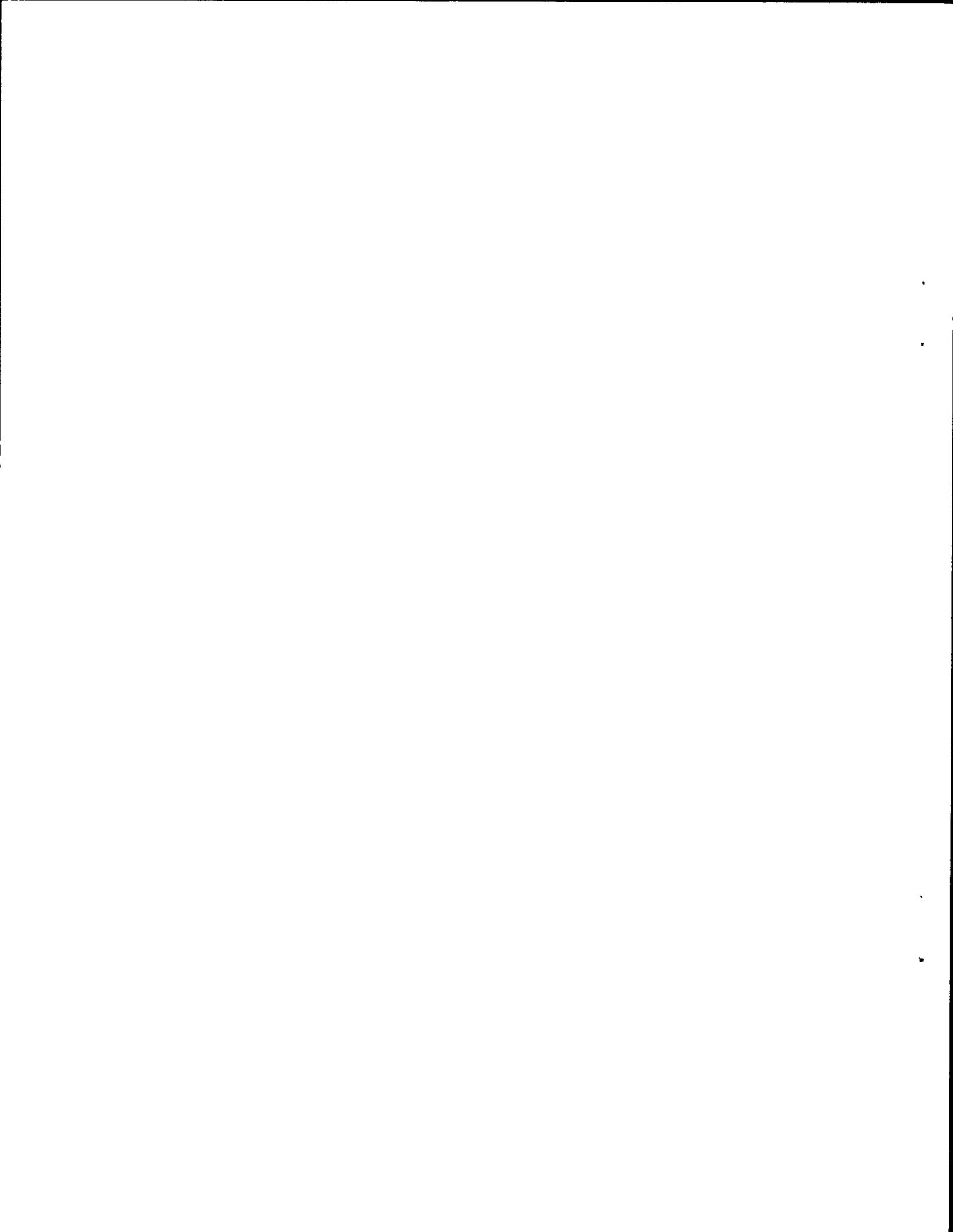
Enclosed is a listing of air taxi operators that were granted extensions of the June 1, 1979, installation compliance date for shoulder harness requirements which was required by 14 CFR 135.10. All requests for an extension of this date were required because of non-availability of shoulder harness kits by vendors or manufacturers prior to June 1, 1979. In three cases, requests were made after June 1, for reasons noted.

I trust that the above information and the enclosed listing of air taxi operators will fulfill the Board's request.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure





## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

January 4, 1980

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

This is to acknowledge the Federal Aviation Administration's (FAA) letter of December 5, 1979, in response to the National Transportation Safety Board's safety recommendations A-79-68, 69, and 70 issued as a result of the Rocky Mountain Airlines DeHavilland DHC which crashed at Steamboat Springs, Colorado, on December 4, 1978.

The Safety Board recommended that the FAA amend 14 CFR 135 and 121 to require a survival training program for crewmembers that would include sea, desert, winter, and mountain survival (A-79-68); issue an Advisory Circular which outlines acceptable means of compliance with survival training requirements (A-79-69); and strictly enforce the compliance date for installation of shoulder harnesses as required by 14 CFR 135.171 (A-79-70).

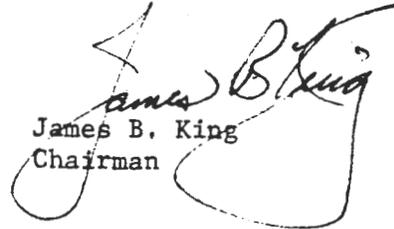
The FAA's response to A-79-68 and 69 indicated agreement, in principle, with the need for crewmember survival training. We noted that rather than making a regulatory change, FAA plans to issue an Air Carrier Operations Bulletin (ACOB) within 90 days, which will require inspectors to assure that carriers include survival training, appropriate to route structure, in recurrent crewmember training. Since the ACOB will also include a suggested outline for a survival training program, we have classified the response to recommendations A-79-68 and 69 as "Open-- Acceptable Alternate Action" until the bulletin is issued and reviewed by the Safety Board staff.

In response to A-79-70, which called for strict enforcement of the compliance date for shoulder harness installation required by 14 CFR 135.171, the FAA stated that compliance date extensions, beyond June 1, 1979, were logical in view of the supply problem and were not being abused. However, the response did not include any supporting information pertaining to the number of extensions being granted or the extent of the supply problem. We would appreciate receiving a summary of extensions

granted by the FAA which shows the name of the operator; the date of the request; the reason for the request; the scheduled date of compliance; and in cases when the extension was requested after June 1, 1979, the reasons for late filing.

Until such information is made available for review, A-79-70 will be classified as "Open--Unacceptable Action."

Sincerely yours,



James B. King  
Chairman



OFFICE OF  
THE ADMINISTRATOR

December 5, 1979

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-79-68 through 70.

A-79-68. Amend 14 CFR 135.331 and 121.417 to require that each certificate holder provide a survival training program for its crewmembers that would include the basic information on sea, desert, winter, and mountain survival.

Comment. We do not believe that a regulatory amendment, as recommended, is appropriate at this time. We do agree, however, that crewmembers should be knowledgeable in survival techniques for the various environmental conditions that may be encountered following an air carrier accident.

To initiate training as soon as practical, we plan to issue an Air Carrier Operations Bulletin (ACOB), within the next 90 days, instructing our principal operations inspectors to have their assigned air carriers include survival training, as appropriate to the carrier's route structure, during the crewmembers' recurrent training.

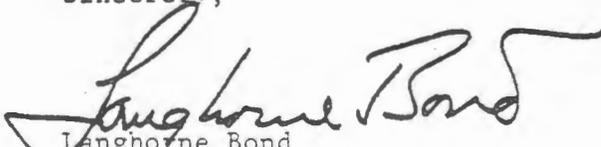
A-79-69. Issue an Advisory Circular which outlines acceptable means of compliance with such a survival training program requirement.

