

MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Report No. FAA-ASF-80-2

**LEVEL II**

12  
P.S.

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

AD A089971



**QUARTERLY REPORT  
April through June 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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16. Abstract <p>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.</p> <p>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-80-5 through 7), 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.</p>		
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## 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.

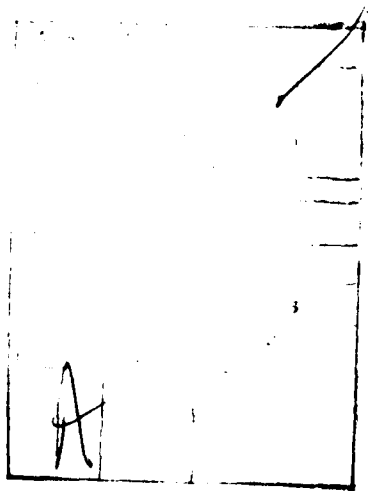
A notice of each recommendation and the receipt of a response from the agency is published in the Federal Register. There is no requirement to publish either the recommendation or the response in its entirety.

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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NEW RECOMMENDATIONS

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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 FAA action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-80-5 through 7), but background material is included only for those recommendations which remain in an "Open" status. Background information for those recommendations which have been closed are available in FAA headquarters files.

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 second quarter, April 1 - June 30, 1980:

- FAA initial responses to NTSB recommendations:

15 letters involving 24 recommendations

- FAA "final report" letters to NTSB:

6 letters involving 10 recommendations

Officially "Closed" by NTSB-----22 recommendations

There were three FAA responses to five 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>
12/15/79	A-80-9 & 10	1/23/80	4/16/80	Issued AD
9/29/79	A-80-11	2/5/80	5/5/80	Airworthiness Alert
3/8/80 (Incident)	A-80-20 & 21	3/14/80	5/13/80	Issued AD

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

A-80-9 and 10. On December 15, 1979, a Hughes 269C helicopter crashed 2 miles west of West Milton, Ohio, fatally injuring the pilot who was the only person on board the aircraft. Investigation revealed that an in-flight separation of the tailboom occurred at the P/N 269A2324-7 tailboom center attach fitting. The center attach fitting broke into more than three pieces that separated with the left and right tailboom support struts. A metallurgical examination of the fitting fracture disclosed evidence of a large preexisting fatigue crack through approximately 90 percent of the left side fracture.

The accident aircraft, N7483F, S/N 584, had an upgraded P/N 269A2324-7 tailboom center attach fitting which had been redesigned with increased thickness in the forward lugs to make it less susceptible to cracks and structural damage than the original fitting P/N 269A2324 design. Hughes Service Information Notice (HSIN) No. N-82.3, dated September 19, 1977, prescribed an inspection of the center section fitting and other fittings in the area of the lugs, but expressly states that the redesigned P/N 269A2324-7 fitting (factory equipped on all model 269C helicopters) is not subject to that notice. Moreover, HSIN No. N-82.3 does not pertain to any model 269C having a serial number greater than 569 and, therefore, was totally inapplicable to the accident aircraft. Separation of the P/N 269A2323-7 fitting can result in loss of the helicopter flight controllability.

The Board issued Safety Recommendations A-80-9 and 10 on January 23, 1980, addressing the 269C tailboom failure. It was recommended that the FAA require an immediate inspection of all tailboom center section fittings, P/N 269A2324-7, installed in Hughes model 269 helicopters for evidence of cracks and establish a schedule for recurring inspections of that fitting based on an appropriate number of operating hours.

The FAA concurred in these recommendations and on February 25, 1980, issued an airworthiness directive requiring initial and repetitive inspections of the tailboom center section fittings P/N 269A2324-7, installed on Hughes model 269 helicopters. On May 27, 1980, NTSB acknowledged that AD-80-WE-3-AD, Amendment 34-3707, fulfilled the objectives of both recommendations and classified A-80-9 and 10 in a "Closed--Acceptable Action" status.

A-80-11. On September 29, 1979, a Cessna Model 120, N72504, crashed near Vicksburg, Mississippi, after the right wing separated in flight. Both persons aboard, an instructor pilot and his student were killed. Investigation disclosed that the wing separated when the forward wing strut, upper rod-end spherical fitting failed. Metallurgical examination disclosed that the fitting was severely pitted and corroded. The fitting apparently had become pitted and corroded over a long period of time and, at the location of failure, corrosion was found to have penetrated almost the entire thickness of the fitting.

The airplane involved was manufactured in 1946, and was last inspected in February 1979. Although the external location of the spherical fitting makes it physically and visually accessible, evidence of corrosive deterioration, cracking, or elongation apparently was not detected during the inspection. According to the Board, paint which covered the lower portion of the fitting in the area of the failure, may have partially obscured the corrosion. Wing strut fittings similar to the one which failed are installed on many Cessna Model 140 airplanes. As of December 31, 1978, a total of 3,486 Cessna Model 120/140 aircraft were registered with the Federal Aviation Administration, the newest of which are approaching 30 years in service.

The Board issued Safety Recommendation A-80-11 on February 5, 1980, addressing the Cessna wing strut failure. It was recommended that FAA issue an airworthiness directive applicable to the Cessna Model 120 and 140 airplanes, requiring an immediate inspection of wing strut upper rod-end spherical fittings for corrosion, cracking, or elongation. If any of these conditions are detected, the fittings should be replaced before further flight. The FAA did not concur in this recommendation on the grounds that the failure was not a typical situation with regard to the normal maintenance procedures upon which the airworthiness of general aviation airplanes are dependent. A review of our records and those of the manufacturer revealed only one additional report of corrosion in this area during the past 5 years. There were no additional accidents or incidents on record associated with this condition.

Accordingly, on May 5, 1980, the FAA informed the NTSB that the adequacy of Cessna 120/140 wing strut upper rod-end spherical fittings would be assured by a suitable Airworthiness Alert regarding inspections of this area to repair stations and maintenance personnel. It was emphasized that the FAA does not issue airworthiness directives as a substitute for enforcing maintenance rules. To do so would dilute the significance of an airworthiness directive to the public at large and, more specifically, to the users of airworthiness directives. It would also have the long-term effect of reducing the effectiveness of the airworthiness directive program. The General Aviation Airworthiness Alert system is designed to identify and to emphasize maintenance significant items such as that identified in the NTSB investigation relative to Safety Recommendation A-80-11. The FAA, therefore, highlighted this situation in General Aviation Airworthiness Alert Number 24, dated July 1980. In citing this corrosion and severe pitting condition, the FAA wrote:

"A recent accident is attributable to failure of the right forward strut upper rod end attach fitting, which was induced by corrosion and severe pitting.

"Although the spherical rod end fittings are in an area which is easily inspected, it is obvious from the condition of both the failed part and the matching rod end from the opposite wing strut, that the corrosion was overlooked for an extended period of time.

"It is recommended that a detailed inspection of the entire wing strut assembly, including the spherical rod ends, be made for evidence of corrosion, pitting, cracking or other indications of impending failure as soon as possible, and again at each annual inspection. Some airplanes may have an optional fairing installed which must be removed to inspect the rod ends."

A-80-20 and 21. On March 8, 1980, a Swearingen SA-226 AT, N720R, with a crew of two and six passengers, experienced a rapid decompression at 16,000 feet when most of the aft cargo compartment door separated in flight. About 3/4 of the door, along with interior furnishings including an unoccupied passenger seat, separated from the aircraft. Two passengers were injured slightly during the decompression and the empennage was damaged slightly when some of the material from the cargo door or the cabin struck the upper fuselage and the vertical stabilizer. Some of the material from the cabin lodged around the control surfaces in the empennage. A safe landing was made in Albany, New York.

According to the NTSB, investigation indicated that the aircraft was being operated at a pressure differential of approximately 7 psi to maintain an approximate sea level pressure. Examination of the aircraft indicated that there were static failures of the door's latching mechanism, possibly because the mechanism was adjusted improperly. A review of the Service Difficulty Reports on this type of door showed that there had been 29 reports of various problems, including bent latches, stuck pins, misadjustments, and broken cables. There have been no previous reports of structural problems, failures, or in-flight separations.

There are about 200 of these aircraft in operation and a large number of them are being used in commuter/air taxi operations. The accident aircraft had accumulated about 2,200 hours of operation at the time of the accident. Accordingly, the NTSB recommended that the FAA issue a telegraphic Airworthiness Directive requiring an immediate inspection of the door latching mechanism of the aft cargo doors on all Swearingen SA-226 aircraft to assure proper adjustment and structural integrity, and issue an Airworthiness Directive restricting the cabin pressure differential in Swearingen SA-226 aircraft until the cause of the aft cargo door failure can be determined and an appropriate corrective action carried out.

Emergency telegraphic Airworthiness Directive (AD), No. T80SW 14, applicable to operators of Swearingen Model SA226TC and SA226AT airplanes, was issued on March 14, 1980. The AD required an immediate inspection of the door latching mechanism of the aft cargo door to assure proper adjustment, operation, and structural integrity, and prohibited flight operation with a pressurized cabin. On March 15, AD T80SW 14 was amended by adding a clarifying paragraph requiring compliance prior to further flight. On March 19, telegraphic AD T80SW 15 was issued, superseding AD T80SW 14, as amended. This AD T80SW 15 included the provisions of AD T80SW 14 and provided for inspection at 250-hour intervals to assure proper adjustment, operation, and structural integrity of the door system. On May 5, 1980, the Board expressed satisfaction with these ADs and classified A-80-20 and A-80-21 in a "Closed--Acceptable Action" status.

These actions, which constitute responses to Class I - Urgent Action recommendations, are the product of indepth study of the problem, and analysis of the air traffic control system, flight operations, airworthiness, or other areas within the purview of FAA regulatory and enforcement authority.

The third quarterly report will be published in October 1980. The Class I - Urgent Action recommendations that the FAA has responded to during the third quarter, CY-80, will be discussed, as well as such other issues that may be appropriate at that time.

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

April 10, 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-80-1 and 2, issued by the Board on January 11, 1980. These recommendations resulted from the Board's investigation of a Swift Aire Lines, Inc., Aerospatiale Nord 262 which ditched in Santa Monica Bay after experiencing the loss of both engines shortly after takeoff from Los Angeles International Airport, California. One engine was inadvertently shut down.

During its investigation, the Board found evidence that indicated the pilots were unable to restart the left engine because they had failed to place the propeller control lever in the feather position. Propeller feathering is necessary before an engine can be restarted successfully on the Nord 262 aircraft.

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

A-80-1. Require changes to the Nord 262 operations manuals that (1) alert the flightcrew to the fact that an airborne engine restart is not possible unless the propeller has been feathered; and (2) provide guidance to the flightcrew regarding the urgency of completing the full engine shutdown procedure after the loss of an engine.

Comment. We concur in this recommendation and must assume that the NTSB reference to "the Nord 262 operations manuals" refers to operations information maintained by the operator and not the FAA-approved airplane flight manual. We believe that the airplane flight manual does in fact provide sufficient guidance in this area. The emergency procedure for engine shutdown, if properly executed in accordance with the published checklist, will ensure that the engine control configuration is such that a restart can be successfully initiated. We will issue an air carrier operations bulletin to our field inspectors instructing them to ensure that proper emphasis is placed on air restart in the operator's training program and that the operator's operations manuals/checklists be reviewed for proper guidance on this procedure.

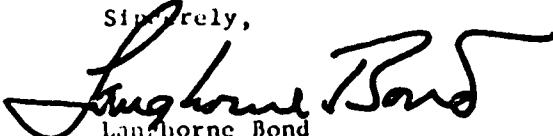
A-80-2. Require a change to the Nord 262 operations manuals that specifies an engine runup and autofeather check before any flight when the air temperature is below 0° C.



Comment. We concur in the recommendation and again must assume that the NTSB is referring to operations information maintained by the operator. Accordingly, we will include in the same operations bulletin guidance to the effect that field inspectors should ensure that operator's training programs, operations manuals, and checklists stress the importance of conducting an engine runup and autofeather check prior to flight in freezing weather conditions.

We believe that the foregoing actions will accomplish the objectives of recommendations A-80-1 and 2.

Sincerely,

  
Langhorne Bond  
Administrator

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

ISSUED: January 11, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-1 and -2

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On March 10, 1979, Swift Aire Lines, Inc., Flight 235, an Aerospatiale Nord 262, ditched in Santa Monica Bay after experiencing the loss of both engines shortly after takeoff from Los Angeles International Airport, California.

After liftoff from runway 24L, the right propeller autofeathered, and the right engine shut down. Seconds later the pilot apparently misidentified the failed engine and inadvertently shut down the left engine.

During its investigation, the National Transportation Safety Board found evidence that indicated the pilots were not able to restart the left engine because they had failed to place the propeller lever in the feather position. Propeller feathering is necessary before an engine can be restarted successfully on the Nord 262 aircraft.

At the time of the accident, there was no guidance in the company's Nord 262 operations manual indicating the urgency of setting the propeller control lever at "feather" while performing the post-autofeather procedure in order to perform a successful engine restart. After the accident, this deficiency was corrected in Swift Aire's operations manual; however, to our knowledge, no other Nord 262 operators have initiated manual changes of this nature.

The Safety Board believes this accident might have been prevented had the flightcrew been aware of the need to place the propeller lever in the feather position after engine shutdown since sufficient time was available for a successful restart.

2721-A

During its investigation of the Swift Aire accident, the Safety Board also learned that during cold weather operations Ransome Airlines had experienced numerous autofeather problems during Nord 262 engine runups and ground rolls for takeoff. Corrective action for some of these incidents required draining water from the autofeather propeller pressure hose.

As a result of these autofeather problems, Ransome Airlines initiated a requirement for engine runups and autofeather checks before the first flight of the day when the air temperature is below 0° C. This procedure reportedly has greatly reduced the number of autofeather problems previously experienced by this airline.

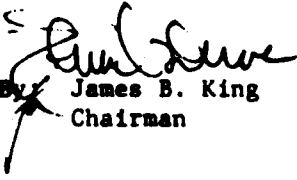
The use of this procedure indicates to the pilot that there is no blockage of the propeller feathering system, and it also minimizes an inadvertent activation of the autofeather system during takeoff which could be caused by trapped pressure in the airframe pitot system.

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

Require changes to the Nord 262 operations manuals that (1) alert the flightcrew to the fact that an airborne engine restart is not possible unless the propeller has been feathered; and (2) provide guidance to the flightcrew regarding the urgency of completing the full engine shutdown procedure after the loss of an engine. (Class II, Priority Action) (A-80-1)

Require a change to the Nord 262 operations manuals that specifies an engine runup and autofeather check before any flight when the air temperature is below 0° C. (Class II, Priority Action) (A-80-2)

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

  
By James B. King  
Chairman



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

May 9, 1980

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

Dear Mr. Bond:

Thank you for your letter of April 9, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-3 and 4, issued January 10, 1980. These recommendations stemmed from an incident involving a Tennessee Airways Cessna 402 on May 30, 1979.

In A-80-3 the Safety Board recommended that the Federal Aviation Administration (FAA):

"Inform all operators about the possibility and effects of a deteriorated O-ring packing on trim tab actuators on Cessna aircraft in General Aviation Airworthiness Alerts, Advisory Circular 43-16."

We are satisfied with the article the FAA proposes to publish in a General Aviation Airworthiness Alert calling attention to the more stringent and frequent inspections prescribed for Cessna 400 series - Trim Tab Actuators. Safety Recommendation A-80-3 is now classified in a "Closed--Acceptable Action" status.

In A-80-4 we recommended that the FAA:


"Review the present inspection criteria for inspection and lubrication of the elevator trim tab actuators and other similar actuators on Cessna 402's and prescribe more stringent criteria if they are not adequate to prevent failure of the actuator due to corrosion or inadequate lubrication."

Honorable Langhorne M. Bond

- 2 -

We are pleased to note that the FAA has conducted the recommended review and that through the General Aviation Airworthiness Alerts attention will be drawn to the more frequent inspection/lubrication intervals now prescribed in the service maintenance manuals. Safety Recommendation A-80-4 is also 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

April 9, 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 NTSB Safety Recommendations A-80-3 and A-80-4 issued by the Board on January 10, 1980. These recommendations resulted from the Board's review of a May 30, 1979, incident involving a Tennessee Airways Cessna 402, N87280, being operated as an air taxi.

In its January 10 transmittal letter, the Board stated that the pilot felt a "shudder" in the airframe during cruising flight. He reduced power and, as the airspeed slowed to 110 mph, the shudder stopped. During the landing approach, with the landing gear down and full flaps extended, the shudder began again at 95 mph and continued through the landing. The Board stated further that examination of the aircraft revealed that the elevator trim tab actuator jackscrew, Part Number 1260074-4, could be moved in and out without rotating it. Further examination by Cessna Aircraft Company revealed that the jackscrew O-ring packing had deteriorated and the jackscrew threads were rusted and badly worn because of a lack of lubrication. The Board's examination of the aircraft records indicated that the total aircraft time was 2,042 hours, but the Board could not determine when the actuator was last lubricated. The Board was also concerned that similar actuators are used in the aileron and rudder systems on this aircraft and on other Cessna aircraft.

FAA has carefully considered the Board's recommendations and provides the following comments and actions in response:

A-80-3. Inform all operators about the possibility and effects of a deteriorated O-ring packing on trim tab actuators on Cessna aircraft in General Aviation Airworthiness Alerts, Advisory Circular 43-16.

Comment. The Cessna 402 Service Manual specifies a "free-play" inspection every 100 hours. Also, the Service Manual specifies an inspection of the aileron, elevator, and rudder trim tab actuators for condition and security each 100 hours and warns against attempting to repair damaged components. Additionally, the Service Manual specifically mentions the O-ring as one part that has to be replaced with a new part on reassembly. We believe the corrosion or the faulty O-ring should

have been found on a repetitive 100-hour free-play or actuator inspection. Cessna Service Letter ME77-34, Supplement No. 1 (copy enclosed), dated February 13, 1978, reiterates the need for inspection of the trim tab control system at 100-hour intervals. Finally, Service Information Letter ME79-28 (copy enclosed), dated August 1, 1979, reduced the actuator servicing period from 1,500 to 1,000 hours. The maintenance manual is scheduled to be revised accordingly.

From a review of the Maintenance Difficulty Record we received on N87280, it is doubtful if the discrepant actuator had ever been serviced. Further, a free-play check of the tab would have indicated a problem long before the threads stripped.

We have three documented cases where Cessna Model 400 series, except the Model 441, airplanes had a completely free elevator trim tab, and four cases where an elevator trim tab was partially free. All were landed safely by reducing airspeed.

A proposed article (copy enclosed), calling attention to the maintenance manual criteria for trim tab actuator lubrication/overhaul, has been submitted for publication in General Aviation Airworthiness Alerts, Advisory Circular 43-16, as recommended.

A-80-4. Review the present inspection criteria for inspection and lubrication of the elevator trim tab actuators and other similar actuators on Cessna 402's and prescribe more stringent criteria if they are not adequate to prevent failure of the actuator due to corrosion or inadequate lubrication.

Comment. FAA has reviewed the present maintenance manual inspection and lubrication criteria for the trim tab systems on the Model 400 series airplanes. Except for the reduced actuator servicing period mentioned in our response to A-80-3 and soon to be incorporated in the maintenance manual, we consider the current criteria adequate.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosures

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

ISSUED: January 10, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-3 and-4

On May 30, 1979, a Tennessee Airways Cessna 402, N87280, being operated as an air taxi, was in cruising flight when the pilot felt a "shudder" in the airframe. He reduced power and as the airspeed slowed to 110 mph the shudder stopped. The pilot diverted the flight to Shelbyville, North Carolina, and during the landing approach, with the landing gear down and full flaps extended, the shudder began again at 95 mph and continued throughout the landing. Examination of the aircraft revealed that the elevator trim tab actuator jackscrew, Part Number 1260074-4, could be moved in and out without rotating it.

The trim tab actuator assembly was taken to Cessna Aircraft Company, Wichita, Kansas, and examined. Examination revealed that the jackscrew o-ring packing had deteriorated and the jackscrew threads were rusted and badly worn because of a lack of lubrication.

The Service Manual requires a trim tab "free play" inspection every 100 hours. However, the condition of the packing is not ascertained during this inspection procedure. The interval between actuator lubrication is 1,500 hours; this long interval is adequate only if the packing remains in good condition. Examination of the aircraft records indicated that the total aircraft time was 2,042 hours. The Safety Board could not determine when the actuator was last lubricated.

A check of service difficulty records showed four other possible cases of this type of distress on Cessna model 402 aircraft. In addition, the Safety Board understands that similar actuators are used in the aileron and rudder systems on this aircraft and on other Cessna aircraft.

Since a divergent tail flutter with subsequent aircraft damage can be caused by a free tab, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Inform all operators about the possibility and effects of a deteriorated o-ring packing on trim tab actuators on Cessna aircraft in General Aviation Airworthiness Alerts, Advisory Circular 43-16. (Class II, Priority Action) (A-80-3)

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Review the present inspection criteria for inspection and lubrication of the elevator trim tab actuators and other similar actuators on Cessna 402's and prescribe more stringent criteria if they are not adequate to prevent failure of the actuator due to corrosion or inadequate lubrication. (Class II, Priority Action) (A-80-4)

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

April 10, 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-80-5 through 7, issued by the Board on January 11, 1980. These recommendations resulted from the Board's investigation of an accident involving a Cessna 182 which crashed while maneuvering for an emergency landing after loss of engine power. The investigation revealed water in both the carburetor and fuel strainer.

