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



**QUARTERLY REPORT
October through December 1980**

FEDERAL AVIATION ADMINISTRATION

MAY 27 1981

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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-80-56 through 58), 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

Following is a listing of the 19 new recommendations received during the fourth quarter of CY 1980:

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SUMMARY

Statistics for CY 1979 included:

108 new recommendations issued to FAA.

46 recommendations officially "CLOSED" during this period.

Statistics for CY 1980 included:

115 new recommendations issued to FAA.

74 recommendations officially "CLOSED" during this period.

The following exchanges of NTSB/FAA correspondence concerning NTSB Safety Recommendations occurred during the fourth quarter, October 1 - December 31, 1980:

- FAA initial responses to NTSB recommendations:

8 letters involving 19 recommendations.

- FAA "final report" letters to NTSB:

9 letters involving 25 recommendations.

Officially "CLOSED" by NTSB ----- 17 recommendations.

There were 7 FAA responses to 8 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>
10/31/79	A-80-60	7/14/80	10/9/80	Rewriting Advisory Circular
4/8/80 & 5/16/80	A-80-61	7/21/80	10/17/80	Issued Maintenance Alert
7/18/80	A-80-78 & 79	8/19/80	10/4/80	Investigated Service Difficulty Reports; Issued AD
7/28/80	A-80-82	9/4/80	11/13/80	Issued AD
8/26/80	A-80-85	8/28/80	11/13/80	Issued AD
8/20/80	A-80-87	9/10/80	12/9/80	Amended AD
5/14/80	A-80-106	10/2/80	12/15/80	Prior Alert Issued

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

A-80-60. On October 31, 1979, Western Airlines, Inc., McDonnell Douglas DC-10-10, N903WA, crashed at Mexico City International Airport, Mexico. Although the aircraft was cleared for a Tepexpan arrival and was advised that the landing runway was 23R, the crew continued the approach to runway 23L, which had been closed for repairs. The aircraft struck heavy equipment on runway 23L as the crew attempted to execute a missed approach. Of the 76 passengers and 13 crewmembers aboard, 61 passengers and 11 crewmembers were fatally injured. One person on the ground was fatally injured.

The crew was advised on at least four occasions by either Mexico City Air Route Traffic Control Center or the tower that they were to land on runway 23R. The investigation revealed that both pilots knew that runway 23L was closed and that each had landed aircraft at the airport while the runway was closed. This approach and landing procedure involved a sidestep maneuver, which is a visual alignment maneuver required of a pilot executing an approach to one runway while cleared to land on a parallel runway.

In Safety Recommendation A-80-60, the National Transportation Safety Board (NTSB) expressed belief that there is an urgent need to publish more information on sidestep maneuver procedures. The Board contends that nowhere on standard United States' approach charts is the complete maneuver portrayed, nor is the word "sidestep" shown. The procedure is shown as a straight-in approach to an adjacent runway, as a circling approach to the sidestep runway, or as a note at the bottom of the chart giving ceiling and visibility minima. Accordingly, the Board recommended that the Federal Aviation Administration (FAA) "Publish an Advisory Circular, or amend an existing Advisory Circular, to disseminate information on the sidestep maneuver procedures, terminal ATC communication procedures, radar separation and equipment requirements, and landing minima applicable to the use of the sidestep maneuver by American air carriers at both domestic and foreign airports."

The Airman's Information Manual describes the sidestep maneuver, the relevant ATC communications, and sidestep landing minimums in paragraphs 380 and 381. However, in the interest of safety and as an additional precaution, Advisory Circular 90-1A, Civil Use of U.S. Government Instrument Approach Procedure Charts is currently being rewritten to provide sidestep information. We expect this rewrite to be completed by May 1981, thereby correcting the deficiencies which were of concern in Safety Recommendation A-80-60.

A-80-61. The National Transportation Safety Board investigated two similar accidents involving explosion and fire in an aircraft wing during engine start. Both occurred in similar Beech airplanes, a Model B58 and a Model B95. Both occurred on the ground and no injuries resulted. However, the Board determined that the unsafe condition which caused the fires could lead to fire in flight and, consequently, issued Safety Recommendation A-80-61. The accidents investigated were the April 8, 1980, Beechcraft 95 fire at Tulsa, Oklahoma, and the May 16, 1980, Beechcraft B58 fire at Casper, Wyoming. In both cases the fuel vent lines were disconnected at B-nut fittings inside the wings. The investigation disclosed that when the fuel tank is full and the fuel expands, the pressure relief valve allows the expanded fuel and vapors to be expelled overboard through the vent line. When the vent line is disconnected, the fuel will be vented into the interior of the wing and flow inboard toward the engine nacelle because of the wing dihedral. When the fuel reaches the nacelle, it can be ignited by hot engine parts or engine exhaust. The investigation confirmed that both fires began in this manner. In addition, one other Beechcraft Model 95 was inspected and found to have the vent line disconnected at a B-nut fitting.