Comment. As discussed in A-79-68 above, an Air Carrier Operations Bulletin instead of an Advisory Circular is more appropriate at this time. We plan to include a suggested outline for a survival training program in this Air Carrier Operations Bulletin.

A-79-70. Strictly enforce the compliance date for the installation of shoulder harnesses as required by 14 CFR 135.171.

Comment. This agency's action of granting certain operators extensions to the shoulder harness requirement under Part 135 is a logical solution to a supply problem. We are not aware of any abuses by operators in delaying the installation of shoulder harnesses in their aircraft.

Sincerely,

  
Langhorne Bond  
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 6, 1979

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-79-68 through -70

The National Transportation Safety Board's investigation of the Rocky Mountain Airlines DeHavilland DHC aircraft accident near Steamboat Springs, Colorado, on December 4, 1978, illustrated the immediate need for survival training for crewmembers and for the installation of shoulder harnesses on crew seats. 1/

Survival Training

The accident occurred in near-blizzard conditions about 1945 m.s.t. in mountainous terrain at the 10,500-ft. level. The first emergency rescue team arrived at the accident site about 10 hours later; the evacuation was completed 16 hours after the accident. Falling and blowing snow, strong winds, rugged terrain, darkness, and subfreezing temperatures hampered the search and rescue efforts.

There was a great potential for serious postcrash trauma, including hypothermia and frostbite. The aircraft occupants were extremely fortunate, however, to have among them a passenger trained in winter survival techniques, who acted promptly and appropriately and, with the few available resources, saved the lives of many of the passengers. Only 1 of the 20 passengers and 1 crewmember died as a result of this accident; 1 crewmember sustained minor frostbite.

1/ For more detailed information, read: "Aircraft Accident Report, Rocky Mountain Airways, Inc., DeHavilland DHC-6 Twin Otter, N25RM, near Steamboat Springs, Colorado, December 4, 1978." (NTSB-AAR-79-6).

A review of the Federal Aviation Regulations regarding crewmember emergency training revealed that crewmembers are required to be knowledgeable about methods and procedures to cope with in-flight emergencies, evacuations, and ditchings. However, this training does not extend to postcrash survival problems outside the aircraft. The actions taken by this passenger were the responsibility of the crewmembers. The Safety Board believes that appropriate training should be provided so that crewmembers can cope with these situations.

The Board learned that the FAA requires survival training for its own crewmembers as outlined in Section 261 of FAA Handbook 4040.9, "General Manual for Operation of FAA Aircraft." Courses are provided by the Civil Aeromedical Institute (CAMI). We believe that the existing information and programs could be adapted easily for commercial operators.

#### Shoulder Harnesses

The Board's investigation established that shoulder harnesses, if worn by the crewmembers, might have reduced their injuries.

The new 14 CFR 135, which became effective December 1, 1978, specifies the installation of shoulder harnesses at flightcrew stations of certain commuter aircraft by June 1, 1979, with provisions for the granting of extensions to December 1, 1980, to individual operators.

The Safety Board believes that the June 1 date allowed adequate time for most operators to comply. However, the Safety Board recognizes that a few operators had to develop Supplemental Type Certificates for certain older aircraft and that some operators have encountered supply problems beyond their control. In these few cases, extensions may be necessary, but it is inconceivable that many operators would require more than the initial 6 months of lead time for compliance. The Board believes that compliance with the requirements of 14 CFR 135.171 should be strictly enforced.

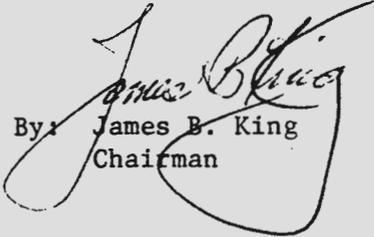
In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

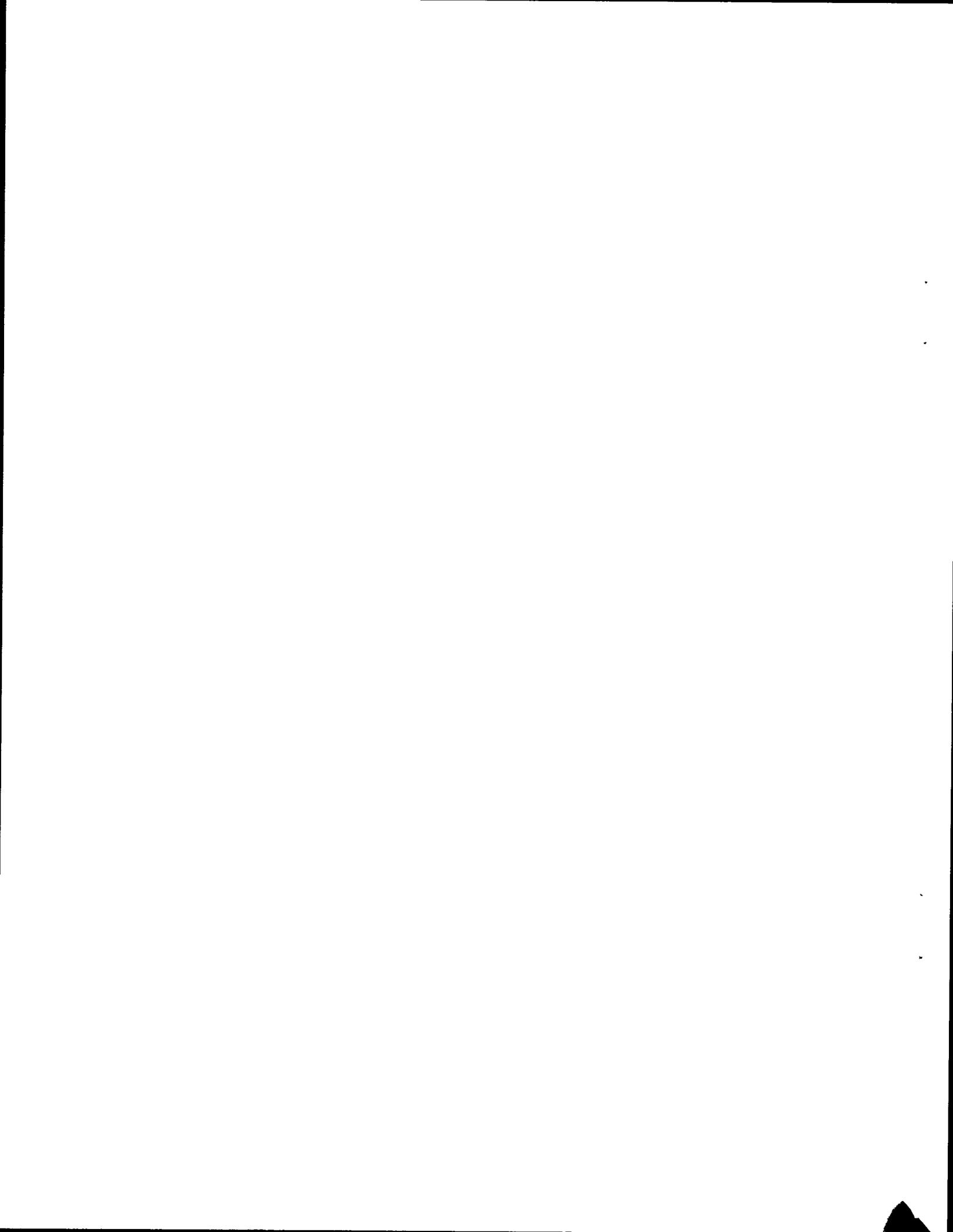
Amend 14 CFR 135.331 and 121.417 to require that each certificate holder provide a survival training program for its crewmembers that would include the basic information on sea, desert, winter, and mountain survival.  
(Class II - Priority Action) A-79-68)

Issue an Advisory Circular which outlines acceptable means of compliance with such a survival training program requirement. (Class II - Priority Action) (A-79-69)

Strictly enforce the compliance date for the installation of shoulder harnesses as required by 14 CFR 135.171. (Class II - Priority Action) (A-79-70)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and GOLDMAN, Members, concurred in these recommendations. BURSLEY, Member, did not participate.