The following comments and actions are provided in response to these recommendations:

A-80-5 and A-80-6. Distribute among general aviation pilots and operators the information in Advisory Circular 20-43C concerned with eliminating water from fuel.

Require that all Accident Prevention Specialists in FAA District Offices make elimination of water from fuel systems an item for special emphasis in their contacts with general aviation pilots and operators.

Comment. We concur in these recommendations. To implement them, our Accident Prevention Specialists have been advised to place special emphasis, in their presentations to general aviation pilots and operators, on the importance of removing water from the aircraft fuel system prior to flight. In addition, the Accident Prevention Specialist will distribute among general aviation pilots and operators the information in both Advisory Circular 20-43C, Aircraft Fuel Control, and Advisory Circular 00-34A, Aircraft Ground Handling and Servicing, that contain procedures for removal of water and contaminants from aviation fuels and aircraft fuel systems.

We enclose a copy of the implementing letter for your reference.

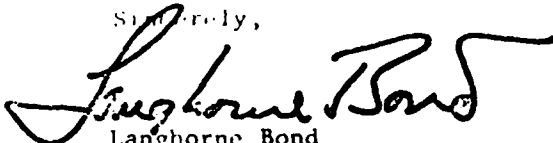
A-80-7. Require that Cessna include in Pilots Operating Handbooks or Flight Manuals for all its aircraft models a detailed discussion of, and specific instructions for, the detection and elimination of water from the fuel systems of these aircraft.

Comment. Our review of Cessna Handbooks and Manuals indicates that the instructions which have been provided over the years in the Owner's Manual and Pilot's Operating Handbooks, if followed, are adequate for

detection and elimination of water from the aircraft fuel systems. This is supported by the accident/incident records for 1978, which show 19 cases or .026 percent of the 72,146 high-wing Cessna aircraft registered had a problem with water in the fuel. Based on this information, we believe that insufficient justification exists to require mandatory revision of all previous Owner's Manuals or Pilot's Operating Handbooks to amplify fuel system water detection and removal instructions. However, the recommendation will be forwarded to Cessna for their consideration in future revisions of existing Owner's Manuals or Pilot's Operating Handbooks, and in new Pilot's Operating Handbooks.

We believe that the foregoing actions will accomplish the objectives of NTSB Recommendations A-80-5 through 7.

Sincerely,



Langhorne Bond  
Administrator

Enclosure

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

ISSUED: January 11, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-5 through -7

During 1978 there were at least 19 accidents or incidents involving various models of high wing Cessna aircraft in which engine power was lost because of water in the fuel. Many of these are documented at the FAA's Maintenance Analysis Center in Oklahoma City.

Typical of these is an accident which occurred at Cape Girardeau, Missouri, on August 30, 1978. The Cessna 182 crashed while maneuvering for an emergency landing after loss of engine power. The investigation revealed water in both the carburetor and fuel strainer. This model airplane had the fuel strainer drain control knob located inside the cabin so that the operator could not see the fuel as it was drained. Also there were no quick-drain valves installed in the sumps. The pilot stated that he "drained the strainer three times"; however, it was apparent that he did not have a full understanding of the proper way to eliminate water from the fuel lines and sumps.

Owners manuals for Cessna 150, 172, 182, 210 for model years from 1957 to 1977 were reviewed. This review showed that there are inadequate instructions and descriptions as to the proper method of eliminating water from the fuel system.

The Safety Board discussed fuel contamination in some detail in its 1974 Special Study of General Aviation Accidents Involving Fuel Starvation. At that time, the Safety Board made recommendations to the Federal Aviation Administration (A-74-35 and A-74-36) directed to making more specific, detailed information available to pilots. Both the FAA and the General Aviation Manufacturers Association (GAMA) agreed with the intent of the recommendations. However, except for the reissuance of Advisory Circular 20-43C in October 1976 in limited distribution, the Safety Board is not aware of any effort on the part of either FAA or the manufacturers to make such information available.

The Safety Board believes that Advisory Circular 20-43C presents the kind of explanation and details which pilots need in order to properly purge water

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from their airplane's fuel systems. We also believe that the same type of information should be provided in Airplane Flight Manuals or Owner's manuals.

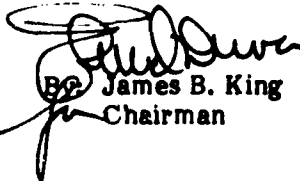
Accordingly, the Safety Board recommends that the Federal Aviation Administration:

Distribute among general aviation pilots and operators the information in Advisory Circular 20-43C concerned with eliminating water from fuel. (Class II, Priority Action) (A-80-5)

Require that all Accident Prevention Specialists in FAA District Offices make elimination of water from fuel systems an item for special emphasis in their contacts with general aviation pilots and operators. (Class II, Priority Action) (A-80-6)

Require that Cessna include in Pilots Operating Handbooks or Flight Manuals for all its aircraft models a detailed discussion of, and specific instructions for, the detection and elimination of water from the fuel systems of these aircraft. (Class II, Priority Action) (A-80-7)

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

  
James B. King  
Chairman



## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

June 6, 1980

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

Dear Mr. Bond:

Reference is made to your letter of April 18, 1980, responding to the National Transportation Safety Board Safety Recommendation A-80-8 issued January 21, 1980. This recommendation resulted from a Trans World Airlines B-727 maneuver accident over southern Michigan on April 4, 1979. The aircraft entered a high-speed spiral dive while cruising at 39,000 feet, from which it did not recover until it descended to an altitude between 5,000 and 6,000 feet. An emergency landing was made at an alternate airport. There was extensive inflight damage. The No. 7 leading edge slat on the right wing, the No. 10 spoiler panel, and several other components were missing. We recommended that the Federal Aviation Administration (FAA) in cooperation with the Boeing Company:

"Disseminate to all Boeing 727 operators and flightcrews information of the type included in Boeing Operations Manual Bulletin 75-7 and TWA Flight Operations Safety Bulletin 79-3, which address control problems associated with high-speed asymmetrical leading edge slat configuration on B-727 aircraft."

The Safety Board has difficulty accepting the FAA's reasons for not concurring in this recommendation. Although the accident is still under investigation, it is already known that isolation of the No. 7 leading edge slat in the extended position created lateral control problems. Both referenced bulletins address operational aspects related to high-speed asymmetric slat extension, not just "failures discovered during scheduled maintenance. . . ." The Boeing bulletin indicates that if a slat should extend in flight, "Significant lateral control would be required to prevent high roll rates." We believe that the flight simulations mentioned in the TWA bulletin have accurately demonstrated the measure of lateral control needed by a pilot to cope with a high-speed asymmetric leading edge slat configuration in the B-727. Consequently, notwithstanding the low probability of slat extension without

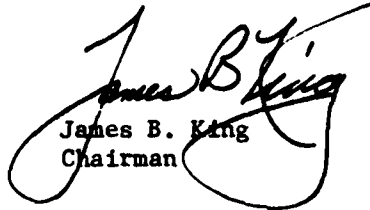
Honorable Langhorne Bond

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some advance warning, we believe it important that B-727 pilots be made aware of the control problems associated with an asymmetrical configuration. This obviously was part of the original intent of the Boeing bulletin which, according to several pilots involved with the investigation, was never brought to their attention.

We believe that sufficient factual information has been developed in the investigation to define the dimensions of the problems and the measures of control needed by a pilot to retain control of the aircraft. We further believe this information should be made available to the pilot. Therefore, we request the FAA to reconsider this recommendation, which we are maintaining in an "Open--Unacceptable Action" status.

Sincerely yours,



James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

April 18, 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-80-8 issued by the Board on January 21, 1980. This recommendation resulted from the Board's investigation of an incident which occurred on April 4, 1979, when a Trans World Airlines B-727 entered a high-speed spiral dive while cruising at 39,000 feet (FL390) near Saginaw, Michigan. The aircraft did not recover from the dive until the aircraft reached an altitude between 5,000 and 6,000 feet m.s.l. despite flightcrew actions to counteract the maneuver. The aircraft was then landed under emergency conditions at an alternate airport. The aircraft was damaged extensively, and the No. 7 leading edge slat on the right wing, the No. 10 spoiler panel, and several other components were missing.

The following are FAA's comments in response to this recommendation:

Recommendation A-80-8. Disseminate to all Boeing 727 operators and flightcrews information of the type included in Boeing Operations Manual Bulletin 75-7 and TWA Flight Operations Safety Bulletin 79-3 which address control problems associated with high-speed asymmetrical leading edge slat configuration on B-727 aircraft.

Comment. We do not concur in this recommendation for the reasons outlined below:

In the recommendation, reference is made to Boeing 727 Air Carrier Operations Bulletin 75-7 and to TWA Flight Operations Safety Bulletin 79-3 (the former serves as a basis for the latter) with the suggestion that these documents provide valuable information to B-727 crews who may be faced with circumstances similar to those encountered on TWA flight 841 of April 4, 1979. We do not find this logic acceptable for the following reasons:

a. The subject bulletins address failures discovered during scheduled maintenance; not in flight.



b. Failure of internal lockrings discussed therein posed potential inadvertent slat extension only if:

- (1) hydraulic system "A" had failed;
- (2) air speed was in excess of M  $\quad$  ; and  
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- (3) flight spoilers were extended.

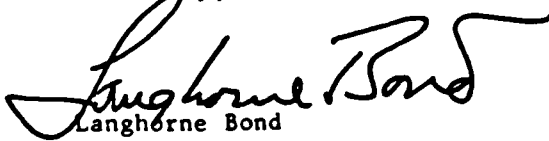
It is extremely improbable that the above would happen at all, and certainly not without considerable advance indications of slat malfunction through slow actuation, incomplete stowage, or other symptoms readily identifiable on the flight deck during normal system operations. (To the best of our knowledge, none of the above symptoms or crew actions were revealed in the NTSB investigation or any other investigative findings.)

c. Bulletin recommendations were intended to alert pilots to avoid possible abnormal lateral inputs if the above symptoms become evident; not what steps should be taken to recover once the resultant maneuver was under way.

As you know, the Board is still developing information for its use in deliberations to develop a probable cause and it appears possible that all facts which preceded the April 4, 1979, incident may not be ascertained. Without such facts, no meaningful conclusions can be reached concerning design deficiencies, training needs, or operational limitations.

We therefore concur with Boeing that the TWA flight 841 experience should be considered an isolated incident which may never be duplicated. We do not believe that this approach to the TWA flight 841 problem is appropriate at this time, and it is at least premature, pending the Board's final deliberations. In the meantime, we will continue to support the efforts of the Performance Group in the evaluation of existing evidence and data.

Sincerely,

  
Langhorne Bond  
Administrator

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

ISSUED: January 21, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-8

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On April 4, 1979, a Trans World Airlines B-727 entered a high-speed spiral dive while cruising at 39,000 feet (FL390) near Saginaw, Michigan. The aircraft did not recover from the dive until the aircraft reached an altitude between 5,000 and 6,000 feet m.s.l. despite flightcrew actions to counteract the maneuver. The aircraft was then landed under emergency conditions at an alternate airport. The aircraft was damaged extensively, and the No. 7 leading edge slat on the right wing, the No. 10 spoiler panel, and several other components were missing.

During its investigation, the Safety Board examined the effects of full extension of the No. 7 slat on aircraft performance and control during level flight and descent. Using a Boeing engineering simulator, it was determined that the extended slat will generate a right roll which will be countered by the autopilot until its roll authority is exceeded. At the onset, the roll is readily recognizable and controllable as long as lateral controls are used with minimal delay and only to the extent needed to return the aircraft to a wings-level attitude. If the application of corrective controls is delayed and then used to full travel, an uncontrollable, steep descending spiral will develop. This occurs at certain Mach number and angle of attack relationships where the extended slat generates rolling moments that exceed the control authority available to the pilot. The spiral will continue until Mach number and angle of attack values are reduced or until the slat separates from the aircraft. The simulation results confirm the flightcrew's description of the spiral dive and the loss of roll control until the slat separated from the aircraft. Under certain conditions, recovery would not be possible.

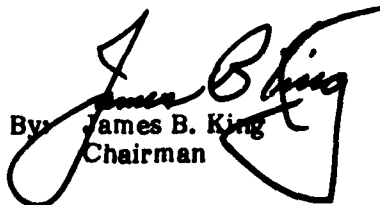
The Safety Board believes that an extended No. 7 slat precipitated control problems that culminated in a loss of control. The Safety Board is also aware of TWA Safety Bulletin 79-3 and Boeing Operations Manual Bulletin 75-7 that, to a degree, inform flightcrews of the recognition and control aspects of an asymmetric slat configuration. The Safety Board believes that flightcrews must be able to recognize and react to such a condition and that there is a need to more widely disseminate comprehensive guidance to flightcrews.

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Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration in cooperation with the Boeing Company:

Disseminate to all Boeing 727 operators and flightcrews information of the type included in Boeing Operations Manual Bulletin 75-7 and TWA Flight Operations Safety Bulletin 79-3 which address control problems associated with high-speed asymmetrical leading edge slat configuration on B-727 aircraft. (Class II, Priority Action) (A-80-8)

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

  
By James B. King  
Chairman



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

May 27, 1980

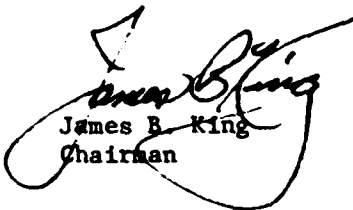
Honorable Langhorne Bond  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter of April 16, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-9 and A-80-10. These recommendations stemmed from our investigation of an in-flight separation of the tailboom of a Hughes 269C helicopter. The recommendations called for immediate and repetitive inspections of Hughes Model 269 series helicopters equipped with a certain tailboom center support fitting.

The Safety Board is pleased to note that the Federal Aviation Administration issued an Airworthiness Directive regarding Hughes Model 269 Helicopters (Docket No. 80-WE-3-AD; Amendment 39-3707), effective March 13, 1980, to fulfill the objectives of both recommendations. Safety Recommendations A-80-9 and A-80-10 are 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

April 16, 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-80-9 and 10, issued by the Board on January 23, 1980. These recommendations resulted from the Board's investigation of an in-flight separation of the tailboom of a Hughes 269C helicopter.

The following comments and actions are provided in response to these recommendations:


A-80-9 and A-80-10. Require an immediate inspection of all tailboom center section fittings, P/N 269A2324-7, installed in Hughes model 269 helicopters for evidence of cracks.

Establish a schedule for recurring inspections of that fitting based on an appropriate number of operating hours.

Comment. The FAA concurs in these recommendations and on February 25, 1980, issued an airworthiness directive requiring initial and repetitive inspections of the tailboom center section fittings P/N 269A2324-7, installed on Hughes Model 269 helicopters. We enclose a copy of the airworthiness directive for your reference.

We believe that compliance with the airworthiness directive, which became effective March 13, 1980, will accomplish the objectives of NTSB Recommendations A-80-9 and 10.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure

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

ISSUED: January 23, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-9 and 10

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On December 15, 1979, a Hughes 269C helicopter crashed 2 miles west of West Milton, Ohio, fatally injuring the pilot who was the only person on board the aircraft.

Preliminary investigation has indicated that an in-flight separation of the tailboom occurred at the P/N 269A2324-7 tailboom center attach fitting. The center attach fitting broke into more than three pieces that separated with the left and right tailboom support struts. The forward end of the fitting was attached to the tailboom tube by 16 rivets, with 8 rivets on each side of the fitting centerline. Fracture of the P/N 269A2324-7 fitting occurred in the web portion between the forward center portion and the left and right ends, incorporating the first three rivets forward on the left side and the second through fifth rivets forward on the right side. A preliminary metallurgical examination of the fitting fracture disclosed evidence of a large preexisting fatigue crack through approximately 90 percent of the left side fracture. High cycle, low stress fatigue crack initiations occurred at the intersection of the rivet holes and top surface of the web which mates with the tailboom tube, at the top surface of the web at the forward faying surface of the tailboom tube, and at the top surface of the flange in the forward center section of the fitting between the strut lugs. The fracture on the right side of the fitting showed evidence of a high stress, low cycle fatigue crack initiating in the web just forward of the rivets. Initiation of the right side fatigue crack was along the faying surface adjacent to the tube with fatigue progression through the fitting web thickness in the downward direction. The right side fracture appeared secondary to the left side fracture. Metallurgical examination of this component is continuing.

The accident aircraft, N7483F, S/N 584, had an upgraded P/N 269A2324-7 tailboom center attach fitting which had been redesigned with increased thickness in the forward lugs to make it less susceptible to cracks and structural damage than the original fitting P/N 269A2324 design. Hughes Service Information Notice (HSIN) No. N-82.3, dated September 19, 1977, prescribed an inspection of the center section fitting and other fittings in the area of the lugs but expressly states that the redesigned P/N 269A2324-7 fitting (factory equipped on all model 269C helicopters) is not subject to that notice. Moreover, HSIN No. N-82.3 does not pertain to any model 269C having a serial number greater than 569 and, therefore, was totally inapplicable to the accident aircraft.

FAA Airworthiness Directive 76-18-01, Amendment 39-2707, required inspection of the P/N 269A2324 fittings but excludes any examination of the redesigned P/N 269A2324-7 fittings. Therefore, no inspection requirements by airworthiness directive or HSIN exist for the P/N 269A2324-7 fitting.

Separation of the P/N 269A2323-7 fitting will result in loss of the helicopter flight controllability.

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

Require an immediate inspection of all tailboom center section fittings, P/N 269A2324-7, installed in Hughes model 269 helicopters for evidence of cracks. (Class I, Urgent Action) (A-80-9)

Establish a schedule for recurring inspections of that fitting based on an appropriate number of operating hours. (Class I, Urgent Action) (A-80-10)

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

May 5, 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-80-11, issued by the Board on February 5, 1980. The recommendation resulted from the Board's investigation of a fatal accident involving a Cessna Model 120, N72504, which crashed near Vicksburg, Mississippi, on September 29, 1979, after the right wing separated in flight.

Investigation disclosed that the wing separated when the forward wing strut, upper rod-end spherical fitting failed. Metallurgical examination disclosed that the fitting was severely pitted and corroded. The fitting apparently had become pitted and corroded over a long period of time and, at the location of failure, corrosion was found to have penetrated almost the entire thickness of the fitting.

The following are the Federal Aviation Administration's comments and action in response to this recommendation:

A-80-11. Issue an Airworthiness Directive applicable to the Cessna Model 120 and 140 airplanes, requiring an immediate inspection of wing strut upper rod-end spherical fittings for corrosion, cracking, or elongation. If any of these conditions are detected, the fittings should be replaced before further flight.

Comment. We do not concur in this recommendation. The failure was related to inattentive maintenance over an extended period of time. This is not a typical situation with regard to the normal maintenance procedures upon which the airworthiness of general aviation airplanes are dependent. A review of our records and those of the manufacturer reveals only one additional report of corrosion in this area during the past 5 years. There are no additional accidents or incidents of record associated with this condition. The adequacy of Cessna 120/140 wing strut upper rod-end spherical fittings will be assured by a suitable Airworthiness Alert regarding inspections of this area to repair stations and maintenance personnel. Therefore, we are developing an Airworthiness Alert to bring this to the attention of maintenance inspectors and repair stations.

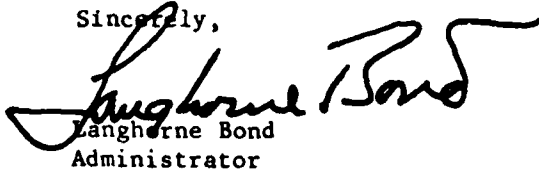


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The FAA does not issue airworthiness directives as a substitute for enforcing maintenance rules. To do so would dilute the significance of an airworthiness directive to the public at large and more specifically to the users of airworthiness directives and would have the long-term effect of reducing the effectiveness of the airworthiness directive program. The General Aviation Airworthiness Alert system is designed to identify and to emphasize maintenance significant items such as the one identified in the NTSB investigation which preceded recommendation A-80-11. Therefore, the issuance of an Airworthiness Alert is the most appropriate way to ensure efficiency of future maintenance of wing strut upper rod-end spherical fittings.

We believe that the above-mentioned action will fulfill the objective of NTSB Safety Recommendation A-80-11 while incurring the least burden on owners and operators.

Sincerely,



Langhorne Bond  
Administrator

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

ISSUED: February 5, 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-80-11

On September 29, 1979, a Cessna Model 120, N72504, crashed near Vicksburg, Mississippi, after the right wing separated in flight. Both persons aboard, an instructor pilot and his student, were killed.

Investigation disclosed that the wing separated when the forward wing strut, upper rod-end spherical fitting failed. Metallurgical examination disclosed that the fitting was severely pitted and corroded. The fitting apparently had become pitted and corroded over a long period of time and, at the location of failure, corrosion was found to have penetrated almost the entire thickness of the fitting.

The airplane involved was manufactured in 1946, and was last inspected in February 1979. Although the external location of the spherical fitting makes it physically and visually accessible, evidence of corrosive deterioration, cracking, or elongation apparently was not detected during the inspection. Paint, which covered the lower portion of the fitting in the area of the failure, may have partially obscured the corrosion.