The Board stated that on all three aircraft, the fuel tank inspection and leak test required by Airworthiness Directive (AD) 78-05-06 had been accomplished a few days before the discovery of the disconnected vent lines. The airworthiness directive requires that the inspection be accomplished in accordance with the manufacturer's instructions. For these aircraft the appropriate document is Beechcraft Service Instruction No. 895, Revision 1. This Service Instruction states: "Plug all pressure relief vents (if equipped) and recessed vents. . . ." It appears that, rather than plugging the vent outlets, the vent lines are being disconnected and fitted with plugs. In the cases cited, it appears the plugs were removed but the vent lines were not properly reconnected. The service instruction procedure does not have specific steps for restoring the system to its original configuration. The Safety Board expressed concern that the condition described above could exist in other aircraft and that the condition may recur after future inspections. Accordingly, the Safety Board recommended that the FAA "Require a one-time inspection of those aircraft that have been inspected in accordance with the requirements of Airworthiness Directive 78-05-06, to ensure the integrity of the fuel vent system."

Airworthiness Directive 78-05-06 does not relate to the integrity of the vent system, and any vent system integrity check would be a maintenance inspection item. Assuming the mechanic complies with the procedures set forth in the AD, there should be no problems with the repair procedures as outlined. Accordingly, the FAA does not believe an AD for a one-time maintenance inspection is necessary to assure

that a mechanic had adequately completed an inspection that is already required by an AD. However, since vent lines may have been improperly disconnected in demonstrating compliance with AD 78-05-06, the FAA prepared the following maintenance alert to advise mechanics who are responsible for compliance with AD 78-05-06 to use caution and follow instructions as set forth in the AD:

GOODYEAR AEROSPACE CORPORATION

Fuel Cells, BTC-39 series construction type.

AD 78-05-06 requires inspections of those fuel cells to determine integrity. There is evidence that some maintenance facilities accomplishing this AD may have improperly disconnected vent lines within the wings and failed to reconnect them. This of course can easily lead to fuel leakage within the wings and potential hazards. Maintenance facilities are urged to assure the integrity and continuity of all fuel systems at any time work or inspections are performed. They may wish to reevaluate their procedures on any aircraft on which they have accomplished this AD.

With this action, the NTSB was informed that the FAA considers action on Safety Recommendation A-80-61 completed.

A-80-78 and 79. On July 18, 1980, a Bell 205A-1 helicopter, N6107N, equipped with fixed-type floats (inflated), was returning to the Arcola-Houston, Texas, Airport on a flight from an offshore oil rig. Immediately after acknowledging airport advisories on the radio, the pilot, who was the sole occupant, reported that he was in trouble. When the aircraft wreckage was located 3 miles east of the airport, it was inverted and burned. The main rotor system was found 350 yards from the main impact area. The pilot was killed. Examination of the wreckage revealed that a fatigue crack existed on the right forward cross tube (PN 205-050-114-9) where the support saddle fitting (PN 204-050-011-21) was riveted. The fatigue crack was located between two rivet holes. According to the NTSB the remaining fracture in the cross tube diameter was caused by static overload. Separation of the float support in this area would have caused the float to swing outboard as it pivoted around the aft cross tube attachment and to expose a large flat plate drag area to the slip stream, which could have resulted in the pilot losing control of the helicopter. FAA Airworthiness Directive 76-14-03, Bell Amendment 39-2665, effective August 7, 1976, required that the cross tubes in the float kit installed on this model helicopter be removed before they had been operated 500 hours. According to the NTSB, the operator of the accident helicopter reported that the aircraft had been operated approximately 440 hours since the float kit had been installed. The

manufacturer reported that replacement cross tubes with clamp-on saddle support fittings are available and it was estimated that there are still 35 or more float kits with the riveted saddle support fittings in service. Accordingly, the Safety Board recommended that the FAA "Issue a telegraphic airworthiness directive applicable to all Bell 205 and 212 helicopter models equipped with fixed float kits (PN 205-706-050-1 and -7), on which AD 76-14-03 has not been accomplished, to require an immediate one time x-ray or equivalent inspection of all cross tube inner diameters in the areas where the support saddle fittings are riveted for evidence of cracks."