  
By: James B. King  
Chairman



**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

September 9, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is to advise you of actions taken relating to NTSB Safety Recommendations A-79-73 and 74. These recommendations were issued as a result of the midair collision involving a Pacific Southwest Airlines Boeing 727 and a Cessna 172 at San Diego, California, on September 25, 1979.

A-79-73. Prescribe an appropriate method to do so and require all air carrier companies and commercial operators to test their pilots recurrently on ATC radar procedures, radar services, pilot/controller relationships, and ATC clearances.

Comment. As discussed in our letter of January 8, we have since issued Change 13 to Order 8430.17, Air Carrier Operations Bulletins, on March 29. This change transmits Air Carrier Operations Bulletin No. 8-80-1 - Interrelationships of the Pilot and Controller, which identifies the areas of the Board's concern and outlines procedures to be followed by principal operations inspectors in these areas. A copy of the change to the order is enclosed for your information.

We believe the guidance in the change meets the intent of Recommendation A-79-73, and accordingly, the Federal Aviation Administration considers action on this recommendation completed.

A-79-74. Prescribe a method to insure that all general aviation pilots are tested periodically on ATC radar procedures, radar services, pilot/controller relationships, and ATC clearances as appropriate to their operations.

Comment. As also discussed in our letter of January 8, we have since completed the development of "Using The System," a slide and tape presentation that advises the pilot of proper procedures for operating in terminal control areas and terminal radar service areas.

Individual copies of this presentation have been distributed to each General Aviation District Office, Flight Standards District Office, and Regional Accident Prevention Coordinator for use at general aviation accident prevention meetings.

We consider action on this recommendation completed.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure



Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

February 6, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your response of January 8, 1980, to recommendations A-79-73 and 74 which were issued on October 10, 1979, as a result of the midair collision involving a Pacific Southwest Airlines Boeing 727 and a Cessna 172 at San Diego, California, on September 25, 1978.

The National Transportation Safety Board was pleased to note that the Federal Aviation Administration (FAA) agreed in principle with safety recommendations A-79-73 and 74, which were intended to assure that pilots employed by air carrier companies and commercial operators (A-79-73) as well as general aviation pilots (A-79-74) were periodically tested on ATC system procedures, services, and pilot/controller relationships. Although the recommendation letter proposed inclusion of ATC recurrent training requirements in the Code of Federal Regulations (14 CFR 61.57 and 14 CFR 121 Appendix F), your proposed alternatives to augment present recurrent training for commercial and general aviation pilots by providing written guidance to principal operations inspectors assigned to air carriers and commercial operators, and by developing a presentation for use in the Accident Prevention Program, are considered acceptable.

Your reply to A-79-73 and A-79-74 will be classified as "open-- acceptable alternate action," until our staff has the opportunity to review the guidance provided to POI's and the presentation developed for the Accident Prevention Program. We would appreciate being informed of progress regarding these proposed alternatives.

Sincerely,

A handwritten signature in black ink, appearing to read "James B. King".

James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

January 8, 1980

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S. W.  
Washington, D. C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-79-73 and 74 issued on October 10, 1979. These recommendations are based on the Board's concern that there may be a lack of understanding on the part of pilots regarding the relationship of their responsibility and the responsibility of the air traffic controller when a pilot accepts a "maintain visual separation" clearance. The Board stated in its forwarding letter that it believes the Airman's Information Manual (AIM) adequately describes the interrelationship of pilot and controller roles and responsibilities, but believes that all pilots should be tested recurrently on those responsibilities and relationships as outlined in the AIM. The following are the Federal Aviation Administration's comments and actions in response to these recommendations.

A-79-73. Prescribe an appropriate method to do so and require all air carrier companies and commercial operators to test their pilots recurrently on ATC radar procedures, radar services, pilot/controller relationships, and ATC clearances.

Comment. We agree it is essential that pilots be aware of their roles and responsibilities when they accept a "maintain visual separation" clearance. However, we believe that we have adequate control of air carrier and commercial operators' training programs through the principal operations inspectors (POI) assigned to the individual operators. We propose to issue appropriate bulletins requesting the POI's to ensure that interrelationships of the pilot and controller roles and responsibilities are covered in each operator's recurrent training program. We plan to have these bulletins issued by the end of March 1980.

A-79-74. Prescribe a method to ensure that all general aviation pilots are tested periodically on ATC radar procedures, radar services, pilot/controller relationships, and ATC clearances as appropriate to their operations.

Comment. 14 CFR 61.57, "Recent Flight Experience: Pilot in Command," presently includes language which provides for a flight review, including ATC procedures, which, we believe, adequately covers the pilot/controller relationships while still providing the flexibility to the person giving the review to deal with the pilot's individual needs. Paragraph 61.57 (b) states that a flight review consists of a review of the current general operating and flight rules of Part 91, and a review of those maneuvers and procedures which in the discretion of the person giving the review are necessary for the pilot to demonstrate that he can safely exercise the privileges of his pilot certificate.

This individual treatment is further emphasized by industry guidance material on the Biennial Flight Review (BFR) such as that published in the enclosed excerpt from a publication by the National Association of Flight Instructors widely used for the conduct of BFR's by flight instructors.