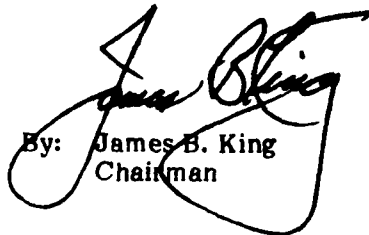
Wing strut fittings similar to the one which failed are also installed on many Cessna Model 140 airplanes. As of December 31, 1978, a total of 3,486 Cessna Model 120/140 aircraft were registered with the Federal Aviation Administration, the newest of which are approaching 30 years in service.

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

Issue an Airworthiness Directive applicable to the Cessna Model 120 and 140 airplanes, requiring an immediate inspection of wing strut upper rod-end spherical fittings for corrosion, cracking, or elongation. If any of these conditions are detected, the fittings should be replaced before further flight. (Class I - Urgent Action) (A-80-11)

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



By: James B. King  
Chairman



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

June 3, 1980

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

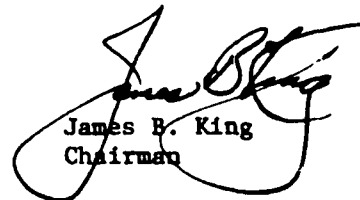
Dear Mr. Bond:

Thank you for your letter of May 6, 1980, responding to National Transportation Safety Board Safety Recommendation A-80-12. This recommendation stemmed from our concern about certain potentially critical flight characteristics of the de Havilland Twin Otter, DHC-6 airplane. We recommended that the Federal Aviation Administration (FAA):

"Immediately notify all DHC-6 operators of the aircraft's unique operational requirements during a full-flap go-around, and of the need for maintaining a nose-down airplane pitch attitude and adequate airspeed during this phase of flight."

The Safety Board is pleased to note that de Havilland Aircraft of Canada, Ltd., has incorporated a caution note in their DHC-6 Aircraft Flight Manual, and that the FAA has issued Operations Bulletin No. 2-80-1 to fulfill the recommendation. The status of A-80-12 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

May 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-80-12, issued by the Board on February 6, 1980. The recommendation resulted from the Board's evaluation of flight characteristics of the DeHavilland Twin Otter, DHC-6 airplane, which involve the proper pitch attitude and airspeed during go-around maneuvers in the short takeoff and landing full-flap configuration.

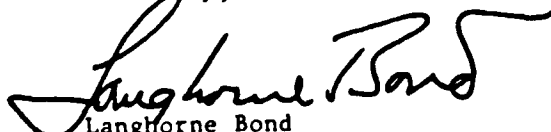
The following Federal Aviation Administration comments and actions are in response to the recommendation:

A-80-12. Immediately notify all DHC-6 operators of the aircraft's unique operational requirements during a full-flap go-around, and of the need for maintaining a nose-down airplane pitch attitude and adequate airspeed during this phase of flight.

Comment. DeHavilland Aircraft of Canada, Ltd., has incorporated a caution note in their DHC-6 Aircraft Flight Manual regarding full-flap go-arounds. This revision was effective February 21 and states that on go-arounds with flaps extended, the aircraft's nose will point below the actual flight path, and appropriate climb airspeed should be maintained. The flight manual revision is enclosed. Operations Bulletin Number 2-80-1 to our field offices was issued on April 17, 1980. The bulletin contains appropriate guidance to assist principal inspectors in their contacts with assigned air taxi operators (copy enclosed).

We believe the foregoing actions will accomplish the objective of NTSB Safety Recommendation A-80-12.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosures

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

ISSUED: February 6, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-12

Recently, the National Transportation Safety Board received a copy of a letter sent by an air carrier check pilot to a Federal Aviation Administration operations inspector. The letter described certain potentially critical flight characteristics of the deHavilland Twin Otter, DHC-6 airplane, which involve the proper pitch attitude and airspeed during go-around maneuvers in the short takeoff and landing full-flap configuration.

A go-around or balked landing in the DHC-6 with full-flaps (37 1/2°) must be performed with the nose below the horizon, avoiding rotation of the nose of the airplane above the horizon. An excessive initial pitch attitude or a very rapid pitch change, or both, results in rapid deterioration of airspeed, a stall and a loss of control. The nose of the airplane must be kept below the actual flightpath until the flaps have been retracted.

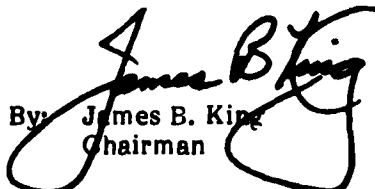
A DHC-6 pilot accustomed to conventional nose-high pitch attitudes during go-around may not be fully appreciative of or familiar with the relatively nose-low, short takeoff and landing pitch requirements of the DHC-6 during a full-flap go-around. Currently, there is no precautionary or instructive material in the DHC-6 flight manual relating specifically to this phase of flight. DeHavilland Aircraft of Canada, Ltd., has informed the Safety Board of its intention to provide such supplemental information in the manual in the near future. However, according to the Ministry of Transport, Canada, the certifying authority for the DHC-6, some flight testing of the airplane will be required before the new information is approved.

In the interim, the Safety Board believes that all DHC-6 operators should be advised explicitly of the unique and critical pitch attitude requirements during a full-flap go-around and of the need to maintain the recommended go-around airspeed. The Safety Board, therefore, recommends that the Federal Aviation Administration:

2865

Immediately notify all DHC-6 operators of the aircraft's unique operational requirements during a full-flap go-around, and of the need for maintaining a nose-down airplane pitch attitude and adequate airspeed during this phase of flight. (Class II, Priority Action) (A-80-12)

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

  
By: James B. King  
Chairman



## National Transportation Safety Board

Washington, D.C. 20594

Office of  
Chairman

June 3, 1980

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

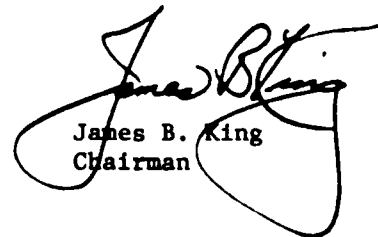
Dear Mr. Bond:

Thank you for your letter dated May 13, 1980, responding to the National Transportation Safety Board Safety Recommendations A-80-13 and 14 issued February 13, 1980. These recommendations stemmed from our investigation of a Beech 70 (Queen Air) crash just after takeoff at Gulfport, Mississippi, on March 1, 1979. The nose baggage door came open and struck the propeller.

The Safety Board is pleased to note that the Federal Aviation Administration (FAA) concurs with the intent of A-80-13 and that a study will be initiated of the baggage door locking mechanism for light twin engine aircraft. The status of this recommendation is classified as "Open--Acceptable Alternate Action."

In A-80-14, we recommended that the FAA require that the nose baggage door interrupter system on all Beech models be operational before flight. We note that the FAA concurs with this requirement and is enforcing such action. The status of this recommendation is 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

May 13, 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-80-13 and 14, issued by the Board on February 13, 1980. These recommendations resulted from the Board's investigation of a fatal accident of a Beech 70 Excalibur Conversion (Queen Air), N777AE, which crashed just after takeoff on March 1, 1979, at Gulfport, Mississippi.

The investigation revealed that the nose baggage door came open during takeoff and struck the left propeller. The door apparently had not been secured properly by the station agent who had removed baggage from the compartment.

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

A-80-13. Take action to provide double failure protection by means of a secondary locking device on nose baggage doors of light twin engine aircraft engaged in Part 135 operations.

Comment. We concur in the intent of this recommendation. Action will be taken to initiate a study to determine if an additional nose baggage door locking mechanism is needed for any specific light twin engine aircraft engaged in Part 135 operations. If this study shows that an additional mechanism is needed on certain model airplanes, we will coordinate with the appropriate manufacturer to develop such an improvement. We will inform the Board of the results of the study and subsequent action.

A-80-14. Require that the nose baggage door interrupter system on all Beech Aircraft models so equipped be operational before flight.

Comment. We concur in the requirement that baggage door interrupter systems should be operational before flight.

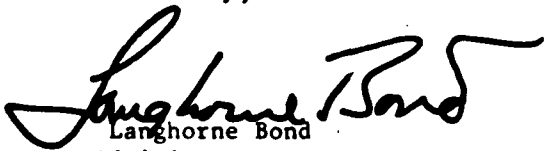
Federal Aviation Regulations (FARs) 135.143a, 91.29, and 91.165 were cited by enforcement action that was completed on February 7, 1980, against Universal Airways, Inc., as a result of operating airplane N777AE in an unairworthy condition with the baggage door starter interrupter system inoperative.

Approved Minimum Equipment Lists that are related to FAR 135.179 do not mention the interrupter system; however, this system is specified by the type designs for the airplanes that are under consideration. Consequently, FAR 135.143 requires the interrupter system to be operational before flight for air taxi operations. For general operations, the same requirements are imposed by FARs 91.29 and 91.165.

Noncompliance with the above requirements, rather than the absence of requirements, caused the service difficulties cited by the Board. In order to achieve compliance, Order 8440.5A was revised on April 9, 1979, to incorporate revised Operations Bulletin Number 75-1. We also issued a Maintenance Note on page 12 of General Airworthiness Alert Number 10 during May 1979 (copies enclosed).

We believe that the foregoing actions will fulfill the objective of NTSB Safety Recommendations A-80-13 and 14.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosures

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

ISSUED: February 13, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-13 and -14

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On March 1, 1979, a Beech 70 Excalibur Conversion (Queen Air), N777AE, crashed just after takeoff from the Gulfport-Biloxi Regional Airport, Gulfport, Mississippi. The aircraft was being operated by Universal Airways, Inc., under 14 CFR 135.

The aircraft took off from runway 17 and reached an altitude of 100 feet at the departure end of the runway. At this time, the pilot told Gulfport Tower, "Universal 76 is taking it around, going to land, going to land on 13." Witnesses stated that as the aircraft began a right turn the nose "pitched up" following which the aircraft immediately entered a steep dive, which it maintained until ground impact. All eight occupants were killed; there was no fire after impact.

The investigation revealed that the nose baggage door came open on takeoff and struck the left propeller. The door apparently had not been secured properly by the station agent who had removed baggage from the compartment.

The forward baggage compartment door is hinged at the top and is opened by turning a D-shaped handle. The latching mechanism incorporates three sliding bayonet latches which are held in the latched position by an overcenter cam. A microswitch is mounted ahead of the forward bayonet and door frame and is connected in series to the left engine starter switch. The door must be fully latched and the microswitch actuated by the pressure of the bayonet point before the engine can be started. This feature was designed by Beech to ensure safety of operation of the aircraft. On N777AE, however, the safety interrupt feature had been bypassed by a wire installed between the battery terminals of the two-engine magneto/start switches. This allowed both engines to be started even though the door was not fully latched.

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In a similar accident involving a Ross Aviation Beech 65-80 (Queen Air) at Albuquerque, New Mexico, on May 19, 1972, nine persons were killed. As a result of that accident and a similar accident involving a Beech 99, the Safety Board issued Safety Recommendations A-72-78 through -81 directed to the Administrator. These recommendations dealt with the need for: secondary locking devices; cargo restraint systems; an alert to all air taxi operators; rulemaking to revise 14 CFR 135; and evaluation of the applicability of 14 CFR 23.787(b) to this type of nose cargo compartment.

The FAA issued an alert to all operators and owners regarding the need for positive door closure and for rigging the door actuating mechanism in accordance with the manufacturer's instructions. In addition, the FAA responded that if the door latching mechanism was properly maintained and fully secured by the operator, the requirements for cargo compartments and cargo security and protection contained in 14 CFR 23.787(b) would be satisfied. As you may know, based on this response the recommendations were "Closed - Unacceptable Action" by the Board.


In 1976, Beech Aircraft Corporation surveyed 66 Beech Queen Airs that were equipped with nose baggage doors. The findings of the survey indicated that only 10 of the 66 aircraft had properly operating starter interrupt systems.

In view of these findings, the unacceptable response to our previous recommendations and the Gulfport accident, the Safety Board concludes that action is still required to prevent inadvertent opening of nose baggage doors in flight. Therefore, the Safety Board recommends that the Federal Aviation Administration:

Take action to provide double failure protection by means of a secondary locking device on nose baggage doors of light twin engine aircraft engaged in Part 135 operations. (Class II, Priority Action) (A-80-13)

Require that the nose baggage door interrupter system on all Beech Aircraft models so equipped be operational before flight. (Class II, Priority Action) (A-80-14)

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

May 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 response to NTSB Safety Recommendation A-80-15, issued by the Board on February 26, 1980. The recommendation resulted from the Board's investigation of a hard landing accident involving an air taxi Cessna 310Q at Beckley, West Virginia, on January 26, 1979.

The pilot-in-command was flying the light twin-engine airplane from the right seat. While the pilot of the flight held a flight instructor certificate, he stated that he was not engaged in flight instruction from the right seat at the time of the accident; however, the left front seat was occupied by a pilot with only a single-engine rating. During the course of the investigation, a potential safety problem was identified which could contribute to similar accidents. The investigation determined that the flight instruments were not adequately visible from the right seat to a person with normal vision.

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

A-80-15. Require that the pilot-in-command of a Part 135 air taxi or commuter air carrier flight occupy a seat in the pilot compartment which affords him the most direct view of the basic flight and navigation instruments with a minimal deviation from his normal position and line of sight when he is looking forward along the flightpath.

Comment. The pilot involved in this accident held a flight instructor certificate with airplane multiengine and instrument airplane ratings and had therefore demonstrated his ability to pilot an airplane from the right seat. Immediately prior to the night landing accident, he had descended successfully through an overcast area and executed an instrument approach. The accident report indicates that the airframe had accumulated a significant amount of ice. The Board's finding of probable cause was "improper level off" with a factor of "airframe ice."

Since the Board was unable to find a causal relationship between the accident and the seat occupied by the pilot-in-command, we are unable to use that relationship inferentially to justify regulatory action.

2

As a result of the FAA investigation of this accident, enforcement action was taken against the pilot. In addition, the certificate holder voluntarily surrendered his air taxi commercial operator certificate. Part 135 presently contains several sections prohibiting unauthorized persons from performing pilot duties or handling aircraft controls. We are issuing an operations bulletin for the guidance of our field inspectors which emphasizes the potential safety problem identified. A copy of the bulletin will be provided to the Board.

We believe that these actions will fulfill the objectives of Safety Recommendation A-80-15.

Sincerely,

  
Langhorne Bond  
Administrator

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

ISSUED: February 26, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-15

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On January 26, 1979, N7671Q, a Cessna 310Q, on a nonscheduled air taxi flight, made a hard landing at Beckley, West Virginia, which injured two passengers and damaged the airplane substantially.

The pilot-in-command was flying the light twin-engine airplane from the right seat. In the enclosed accident brief relative to this accident, this fact is stated as a significant "remark." While the pilot of the flight held instructor and instrument flight instructor certificates, he stated that he was not engaged in flight instruction from the right seat at the time of the accident; however, the left front seat was occupied by a pilot with only a single-engine rating. During the course of the investigation, a potential safety problem was identified which could contribute to similar accidents.

The Cessna 310Q is certificated for single-pilot operation. The flight instruments are positioned on the left side of the instrument panel. The National Transportation Safety Board's investigation disclosed that the flight instruments are difficult to see from the right front seat and that this may be true in other light twin-engine aircraft. Nevertheless, the regulations in 14 CFR Part 135 do not prohibit the pilot-in-command from occupying the right seat. The Safety Board believes that aircraft with similarly configured instruments should not be flown from the right seat by the pilot-in-command for 14 CFR Part 135 operations. 1/

1/ Although the instructor pilot in the accident aircraft was flying with a certificate of demonstrated ability because he had lost the sight of one eye, the recommendation is based on the fact that our investigation determined that the flight instruments were not adequately visible from the right seat to a person with normal vision.

2816-A

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

Require that the pilot-in-command of a Part 135 air taxi or commuter air carrier flight occupy a seat in the pilot compartment which affords him the most direct view of the basic flight and navigation instruments with a minimal deviation from his normal position and line of sight when he is looking forward along the flightpath.  
(Class II, Priority Action) (A-80-15)

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

  
By: James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

June 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-80-19, issued by the Board on March 13, 1980. This recommendation resulted from the Board's investigation of the crash of a Transamerica Airline, L-188, N859U, at 0447 m.s.t. on November 18, 1979. While climbing from 12,000 to 13,000 feet following departure from Hill Air Force Base, Utah, the crew advised Salt Lake Center that all electrical power had been lost and requested an immediate descent to VFR conditions. During the descent, the aircraft attained a high rate of descent with excessive airspeed and broke up in flight. The Board believes that had N859U had a third attitude-indicating instrument aboard, the crew probably could have avoided the high airspeed and descent rates which contributed to the aircraft breakup.

Accordingly, the Board recommended that the Federal Aviation Administration (FAA):

A-80-19. Amend 14 CFR 121.305(j) to extend its application to all large turboprop aircraft to require an additional attitude-indicating instrument, for bank and pitch, operating from a source of power independent of the normal electrical generating system as is now required on all large turbojet aircraft.

Comment. We do not concur with this recommendation, and it is our belief that a third attitude-indicating instrument should not be required on all large turboprop aircraft due to lack of flight control or electrical problems associated with this type of aircraft.

On June 11, 1969, FAA issued Notice of Proposed Rule Making (NPRM) 69-26, Additional Attitude Instrument in Large Turbojet Airplanes. This notice did not consider requiring a third attitude indicator on turboprop aircraft and the preamble to Amendment 121-57, published in 35 FR 304, January 8, 1970, did not discuss the feasibility of requiring an additional attitude indicator in other than turbojet-powered aircraft (copy enclosed).

NTSB response to Notice 69-26, dated September 10, 1969, concurred with the proposed rule, as written, without further comment or any suggested revisions (copy enclosed).

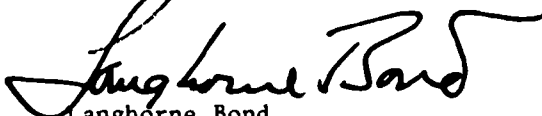
It is our understanding that the Board has not, as of this date, published an accident report identifying the causal factor for this accident. Accordingly, we are not able to say, positively, what the actual cause was. However, we do not believe that Transamerica Airlines' L-188 aircraft experienced a complete electrical power failure due to the fact that the cockpit voice recorder did not reflect a loss of total electrical power. The cockpit voice recorder factual report transcript prepared by NTSB (copy enclosed) states that a preliminary analysis of the power spectrum gave no clues as to the exact nature of the electrical problem mentioned on the radio. The System Group Factual Report of Investigation (copy enclosed) states that no positive evidence of an electrical malfunction was found during their investigation of this accident.

A review of all L-188 accidents from 1962 to 1979 did not reveal a problem with the aircraft's electrical systems or an accident that was related to a problem with flight instruments. There is no known case of a total electrical failure in the L-188 aircraft.

In the event of a total electrical power failure, i.e., loss of all engine-driven generators, the pilot's horizon, turn and bank indicators, as well as the white instrument lights, these elements are all automatically powered directly from the battery. This is accomplished without further action from the flightcrew as long as the battery switch is in the "on" position.

We believe it would be prudent for the Board to pursue further investigation in order to clarify and resolve these aforementioned points. Depending upon the findings resulting from this investigation, we believe it would be advisable to again consider what action is appropriate when the final accident report is published.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosures

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

ISSUED: March 13, 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-80-19

On November 18, 1979, at 0447 m.s.t., a Transamerica Airline, L-188, N-859U, with three crewmembers and 27,000 pounds of cargo aboard, departed Hill Air Force Base, Utah. While climbing from 12,000 to 13,000 feet, the crew advised Salt Lake Center that it had lost all electrical power, and requested an immediate descent to VFR conditions with vectors to avoid high terrain. During the descent, the aircraft attained a high airspeed and rate of descent, and broke up in flight. Although the Safety Board's analysis has not yet been completed, the evidence developed in the investigation indicates that certain precautionary action should be initiated on an expedited basis.

Federal Aviation Regulations (14 CFR 121.305(j)) require that all turbojet aircraft be equipped with three gyroscopic bank-and-pitch indicators, the third of which is to be powered independently of the normal electrical generating system; this requirement, however, does not apply to large turboprop aircraft operating under 14 CFR 121 regulations. The Safety Board believes that had N-859U had a third attitude-indicating instrument aboard, the crew probably could have avoided the high airspeed and descent rates which contributed to the airplane breakup.

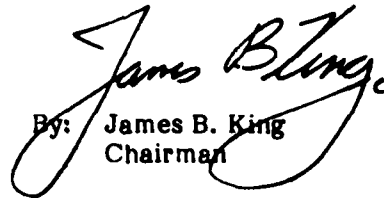
The Safety Board supported the 1969 proposed rulemaking to require the indicating instrument in all turbine engine powered transport category aircraft, including large turboprop aircraft. However, turboprop aircraft were not included in the final rule NPRM 69-26, which instituted the requirement for large turbojet aircraft.

2881

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

Amend 14 CFR 121.305(j) to extend its application to all large turboprop aircraft to require an additional attitude-indicating instrument, for bank and pitch, operating from a source of power independent of the normal electrical generating system as is now required on all large turbojet aircraft. (Class II, Priority Action) (A-80-19)

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

May 13, 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-80-20 and 21, issued by the Board on March 14, 1980. Updated copies of the two recommendations were hand-delivered to the office of Federal Aviation Administration's (FAA) Associate Administrator for Aviation Standards at approximately 6:00 p.m. on Friday, March 14, with copies dated March 14 hand-delivered to FAA on Monday. These recommendations resulted from the Board's ongoing investigation of a door failure and rapid decompression at 16,000 feet of a Swearingen SA-226 AT on March 8. The Board's preliminary examination of the aircraft indicated that there were static failures of the door's latching mechanism, possibly because the mechanism was adjusted improperly.