By letter dated November 4, 1980, the FAA expressed nonconurrence in Safety Recommendation A-80-78. As noted in the preamble to the NTSB recommendations, the operator reported that the aircraft had been operated approximately 440 hours since the float kit had been installed. The FAA questioned the validity of the operator's report of 440 hours. Our review of the records resulted in a conclusion that this float landing gear cross tube, PN 205-706-050-9 on aircraft N6207N, had attained a total time-in-service of 640 hours. A similar review of records by Bell Helicopter Textron personnel revealed a total time-in-service of 607 hours. In either case, the mandatory replacement time of 500 hours specified in AD 76-14-03 was apparently exceeded.

The float landing gear in question was originally delivered to the Peruvian Navy in 1973 by Bell Helicopter Textron as loose equipment for a Model 205A-1 helicopter. Subsequently, the helicopter was wrecked, sold, and returned to the United States with the float kit. The helicopter was repaired and sold without the float kit. The float kit was then sold separately to the present operator of N6207N.

The FAA has no records of service difficulties over the past 6 years related to the fixed float landing gear cross tubes installed on Bell Model 205A-1 and 212 helicopters. Since the agency has no service difficulty reports and the time-in-service of the float landing gear installed on Bell Model 205A-1, N6207N, is questionable, the FAA does not believe an immediate x-ray inspection of the cross tubes for cracks is warranted. Therefore, the Safety Board was informed that the FAA intended to take no further action in regard to Safety Recommendation A-80-78. By letter dated December 16, 1980, the Board classified Safety Recommendation A-80-78 in a "Closed--Reconsidered" status based on the fact that the FAA provided information to indicate that the mandatory replacement time was exceeded and the FAA has no records of service difficulties over the past 6 years pertaining to the fixed float landing gear cross tubes installed on Bell 205A-1 and 212 helicopters.

In Safety Recommendation A-80-79, the Board recommended "Issue an airworthiness directive to require the removal of forward and aft cross tube assemblies (PN 205-050-114-1, -3, -5, -7) and cross tube

assemblies (PN 205-706-050-5 and -9) from all Bell Model 205A-1 and 212 helicopters within the next 50 hours time-in-service and replacement with clamp-on saddle support fittings."

In the November 4, 1980, letter, the FAA concurred in NTSB Safety Recommendation A-80-79. An "immediate adopted" AD was issued and became effective upon publication in the Federal Register. This AD required installation of float landing gear forward and aft cross tubes having clamp-on saddle fittings within the next 50 hours time-in-service. Additional information regarding the subject is contained in Bell Helicopter Textron Operation's Safety Notice, OSN 205/212-80-2, dated July 29, 1980, and Bell Service Bulletins 205-80-13 and 212-80-18, each dated August 20, 1980. With this action, the NTSB was informed that the FAA considered action completed on Safety Recommendation A-80-79.

In the December 16, 1980, letter, the NTSB classified Safety Recommendation A-80-79 in a "Closed--Acceptable Action" status, based on the issuance of an AD which fulfilled the intent of this recommendation.

A-80-82. On July 28, 1980, an Aerospatiale Lama 315B helicopter, N67103, crashed and burned near Dillon, Montana. The pilot was killed. The aircraft had just lifted a 1,000-lb. external sling load and was transitioning to forward flight when directional control was lost. The aircraft descended rapidly while rotating about its vertical axis, and crashed.

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

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

The Safety Board expressed concern that other main transmissions installed on these model helicopters may have excessive wear in the area of the gear/shaft splines. The manufacturer indicated that more than 0.25 inch of radial free play measured at the tail rotor drive

output flange should be considered excessive, and on August 14, 1980, issued a telegraphic bulletin to all operators of 315 Lama and 316B, 316C, and 319 Allouette III helicopters recommending an inspection procedure that would reveal excessive wear in the area of gear/shaft splines.