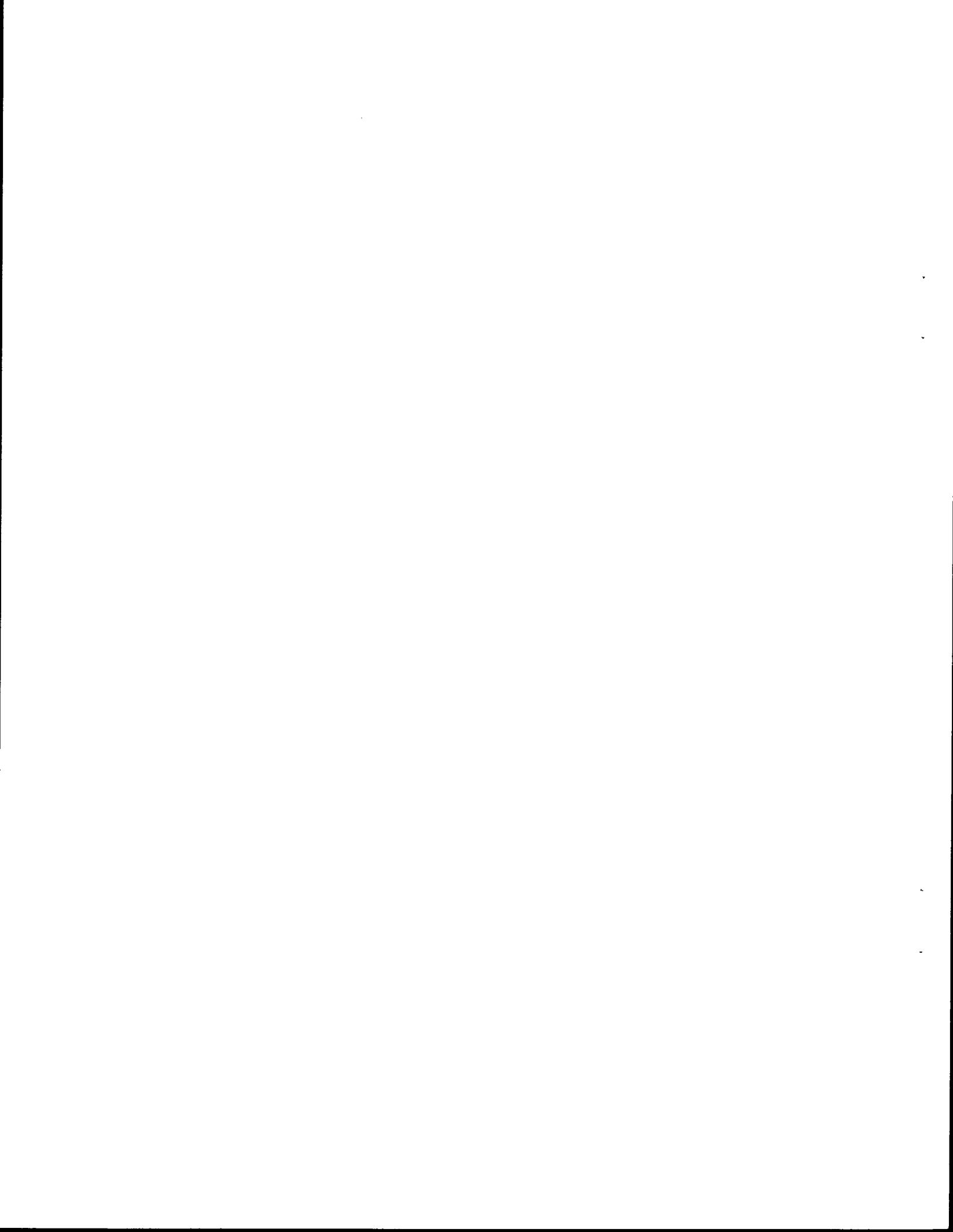
Our Office of Flight Operations will work with the Air Traffic Service in developing a presentation to be used in the Accident Prevention Program that will educate the general aviation pilots on radar services that are available and will discuss pilot/controller relationships and ATC clearances for pilots operating under visual flight rules.

In the absence of additional information indicating a significant shortcoming in general aviation pilot/controller relationships, we believe that the current regulations provide a satisfactory level of regulation and flexibility to permit the intent of this recommendation to be accomplished.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: October 10, 1979

Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-79-73 and -74

The National Transportation Safety Board's investigation of the midair collision involving Pacific Southwest Airlines Flight 182, a Boeing 727, and N7711G, a Cessna 172, at San Diego, California, on September 25, 1978, revealed that the air carrier's flightcrew probably was not aware of the full extent of its responsibility after accepting a maintain-visual-separation clearance. Because of the cooperative nature of the air traffic control (ATC) system, the Safety Board is concerned that there may be a lack of understanding on the part of pilots regarding the relationship of their responsibility and the responsibility of the air traffic controller when a pilot accepts a maintain-visual-separation clearance.

While the Board believes the AIM adequately describes the interrelationship of pilot and controller roles and responsibilities, we further believe all pilots should be tested recurrently on pilot/controller interrelationships and responsibilities as outlined in the AIM.

A way to address this issue might be for the requirements of 14 CFR 61.57, "Recent Flight Experience: Pilot in Command," to be expanded expressly to include a review of ATC procedures, and for 14 CFR 121, "Appendix F - Proficiency Check Requirements," to be expanded expressly to include a similar review.

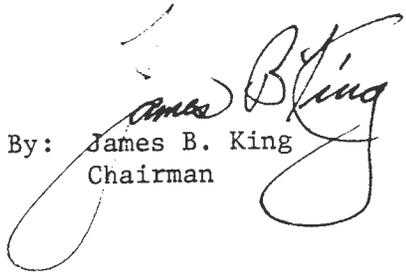
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Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Prescribe an appropriate method to do so and require all air carrier companies and commercial operators to test their pilots recurrently on ATC radar procedures, radar services, pilot/controller relationships, and ATC clearances. (Class-II, Priority Action) (A-79-73)

Prescribe a method to insure that all general aviation pilots are tested periodically on ATC radar procedures, radar services, pilot/controller relationships, and ATC clearances as appropriate to their operations. (Class-II, Priority Action) (A-79-74)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in the above recommendations.

By:  James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

August 27, 1980

The Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, SW.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to your letter of July 9 and supplements our letter of January 15 to NTSB Safety Recommendations A-79-80 and 81.

A-79-80. Require that pilots involved in 14 CFR 135 operations be thoroughly trained on the performance capabilities and handling qualities of aircraft when loaded to their maximum certificated gross weight or to the limits of their c.g. envelope, or both.

Comment. An amendment to 14 CFR Part 135, Amendment No. 135-3, issued January 30 requiring additional operating experience for commuter pilots-in-command, was effective March 1. A notice providing specific flight testing standards for Part 135 pilots was issued on January 14 and should result in pilots being more knowledgeable about their aircraft and its limitations. Copies of both are enclosed.

The revised Part 135 provides training in weight and balance, runway limitations for takeoff and landing, aircraft performance data, and operating limitations during initial, transition, and upgrade ground training for pilots. In April 1979, increased Part 135 surveillance requirements were initiated which involved additional en route inspections and other FAA emphasis items. Crewmembers demonstrated their knowledge of weight and balance procedures and aircraft performance as part of the surveillance.

In the transmittal letter of October 17, 1979, the NTSB stated it would be impractical to accomplish flight training in an aircraft loaded to gross weight or at c.g. limits, but that pilots should nevertheless be thoroughly familiar with performance at maximum certificated gross takeoff weight and have training under conditions at or near gross weight, etc.

The revised training and testing requirements and the exposure to various weight and loading conditions that the pilot will receive during the acquisition of operating experience now required in Amendment No. 135, will provide the needed additional familiarization and knowledge of aircraft performance deficiencies. We believe these actions fulfill the intent of Safety Recommendation A-79-80.

2

A-79-81. Expedite rulemaking which would make the flight time and duty time limitations and rest requirements for commuter air carriers the same as those specified for domestic air carrier crewmembers under 14 CFR 121.

Comment. On August 4, 1980, the FAA issued a supplemental Notice of Proposed Rule Making (NPRM) No. 78-3B, Docket No. 17669, to revise the flight and duty time limitations and rest requirements for flight crewmembers utilized by domestic, flag, and supplemental air carriers, commercial operators, and air taxi operators. I am enclosing a copy of the NPRM for the Board's review and records.

Sincerely,

A handwritten signature in cursive script, appearing to read "Langhorne Bond".