The Board's Safety Recommendations were as follows:

A-80-20. Issue a telegraphic Airworthiness Directive requiring an immediate inspection of the door latching mechanism of the aft cargo doors on all Swearingen SA-226 aircraft to assure proper adjustment and structural integrity.

A-80-21. Issue an Airworthiness Directive restricting the cabin pressure differential in Swearingen SA-226 aircraft until the cause of the aft cargo door failure can be determined and an appropriate corrective action carried out.

Comment. Emergency telegraphic Airworthiness Directive (AD), No. T80SW 14, applicable to operators of Swearingen Model SA226TC and SA226AT airplanes, was issued on March 15, 1980. The AD required an immediate inspection of the door latching mechanism of the aft cargo door to assure proper adjustment, operation, and structural integrity, and prohibited flight operation with a pressurized cabin.

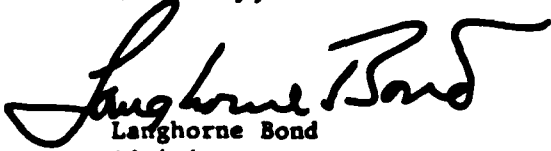
Later on March 15, AD T80SW 14 was amended by adding a clarifying paragraph requiring compliance prior to further flight.

On March 19, telegraphic AD T80SW 15 was issued, superseding AD T80SW 14, as amended. This AD T80SW 15 includes the provisions of AD T80SW 14 and provides for inspection at 250-hour intervals to assure proper adjustment, operation, and structural integrity of the door system. Enclosed are copies of all referenced ADs.

2

We are in receipt of the NTSB letter dated May 5 and note that recommendations A-80-20 and 21 are now classified in a "Closed--Acceptable Action" status.

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

3 Enclosures



Office of  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

May 5, 1980

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

Dear Mr. Bond:

On March 8, 1980, a Swearingen SA-226 experienced a rapid decompression at 16,000 feet. Three-quarters, approximately, of the aft compartment door and interior furnishings, including an unoccupied passenger seat, separated from the aircraft. In view of the potential for a catastrophe in this type of accident, the National Transportation Safety Board on March 14, 1980, issued the following two recommendations to the Federal Aviation Administration (FAA):

- A-80-20 Issue a telegraphic Airworthiness Directive requiring an immediate inspection of the door latching mechanism of the aft cargo doors on all Swearingen SA-226 aircraft to assure proper adjustment and structural integrity.
- A-80-21 Issue an Airworthiness Directive restricting the cabin pressure differential in Swearingen SA-226 aircraft until the cause of the aft cargo door failure can be determined and an appropriate corrective action carried out.

The Safety Board has examined Emergency Telegraphic Airworthiness Directive (AD), No. T80SW14, dated March 15, 1980, as amended, and Emergency Telegraphic AD, T80SW15, dated March 19, 1980. We are satisfied that compliance with these AD's will fulfill Safety Recommendations A-80-20 and 21, which are now classified in a "CLOSED--ACCEPTABLE ACTION" status.

Sincerely yours,

  
James B. King  
Chairman

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

ISSUED: March 14, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-20 and -21

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On March 8, 1980, a Swearingen SA-226 AT, N720R, with a crew of two and six passengers, experienced a rapid decompression at 16,000 feet when most of the aft cargo compartment door separated in flight. About 3/4 of the door along with interior furnishings, including an unoccupied passenger seat, separated from the aircraft. Two passengers were injured slightly during the decompression and the empennage was damaged slightly when some of the material from the cargo door or the cabin struck the upper fuselage and the vertical stabilizer. Some of the material from the cabin lodged around the control surfaces in the empennage. A safe landing was made in Albany, New York. Although ground search continues for the separated items, only baggage has thus far been recovered.

The National Transportation Safety Board's on-going investigation indicates that the aircraft was being operated at a pressure differential of approximately 7 psi to maintain an approximate sea level pressure. Preliminary examination of the aircraft indicates that there were static failures of the door's latching mechanism, possibly because the mechanism was adjusted improperly.

A review of the Service Difficulty Reports on this type door showed that there have been 29 reports of various problems, including bent latches, stuck pins, misadjustments, and broken cables. There have been no previous reports of structural problems, failures, or in-flight separations.

There are about 200 of these aircraft in operation and a large number of them are being used in commuter/air taxi operations. The accident aircraft had accumulated about 2,200 hours of operation at the time of the accident.

The Safety Board has been advised that the aircraft manufacturer is preparing an Alert Service Bulletin to all owner/operators of this aircraft which will recommend inspection and adjustment, as required, of the door latching mechanism.

2906

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In view of the potential for a catastrophic accident, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a telegraphic Airworthiness Directive requiring an immediate inspection of the door latching mechanism of the aft cargo doors on all Swearingen SA-226 aircraft to assure proper adjustment and structural integrity. (Class I, Urgent Action) (A-80-20)

Issue an Airworthiness Directive restricting the cabin pressure differential in Swearingen SA-226 aircraft until the cause of the aft cargo door failure can be determined and an appropriate corrective action carried out. (Class I, Urgent Action) (A-80-21)

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

June 24, 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-80-22 and 23, issued by the Board on March 26, 1980. These recommendations resulted from the Board's investigation of the crash of a deHavilland DHC-6-200 (N68DE), owned and operated by Downeast Airlines, while executing a "localizer only" approach to Runway 3 at the Knox County Regional Airport, Rockland, Maine. The accident occurred at 2100 hours e.d.t. on May 30, 1979, and resulted in 17 fatalities, including both flight crewmembers and 15 of the 16 passengers. The surviving passenger was injured seriously.

The National Transportation Safety Board's investigation of the accident revealed that although instrument approaches to the Knox County Regional Airport are from the south, there are no reference visibility markers to measure low visibility conditions south of the airport. In addition, the Board noted that there are no published guidelines which specify the number and location of visibility markers needed at airports to assure representative surface visibility values. The Safety Board believes that a uniform set of guidelines should be developed to specify the location and number of visibility markers appropriate for airports to assure representative surface visibility values. Accordingly, the Board made two specific recommendations, and following are the Federal Aviation Administration's (FAA) comments and actions in response to these recommendations:

A-80-22. Insure that lighted visibility markers are installed south of the Knox County Regional Airport, Rockland, Maine, within sight in clear visibility conditions of the normal weather observation position. One of the markers should be placed about 3/4 statute mile from the point of observation.

A-80-23. Establish guidelines on the location and number of visibility markers necessary at airports to assure representative surface visibility values for airport runways and the airport runway environment.

Comment. We have reviewed Safety Recommendations A-80-22 and 23 and do not agree with the Board's recommended action. We base our nonconurrence on the belief that present methods for determining visibility are adequate. Except for airport operations conducted under Category II

and III weather conditions where runway visual range (RVR) reporting is required, the FAA's current visibility reporting requirements are satisfied by reporting prevailing visibility, though provisions are made in Federal Meteorological Handbooks #1 and #9 (copies enclosed) for reporting significant deviations from prevailing conditions. Federal Meteorological Handbook #1, which deals with surface observations, and Federal Meteorological Handbook #9, which deals with aviation weather observations, both provide adequate information for the observation and reporting of prevailing visibility. We do not believe further revision is necessary.

The ideal method for measuring and reporting visibility would be to determine and report the slant visibility. Slant visibility represents the conditions a pilot should encounter within the maneuvering area for that airport during the landing maneuver from the decision point (missed approach point) through rollout on the runway. Unfortunately, this capability is not technically feasible at present. Therefore, any existing method for measuring visibility, including RVR, is based on assumptions which presume that visibility measured at ground level is representative of conditions likely to be encountered in flight. In a homogeneous atmosphere, these techniques produce excellent results. However, in a nonhomogeneous atmosphere, existing techniques generate visibility measurements at ground level, which are reasonably accurate. It cannot be stated with high confidence, however, that these measurements are representative of conditions likely to be encountered in flight.

Additionally, ground visibility is defined in FAR Part 1 as "prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service (NWS) or an accredited observer." Prevailing visibility, as determined by the NWS, represents the greatest distance that can be seen throughout at least half of the horizon circle, or if the visibility is varying rapidly during the time of observation, the average of all observed values. This concept has been in use for many years, and pilots are accustomed to receiving and utilizing this form of visibility information.


For example, fog located beyond the airport boundary could obscure visibility markers located 3/4 of a mile from the threshold. However, since the fog may have limited vertical extent, there could be a high probability that the inflight visibility would be very good, and the landing maneuver could be completed in continuous visual conditions. A contrasting example could be encountered where the ground level visibility was excellent, and the inflight visibility at the prescribed minimum altitude over the missed approach point was significantly less or nonexistent.

These possibilities have been accounted for in the design of the Instrument Flight Rules approach criteria, and in the flight rules governing instrument approaches. Although Federal Aviation Regulation (FAR) 121 and FAR 135 operators must be provided a visibility report which indicates that the visibility is at or above the minimum before executing the instrument approach, the ultimate decision to continue the approach beyond the missed approach point is the responsibility of the pilot-in-command. The flight rules are structured in this manner to account for rapidly changing weather conditions, as well as potential deficiencies in the capability of current technology to measure a visibility which is representative of the conditions the pilot is likely to encounter. These flight rules are explicitly stated in FARs 91.117, 121.651, 121.653, and 135.225.

We have concluded that the concept of prevailing visibility provides the most appropriate measurement of visibility obtainable by current manual observation techniques. This concept combined with the flight rules for descent below minimum descent altitude/decision height permits the safe and efficient conduct of instrument approaches. In this regard, we note that the aircraft in question crashed more than 3/4 of a mile from the runway threshold. Since the missed approach point (MAP) is the runway threshold, the flight should have maintained a minimum altitude of 440 mean sea level (387 height above touchdown) until reaching the MAP or until visual contact was established with the runway environment. Terrain clearance is assured through compliance with the published instrument approach procedure and the flight rules governing their use. This instrument approach concept is standard procedure and basic to the flight operations environment. Accordingly, any change to these universally understood and accepted procedures could tend to induce greater pilot reliance on imprecise guidance.

In consideration of the above discussion, we do not believe further action is appropriate at this time on Safety Recommendations A-80-22 and 23.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure

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

ISSUED: March 26, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-22 and -23

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On May 30, 1979, at 2100 e.d.t., a deHavilland DHC-6-200 (N68DE) owned and operated by Downeast Airlines, crashed while making a "localizer only" approach to runway 3 at the Knox County Regional Airport, Rockland, Maine. Both flight crewmembers and 15 of the 16 passengers were killed; the surviving passenger was injured seriously.

The National Transportation Safety Board's investigation of the accident revealed that although instrument approaches to the Knox County Regional Airport are from the south, there are no reference visibility markers to measure low visibility conditions south of the airport. In addition, the Board notes that there are no published guidelines which specify the number and location of visibility markers needed at airports to assure representative surface visibility values.

Runway 3 at Knox County Regional Airport has a localizer only approach and a nondirectional beacon approach, and is used for instrument approaches. When the Rockland barometer is used, the minimum visibility for the localizer approach is 3/4 statute mile. At 2030, a surface visibility observation of 3/4 statute mile was transmitted to N68DE. This observation was based on the sighting of a lighted visibility marker located about 3/4 statute mile north of the airport. All visibility markers at Rockland located within 1.5 statute miles of the airport are to the north and west of the airport. In this circumstance it is highly unlikely that the visibility information available to the pilot of N68DE both before and during his approach to runway 3 was representative of the actual conditions. Since the only instrument approaches to the airport are made from the south, the Safety Board believes that more representative visibility information for the approach and landing should be made available by installing lighted visibility markers to the south of the airport.

Federal Meteorological Handbook No. 1, chapter A6, paragraphs 2.7 and 3.5, specify the types and the selection criteria for visibility markers. Meteorological Service for International Air Navigation Annex 3 to the Convention of International Civil Aviation recommends in paragraph 4.5.2 that "for reports for takeoff the visibility observations should be representative of the takeoff and climb out area, and for reports for landing the observations should be representative of the approach and landing area." However, neither the Federal Aviation Administration nor the National Weather Service publishes

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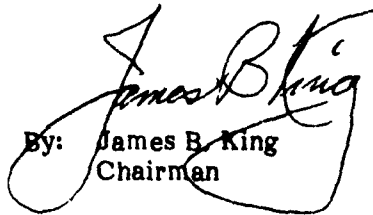
criteria for the location and number of visibility markers needed at airports to assure representative values of surface visibility. The Safety Board believes that a uniform set of guidelines should be developed to specify the location and number of visibility markers appropriate for airports to assure representative surface visibility values.

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

Insure that lighted visibility markers are installed south of the Knox County Regional Airport, Rockland, Maine, within sight in clear visibility conditions of the normal weather observation position. One of the markers should be placed about 3/4 statute mile from the point of observation. (Class II, Priority Action) (A-80-22)

Establish guidelines on the location and number of visibility markers necessary at airports to assure representative surface visibility values for airport runways and the airport runway environment. (Class II, Priority Action) (A-80-23)

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

June 25, 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-80-24 and 25, issued by the Board on March 27, 1980. These recommendations resulted from the Board's investigation of the crash of a Piper Model PA-18 Super Cub at the Lebanon Regional Airport, Lebanon, New Hampshire, on April 21, 1979.

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

A-80-24. Amend FAR 61.31, "General Limitations," to require that before acting as pilot-in-command of a tailwheel airplane, a private or commercial pilot receive flight instruction (including all normal and contingent aspects of takeoffs and landings) from an authorized flight instructor who has found him competent to pilot such airplanes and has so endorsed his pilot logbook. This requirement need not apply to pilots who have logged flight time as pilot-in-command in tailwheel airplanes before the effective date of this amendment.

A-80-25. Amend FAR 61.57, "Recent Flight Experience: Pilot in Command (c) General Experience," to make more stringent the currency requirements for the pilot in command of a tail wheel configured airplane carrying passengers.

Comment. We concur with the Board that an adequate checkout of pilots in tailwheel aircraft is essential. However, we believe that the same philosophy applies equally to safe operation of any aircraft. The accident involving a Piper Model PA-18 Super Cub referred to in the recommendations reflects an overall lack of pilot proficiency including landing and go-around procedures.

Educational material, such as the Flight Training Handbook AC 61-21A, provides valuable information to instructors and pilots transitioning to aircraft with significantly different flight characteristics, performance capabilities, and operating procedures from those which the pilot has previously flown. The publications issued by the FAA in the Accident Prevention Program, such as the enclosed copy of "Some Hard Facts About Soft Landings," are available to instructors and pilots. The private and commercial pilot flight test guides, AC 61-54A and AC 61-55A, respectively, provide additional information concerning tailwheel aircraft operational procedure (copies enclosed).


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Consequently, we believe that requirements of the FAR, when coupled with the educational materials available through the FAA, adequately provide the basis for a comprehensive checkout in tailwheel configured aircraft.

We, of course, share the Board's concern for safety in all aspects of flight operations. Accordingly, in addition to the comprehensive efforts described above, we will also carefully consider currency requirements for differently configured aircraft during our next review of Part 61 of the FAR.

We believe these actions serve to provide adequate information and guidance regarding the concerns expressed in NTSB Safety Recommendations A-80-24 and 25.

Sincerely,

  
Langhorne Bond  
Administrator

3 Enclosures



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

ISSUED: March 27, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-24 and -25

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On April 21, 1979, a Piper Model PA-18 Super Cub crashed at the Lebanon Regional Airport, Lebanon, New Hampshire. The sky was clear and although the wind was calm, the airplane was observed to bounce severely several times during the attempted landing. The airplane then turned right, and a go-around was initiated. Shortly thereafter, the aircraft crashed near the airport boundary and burned. The pilot was killed, and his passenger was seriously injured.

The pilot had flown this new airplane from the Piper factory at Lock Haven, Pennsylvania, and was in the process of delivering it to Lebanon when the accident occurred. Although he had accumulated several hundred flight hours in tricycle gear aircraft, his experience in tailwheel airplanes was limited to about 5 hours. Moreover, before the date of the accident, he had not flown in a tailwheel airplane for 2 years. While the pilot made a number of takeoffs and landings with a flight instructor in the PA-18 immediately before he departed for Lebanon, the Safety Board believes that the scope of this familiarization was inadequate and did not prepare him sufficiently to take charge of the aircraft.

The Safety Board believes that the severe bouncing observed during the landing attempt clearly indicates that the pilot did not perform the landing flare maneuver properly. Moreover, lack of skill in the operation of tailwheel airplanes was further evidenced by the pilot's delay in initiating a go-around. The go-around, although belated, would still have been successful if the pilot had been thoroughly familiar with this aircraft. Lacking such familiarity however, he apparently failed to retrim the airplane from an approach trim setting to a go-around setting since the adjustable stabilizer was found in the full airplane nosedown position. The resultant stick forces would have been very high during the attempted go-around and particularly disconcerting to this pilot with limited experience in tailwind airplanes.

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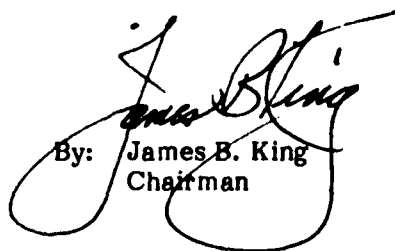
The safe operation of tailwheel airplanes requires a unique measure of operational familiarization that is not transferable from experience in tricycle gear aircraft. Tailwheel airplanes are especially prone to loss of directional control during takeoff and landing, and to severe bouncing if the landing is not performed properly. The pilot's knowledge and level of proficiency concerning crosswind takeoffs and landings, power (wheel) landings, recovery from bounced landings, and go-around procedures is particularly critical to safe operation of tailwheel aircraft. A special study <sup>1/</sup> by the Safety Board has shown that the total accident rate for tailwheel aircraft is more than twice that of aircraft with tricycle landing gear.

The Safety Board believes that an adequate checkout of pilots in tailwheel airplanes is essential and that continued safe operation of these airplanes requires a minimum level of recent experience somewhat greater than presently required. The checkout should focus on safe takeoffs and landings and should provide measurable assurance of the pilot's capability to operate the airplane in all phases of flight. Consequently, the Safety Board recommends that the Federal Aviation Administration:

Amend FAR 61.31, "General Limitations," to require that before acting as pilot-in-command of a tailwheel airplane, a private or commercial pilot receive flight instruction (including all normal and contingent aspects of takeoffs and landings) from an authorized flight instructor who has found him competent to pilot such airplanes and has so endorsed his pilot logbook. This requirement need not apply to pilots who have logged flight time as pilot-in-command in tailwheel airplanes before the effective date of this amendment. (Class II, Priority Action) (A-80-24)

Amend FAR 61.57, "Recent Flight Experience: Pilot in Command (c) General Experience," to make more stringent the currency requirements for the pilot in command of a tail wheel configured airplane carrying passengers. (Class II, Priority Action) (A-80-25)

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

  
By: James B. King  
Chairman

<sup>1/</sup> "Single-engine, Fixed-wing General Aviation Accidents, 1972-1976 (NTSB-AAS-79-1).

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.

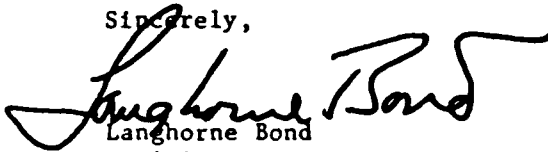
However, it has become evident that some airplane operators/owners are switching forks from one airplane to another. Therefore, the time in service reflected in field records becomes questionable. To avoid reliance upon these questionable records, an emergency AD was issued April 17, 1980, (copy enclosed) 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.

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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.

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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

June 20, 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-80-30 and 31, issued on April 23, calling on the Federal Aviation Administration (FAA) to require the installation of improved tail rotor blades on all Bell Model 47 helicopters. FAA's comments and actions in response to these recommendations follow.

A-80-30. Issue an Airworthiness Directive to require the installation of the improved tail rotor blades, part No. 47-642-117 on all Bell 47 model helicopters for which the installation has been approved as soon as possible after receipt of the directive.

A-80-31. Expedite the approval of the improved tail rotor blades for installation on all Bell 47 model helicopters equipped with Franklin engines and expedite action to require the installation of the improved blades on those aircraft.

Comment. On January 30, our Southwest Region issued a Notice of Proposed Rule Making (NPRM) calling for replacement of tail rotor blades, P/N 47-642-102, with improved blades, P/N 47-642-117, on all Bell Model 47, H-13, and TH-13T series helicopters, except those equipped with Franklin Engine Company (Aircooled Motors) engines. The NPRM also provides for reducing the retirement time of the blades, P/N 47-642-102, on those helicopter models requiring the blade replacement. This NPRM action was initiated by the FAA based on the service history of tail rotor blade, P/N 47-642-102, fatigue failures. The closing date for comments to the docket was March 18.

The FAA issued Airworthiness Directive (AD) 68-02-03 in January 1968 because of several Bell Model 47 helicopter tail rotor blade failures. AD 68-02-03 reduced the retirement time of tail rotor blades, P/N 47-642-102, from 2,500 to 600 hours' time-in-service and required frequent inspections of three critical areas of this blade on all Bell Model 47 helicopters and on any other helicopters equipped with these blades. In 1970, AD 70-10-08 was issued to amend, clarify, and supersede AD 68-02-03. The essential provisions of AD 68-02-03 were carried over to AD 70-10-08.

FAA's records of service history of the Model 47 tail rotor blades since AD 68-02-03 was issued do not contain any reports of tail rotor blade fatigue failures on Franklin engine-powered Model 47 helicopters. These particular helicopters are the early models, having a lower gross

weight and using less power than the Lycoming engine-powered helicopters. As FAA stated in the preamble to the NPRM issued on January 30, the service history information of U.S.-registered Model 47 helicopters indicates that neither a mandatory reduction in the retirement time for blades, P/N 47-642-102, installed on Franklin engine-powered helicopters, nor mandatory installation of the improved tail rotor blades on these particular Model 47's, is warranted.

Since January 1976, ten additional reports have been received by FAA, indicating an inflight failure of tail rotor blade, P/N 47-642-102, on six Model 47G-2 and one each on Models 47-G-2A-1, 47 J-2, 47-D, and 47G-3 helicopters. These helicopters were all equipped with Lycoming (AVCO) engines.

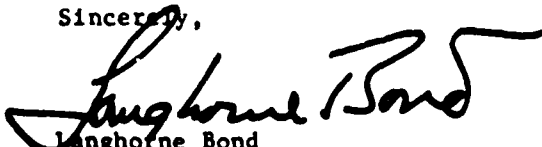
As a result of inflight blade failures, Bell Helicopter Textron issued Alert Service Bulletin Nos. 47-79-3 and 47-79-4 and OSN 47-79-2. These directives specify removal of the tail rotor blade, P/N 47-642-102, and installation of the improved tail rotor blade, P/N 47-642-117. The directives also require a reduction in retirement time from 600 to 300 hours for blades P/N 47-642-102. Included are blades installed on all Model 47 series helicopters regardless of the engine used.

The FAA acknowledges that improved blade P/N 47-642-117 is more durable than blade P/N 47-642-102 and recommends the installation of the improved blades on Model 47 series helicopters equipped with Franklin engines. The agency does not believe, however, that the service history on these models warrants mandatory installation of the improved tail rotor blades on these particular helicopters.

The Board's Recommendations A-80-30 and 31 are substantially the same as its March 18 comments submitted for inclusion in the NPRM docket. These recommendations call for immediate issuance of an AD, requiring installation of the improved blades on all models for which they are currently approved. Improved blade installation is also required on all other Model 47's, including those equipped with Franklin engines, as soon as installation can be approved.

On May 2, FAA issued its final rule, effective June 9, after carefully weighing all comments to the docket and other considerations described above. In our judgment, FAA's action provides an effective solution to this safety issue, and I am enclosing a copy of the final rule for the Board's review and records.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure



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

ISSUED: April 23, 1980

-----  
Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-30 and -31

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During several recent accident investigations, the Safety Board has identified recurring failures of tail rotor blades on Bell model 47 helicopters. Two recent accidents in California are typical of several previous accidents.

On March 8, 1980, a Bell 47G helicopter crashed during a crop dusting operation in Brentwood. The pilot was seriously injured. The investigation is continuing; however, preliminary reports indicate that a tail rotor blade separated in flight.

On September 14, 1979, a Bell 47J-2 helicopter lifted off the Queen Mary helicopter pad with four passengers and a pilot on board for a sightseeing tour of Long Beach Harbor. Witnesses saw the tail rotor blade separate from the aircraft at 200 feet above ground level and in level flight over Queensway Bay. The helicopter descended out of control, crashed, and sank in 35 feet of water. All five occupants were killed.

Upon examination, the tail rotor blade, P/N 47-642-102, was found to have separated through the grip in the grease seal radius retention area. This area is covered by Airworthiness Directive 70-10-08. The Airworthiness Directive requires a detail daily inspection of the exterior surface of the blades for the presence of cracks, dents, and nicks, and a 150-hour periodic inspection of the interior surface of the blade in the grip area for cracks, corrosion, and tool marks. The inspection is to be conducted using dye penetrant techniques, or a light and a magnification device.

A metallurgical examination of the failed blade disclosed that the failure stemmed from a fatigue crack that began on the inside diameter of the grip. The fatigue had begun at small corrosion pits less than 0.002-inch deep. The service life of the blade is 600 hours; however, this blade failed within a total time of only 536.4 hours.

Additional recent accidents involving tail rotor blade failures on Bell 47 series helicopters include the following:

- (1) A Bell 47G-2A-1 helicopter, N1158W, crashed 3 miles NW of Laughmar, Florida, on July 15, 1978. There was one fatality. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that had begun on the trailing edge of the airfoil. The total time on the blade was 77.5 hours.
- (2) A Bell 47G-2 helicopter, N47WV, crashed at Pigeon Forge, Tennessee, on July 16, 1978, resulting in four fatalities. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that started in the grip. The total time on the blade was 468 hours.
- (3) A Bell 47G-2 helicopter, N68367, crashed in Solodad, California, on August 12, 1978. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that began in the grip. The total time on the blade was 400 hours.
- (4) A Bell 47G-2, N6729D, crashed near Crossland, Georgia, on August 12, 1978. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that began in the grip. The total time on the blade was 365 hours.

In most of the failures examined by the Safety Board's Metallurgical Laboratory, the fatigue cracks had begun from extremely small stress raisers such as knicks, corrosion pits, tool marks, and scratches. Most of these defects could have been overlooked by a visual inspection.

The long history of fatigue failures in tail rotor blade P/N 47-642-102 reflects a low fatigue margin and an obvious need to replace the blade with a design more resistant to fatigue cracking.

In December 1979, Bell issued Alert Service Bulletins Nos. 47-79-3 and 47-79-4, which recommended that the service life of the tail rotor blades be reduced immediately from 600 hours to 300 hours, and that all blades with more than 300 hours be scrapped. The Bulletins further recommended that the current model blades be replaced with the new model blades by July 1980. The new model blades have been shown to have a higher margin for fatigue and have a higher recommended service life of 2,400 hours.

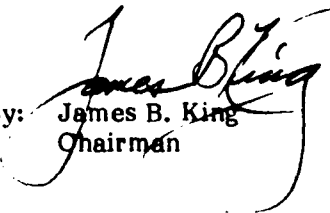
The FAA's Southwest Region has issued a Notice of Proposed Rulemaking (NPRM) for adoption of an Airworthiness Directive on this matter, which essentially is the same as the Bell Service Bulletins except that the NPRM excludes those Bell 47 helicopters equipped with Franklin (Aircooled Motors) engines. In the text of the NPRM, the FAA recognizes the need for the improved tail rotor blades to be installed on these models and recommends that this be accomplished later. The Safety Board does not agree that the Bell 47 helicopters equipped with these engines should be excluded from the provisions of the proposed Airworthiness Directive. Further, the Safety Board believes that removal of all blades with part No. 47-642-102 should be expedited.

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

**Issue an Airworthiness Directive to require the installation of the improved tail rotor blades, part No. 47-642-117 on all Bell 47 model helicopters for which the installation has been approved as soon as possible after receipt of the directive. (Class I, Urgent Action) (A-80-30)**

Expedite the approval of the improved tail rotor blades for installation on all Bell 47 model helicopters equipped with Franklin engines and expedite action to require the installation of the improved blades on those aircraft. (Class I, Urgent Action) (A-80-31)

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

June 20, 1980



OFFICE OF  
THE ADMINISTRATOR

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

Dear Mr. Chairman:

The following information updates the action taken by the Federal Aviation Administration (FAA) concerning NTSB Safety Recommendation A-76-37.

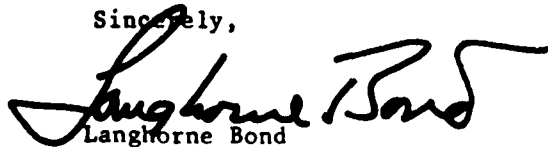
Recommendation A-76-37 - Revise appropriate air traffic control procedures to specify that the location and severity of thunderstorms be considered in the criteria for selecting active runways.

Comment - The FAA Facility Operation and Administration Handbook (7210.3E) has been revised to include specific assignment of responsibility for "selecting active runways." It will be further revised to specifically include "severe weather activity" as one of the several factors to be considered in the selection process. Because this change cannot be accomplished to the printed handbook prior to an effective date of October 1, we are issuing it as a notice to be effective upon receipt. A copy of revised requirements is enclosed.

Sensor equipment such as the "pressure jump detector," intended for severe weather location/intensity detection, is not presently available for operational use. Should that or other similar equipment become available and its use be determined feasible, it will be considered for incorporation into the National Airspace System.

The FAA considers action completed with regard to this recommendation.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure



Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20594

May 22, 1980

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

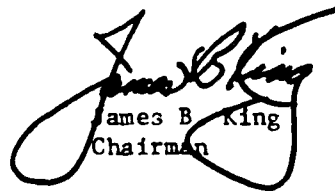
Dear Mr. Bond:

Thank you for your letter dated April 18, 1980, responding to National Transportation Safety Board Safety Recommendation A-76-40 issued April 1, 1976. This is one of 14 recommendations that stemmed from the Safety Board's investigation of an Eastern Air Lines, Boeing 727, accident at the John F. Kennedy International Airport at Jamaica, New York, on June 24, 1975. We recommended that the Federal Aviation Administration (FAA):

"Expedite the program to develop, in cooperation with appropriate Government agencies and industry, typical models of environmental winds associated with mature thunderstorms which can be used for demonstration purposes in pilot training simulators."

The Safety Board is pleased to note that extensive investigation and testing by Government agencies and industry groups have resulted in the development and selection of models of classic wind shears associated with thunderstorms. We are also pleased to be informed that these models are being utilized by many air carriers during initial and recurrent pilot simulator training programs. The FAA's responsive actions satisfy the intent of the recommendation, which we are now classifying as "Closed--Acceptable Action."

Sincerely yours,

  
James B. King  
Chairman

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

April 18, 1980

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

Dear Mr. Chairman:

Following is a summary of the actions taken by the Federal Aviation Administration (FAA) regarding NTSB Safety Recommendation A-76-40:

"Expedite the program to develop, in cooperation with appropriate Government agencies and industry, typical models of environmental winds associated with mature thunderstorms which can be used for demonstration purposes in pilot training simulators."

In our letter of July 7, 1976, we indicated that the FAA, in conjunction with the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, had already developed models of environmental winds associated with mature thunderstorms and were testing them in a piloted simulator. We stated that we would make these models available to operators of pilot training simulators.

Extensive investigation and testing by Government agencies and industry groups have resulted in the selection of 10 models of classic wind shears associated with thunderstorms and other shear producing phenomenon. These models are available to all interested operators and are currently utilized nationally and internationally by many air carriers during initial and recurrent pilot simulator training programs. Wind shear models are available in IBM punch card and computer listing format.

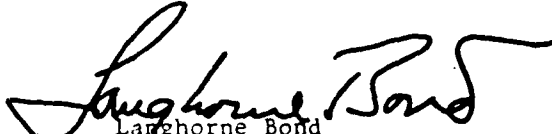
The results of the wind shear hazard determination work indicate the severity of a wind shear encounter is highly dependent on the position and alignment of the approach path with respect to the wind field and on the timing of the encounter. Another conclusion of these studies is that both wind shear in the vertical wind component and wind shear in the longitudinal wind component can produce a hazardous condition. High severity wind shear is also found to be hazardous on takeoff. The models developed consider shears in the vertical and longitudinal plane and during the approach and takeoff phase.

2

The available models have provided tangible situations under controlled conditions and have led to the development of specific pilot operational procedures to avoid or cope with known wind shear conditions.

We believe these actions meet the intent of the Board's recommendation.

Sincerely,

  
Langhorne Bond  
Administrator



Office of the  
Chairman

## National Transportation Safety Board

Washington, D.C. 20591

March 31, 1980

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

Dear Mr. Bond:

The National Transportation Safety Board has reviewed your letter of January 30, 1980, documenting the reasons you consider actions on our recommendation A-76-37 are complete. We believe the actions taken by the Federal Aviation Administration (FAA) to date are a significant step toward improving the safety operations in a terminal area, but they have not yet fully satisfied the recommendation, which specifies the selection of active runways to reduce the chance of an aircraft penetrating or flying below a thunderstorm during approach or takeoff and/or to avoid adverse winds generated by a thunderstorm gust front or the associated downdrafts.

The Low Level Wind Shear Alert System (LLWSAS) does not measure winds in the approach or climb out zones beyond the perimeter of an airport. As noted in paragraph 981 of the ATC Procedures Handbook, 7110.65A, "The LLWSAS is designed to detect possible low level wind shear conditions around the periphery of an airport. It does not detect wind shear beyond that limitation."

The changes to the Facility Operations Handbook, 7210.3E, do provide for improved collection and dissemination of SIGMETs and PIREPs. While we agree that SIGMETs are very useful to aircraft while en route in planning routes or alternate actions in the event of severe weather, they are not sufficiently timely or detailed to warn aircraft of specific hazards in a terminal area. PIREPs can be sufficiently detailed and timely to be useful, but their collection is frequently happenstance, requiring an aircraft to be in a specific location to observe a particular hazard.

The problem of timeliness and detail also applies to the Center Weather Service Units. They are not presently staffed to keep continuous watch in each terminal area within the Air Route Traffic Control Center's area of responsibility, nor do they have available the detailed data required to define the hazard to individual runways at an airport.



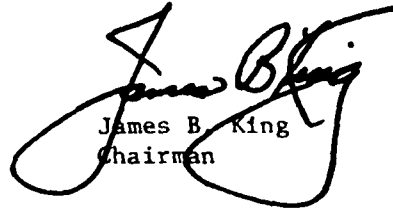
Honorable Langhorne M. Bond

- 2 -

What is required is a set of objective criteria based upon the proximity and intensity of thunderstorms in terminal areas to select an approach path and runway free of thunderstorm hazards. To accomplish this, sensors to adequately describe the thunderstorm activity beyond the airport perimeter will be required. Although the LLWSAS is a major step forward in the safety of terminal operations, it is too limited in area coverage to meet the requirements of this recommendation.

Based on the above, we do not agree that actions on this recommendation are complete. We are, therefore, continuing to maintain A-76-37 in an "Open--Unacceptable Action" status.

Sincerely yours,



James B. King  
Chairman



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
WASHINGTON, D.C. 20591

January 30, 1980

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

Dear Mr. Chairman:

The following information updates the action taken by the Federal Aviation Administration (FAA) concerning NTSB Safety Recommendation A-76-37.

Recommendation A-76-37. Revise appropriate air traffic control procedures to specify that the location and severity of thunderstorms be considered in the criteria for selecting active runways.

Comment. In our letter of July 7, 1976, we advised the Board that runway selection on the basis of other than known winds actually affecting the runway in use could very easily result in operational conditions not acceptable by users and, in fact, have an adverse effect/impact on safety in the system. We believe the present air traffic procedures, which require aircraft to be informed of phenomena likely to produce an adverse safety effect and those requiring avoidance of known areas of possible hazard to safety, provide the best current means of providing pilots the information they need to assess and determine the most appropriate action for their operation. Decisions of this nature must remain with the pilot.

To further assist pilots in making this determination, we have taken the following actions:

1. Low Level Wind Shear Alert System (LLWSAS).

Approximately 20 LLWSASs are operational. A total of 58 systems are scheduled for installation by the end of fiscal year 1983, which provides the centerfield wind, wind shear and in many instances, runway end wind information.

2. ATC Procedures Handbook, 7110.65A.

ATC procedures for the provision of departure and arrival information and low level wind shear advisories now make provisions for the use of LLWSAS equipment (copy enclosed).

2

3. Facility Operations Handbook.

Changes to the Facility Operations and Administration Handbook 7210.3E (copy enclosed) provide for improved collection and dissemination of SIGMETs and PIREPs.

4. Center Weather Service Units.

Three meteorologists are presently assigned to permanent duties in 13 air route traffic control centers (ARTCC). Eight additional ARTCCs are programmed to receive three meteorologists plus associated equipment in mid-fiscal year 1980. The meteorologists assigned work directly in support of the ARTCC and service all terminal and flight service station facilities within the ARTCC area of jurisdiction.

The FAA considers action completed with regard to this recommendation.

Sincerely,

Original signed by:  
Langhorne Bond  
Administrator

Enclosures

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

JUL 7 1978

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-76-31 through 44.

Recommendation No. 1. Conduct a research program to define and classify the level of flight hazard of thunderstorms using specific criteria for the severity of a thunderstorm and the magnitude of change of the windspeed components measured as a function of distance along an airplane's departure or approach flight track and establish operational limitations based upon these criteria.

Comment. The Federal Aviation Administration (FAA) has already initiated a research program in conjunction with the National Severe Storms Laboratory to determine the magnitude of windspeed component changes in thunderstorms by using a highly instrumented aircraft to penetrate actual thunderstorms. The associated characteristics of the thunderstorms and level of flight hazard are currently being investigated in a second research program which will determine the detrimental effects on aircraft performance and controllability as a function of windspeed component changes. If the results of this research show that meaningful and clearly defined operational limitations can be established based upon these criteria, then we may proceed with appropriate rulemaking. We expect to complete the research by December 1978.

Recommendation No. 2. Expedite the program to develop and install equipment which would facilitate the detection and classification, by severity, of thunderstorms within 5 nmi of the departure or threshold ends of active runways at airports having precision instrument approaches.

Comment. Experimental thunderstorm gust front detection systems will be tested on a high priority basis beginning this summer at Chicago O'Hare and Dulles Airports. These test systems should provide us with the data required to design a production system which could provide

sufficient warning of the approach of any hazardous thunderstorm gust fronts. In addition, we have completed testing and are presently preparing procurement specifications for a radar display device which will portray thunderstorm location and severity derived from an existing remote weather or long range radar. The information is transmitted digitally over telephone lines to the display located in appropriate air traffic control sites.

Recommendation No. 3. Install equipment capable of detecting variations in the speed of the longitudinal, lateral, and vertical components of the winds as they exist along the projected takeoff and approach flightpaths within 1 nmi of the ends of active runways which serve air carrier aircraft.

Comment. The equipment described by the NTSB in this recommendation does not currently exist and, therefore, no installations are possible at this time. However, the FAA, in conjunction with other government agencies, has programs underway to develop and/or refine sensors which are capable of detecting variations in wind components. These sensors include acoustic doppler, doppler radar, pulsed laser doppler, FM/CW radar, and acoustic pulsed radar. Each of these systems has its own technical and economic advantages and limitations; FAA is striving to determine as rapidly as possible which of the many candidates offer the greatest enhancement to safety along the lines of this recommendation with an acceptable cost. We expect to complete this by June 1978.

Recommendation No. 4. Require inclusion of the wind shear penetration capability of an airplane as an operational limitation in the airplane's operations manual, and require that pilots apply this limitation as a criterion for the initiation of a takeoff from, or an approach to, an airport where equipment is available to measure the severity of a thunderstorm or the magnitude of change in wind velocity.

Comment. As stated in our response to the first recommendation, we are currently pursuing the research necessary to establish wind shear related operational limitations for general aircraft types. Regulatory steps must await the successful completion of the research and the installation of appropriate measurement equipment.

Recommendation No. 5. As an interim action, install equipment capable of measuring and transmitting to tower operators the speed and direction of the surface wind in the immediate vicinity of all runway ends and install lighted windsocks near to the side of the runway, approximately 1,000 feet from the ends, at airports serving air carrier operations.

Comment. At present, we are installing anemometers near six runway ends at Chicago O'Hare Airport, and we are planning to make similar installations at Atlanta, Houston, and Denver. However, at present, there is disagreement between aviation meteorological experts as to whether the most appropriate location for anemometers is at the runway threshold, the middle marker, or the outer marker. Other experts feel that microbarographs are superior to anemometers in detecting the most hazardous conditions. FAA is currently conducting research to answer these questions before spending large sums of money on installations which may later prove to be ineffective. (For example, the NTSB's proposed wind measurement location would probably be ineffective in the case of a departing aircraft encountering a thunderstorm gust front shear just past the departure end of the runway.) We expect to complete this research by December 1978.

We believe that lighted windsocks are of limited value and may be a distraction to pilots during low ceiling/visibility operations.

Recommendation No. 6. Develop and institute procedures whereby approach controllers, tower controllers, and pilots are provided timely information regarding the existence of thunderstorm activity near to departure or approach flightpaths.

Comment. Action on this recommendation would be redundant as the FAA has existing programs informing control personnel and users regarding thunderstorm activity. Part of the existing system includes National Weather Service (NWS) data, visual observation, radar data and pilot reports. It should be noted that our on-going "thunderstorm activity" information is just one of the many diversified and necessary types of weather data integral to the system (National Airspace System), and provided through existing procedures and programs. A sampling of other significant weather information includes reports concerning areas of strong frontal activity, squall lines, widespread fog, moderate to heavy icing, turbulence, or similar conditions pertinent to the safety of flight. In our efforts to improve existing procedures, arrangements have been agreed to between the FAA and NWS to test a procedure to alert elements of the air traffic control system and airborne pilots of thunderstorms observed by NWS weather radars 30 miles or closer to any of five major terminals in the Washington, D.C., and New York City areas.

The test has been arranged to determine whether this type of information may be effective operationally to enhance safety.

Recommendation No. 8. Modify or expand air traffic controller training programs to include information concerning the effect that winds produced by thunderstorms can have on an airplane's flightpath control.

Comment. The FAA Academy portion of the Air Traffic Training Program which began on January 13 contains a lesson on "Turbulence and Jetstreams." The lesson includes categories of turbulence intensity. Types of turbulence on an airplane's flightpath control is covered in great detail. As we learn more about the causes and effects of wind shear, our training syllabus will be modified accordingly.