Langhorne Bond  
Administrator

3 Enclosures



## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

July 9, 1980

Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Reference is made to the National Transportation Safety Board Safety Recommendations A-79-80 and A-79-81 issued October 17, 1979. These recommendations, which stemmed from the Safety Board's investigation of several commuter air carrier accidents, pertained to:

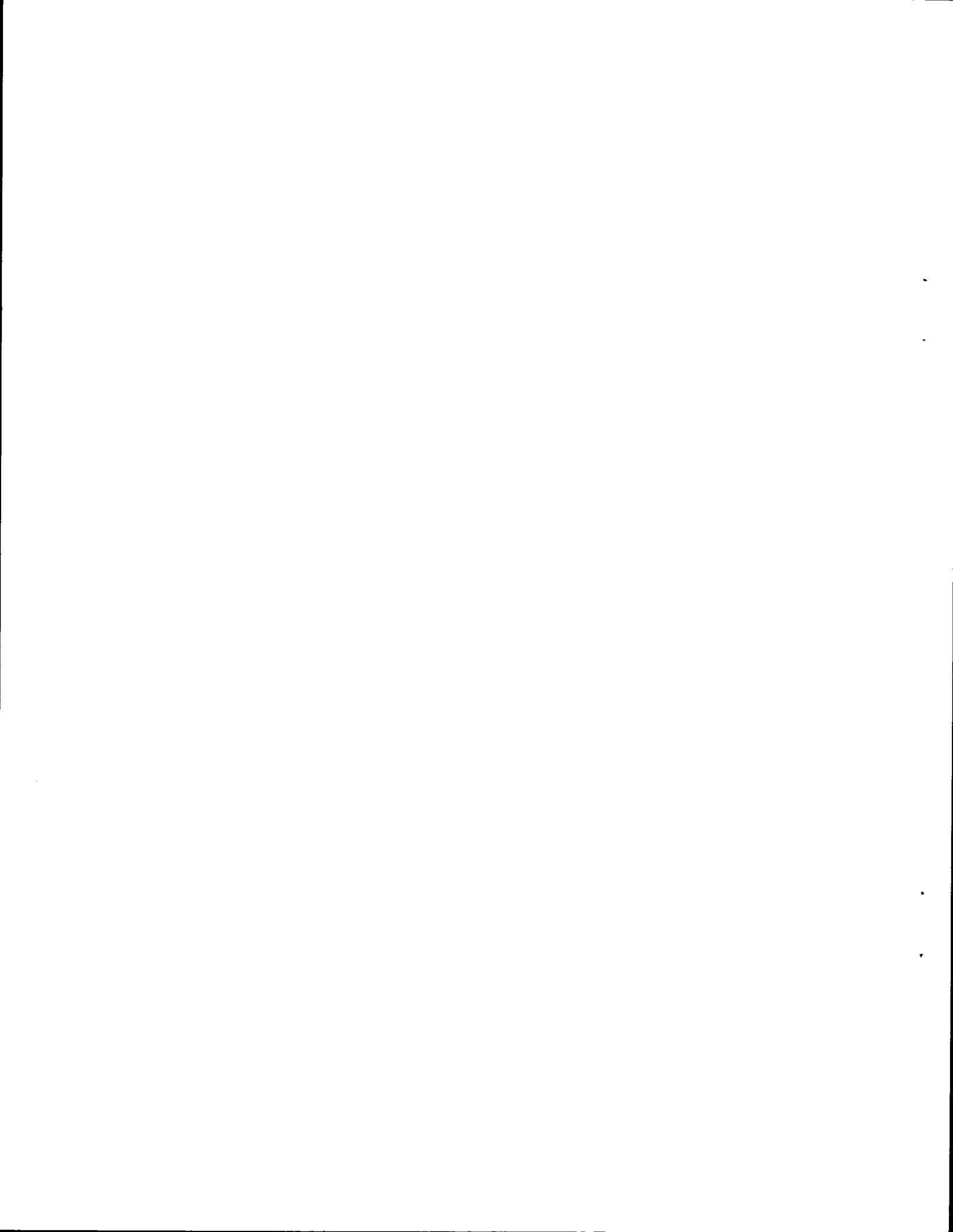
1. Pilots' handling of aircraft loaded to maximum gross weight.
2. Flight and duty time limitations for operations under FAR Part 135.

The Federal Aviation Administration's response of January 15, 1980, indicated actions were in progress to resolve these recommendations. To better evaluate their progress and update the public docket, we would appreciate a further report of actions taken.

Sincerely yours,

A handwritten signature in cursive script that reads "James B. King".

James B. King  
Chairman





## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

February 7, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

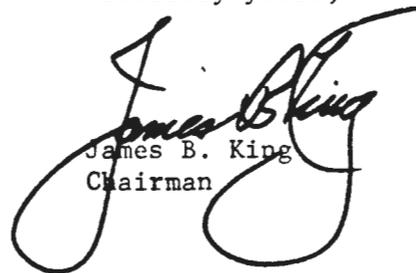
Dear Mr. Bond:

Thank you for your letter of January 15, 1980, responding to the National Transportation Safety Board's Safety Recommendations A-79-80 and 81. Our comments to your response are as follows:

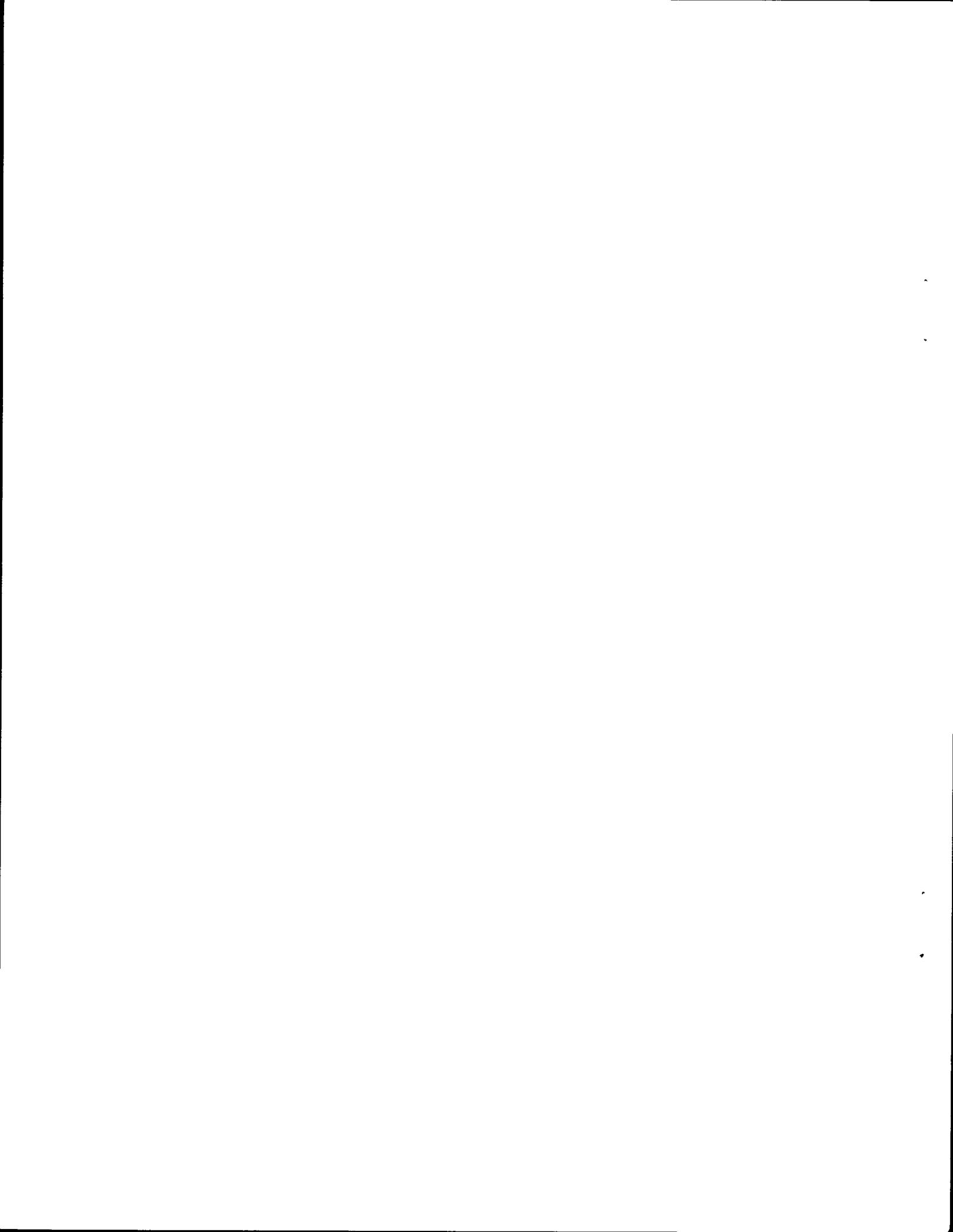
A-79-80. The Safety Board is pleased to note that the Federal Aviation Administration (FAA) is proposing regulatory action to upgrade the operating experience and testing standards of Part 135 pilots. Pending the revision of the rules, A-79-80 is classified in an "OPEN--ACCEPTABLE ACTION" status.