Recommendation No. 9. Modify initial and recurrent pilot training programs and tests to require that pilots demonstrate their knowledge of the low-level wind conditions associated with mature thunderstorms and of the potential effects these winds might have on an airplane's performance.

Comment. Air Carrier Operations Bulletin No. 75-8, Subject: Low Level Wind Shear, was issued on December 30, 1975. This bulletin requires our principal operations inspectors to ensure compliance with the recommendations enumerated in this item.

An advisory circular on wind shear phenomena was published on April 8. This circular will be of value to both air carrier and general aviation pilots.

Recommendation No. 10. Expedite the program to develop, in cooperation with appropriate Government agencies and industry, typical models of environmental winds associated with mature thunderstorms which can be used for demonstration purposes in pilot training simulators.

Comment. The FAA, in conjunction with the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA), has already developed models of environmental winds associated with mature thunderstorms and is currently testing them in a piloted simulator. We will make these models available to operators of pilot training simulators. We expect the model to be available by October 1976.

Recommendation No. 11. Place greater emphasis on the hazards of low-level flight through thunderstorms and on the effects of wind shear encounter in the Accident Prevention Program for the benefit of general aviation pilots.

Comment. We concur with this recommendation. We believe that forceful instruction and pilot tests on the knowledge of hazards of low-level wind shear will reinforce the pilot's respect for this particular weather phenomenon. Air taxi pilots are **now required** to demonstrate this knowledge during initial and recurrent pilot training (Handbook 8430.1A, Operations Bulletin 75-4). Additionally, an FAA Advisory Circular, Low Level Wind Shear, was published April 8.

Accident prevention specialists will continue to emphasize the hazards of marginal weather operations, particularly around thunderstorm activity.

Recommendation No. 12. Expedite the research to develop equipment and procedures which would permit a pilot to transition from instrument to visual references without degradation of vertical guidance during the final segment of an instrument approach.

Comment. The FAA is currently installing over 100 additional VASI systems over the next two years to facilitate the pilot's transition from instrument to visual vertical guidance on approach. In addition, we have just initiated a program to examine the heads-up display as an aid in providing vertical guidance in both wind shear and other meteorological environments. We expect to complete this examination by September 1978.

Recommendation No. 13. Expedite the research to develop an airborne detection device which will alert a pilot to the need for rapid corrective measures as an airplane encounters a wind shear condition.

Comment. The FAA is already well underway with two separate research programs to identify such a device. The programs involved the use of a piloted simulator and a nonpiloted digital aircraft simulator, respectively. Final reports will be available soon from the first phase of both programs, and second phases will be initiated soon to complete development of an airborne wind shear detection device. We expect completion of these programs by December 1976.

Recommendation No. 14. Expedite the development of a program leading to the production of accurate and timely forecasts of wind shear in the terminal area.



7

Comment. The National Weather Service has responded positively to an FAA request to provide wind shear forecasts at eight major east coast terminals. A six-month test will begin in August 1976.

Sincerely,

  
John L. McLucas  
Administrator

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

FOR RELEASE: 6:30 A.M., E.D.T., APRIL 1, 1976

(202) 426-8787

ISSUED: April 1, 1976

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-76-31 through 44

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On June 24, 1975, Eastern Air Lines Flight 66, a Boeing 727, crashed during a precision instrument approach to the John F. Kennedy International Airport, Jamaica, New York. One hundred and thirteen persons died from the injuries that they received.

The National Transportation Safety Board's investigation of the accident disclosed that the aircraft developed a high descent rate as it passed through or below the base of a mature thunderstorm. The storm was astride the approach course and approximately 1 mile from the end of the runway. The pilots of other flights which preceded Flight 66 on the approach reported that they too had encountered problems in controlling their aircraft to maintain a safe approach profile. These aircraft avoided an accident possibly because the prevailing conditions were less severe or because the pilots recognized and responded to the situation faster than the pilots of Flight 66.

A study of flight recorder data taken from these flights showed that the performance of each of the aircraft was affected by the strong vertical drafts and changes in the direction of the horizontal winds in the vicinity of the thunderstorm. When a simulator, modeled to reproduce the aerodynamic characteristics of the B-727, was exposed to these approach conditions, it became evident that the ability of an airplane to negotiate a safe landing or even a missed approach was marginal. In the case of Flight 66, impact might possibly have been avoided had the flightcrew recognized the onset of the descent rate more quickly.

AD-A089 971

FEDERAL AVIATION ADMINISTRATION WASHINGTON DC OFFICE--ETC F/G 1/2  
SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSES TO NATIONAL--ETC(U)  
JUL 80 J R HARRISON

UNCLASSIFIED

FAA-ASF-80-2

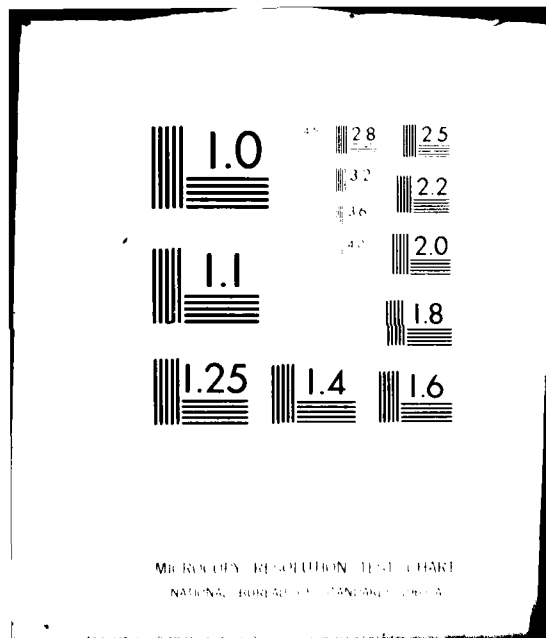
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MILWAUKEE RESOLUTION TEST CHART  
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Honorable John L. McClucas (2)

However, even though they had been alerted to a wind shear condition, the crew probably did not anticipate the rapid change in the airplane's flight profile. Also, since they had both the approach lights and subsequently the runway in sight, they were probably relying on visual cues for guidance, particularly since the glideslope was designated unusable below 200 feet. There were no visual aids such as VASI to help them detect the deviation below a safe glidepath.

The circumstances of this accident are similar to those of other accidents which have been investigated by the Safety Board. On May 18, 1972, an Eastern Air Lines Douglas DC-9-31 touched down hard on the runway at Fort Lauderdale, Florida; the airplane was destroyed and three persons were injured. On July 23, 1973, an Ozark Air Lines, Inc., Fairchild Hiller FH-227B crashed while on a precision approach to the Lambert-St. Louis International Airport, St. Louis, Missouri. Thirty-seven passengers died in that crash. On January 30, 1974, a Pan American World Airways, Inc., Boeing 707 crashed while on approach to Pago Pago, American Samoa, killing 96 persons. In all of these crashes, the airplanes were penetrating heavy rain and probably the adverse wind conditions associated with a mature thunderstorm.

The potential hazards of flight through or below a fully developed thunderstorm are well recognized. In fact, most, if not all, air carrier operations have established a policy to avoid the intense radar echoes by 20 miles or more when flying at cruising altitudes. This policy is consistent with Advisory Circulars 00-24 and 90-12A. In the terminal environment, however, there appears to be a tendency on the part of pilots, as well as traffic controllers, to let the desire for an uninterrupted flow of traffic interfere with an objective evaluation of the hazard potential of approaches through or under thunderstorms. Consequently, approaches are being conducted through these hazardous conditions during what is perhaps the most critical phase of flight -- when the aircraft is at low altitude, with little airspeed margin, and with the airplane in a high drag configuration.

The Safety Board recognizes the problems in the terminal area which stem from traffic density, air traffic control coordination requirements, complex departure and arrival routes, and adjacent airports. These factors, combined with the characteristics of rapidly developing thunderstorms and the limited weather detection capability of the ATC radar equipment, hinder the coordinated effort which must be made by pilots and controllers to avoid thunderstorms. Nevertheless, the Safety Board believes that these problems can and must be resolved in order to prevent more accidents of this kind.

Honorable John L. McLucas (3)

Since 1973, the Safety Board has submitted to the Administrator, Federal Aviation Administration, eight specific recommendations which can be directly related to accidents involving approaches through conditions similar to those encountered by Flight 66. Copies of these recommendations and the Administrator's responses are attached. The recommendations concerned such areas as the expansion of authority for air traffic controllers to deny approaches or takeoffs through thunderstorms, the development of ATC radar with better severe weather detection capability, the implementation of better systems to relay severe weather warnings to pilots, the installation of VASI on all instrument runways, the issuance of training material and improvements in training programs to stress the effect of wind shear on an airplane's flightpath control, and the development of wind shear detection devices.

The FAA has expressed agreement with many of these recommendations and in some cases action has been taken to comply. In other cases, action has not been taken.

The Safety Board believes that the continuing occurrence of approach accidents involving passage of an airplane through or below thunderstorms indicates that more positive and more immediate actions are necessary. Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration, in coordination with the National Oceanic and Atmospheric Administration, where appropriate:

1. Conduct a research program to define and classify the level of flight hazard of thunderstorms using specific criteria for the severity of a thunderstorm and the magnitude of change of the wind speed components measured as a function of distance along an airplane's departure or approach flight track and establish operational limitations based upon these criteria. (Class II - Priority Followup)
2. Expedite the program to develop and install equipment which would facilitate the detection and classification, by severity, of thunderstorms within 5 nmi of the departure or threshold ends of active runways at airports having precision instrument approaches. (Class II - Priority Followup)
3. Install equipment capable of detecting variations in the speed of the longitudinal, lateral, and vertical components of the winds as they exist along the projected takeoff and approach flightpaths within 1 nmi of the ends of active runways which serve air carrier aircraft. (Class II - Priority Followup)

Honorable John L. McLucas. (4)

4. Require inclusion of the wind shear penetration capability of an airplane as an operational limitation in the airplane's operations manual, and require that pilots apply this limitation as a criterion for the initiation of a takeoff from, or an approach to, an airport where equipment is available to measure the severity of a thunderstorm or the magnitude of change in wind velocity. (Class II - Priority Followup)
5. As an interim action, install equipment capable of measuring and transmitting to tower operators the speed and direction of the surface wind in the immediate vicinity of all runway ends and install lighted windsocks near to the side of the runway, approximately 1,000 feet from the ends, at airports serving air carrier operations. (Class I - Urgent Followup)
6. Develop and institute procedures whereby approach controllers, tower controllers, and pilots are provided timely information regarding the existence of thunderstorm activity near to departure or approach flightpaths. (Class I - Urgent Followup)
7. Revise appropriate air traffic control procedures to specify that the location and severity of thunderstorms be considered in the criteria for selecting active runways. (Class I - Urgent Followup)
8. Modify or expand air traffic controller training programs to include information concerning the effect that winds produced by thunderstorms can have on an airplane's flightpath control. (Class III - Longer-Term Followup)
9. Modify initial and recurrent pilot training programs and tests to require that pilots demonstrate their knowledge of the low-level wind conditions associated with mature thunderstorms and of the potential effects these winds might have on an airplane's performance. (Class II - Priority Followup)

Honorable John L. McClucas (5)

10. Expedite the program to develop, in cooperation with appropriate Government agencies and industry, typical models of environmental winds associated with mature thunderstorms which can be used for demonstration purposes in pilot training simulators. (Class III - Longer-Term Followup)
11. Place greater emphasis on the hazards of low-level flight through thunderstorms and on the effects of wind shear encounter in the Accident Prevention Program for the benefit of general aviation pilots. (Class II - Priority Followup)
12. Expedite the research to develop equipment and procedures which would permit a pilot to transition from instrument to visual references without degradation of vertical guidance during the final segment of an instrument approach. (Class III - Longer-Term Followup)
13. Expedite the research to develop an airborne detection device which will alert a pilot to the need for rapid corrective measures as an airplane encounters a wind shear condition. (Class III - Longer-Term Followup)
14. Expedite the development of a program leading to the production of accurate and timely forecasts of wind shear in the terminal area. (Class III - Longer-Term Followup)

TODD, Chairman, McADAMS, THAYER, HURGESS, and HALEY, Members, concurred in the above recommendations.

  
By: Webster B. Todd, Jr.  
Chairman

**Attachments**

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



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

June 25, 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-76-50, issued May 6, 1976, and supplements our letters of June 22, 1976, and May 16, 1978.

A-76-50. Revise Advisory Circular 61-21, Flight Training Handbook, to provide a comprehensive description of the information which would be included under the subtopic "Preflight Operations."

Comment. Advisory Circular AC 61-21A is a complete revision of AC 61-21 and was recently published by Federal Aviation Administration's (FAA) Office of Flight Operations. A copy is enclosed for your information and review. The vast majority of Chapter 5, pages 47 through 57, addresses preflight operations in considerable depth.

We believe the information contained in this revised AC adequately satisfies the intent of Recommendation A-76-50, and we consider action on this recommendation completed.


Please note that Recommendation A-76-50 was one of six generated by NTSB's 1976 Study, U.S. General Aviation Takeoff Accidents - The Role of Preflight Preparation. Recommendations A-76-45 through 49 were previously closed during 1977 and 1978. (See FAA's letter to NTSB, dated May 16, 1978.) Accordingly, this action, relative to Recommendation A-76-50, constitutes FAA's response to the final element of this multiple recommendation.

We also invite your attention to the Board's Recommendation A-76-99, issued July 29, 1976 (A-76-97 through 100). This recommendation states: "Revise Advisory Circular AC 61-4C, AC 61-9B, and AC 61-21 to include a discussion of safe procedures for the demonstration of  $V_{mca}$  and note the  $V_{gsse}$  limitation." Publication of AC 61-21A satisfies this recommendation, in part, and a detailed discussion of

2

aircraft performance is included in Chapters 3, 11, 16, and 17. Since revision of the remaining AC's is not yet completed, Recommendation A-76-99 will be addressed separately at a later date.

Sincerely,

  
Leighton Bond  
Administrator

Enclosure

**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

May 16, 1978

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

Dear Mr. Chairman:

This is to advise that Federal Aviation Administration action with respect to NTSB Safety Recommendations A-76-45, 46, 47, 48 and 49 has been completed.

A-76-45. Through its Accident Prevention Program stress the importance of the elements of good preflight planning and its role in the safety of flight.

Action. All Regional Accident Prevention Coordinators were supplied with copies of NTSB Report AAS-76-2, "U.S. General Aviation Takeoff Accidents: The Role of Preflight Preparation," and directed to stress the importance of thorough preflight preparation and planning at pilot safety meetings. A copy of the reminder memo to all Regional Accident Prevention Coordinators is enclosed.

A-76-46. Amend 14 CFR 141 Appendix A, 14 CFR 61.105 and 14 CFR 61.107 to define the specific elements of preflight operations and to require a separate block of ground and flight training for this subject.

Action. This recommendation was "Closed-Reconsidered" by NTSB letter dated June 30, 1977.

A-76-47. Amend 14 CFR 61.57(b)(2) to specify that the person administering a biennial flight review must ascertain that the applicant understands the elements required for a complete preflight preparation.

Action. Our letter of June 22, 1976, gave our position on this item and our reasons for nonconcurrence. It also explained our preference for an educational program as an alternate solution.

A-76-48. Revise Advisory Circular 61-66, Annual Pilot-in-Command Proficiency Checks, to include an outline of subjects to be included in the preflight planning and preparation phase.

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Action. We have reviewed Advisory Circular 61-66, Annual Pilot-in-Command Proficiency Checks, and concluded that inclusion of an outline of the subjects in the preflight planning phase is inappropriate.

A-76-49. Issue an advisory circular discussing the elements of thorough preflight preparation and the potential dangers associated with each element.

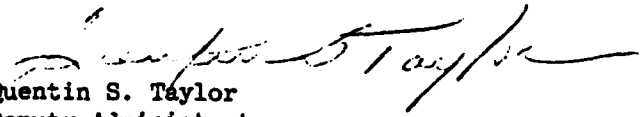
Action. We issued Advisory Circular 61-84, Role of Preflight Preparation, on April 11, 1977. This circular discusses the elements of thorough preflight preparation. A copy of the circular is enclosed.

The following is the status of NTSB Safety Recommendation A-76-50.

A-76-50. Revise Advisory Circular 61-21, Flight Training Handbook, to provide a comprehensive description of the information which would be included under the subtopic "Preflight Operations."

Status. Completion of the revision of Advisory Circular 61-21 has been delayed. We now expect issuance by the end of October.

Sincerely,

  
Quentin S. Taylor  
Deputy Administrator

2 Enclosures



# National Transportation Safety Board

Washington, D.C. 20594

Office of the  
Chairman

23 AUG 1978

Honorable Brock Adams  
Secretary  
Department of Transportation  
Washington, D.C. 20590

Dear Mr. Secretary:

This is to advise that the National Transportation Safety Board by formal Board action on August 15, 1978, has closed out the following Safety Recommendations:

<u>Addressee</u>	<u>Recommendation</u>	<u>Issued</u>	<u>Criteria</u>
FAA	A-74-20	3/26/74	Closed - Acceptable Action
FAA	A-76-8	3/8/76	Closed - Acceptable Action
FAA	A-76-9	3/8/76	Closed - Acceptable Alternate Action
FAA	A-76-10	3/8/76	Closed - Acceptable Action
FAA	A-76-11	3/8/76	Closed - Acceptable Action
FAA	A-76-14	3/8/76	Closed - Acceptable Action
FAA	A-76-45	5/6/76	Closed - Acceptable Action
FAA	A-76-47	5/6/76	Closed - Acceptable Alternate Action
FAA	A-76-48	5/6/76	Closed - Reconsidered
FAA	A-77-65	9/28/77	Closed - Acceptable Alternate Action
FAA	A-77-66	9/28/77	Closed - Acceptable Action

Enclosed is an excerpt from our NTSB Order 6400.1A with the pertinent definitions of the above categories. If we can be of further assistance, please let us know.

Sincerely,

James B. King  
Chairman

Enclosure

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

FOR RELEASE: 6:30 A.M., E.D.T., MAY 6, 1976

(202) 426-8787

ISSUED: May 6, 1976

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Forwarded to:

Honorable John L. McLucas  
Administrator  
Federal Aviation Administration  
Washington, D. C. 20591  
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SAFETY RECOMMENDATION(S)

A-76-45 through 50

The National Transportation Safety Board is concerned about the number of general aviation accidents which occur during the takeoff phase of flight, and the relationship of preflight preparation to these accidents. As a result, the Safety Board has conducted a study, "U. S. General Aviation Takeoff Accidents - The Role of Preflight Preparation," which identifies and assesses factors that most often affect takeoff accidents. The study analyzes several areas in which remedial action should be taken in order to reduce the number of takeoff accidents occurring annually.

The Safety Board examined the data for general aviation takeoff accidents for 1970 through 1974, and studied in-depth those that occurred during 1974. Accident files were then reexamined to determine the relationship between preflight preparation and the causes and factors of the accidents.

The Safety Board believes that preflight preparation and the takeoff portion of a flight must be emphasized continually to the aviation public.

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

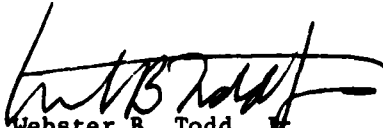
- (1) Through its Accident Prevention Program stress the importance of the elements of good preflight planning and its role in the safety of flight. (Class II - Priority Followup)
- (2) Amend 14 CFR 141 Appendix A, 14 CFR 61.105 and 14 CFR 61.107 to define the specific elements of preflight operations and to require a separate block of ground and flight training for this subject. (Class III-Longer-Term Followup)

1/ National Transportation Safety Board Aviation Special Study No. 76-2.

1765

- (3) Amend 14 CFR 61.57(b) (2) to specify that the person administering a biennial flight review must ascertain that the applicant understands the elements required for a complete preflight preparation. (Class III-Longer-Term Followup)
- (4) Revise Advisory Circular 61-66, Annual Pilot-in-Command Proficiency Checks, to include an outline of subjects to be included in the preflight planning and preparation phase. (Class III-Longer-Term Followup)
- (5) Issue an Advisory Circular discussing the elements of thorough preflight preparation and the potential dangers associated with each element. (Class III-Longer-Term Followup)
- (6) Revise Advisory Circular 61-21, Flight Training Handbook, to provide a comprehensive description of the information which would be included under the subtopic "Preflight Operations." (Class III-Longer-Term Followup)

TODD, Chairman, McADAMS, THAYER, BURGESS, 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

June 25, 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 supplements our responses of July 6, 1978, and July 23, 1979, to NTSB Safety Recommendations A-78-37 through 39.

A-78-37. Revise the surveillance requirements of commuter airlines by FAA inspectors to provide more stringent monitoring.

Comment. On April 25, 1979, the Federal Aviation Administration (FAA) issued Notice N8000.176, Increased Surveillance for Operators under New Part 135. This document put in place a comprehensive series of steps calling for increased surveillance and other steps for operations under new Part 135. A copy of this notice was sent to you with our letter of July 23, 1979. Spot inspections of all Part 135 operators are included in the program and the objectives are to reduce commuter accidents and increase operator awareness of the stringent new requirements of Part 135. On May 30, 1980, the FAA issued Notice N8000.198, which extends the provisions of Notice N8000.176 until December 1, 1980. This new notice provides for increased surveillance for at least 1 year of operations under revised Part 135. A copy of Notice N8000.198 is enclosed. We believe these actions fulfill the intent of Safety Recommendation A-78-37.

A-78-38. Identify FAA offices responsible for the surveillance of large numbers of air taxi/commuter operators and ensure that an adequate number of inspectors are assigned to monitor properly each operator.

Comment. The FAA has surveyed the regions as to their requirements for additional staffing to ensure the adequacy of the air taxi/commuter program. We are now providing 50 additional positions to the field offices in FY 1980 to support these safety programs, and intend to provide an additional 104 positions in FY 1981 if the FAA's budget request for 127 regulatory positions is approved. The air taxi recertification program under revised Part 135 was completed on December 1, 1979. Our work force is now involved in normal program activities and the increased emphasis program on commuter air carriers. We believe these actions fulfill the intent of Safety Recommendation A-78-38.

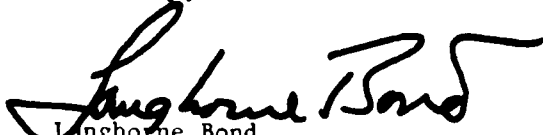
A-78-39. Review the flight operations and training manuals of all commuter airlines to ensure that the requirements of 14 CFR 135 are met and practiced.



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Comment. All flight operations and training manuals were reviewed during the air taxi recertification which was completed December 1, 1979. We believe these actions fulfill the intent of Safety Recommendation A-78-39.

Sincerely,

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

Langhorne Bond  
Administrator

Enclosure

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

July 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 to advise that Federal Aviation Administration action with respect to National Transportation Safety Board Safety Recommendation A-78-37 has been completed.

A-78-37. Revise the surveillance requirements of commuter airlines by FAA inspectors to provide more stringent monitoring.

Action. Notice N8000.176, "Increased Surveillance for Operators Under New Part 135," was issued April 25. This notice directs increased surveillance of scheduled air taxi operators complying with the new Part 135 and prescribes additional actions which emphasize the higher level of safety required in Part 135 operations.

We believe that this action meets the intent of the recommendation.

A copy of Notice N8000.176 is enclosed.

Sincerely,

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

Langhorne Bond  
Administrator

Enclosure

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

JUL 6 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-78-37 through 41.

A-78-37. Revise the surveillance requirements of commuter airlines by FAA inspectors to provide more stringent monitoring.

Comment. We agree that a positive surveillance effort must be maintained to ensure that commuter airlines provide the public with a satisfactory level of safety. In order to provide our inspectors with an adequate surveillance program, the agency continually reviews the FARs, advisory circulars, and other information applicable to commuter operators. In addition to this review process, the FAA, with public participation, recently developed a regulatory proposal (NPRM 77-17) to update FAR Part 135, "Air Taxi Operators and Commercial Operators of Small Aircraft," which, when adopted, will place additional operating requirements on commuter airlines. We believe the updated Part 135 and the ongoing agency program review will continue to provide appropriate guidance for the surveillance of commuter airlines by FAA field inspectors.

A-78-38. Identify FAA offices responsible for the surveillance of large numbers of air taxi/commuter operators and insure that an adequate number of inspectors are assigned to monitor properly each operator.

Comment. We have, at present count, 3,594 FAR Part 135 certificate holders of which 242 are commuter air carrier operators. The number of air taxi/commuter operators that are the responsibility of any one FAA office will vary from year to year as air taxi certificates are surrendered or new applicants certificated. We are continually reviewing our manpower allocations and will assign inspectors, as required, to monitor the operations of each certificate holder.

2

A-78-39. Review the flight operations and training manuals of all commuter airlines to insure that the requirements of 14 CFR are met and practiced.

Comment. Flight operations and training manuals of all air taxi certificate holders are reviewed periodically to determine compliance with applicable Federal Aviation Regulations.

A-78-40. Amend 14 CFR 135.27 to require that flight operations manuals specify: (1) The duties and responsibilities of key management personnel, and (2) positive means to insure the control of flights by company management as well as by the pilots.

Comment. Adoption of the proposed amendment (NPRM 77-17) to FAR Part 135, which contains revised requirements pertaining to management personnel and their responsibilities, will accomplish the substance of this recommendation.

A-78-41. Review the maintenance procedures of air taxi and commuter airlines operators to evaluate the effectiveness of those procedures and to insure adequate company control.

Comment. Air taxi maintenance procedures are under continuous review and evaluation by FAA district offices as a priority item. The proposed update (NPRM 77-17) of FAR Part 135 will, when adopted, require additional maintenance controls beyond those presently in effect.

Sincerely,

  
Quentin S. Taylor  
Deputy Administrator

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

ISSUED: May 17, 1978

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-78-37 through 41

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On September 6, 1977, Alaska Aeronautical Industries Flight 302, a DHC-6-200, crashed into Mount Iliamna when the aircraft strayed off course en route from Iliamna, Alaska, to Anchorage. The 11 passengers and 2 crewmembers died in the accident. The National Transportation Safety Board's investigation revealed poor operational practices, poor maintenance practices, and inadequate training practices by the operator, and inadequate surveillance of the operator by the Federal Aviation Administration. Alaska Aeronautical Industries is the 12th largest commuter airline in the nation and transports more than 150,000 passengers each year. As such, the Safety Board believes that the company's operating procedures must provide a high level of safety to the public, and that FAA's surveillance must insure that adequate standards are maintained.

Operations

Alaska Aeronautical Industries' unwritten policy was that all flights operating under instrument flight rules on low or medium frequency airways would be equipped with two operating automatic direction finding (ADF) navigation receivers. This policy was based on 14 CFR 135.159, which required two independent navigation receivers appropriate to the navigation facilities to be used. On the day of the accident, an aircraft with only one ADF receiver was substituted for a properly equipped aircraft in order to meet scheduling requirements. The change was made by the senior station agent, who had no aeronautical ratings or operational responsibilities. The agent did not consult company management personnel who were responsible for scheduling aircraft. The Safety Board reviewed the company's operations manual but could find no policy to require proper navigation equipment or procedures to govern the scheduling of aircraft. Additionally, the operations manual did not address the relationship between the individual pilots and company operations officials with regard to responsibility and authority for the operational control of the flight.

The lack of management in the dispatch procedure caused all responsibility for operations to be placed with the pilot. Furthermore, company management was not even concerned about monitoring dispatch functions. The Board believes that this situation placed undue pressures on the individual pilots to complete flights, since the pilots alone were responsible for all decisions affecting the flight. Additionally, the operation provided no check by the company of the pilots' adherence to company and federal regulations or to accepted safety standards.

Other operational deficiencies included the lack of procedures to insure that NOTAM's and other information pertinent to Alaska Aeronautical's route system were transmitted to pilots, and the absence of assignment of responsibilities to key management personnel, such as the chief pilot and the training pilot.

#### Training

The Safety Board reviewed Alaska Aeronautical Industries' training program and found that, although it was structured to meet the requirements of 14 CFR 135.55, the administration of the program was weak. Although the training manual set forth adequate training requirements for newly hired pilots, in practice the company required less training. For example, the training manual required 6 hours of initial flight training for a newly hired pilot with no previous air taxi experience, while, according to the testimony of the chief pilot and the training pilot, the company normally administered 1 or 2 hours of initial flight training. The training pilot testified that no formal system existed to apprise pilots of information concerning company procedures and policy. Finally, the training pilot stated that, in addition to his training duties, he flew about 130 hours per month in revenue operations.

These conditions indicate that the company's training program lacked the control and supervision necessary to insure that the program was implemented as specified in their manual. Although the minimum requirements of 14 CFR 135 were found in the training manual, the Board believes that the actual conduct of the program lacks the thoroughness expected of a commuter air taxi operation.

#### Maintenance

Alaska Aeronautical Industries' maintenance procedures were deficient. Pilots' reports of mechanical discrepancies were written into the logbook, but were transferred at the end of the day to a "carry-over worksheet" which was retained in the maintenance department. Pilot writeups which were transferred to the "carry-over worksheet" and corrected were signed off by maintenance personnel on the worksheet; uncorrected items were carried forward. Since a copy of the worksheet was not placed in the logbook, a pilot who would fly an aircraft the following day could not inspect the logbook and, therefore, may accept an aircraft without

2202C

having available the previous discrepancy reports which had been carried over by maintenance. Since the maintenance area was not colocated with the terminal, pilots could not inspect the maintenance records of an aircraft to determine the status of carried-over items or the suitability of an aircraft for a particular flight.

The Safety Board's review of the operator's maintenance program disclosed that the spare parts in stock were not tagged to indicate their maintenance status. Serviceable parts were intermixed with un-serviceable ones. The chief of maintenance testified that he was the only person who knew the condition of all spare parts; if a replacement part was needed, he would determine its condition. As a result, he believed that parts tags were not necessary. The Safety Board believes that this system could lead to the use of un-serviceable parts on aircraft even though the logbook writeup would be signed off as corrected. Again, this practice demonstrates the lack of control and supervision of company management over the daily operation of Alaska Aeronautical Industries.

A review of the company maintenance records disclosed that discrepancies were signed off without corrective action; that parts were removed and installed without part numbers being recorded in the aircraft logbook; and that maintenance carry-over items listed both aircraft directional gyros as inoperative but no corrective action was accomplished because no parts were in stock.

#### FAA Surveillance

The Safety Board is concerned that these lax operational, maintenance, and training procedures existed without positive action by the FAA's office responsible for the surveillance of Alaska Aeronautical Industries. We recognize that this same office was responsible for about 151 other air taxi operators, with the operations inspectors and maintenance inspectors assigned to 54 and 30 air taxi operators, respectively. However, the deficiencies found must be corrected, and a positive surveillance effort must be established in order to provide a satisfactory level of safety to the public.

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

Revise the surveillance requirements of commuter airlines by FAA inspectors to provide more stringent monitoring.  
(A-78-37) (Class II - Priority Action)

Identify FAA offices responsible for the surveillance of large numbers of air taxi/commuter operators and insure that an adequate number of inspectors are assigned to monitor properly each operator.  
(A-78-38) (Class II - Priority Action)

2202C

Review the flight operations and training manuals of all commuter airlines to insure that the requirements of 14 CFR 135 are met and practiced.  
(A-78-39) (Class II - Priority Action)

Amend 14 CFR 135.27 to require that flight operations manuals specify: (1) The duties and responsibilities of key management personnel, and (2) positive means to insure the control of flights by company management as well as by the pilots.  
(A-78-40) (Class II - Priority Action)

Review the maintenance procedures of air taxi and commuter airlines operators to evaluate the effectiveness of those procedures and to insure adequate company control.  
(A-78-41) (Class II - Priority Action)

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

*Francis H. McAdams*

By: James B. King  
Chairman



**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591



OFFICE OF  
THE ADMINISTRATOR

May 21, 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-79-83 and 84, issued October 30, 1979, and supplements our letter of January 28, 1980.

A-79-83. Prepare and issue an Advisory Circular to all owners/operators of aircraft equipped with NiCad batteries to stress the necessity of an inspection of the battery ventilating system during preflight inspections.

A-79-84. Emphasize to maintenance personnel and FAA inspectors, through appropriate FAA publications, the hazards that can result from improperly installed battery ventilation systems.

Comment. Alert No. 22 in Advisory Circular 43-16, issued during May 1980, contains the Maintenance Note pertaining to Battery Ventilation Systems (copy enclosed). We believe that this action fulfills the objective of the above safety recommendations and consider action on these recommendations completed.

Sincerely,

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

Langhorne Bond  
Administrator

Enclosure



## National Transportation Safety Board

Washington, D.C. 20594

February 25, 1980

Office of  
Chairman

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

Dear Mr. Bond:

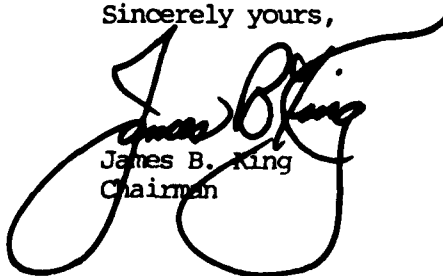
Thank you for your letter of January 28, 1980, responding to the National Transportation Safety Board's Safety Recommendations A-79-82 through A-79-84. These recommendations stemmed from our investigation of a Gates Learjet 25B crash which occurred shortly after takeoff at Sanford, North Carolina, on September 8, 1977. The recommendations pertained to the installation, ventilation, and maintenance of NiCad batteries.

The Safety Board's comments on the Federal Aviation Administration's (FAA) response are as follows:

A-79-82. The FAA's letter AWS-130 of December 21, 1979, addressed to all FAA staff concerned, with a copy of the Safety Board's recommendation enclosed, fulfills the intent of this recommendation, which is now placed in a "closed - acceptable action" status.

A-79-83 and 84. These recommendations are being maintained in an "open - acceptable action" status pending the FAA's issuance of Advisory Circular 43-16. We trust that the maintenance notes section of AC 43-16 will include the necessity for properly installed battery ventilation systems.

Sincerely yours,

A large, stylized 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 28, 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-79-82 through A-79-84 issued by the Board on October 30, 1979. These recommendations resulted from the Board's investigation of a Gates Learjet 25B crash shortly after takeoff at Sanford, North Carolina, on September 8, 1977.

The Board stated in its October 30, 1979, recommendation letter to the Federal Aviation Administration (FAA) that the probable cause of this 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 Board concluded that gases from the aircraft's batteries or fuel leakage from fuel system components, or both, could have been present in the area of the initial explosion. The Board believes that the evidence uncovered by its investigation relating to the ventilation of aircraft batteries and tailcone areas of this and possibly other corporate-type jets merits dissemination through the industry.

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

A-79-82. Advise appropriate personnel to be particularly cognizant during aircraft certification of the provisions for battery ventilation to insure that (1) adequate ventilation is provided during all conditions of ground and flight operations, (2) vent system design precludes inadvertent or maintenance-related removal of essential elements, and (3) batteries and the battery ventilation systems are isolated from all possible ignition sources about the aircraft.

Comment. All Regional Flight Standards Engineering & Manufacturing Branch Chiefs have been alerted to this accident and its probable cause by means of a letter which transmitted a copy of the subject recommendation. A copy of the December 21, 1979, FAA letter is enclosed. We believe that the October 30, 1979, NTSB recommendation letter best expresses the Board's concerns in these subject areas.

A-79-83. Prepare and issue an Advisory Circular to all owners/operators of aircraft equipped with NiCad batteries to stress the necessity of an inspection of the battery ventilating system during preflight inspections.

Comment. Battery ventilation system integrity is a design and maintenance function rather than an item to be included in a pilot's preflight inspection. The probability of a vent hose becoming detached between maintenance or periodic inspection intervals is extremely remote. Maintenance Advisory Circular information is covered in our response to NTSB Recommendation A-79-84 below.

A-79-84. Emphasize to maintenance personnel and FAA inspectors, through appropriate FAA publications, the hazards that can result from improperly installed battery ventilation systems.

Comment. Battery ventilation is covered in the two volumes of Advisory Circular AC 43.13, Acceptable Methods, Techniques and Practices. AC 43-13-1A, Inspection and Repair, emphasizes checking lead acid battery venting systems and reiterates the need when Nickel Cadmium (NiCad) batteries are used to replace lead acid types. AC 43.13-2, Aircraft Alterations, further emphasizes suitable battery compartment venting by stating airflow rates considered adequate. Copies of the appropriate sections of the ACs are enclosed.

To further emphasize the necessity for properly installed battery ventilation systems, FAA plans to include in the Maintenance Notes section of a future issue of AC 43-16, General Aviation Airworthiness Alerts, a reminder of the importance of this installation.

Sincerely,

  
Langhorne Bond  
Administrator

3 Enclosures

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

ISSUED: October 30, 1979

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-82 through -84

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About 2020 e.s.t., on September 8, 1977, Champion Home Builders Company, Gates Learjet 25B, N999HG, crashed shortly after takeoff at Sanford, North Carolina. All five persons aboard were killed, and the aircraft was destroyed.

The aircraft departed Sanford Airport about 2018 e.s.t., for a flight to Flint, Michigan. In accordance with departure instructions from Fayetteville departure control, the flight was about 3 mi west of the airport, climbing through 3,000 ft, on a heading of 270°, when it disappeared from radar. There were no distress calls, but several witnesses west of the airport saw the aircraft on fire below the 600-ft overcast ceiling. The flight completed a right turn to a northeasterly heading and suddenly dove to the ground. Persons in the immediate vicinity reported that the aircraft was on fire before it crashed.

The Safety Board determined that the probable cause of this 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 leakage from fuel system components, or both, could have been present in the area of the initial explosion. The Safety Board believes that the evidence uncovered by its investigation relating to the ventilation of aircraft batteries and tailcone areas of this and possibly other corporate-type jets merits dissemination throughout the industry.

When an aircraft engine is started by aircraft battery power and, as in this case, the aircraft is equipped with Nickel Cadmium (NiCad) batteries, and the batteries are recharged, they generate hydrogen gas. The amount of gas generated depends on the condition of the batteries. Normally, this gas is vented overboard to prevent a dangerous collection of gas within the aircraft. Venting of the battery system depends on hoses attached to overboard vents, and venting of the tailcone system depends primarily on ram air entering the top of the tailcone and exiting through a bottom fuselage opening. Ground operation of an aircraft with no airflow through the tailcone or taxiing with a tailwind could preclude adequate ventilation.

2747-A

On the Gates Learjet airplane involved in this accident, the vent hoses to one side of each battery case were not connected and the venting of this gas overboard depended on air pressure in the battery ventilation and tailcone ventilation systems developed by the movement of the aircraft.

The Safety Board was not able to determine why the hoses were not connected. The Safety Board is aware of 14 CFR 23.1353 and 25.1353 requiring measures to preclude explosive gases emitted by a battery accumulating in hazardous quantities within the aircraft. Following the start of one engine, with the aircraft's battery, the absence of the vent hoses may have permitted hydrogen gas to enter the tailcone of the aircraft. After the engine start, the aircraft taxied downwind. This would have limited the ventilation of the tailcone and could have allowed hydrogen gas from the recharging battery to collect in a confined area.

The Safety Board believes that sufficient hydrogen gas could have been generated to provide a flammable or explosive mixture. This mixture may have ignited as it was drawn overboard past the air conditioning motor. Although classified as explosion-proof, the brush end of the air conditioning motor showed evidence of explosive distortion as did the air plenum chamber through which tailcone air passes en route overboard.

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

Advise appropriate personnel to be particularly cognizant during aircraft certification of the provisions for battery ventilation to insure that (1) adequate ventilation is provided during all conditions of ground and flight operations, (2) vent system design precludes inadvertent or maintenance-related removal of essential elements, and (3) batteries and the battery ventilation systems are isolated from all possible ignition sources about the aircraft. (Class II, Priority Action) (A-79-82)

Prepare and issue an Advisory Circular to all owners/operators of aircraft equipped with NiCad batteries to stress the necessity of an inspection of the battery ventilating system during preflight inspections. (Class II, Priority Action) (A-79-83)

Emphasize to maintenance personnel and FAA inspectors, through appropriate FAA publications, the hazards that can result from improperly installed battery ventilation systems. (Class II, Priority Action) (A-79-84)

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

May 27, 1980

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

Dear Mr. Chairman:

The following information updates the action taken by the Federal Aviation Administration concerning the National Transportation Safety Board's Safety Recommendations A-79-106 and A-79-107.

Recommendation A-79-106. Impose mandatory requirements that all pilots communicate with air traffic control before entering the San Diego terminal radar service area.

Recommendation A-79-107. Establish a Group II terminal control area (TCA) at San Diego with a special requirement that aircraft entering the airspace be equipped with an operating Mode C altitude encoding transponder.

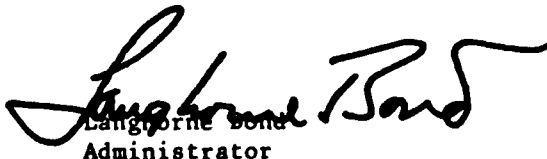
Comment. On March 15, a final rule (copy enclosed) was signed which establishes a Group II TCA for San Diego to be effective on May 15. This means all flights within the TCS will be required to communicate with and will be separated by air traffic control.

Aircraft will be required to have operable navigation equipment, two-way radio, and a transponder to operate in the TCA. An altitude encoder will not be required at this time. We feel that the lack of an altitude encoder will not compromise safety, but intend to address that issue separate and apart from the establishment of the TCA.

In conjunction with the establishment of the Group II TCA, our Western Regional Office has been directed to form user working groups to evaluate the effectiveness and workability of the San Diego TCA.

We are confident that implementation of the TCA complies with the intent of your recommendations.

Sincerely,

  
Langhorne Bond  
Administrator

Enclosure

117

**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20590

February 1, 1980



OFFICE OF  
THE ADMINISTRATOR

Mr. Elwood T. Driver  
Vice Chairman  
National Transportation Safety Board  
300 Independence Avenue, S.W.  
Washington, D.C. 20594

Dear Mr. Driver:

I have reviewed your January 11 letter commenting on the Aircraft Owners and Pilots Association's Petition Notice PR 79-13; the Federal Aviation Administration's Petition Notice 79-17, San Diego Terminal Control Area (TCA) proposal; and my response of January 7 to the National Transportation Safety Board's safety recommendations A-79-106 and 107. A copy of your comments will be placed in the respective dockets and given consideration in reaching a final regulatory conclusion as to the design and need for the San Diego TCA.