A-79-81. It is also noted that the FAA will shortly issue Notice No. 78-3B to provide identical flight and duty time limitations for Parts 135 and 121 operations. Pending regulatory action, A-78-81 is also being maintained in an "OPEN--ACCEPTABLE ACTION" status.

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20590



OFFICE OF  
THE ADMINISTRATOR

January 15, 1980

Honorable James E. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-79-80 and 81 issued on October 17, 1979. These recommendations are based on the Board's concern that the expansion of 14 CFR 135 operations, and particularly commuter air carrier operations, be accompanied by measures to assure a level of safety comparable with that of the air carriers certificated under 14 CFR 121. These recommendations would deal with certain aspects of pilot training and with crew flight time, duty time, and rest requirements. The following are the Federal Aviation Administration's (FAA) comments and actions in response to these recommendations.

A-79-80. Require that pilots involved in 14 CFR 135 operations be thoroughly trained on the performance capabilities and handling qualities of aircraft when loaded to their maximum certificated gross weight or to the limits of their c.g. envelope, or both.

Comment. The FAA is in the process of amending Part 135 to require operating experience similar to that required in Part 121 for any pilot prior to designation as pilot-in-command on commuter air carrier operations. This operating experience would expose the pilot to various gross weight operations for each make and model aircraft to be flown. This operating experience will be acquired under the supervision of a company check pilot. The estimated completion date for this regulatory action is March 1, 1980.

In addition, we are issuing a directive that will be more specific as to testing standards regarding pilots as stated in Part 135. Although present training and testing requirements cover aircraft performance, this additional directive will cover this area in more detail. Estimated completion date for this directive is February 1, 1980.

A-79-81. Expedite rulemaking which would make the flight time and duty time limitations, and rest requirements for commuter air carriers, the same as those specified for domestic air carrier crewmembers under 14 CFR 121.

Comment. Considerable work has been done on amending the present flight and duty time requirements for both 14 CFR 135 and 14 CFR 121 to provide compatible requirements. The final draft of the Notice of Proposed Rule Making does provide for identical requirements for Parts 135 and 121. The Supplemental Notice of Proposed Rule Making, Notice No. 78-3E, on this subject, should be issued by the end of March 1980.

Sincerely,

A handwritten signature in cursive script that reads "Langhorne Bond". The signature is written in dark ink and is positioned above the printed name and title.

Langhorne Bond  
Administrator

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

ISSUED: October 17, 1979

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

} SAFETY RECOMMENDATION(S)

} A-79-80 and -81

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The air taxi industry, particularly the commuter air carrier segment, has enjoyed tremendous growth in recent years. U.S. commuter airlines have gained an average of 10 percent more passengers and 30 percent more freight each year since 1970. Commuter air carrier revenue passenger miles have increased from 750,048,000 in 1975 to 1,145,000,000 in 1978. The FAA has forecast a 116 percent increase in commuter passenger enplanements between fiscal 1978 and 1989. This forecast growth of the air taxi industry has prompted aircraft manufacturers to produce new and larger aircraft.

However, this expansion has been accompanied by a corresponding rise in commuter air carrier accident fatalities. For example, in the first 7 months of 1975 there were 27 commuter air carrier accidents which included 9 fatal accidents and 24 fatalities. During the first 7 months of 1979 there have been 27 commuter air carrier accidents including 10 fatal accidents and 48 fatalities.

In the past 2 years, the National Transportation Safety Board has investigated numerous commuter accidents in which the aircraft was at or above its maximum certificated gross weight or at or beyond its center of gravity (c.g.) envelope, or both <sup>1</sup>/<sub>1</sub>. In all of these accidents, pilots were confronted with the two-fold problem of unfavorable weight and balance and mechanical malfunction. Safety Board investigations of

<sup>1</sup>/<sub>1</sub> Aircraft Accident Report: Rocky Mountain Airways, DHC-6, Cheyenne, Wyoming, February 27, 1979. (NTSB-AAR-79-10)  
Aircraft Accident Report: Columbia Pacific Airlines, Beech 99, Richland, Washington, February 10, 1979. (NTSB-AAR-78-15)  
Aircraft Accident Report: Antilles Air Boats, G-21A, St. Thomas, Virgin Islands, April 5, 1978. (NTSB-AAR-79-9)

these accidents also revealed that the pilots had received no flight or ground training on the performance capabilities and handling qualities of the aircraft when loaded to its maximum certificated gross weight or at the limits of its c.g. envelope.

On March 1, 1979, a commuter air carrier flight, a Beech Model 70, Excalibur conversion, crashed during takeoff at the Gulfport-Biloxi Regional Airport, Gulfport, Mississippi. The investigation revealed that the aircraft was over its maximum certificated gross weight, and out of its c.g. envelope. It also revealed uncorrected maintenance discrepancies, that the ADF and wing flaps were inoperative, and that the starter interrupt system had been bypassed. Further, it revealed that aircraft dispatch operations were hurried and that, in particular, data for weight and balance computations were carelessly compiled. Moreover, the pilot had received no training on the performance capabilities and handling qualities of the aircraft under high gross weight conditions. The accident illustrates a typical result of poor operational practices and incomplete training. The pilot had flown the aircraft earlier that day at its maximum weight for the first time even though it was on a regularly scheduled, unsupervised passenger flight.

Safety Board investigative experience has disclosed also that air taxi/commuter flights are often conducted at high gross weights. Many of the aircraft used by these operators exhibit flight characteristics and handling qualities at high gross weights that are markedly different from those exhibited at lower gross weight.

While it may be impractical to accomplish flight training in aircraft loaded to the maximum gross weight or at the limits of the c.g. envelope, all pilots should be thoroughly familiar with the performance deficiencies which could be produced by such conditions and have training under conditions approaching these limits. Such performance deficiencies may include an increase in takeoff speed, a longer takeoff roll, a reduction in the rate and angle of climb, and a higher stall speed. These deficiencies may be compounded further by an aircraft malfunction, such as an engine failure. Training regarding these factors would have alerted the pilot in the Gulfport accident to the importance of proper weight and balance for safe flight and he might have required accurate computations to be made.

The Safety Board is aware that the Federal Aviation Administration is currently evaluating comments on NPRM 78-3, "Flight Crewmember Flight and Duty Time Limitations and Rest Requirements," as they apply to 14

CFR 121 operations. However, recent commuter air carrier accidents have given added urgency to the need to revise the crew duty time, flight time, and rest period regulations contained in 14 CFR 135 2/.

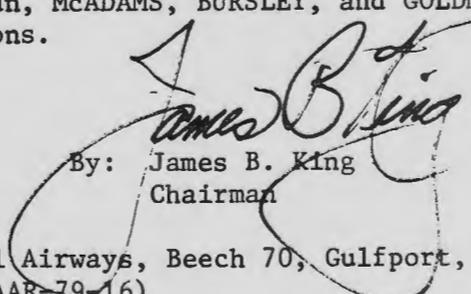
The Safety Board believes that the expansion of 14 CFR 135 operations, and particularly commuter air carrier operations, to more closely approximate those of air carriers certificated under 14 CFR 121, should be accompanied by measures to assure a comparable level of safety. Differences in the types of operational activities usually conducted by a commuter air carrier pilot are other factors which support a need for such changes. Commuter air carrier flights are usually short, and during a long-duty day a pilot can be required to make numerous approaches and landings, and numerous instrument approaches -- often conducted as single pilot IFR operations. The commuter air carrier pilot may be required to perform collateral duties such as baggage handling and aircraft refueling. These factors can all contribute to pilot fatigue, with a possible resultant deterioration of basic flying skills and judgment.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

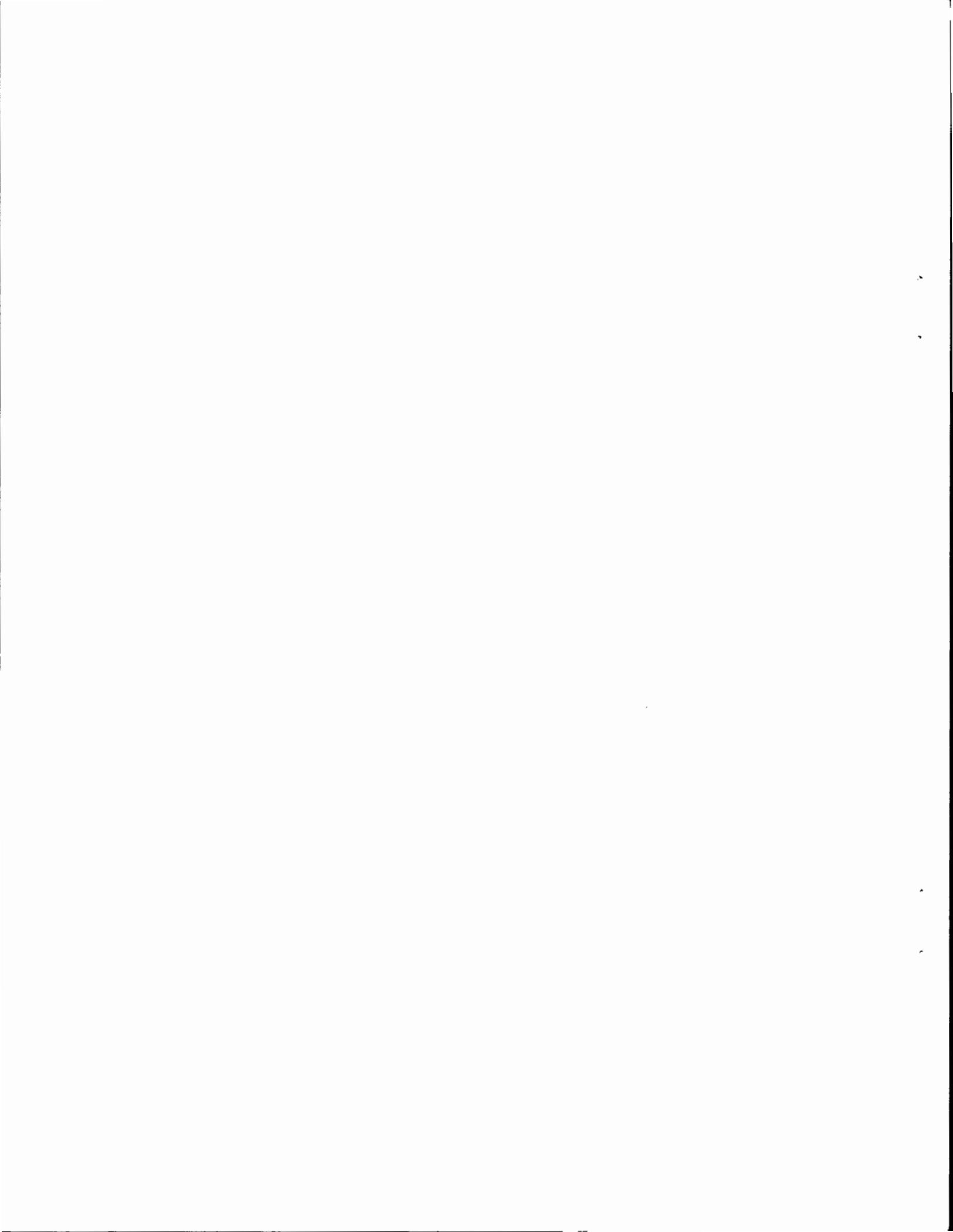
Require that pilots involved in 14 CFR 135 operations be thoroughly trained on the performance capabilities and handling qualities of aircraft when loaded to their maximum certificated gross weight or to the limits of their c.g. envelope, or both. (Class-II, Priority Action) (A-79-80)

Expedite rulemaking which would make the flight time and duty time limitations, and rest requirements for commuter air carriers the same as those specified for domestic air carrier crewmembers under 14 CFR 121. (Class-II, Priority Action) (A-79-81)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, BURSLEY, and GOLDMAN, Members, concurred in these recommendations.

  
By: James B. King  
Chairman

2/ Aircraft Accident Report: Universal Airways, Beech 70, Gulfport, Mississippi, March 1, 1979. (NTSB-AAR-79-16)  
Aircraft Accident Report: Columbia Pacific Airlines, Beech 99, Richland, Washington, February 10, 1978. (NTSB-AAR-78-15)  
Air New England, DHC-6, Yarmouthport, Massachusetts, June 17, 1979. (Currently under investigation)



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 25, 1980

The Honorable James B. King  
Chairman, National Transportation Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is a followup to our letter of February 12 concerning NTSB Recommendation A-79-86.

We have now completed our survey of terminal radar facilities in designated mountainous areas (per FAR, Part 95, Subpart B) and determined the availability of resources to produce emergency obstruction video maps (EOVM) for these sites. Based on our findings, we have decided to adopt your recommendation.

To fully implement your recommendation, an EOVM would be required at 77 terminal radar facilities. Unfortunately, approximately half of these facilities do not have space in their 5-channel video mappers to accommodate another map. Consequently, we cannot guarantee that all 77 facilities will employ an EOVM. Additionally, several of the identified facilities are operated by the military and may elect not to participate. We will, however, require that those facilities which now employ all video mapper channels evaluate alternatives such as combining existing maps, merging EOVMs with their minimum vectoring altitude maps or eliminating maps considered to be lower priorities than the EOVMs.

Enclosed is a list of the 77 facilities in priority order. The priorities within each region were determined by our regional offices and the overall list structured to avoid impacting a regional office with excessive EOVM coordination workload. Specifically, no more than two EOVMs per month should be delivered to a region. We expect EOVM delivery to the lead site within 120 days and then continued deliveries at the rate of two to three facilities per month dependent on resources at the National Ocean Survey.

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Please note that future automation enhancements such as the Discrete Address Beacon System/Data Link and the Automatic Traffic Advisory and Resolution Service will probably dictate radar operation in the full digital mode. In this event, we may no longer have the capability to display a map in the EOVM format (i.e., contour lines) at a number of our major facilities in mountainous areas such as Denver, Oakland, Los Angeles, and Pittsburgh in the not too distant future. Eventually, we expect that all radar facilities will be operating in the full digital mode. However, we will investigate alternative map formats such as a gross outline of mountainous terrain through straight-line depictions or grid mapping which appear to be viable strategies for a digital EOVM.