I regret that you consider my response of January 7 to the safety recommendations A-79-106 and 107 as "Open — Unacceptable Action." Our differences of opinion seem to narrow down to your recommendation for immediate action versus the required deliberative process FAA is pursuing in this matter.

As a result of that difference, we recently completed another on-site observation of air traffic operations in the San Diego area, and I now feel even more strongly dedicated to an orderly continuation of the regulatory process, having concluded that premature action will not be in the best interest of safety.

In order to expedite the rulemaking review process, I have directed that the comments be reviewed as they are received. Barring a deluge of late comments, our review action should be completed by February 15. Should a final decision be reached to implement the TCA after the review process, we would expect to have the San Diego TCA effective by late March.

I believe this expedited action is timely and will achieve the desired safety objectives for the San Diego area.

Sincerely,

Original signed by:  
Langhorne Bond  
Administrator





Department of Transportation  
Washington, D.C. 20591

## National Transportation Safety Board

Washington, D.C. 20591

January 11, 1980

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

Dear Mr. Bond:

We have reviewed (AOPA) Petition Notice NO. 79-17 (Docket No. 19829) which proposes the establishment and use of safety corridors by terminal area traffic operating to and from San Diego, California. The following comments are submitted for your consideration on this matter.

While the Safety Board has examined the rationale for AOPA's views regarding the potential benefits of designated safety corridors for the San Diego terminal area, we do not share its belief that the proposal is a better alternative than the Federal Aviation Administration's TCA proposal. The corridor concept is too restrictive for practical use and does not provide the flexibility needed by Air Traffic Control (ATC) to effectively control all air traffic utilizing the San Diego airspace. The safety hazard requires that separation service be provided to all users of the terminal airspace operating under ATC. The Safety Board believes that the narrow confines of the proposed corridors would restrict the controller's capability to provide such services, increase his workload, and under certain circumstances create more operational problems for ATC than the proposed corridors would resolve.

On December 26, 1979, the Board issued Safety Recommendations A-79-106 and 107. Recommendation A-79-107 stated that the Federal Aviation Administration (FAA) should "Expedite the establishment and implementation of a Group II TCA at San Diego, with the special requirement that aircraft utilizing the airspace be equipped with an operating Mode-C Altitude Encoding Transponder."

The National Transportation Safety Board believes that the policy followed by the FAA over the years of developing TCA's has proven to be effective, and we support Notice of Proposed Rulemaking No. 79-17, "Proposed Group II Terminal Control Area--San Diego, California." However, we continue to believe that promulgation of the final rule should be expedited and that an additional requirement for Mode-C altitude encoding transponders for all aircraft should be adopted.

Our emergency recommendations were prompted by our belief that a particularly hazardous condition exists in the San Diego area. Both AOPA's Petition No. PR 79-13 and the FAA's NPRM No. 79-17 are consistent with our contention that there is a need for operational changes in the San Diego terminal area to assure safe and efficient use of the local airspace.

In FAA's January 7, 1980, response to our recommendations, the FAA contended that our recommendations would create a new form of controlled airspace; we do not agree. We propose no changes in the dimensions of the present TRSA or the proposed Group II TCA. With regard to Recommendation A-79-106, the only "unfamiliar requirement" which would be levied on both pilots and controllers would be a requirement that pilots establish communications with the controllers before entering the TRSA. Our recent investigations of near collisions at San Diego reveal that these incidents more usually have involved pilots who either do not choose to avail themselves of the optional separation service or enter the TRSA before contacting ATC, leaving the controller little time to react should a conflict arise. Our recommended mandatory communications requirement does not constitute a drastic change nor would the change require an extended period of public education: it involves only the San Diego terminal area where the existence of a serious problem is unduly recognized. Changes in charts and other aeronautical publications would certainly be needed, but the need for such changes does not, in the Safety Board's opinion, constitute sufficient cause to maintain the status quo in the San Diego area.

An AOPA official has estimated that 90 percent of all general aviation pilots who operate in the San Diego area communicate with ATC. The other 10 percent may never choose to use the TRSA airspace for one reason or another, such as not having radios aboard or not needing to transit the airspace. However, even a full 10 percent increase in communications workload should neither result in an intolerable burden on controllers nor an inconvenience and waste of fuel for the users of the airspace. With reference to the incidents cited in Safety Recommendations A-79-106 and 107, both small airplanes departed Montgomery Airport and climbed into the TRSA, and this seems to be the source of most of the conflicts. Your concern for the probability of "dangerous concentrations of uncontrolled aircraft just outside of the TRSA" would seem to be speculative. Our concern for the probability of a collision between controlled and uncontrolled traffic just inside the TRSA is based on our review of actual near-collisions in the San Diego area.

In three cases involving mid-air near collision reports at San Diego, an air carrier aircraft was descending under ATC control in the TRSA on a downwind leg for a landing on runway 27 at Lindbergh Field. In each case a general aviation aircraft had departed Montgomery Airport and was climbing eastbound on approximately the same heading as the air carrier. In each of the three incidents, the general aviation aircraft

was being overtaken by the air carrier aircraft and conflict occurred within the designated TRSA airspace. In two of these incidents, the pilots of the general aviation aircraft had penetrated the TRSA airspace and contacted approach control just before the reported incident. In one instance, the pilot was not in radio contact with approach control.

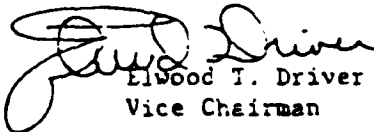
If this potentially dangerous situation is to be resolved, the Safety Board believes it is essential that pilots who find it necessary to enter the TRSA airspace communicate with San Diego Approach Control before entering so that their presence is known to the controller. The knowledge of their impending presence would allow the controller sufficient time to provide traffic advisories or to issue appropriate instructions to the aircraft so that effective separation is maintained.

We believe the needs of the users would be better served by a mandatory requirement for an altitude reporting (Mode-C) transponder at San Diego. If a need for this requirement should arise at other Group II TCA's, we are confident that normal rulemaking procedures will identify such a need.

We are aware that FAA fulfillment of our recommendations may require withdrawing the current NPRM. However, we believe that in view of the dangerous situation at San Diego, the FAA should choose to expedite this action by whatever means are at its disposal.

In the meantime, we consider your response to Safety Recommendations A-79-106 and A-79-107 as "Open--Unacceptable Action."

Sincerely,

  
Elwood T. Driver  
Vice Chairman

Enclosures

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20550

January 7, 1980



OFFICE OF  
THE ADMINISTRATOR

Honorable James E. King  
Chairman, National Transportation  
Safety Board  
Washington, D. C. 20594

Dear Mr. Chairman:

On December 28, 1979, I received your Safety Recommendations A-79-106 and 107 dealing with air safety in the San Diego area.

Earlier--October 18, 1978--the National Transportation Safety Board had recommended a Terminal Radar Service Area (TRSA) at Lindbergh Airport and establishment of Terminal Control Areas (TCAs) in San Diego and wherever else they were needed.

We followed these recommendations by putting a TRSA into operation at Lindbergh Field on April 19, 1979, and setting out to install TCAs at 38 locations throughout the country. One of these was San Diego, and the Federal Register of December 6, 1979, carried a Notice of Proposed Rule Making to that effect. The public comment period was 60 days.

The law does not provide us the luxury of moving more rapidly than this. Perhaps this is just as well, for public participation in the deliberative process allows us to come up with the safest and least burdensome TCA configuration for each site, as well as letting us weigh environmental and economic factors. It also lets us make major changes in the air traffic rules with safety, by giving us the time to educate pilots and controllers in their new responsibilities.

But I am afraid that your December recommendation for an immediate, mandatory TRSA at San Diego risks creating confusion that would detract from safety, not add to it. Your recommendation would create what amounts to a new form of controlled airspace, with unfamiliar requirements suddenly laid on both pilots and controllers. I don't feel we should undertake so drastic a change without a period of public education. There should be time, too, for changes in charts and other aeronautical publications.

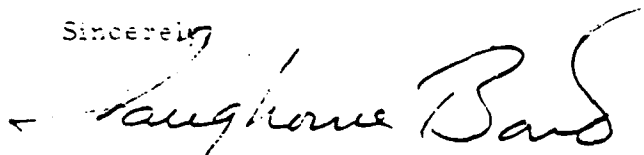
Page 2

Even then there would be problems. Before planes could enter this new type of airspace, controllers would have to identify and issue clearance to them, although many of the aircraft would not be carrying transponders. This would lead to dangerous concentrations of uncontrolled aircraft just outside the TRSA, waiting for controllers to identify them on the radar screen by ordering their pilots to perform turns. This would greatly increase the burden on controllers, as well as causing inconvenience and waste of fuel.

The Board's recommendation regarding mandatory carriage of an altitude reporting (Mode C) transponder is a separate issue. To adopt it for San Diego now would only slow down the current regulatory process. Besides, if it is a good idea for San Diego, it should apply to other Group II TCAs as well, and should be considered in a broader context. This issue is a part of our overall airspace review now underway.

Your recent recommendations came seven weeks after the first incident you cite. I would very much appreciate a chance to review the study you undoubtedly made in the interim, leading you to conclude that the steps you recommended in 1978 are now inadequate.

Sincerely,



Mangherne Bond  
Administrator

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

ISSUED: December 28, 1979

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-106 and 107

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On November 9, 1979, a Western Airlines B-727 and a Funbirds Flying Club Rockwell Commander AC-112B nearly collided on airway V-66 about 9 miles northeast of Lindbergh Airport in San Diego, California, at 4,500 feet m.s.l. The location is within the designated San Diego Terminal Radar Service Area (TRSA). The Western jet was under the control of San Diego Approach Control on a full instrument approach to Lindbergh Airport, and the Commander was on a VFR night cross-country flight eastbound to Imperial, California. The Commander pilot had just departed Montgomery Airport and was not in contact with San Diego Approach Control, although the pilot was aware that he was flying through airspace where positive separation from other aircraft was available if he chose to ask for that service.

On November 18, 1979, another midair near-collision occurred on the same airway about 1 1/4 miles west of the San Diego sports stadium. A Pacific Southwest Airlines (PSA) B-727 was being radar vectored for an approach to Lindbergh Airport by San Diego Approach Control. The approach controller issued a "conflicting traffic" advisory to the PSA flightcrew, which identified the traffic as being "right below us." The approach controller did not know about the conflicting traffic until a few seconds before the two aircraft passed each other. The aircraft was a Piper Twin Comanche PA-30, which had taken off from Montgomery Airport on a VFR flight en route to Imperial. This aircraft had attempted to contact San Diego Approach Control about 1 minute before the PSA jet passed near it, but the pilot had not been radar-identified until moments before the near-collision which took place at an altitude of about 6,200 feet m.s.l. The PSA captain said that, if the controller had not issued the conflicting traffic advisory, his aircraft would have collided with the Piper. This midair near-collision also occurred within the San Diego TRSA. In neither case was the small aircraft equipped with a Mode-C altitude encoding transponder.

2833

The Safety Board is concerned that these two similar incidents again demonstrate the potential for another catastrophic midair collision in the San Diego area. While recognizing that the Federal Aviation Administration's recent Notice of Proposed Rule Making (NPRM) 79-AWE-17 will in all likelihood ultimately result in the establishment of a Terminal Control Area in San Diego, the Safety Board believes that this action does not satisfy the immediate need for segregating controlled, high-performance aircraft and uncontrolled aircraft in the high-density San Diego area, which includes several Airport Traffic Areas in proximity to one another. The busiest of these facilities, Montgomery Airport, lies directly below the arrival flightpath of commercial aircraft approaching San Diego's Air Carrier Terminal, Lindbergh Field. Airway V-66 runs directly through the center of the San Diego terminal area, and is a heavily used eastbound route for aircraft departing airports in the San Diego area.

The Safety Board believes that serious danger continues to exist for a catastrophic aircraft collision in the San Diego area, and that preventive action must be taken immediately. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Immediately exercise its emergency authority and impose mandatory requirements that all pilots communicate with San Diego approach control and receive an appropriate ATC clearance, on a first-come, first-served basis, before entering the San Diego Terminal Radar Service Area. This should be identified as an interim action until a Terminal Control Area is implemented. (Class I, Urgent Action) (A-79-106)

Expedite the establishment and implementation of a Group II TCA at San Diego, with the special requirement that aircraft utilizing the airspace be equipped with an operating Mode-C Altitude Encoding Transponder. (Class I, Urgent Action) (A-79-107).

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



James B. King  
Chairman

**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

**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-80-27 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:

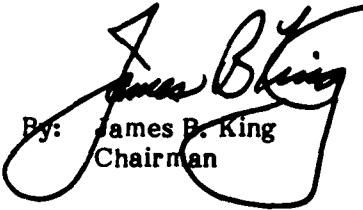
Notify all Learjet operators by telegram of the motive flow valve leak found in this incident, and require an immediate and a recurring inspection of these valves under operating pressures to detect and correct any fuel leaks found. (Class I, Urgent Action) (A-80-27)

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.**

ISSUED: April 23, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-30 and -31

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During several recent accident investigations, the Safety Board has identified recurring failures of tail rotor blades on Bell model 47 helicopters. Two recent accidents in California are typical of several previous accidents.

On March 8, 1980, a Bell 47G helicopter crashed during a crop dusting operation in Brentwood. The pilot was seriously injured. The investigation is continuing; however, preliminary reports indicate that a tail rotor blade separated in flight.

On September 14, 1979, a Bell 47J-2 helicopter lifted off the Queen Mary helicopter pad with four passengers and a pilot on board for a sightseeing tour of Long Beach Harbor. Witnesses saw the tail rotor blade separate from the aircraft at 200 feet above ground level and in level flight over Queensway Bay. The helicopter descended out of control, crashed, and sank in 35 feet of water. All five occupants were killed.

Upon examination, the tail rotor blade, P/N 47-642-102, was found to have separated through the grip in the grease seal radius retention area. This area is covered by Airworthiness Directive 70-10-08. The Airworthiness Directive requires a detail daily inspection of the exterior surface of the blades for the presence of cracks, dents, and nicks, and a 150-hour periodic inspection of the interior surface of the blade in the grip area for cracks, corrosion, and tool marks. The inspection is to be conducted using dye penetrant techniques, or a light and a magnification device.

A metallurgical examination of the failed blade disclosed that the failure stemmed from a fatigue crack that began on the inside diameter of the grip. The fatigue had begun at small corrosion pits less than 0.002-inch deep. The service life of the blade is 600 hours; however, this blade failed within a total time of only 536.4 hours.

Additional recent accidents involving tail rotor blade failures on Bell 47 series helicopters include the following:

2921

- (1) A Bell 47G-2A-1 helicopter, N1158W, crashed 3 miles NW of Laughmar, Florida, on July 15, 1978. There was one fatality. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that had begun on the trailing edge of the airfoil. The total time on the blade was 77.5 hours.
- (2) A Bell 47G-2 helicopter, N47WV, crashed at Pigeon Forge, Tennessee, on July 16, 1978, resulting in four fatalities. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that started in the grip. The total time on the blade was 468 hours.
- (3) A Bell 47G-2 helicopter, N68367, crashed in Solodad, California, on August 12, 1978. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that began in the grip. The total time on the blade was 400 hours.
- (4) A Bell 47G-2, N6729D, crashed near Crossland, Georgia, on August 12, 1978. The tail rotor blade, P/N 47-642-102, separated because of a fatigue crack that began in the grip. The total time on the blade was 365 hours.

In most of the failures examined by the Safety Board's Metallurgical Laboratory, the fatigue cracks had begun from extremely small stress raisers such as knicks, corrosion pits, tool marks, and scratches. Most of these defects could have been overlooked by a visual inspection.

The long history of fatigue failures in tail rotor blade P/N 47-642-102 reflects a low fatigue margin and an obvious need to replace the blade with a design more resistant to fatigue cracking.

In December 1979, Bell issued Alert Service Bulletins Nos. 47-79-3 and 47-79-4, which recommended that the service life of the tail rotor blades be reduced immediately from 600 hours to 300 hours, and that all blades with more than 300 hours be scrapped. The Bulletins further recommended that the current model blades be replaced with the new model blades by July 1980. The new model blades have been shown to have a higher margin for fatigue and have a higher recommended service life of 2,400 hours.

The FAA's Southwest Region has issued a Notice of Proposed Rulemaking (NPRM) for adoption of an Airworthiness Directive on this matter, which essentially is the same as the Bell Service Bulletins except that the NPRM excludes those Bell 47 helicopters equipped with Franklin (Aircooled Motors) engines. In the text of the NPRM, the FAA recognizes the need for the improved tail rotor blades to be installed on these models and recommends that this be accomplished later. The Safety Board does not agree that the Bell 47 helicopters equipped with these engines should be excluded from the provisions of the proposed Airworthiness Directive. Further, the Safety Board believes that removal of all blades with part No. 47-642-102 should be expedited.

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

Issue an Airworthiness Directive to require the installation of the improved tail rotor blades, part No. 47-642-117 on all Bell 47 model helicopters for which the installation has been approved as soon as possible after receipt of the directive. (Class I, Urgent Action) (A-80-30)

Expedite the approval of the improved tail rotor blades for installation on all Bell 47 model helicopters equipped with Franklin engines and expedite action to require the installation of the improved blades on those aircraft. (Class I, Urgent Action) (A-80-31)

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

By:   
James B. King  
Chairman

**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

SAFETY RECOMMENDATION(S)

A-80-32 through -34

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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).

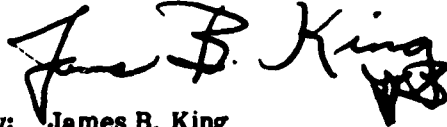
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Notify Foreign Regulatory Agencies of this action. (Class I, Urgent Action) (A-80-33)

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

**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.

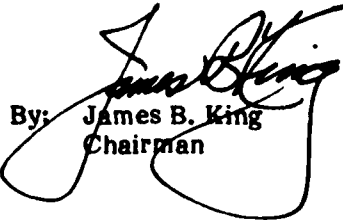
We recognize that the Federal Aviation Administration has been active in alerting owners and operators of cracks in Cleveland P/N 40-76B wheels installed on Piper PA-31-300 model aircraft and that the information was discussed in the August 1977 issue of FAA's General Aviation Inspection Aids Summary.

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

**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

SAFETY RECOMMENDATION(S)

A-80-36 & -37

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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.

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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

**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 breaker 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.

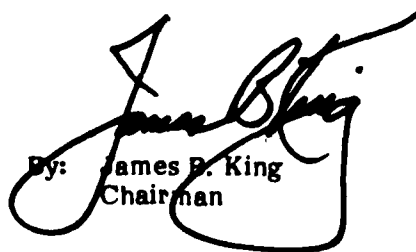
The Beechcraft Shop Manual, Section VII, Queen Air Series, requires that the circuit breakers be checked for looseness and proper operation during the 100-hour inspection in the pilot's compartment.

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

**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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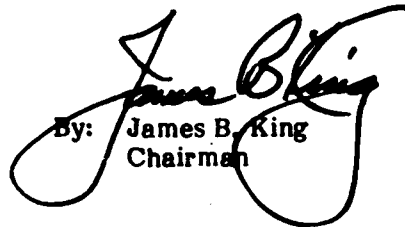


Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

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

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

ISSUED: May 27, 1980

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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. <sup>1/</sup> 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

<sup>1/</sup> 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.

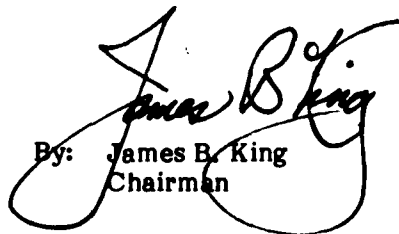
The Safety Board concludes that both areas of concern pose potential hazard to the safe operation of any flight. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

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

**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

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

ISSUED: May 28, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-45

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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.

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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

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

ISSUED: June 3, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

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-drafts 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-drafts 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.

2951A



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

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

ISSUED: June 3, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-47 and -48

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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.

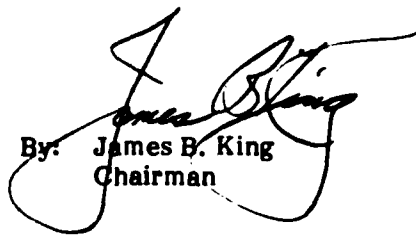
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Because of the circumstances of this accident and the potential for future fatal accidents, the National Transportation Safety Board recommends that the Federal Aviation Administration:

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

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

ISSUED: June 11, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-49

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

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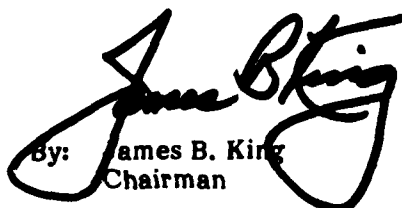
14 CFR 91.81 as clear and unambiguous in the requirement that altimeters be set to read altitude above mean sea level and that these operators are clearly in error by setting altimeters to standard barometric pressure.

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

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

ISSUED: June 17, 1980

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-50

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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

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

ISSUED: June 30, 1980

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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, Oreg.; Omak, Wash.; and Casper, Wyo.

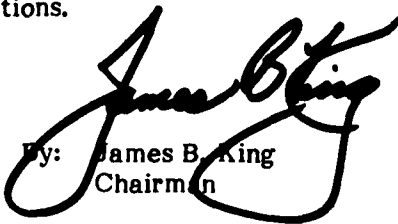


Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

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

**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

SAFETY RECOMMENDATION(S)

A-80-53 through -55

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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.

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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

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