Sincerely,



Langhorne Bond  
Administrator

Enclosure



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

March 18, 1980

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter of February 12, 1980, responding to the National Transportation Safety Board's Safety Recommendations A-79-86 and A-79-87 issued November 15, 1979. These recommendations stemmed from the Safety Board's investigation of a Beech Travel Air accident on March 3, 1979. The aircraft crashed into mountains east of Elko, Nevada, while on an instrument flight rules (IFR) flight plan and under the control of the Salt Lake City Air Route Traffic Control Center (ARTCC).

In A-79-86, we recommended that the Federal Aviation Administration (FAA) require all terminal facilities located in designated mountainous areas to install and use emergency obstruction video radar maps (EOVM). We are pleased to note that the FAA agrees to this recommendation in principle and intends to further respond in 90 days. A-79-86 is therefore being maintained in an "Open--Acceptable Action" status.

In A-79-87, we recommended that the FAA design future ARTCC NAS Stage A radar systems to include the capability of incorporating EOVM and require those facilities servicing designated mountainous areas to be provided with and use the new systems installed. Prior to issuance of this recommendation, we realized that with the present system in use at ARTCC'S the EOVM would not be feasible. Therefore, we recommended that future ARTCC radar systems have this capability. In your reply you refer to the development of the En Route Minimum Safe Altitude Warning (E-MSAW). However, please be aware that the E-MSAW would not have prevented the accident cited or others that the Board has investigated. In addition to the warning that is provided by the E-MSAW, we believe that the controller should have a means of viewing terrain features. Therefore, we not only urge that the EOVM capability be considered in the design of the next generation of en route automation, but that the

Honorable Langhorne M. Bond

- 2 -

new equipment, in fact, incorporate that capability. For the present, we are maintaining A-79-87 in an "Open--Acceptable Action" status.

Sincerely yours,



James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

February 12, 1980

Honorable James B. King  
Chairman, National Transportation  
Safety Board  
800 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Chairman:

This is in response to your letter dated November 15, 1979, concerning NTSB Recommendations A-79-86 and A-79-87.

Recommendation A-79-86. Require all terminal facilities located in designated mountainous areas to install and use emergency obstruction video radar maps.

Comment. We agree in principle with NTSB's recommendation. However, before deciding on adoption, we must determine its impact on our terminal radar facilities (e.g., the loss of an existing video map slot) and the National Ocean Survey's (NOS) personnel resources. It is the latter organization which would be tasked to produce the approximately 60 emergency obstruction video maps (EOVM) that would be required.

You can expect our followup response on this recommendation within 90 days.

Recommendation A-79-87. Design future ARTCC NAS Stage A radar systems to include the capability of incorporating EOVMs and require those facilities servicing designated mountainous areas be provided with and use the feature as the new systems are installed.

Comment. The NTSB refers to the use of an EOVM as outlined in the Facility Management Handbook. However, NAS Stage A does not use a video map--the map is a digitized geographic display.

NAS Stage A has a center map consisting of up to 400 logical maps. There are a maximum of 2,048 words of storage available to design each logical map. Each straight line on a map consists of three words regardless of its length, and each curve on a map consists of many lines. For example, the Chicago Center contoured Lake Michigan on their logical maps and, to achieve this, had to make 1/8-inch line segments. Additionally, the only method of displaying alphanumeric characters on a logical map is through straight lines.

The map selected on an air route traffic control center Plan View Display (PVD) is a logical map. To attempt to display contour lines and terrain elevation information in mountainous areas would be impractical because of the limited amount of storage available (2,048 words per map). Additionally, if it were practical, the map would be highly complex and confusing.

The Denver Center presently has the mountains west of Denver contoured on their displays in the critical climb and descent areas. However, this is in 2,000-foot intervals without elevation information. The elevation information is derived from overhead charts. They attempted to expand on this, but found the displays to be too complex and confusing.

Your staff uses the terminal radar facilities in Seattle, Washington, and Tucson, Arizona, as an example of facilities using an EOVM. The terminal facilities have this capability because the map display is derived from a video mapper, unlike the digitized geographic display used in NAS Stage A radar system.

We are presently developing the En Route Minimum Safe Altitude Warning (E-MSAW) which will be a function of the NAS Stage A computer. E-MSAW will aid the controller by alerting him when a tracked Mode C equipped aircraft is below or is predicted by the computer to go below minimum IFR altitudes as prescribed in FAR Part 91.

In conclusion, we do not believe it feasible, with existing automation resources, to develop an EOVM which displays contour lines and terrain elevations in the NAS Stage A system. Although we believe we are making every effort in this area with the development of E-MSAW, we will, nevertheless, consider an EOVM capability in the design of the next generation en route automation system.

Sincerely,



Langhorne Bond  
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: November 15, 1979

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Forwarded to:

Honorable Langhorne M. Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-79-86 and -87

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On March 3, 1979, a Beech Travel Air, N644SE, crashed into mountains east of Elko, Nevada, killing all four persons aboard. The flight was on an instrument flight rules (IFR) flight plan and was under the control of the Salt Lake City Air Route Traffic Control Center (ARTCC). Shortly after the pilot reported to the ARTCC that he was leaving 13,000 feet for 14,000 feet, the aircraft developed problems with its left engine. The highest altitude the aircraft reached was 13,200 feet, at which point the pilot initiated a descending turn to the left. When the aircraft reached 11,600 feet, the pilot declared an emergency to Salt Lake City ARTCC and turned toward Elko, Nevada.

When the aircraft was at 10,800 feet, the controller transmitted, "...suggest you make a left turn and proceed eastbound from your position. There is a mountain range 12 o'clock and about 2 miles, ten eight on the altitude." When the controller suggested the turn, however, based on a mental correlation of terrain information from an overhead map with the display on his radar scope, the aircraft was already past the highest terrain along its projected track and the elevation of the terrain immediately ahead was between 5,000 and 6,000 feet. Nevertheless, the pilot made the turn to the left and the aircraft crashed into the mountain at the 9,400 foot level. The Safety Board believes that the controller was faced with an extremely difficult task in making a mental correlation of the two sources of information.

The Safety Board also believes that if an Emergency Obstruction Video Map, which displays contour lines and terrain elevation information, had been installed in the Salt Lake City ARTCC, the controller would have known precisely where the mountain range was located in relation to the aircraft, and hence would not have issued the suggested heading. The pilot would then have continued descent to the aircraft's single-engine service ceiling of 7,900 feet and proceeded toward Elko, Nevada.

In view of the foregoing and other accidents that it has investigated, the Safety Board believes that the use of the Emergency Obstruction Video Map, as outlined in paragraph 1481 of the Facility Management Handbook, should be expanded to include every ATC facility controlling airspace over designated mountainous areas.

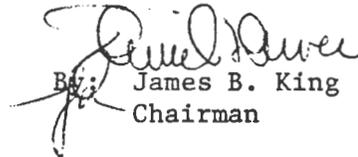
Currently, this type of map is being used at the terminal radar facilities in Seattle, Washington, and Tucson, Arizona, and other terminal facilities are equipped to accommodate the addition of this feature at small cost.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require all terminal facilities located in designated mountainous areas to install and use emergency obstruction video radar maps. (Class II, Priority Action) (A-79-86)

Design future ARTCC NAS Stage-A radar systems to include the capability of incorporating emergency obstruction video maps and require those facilities servicing designated mountainous areas be provided with and use the feature as the new systems are installed. (Class II, Priority Action) (A-79-87)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.

  
BW: James B. King  
Chairman