Accordingly, the NTSB recommended that the FAA "issue a telegraphic Airworthiness Directive to require immediate compliance with the tail rotor drive system inspection criteria specified in the telegraphic bulletin issued by the Aerospatiale Helicopter Company on August 14, 1980. The inspection is applicable to the 315 Lama and 316B, 316C, and 319 Aloutte III model helicopters."

On November 13, 1980, the FAA expressed concurrence in this recommendation, and AD No. T-80-19-51 was issued on September 5, 1980. On December 30, 1980, the NTSB stated that the FAA had fulfilled the intent of this recommendation by issuing telegraphic AD No. T-80-19-51, and Safety Recommendation A-80-82 was classified in a "Closed--Acceptable Action" status.

A-80-85. On August 26, 1980, an Aerospatiale SA-330 helicopter, N3596N, owned and operated by Petroleum Helicopters, Inc., of Lafayette, Louisiana, was inbound to Quonset Point, Rhode Island, with a crew of two and seven passengers. About 2 miles east-southeast of Quonset, the crew reported a fire in the passenger compartment. The onboard fire extinguishers were used to put out the fire, and the helicopter landed without further incident.

Investigation of this incident determined that wire number LXP2BF contacted or shorted, and burned through hydraulic line 330A75 5311 02 causing a high-pressure hydraulic leak and fire. The Safety Board expressed belief that a similar incident occurred with a like model helicopter belonging to Petroleum Helicopters, Inc., several years ago causing extensive damage.

In order to prevent a fire that might result from friction between electrical wires and hydraulic cables on the Aerospatiale SA-330 helicopter, the NTSB recommended that the FAA "Issue an emergency Airworthiness Directive for all Aerospatiale helicopter models SA-330 to inspect, separate, and secure electrical wires that are near hydraulic lines between fuselage stations 5295 and 5600."

The FAA issued an emergency telegraphic AD No. T-80-18-51 on August 29, 1980, based upon its investigation and evaluation of the incident. On September 29, 1980, the NTSB noted that the AD fulfilled the intent of the recommendation and classified Safety Recommendation A-80-85 in a "Closed--Acceptable Action" status.

A-80-86 and 87. The National Transportation Safety Board investigated the presumed crash of a Cessna 340, N110RA, in the water near Petersburg, Alaska, on August 20, 1980. The aircraft, pilot, and three passengers were still missing at the time this recommendation was issued.

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

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

Special inspection requirements were issued initially in December 1979 by the manufacturer in Cessna Multi-Engine Service Information Letter, ME-79-44, and the two subsequent revisions to the letter. Airworthiness Directive 80-18-06, dated August 23, 1980, was also issued, making Revision 2 of the Service Letter mandatory.

Compliance with AD 80-18-06 disclosed several instances of cracked structure in the elevator hinge area. In one case, according to the Board, a precautionary inspection of an aircraft with less than 40 hours total time revealed a crack in the elevator gusset.

The Safety Board expressed concern that the problem which was causing the empennage structural cracking on these particular models was not well defined. Service problems have been associated with those aircraft models with the larger engines installed (greater than 285 maximum continuous horsepower) which were manufactured or modified before a structural change which strengthened the empennage was incorporated in the design. Additionally, the Safety Board expressed concern that the 100-hour total time requirement for initial inspection and the 100-hour recurring inspection interval may be inadequate to detect potential failures. Also, structural cracks in low-time aircraft could be indicative of an unpredicted vibratory mode, a production line quality control deficiency, or both.

Accordingly, the NTSB recommended that the FAA "Revise Airworthiness Directive 80-18-06, dated August 23, 1980, to require an initial

inspection before further flight, regardless of the aircraft's total time, and restrict the performance envelope of those Cessna models affected by the AD to that of the basic Cessna model 335/340 until the empennage structural cracking problem is resolved."

By letter dated December 9, 1980, the FAA concurred in Safety Recommendation A-80-86 and AD 80-18-06 was superseded by AD 80-19-17 on September 12, 1980. Airworthiness Directive 80-19-17 requires an inspection before further flight, and each 10 hours thereafter, regardless of total hours or engine configuration. One hundred and thirteen reports have been received in accordance with the requirements of the AD. A review of these reports indicates that any failure or damage would be readily detectable long before it could progress to a potentially unsafe condition within the 10-hour inspection cycles, regardless of the performance envelope for the particular airplane. It should be noted that the Model 335 and the Model 340 have different performance envelopes. The FAA informed the Safety Board that action on Safety Recommendation A-80-86 was completed.

The Safety Board further recommended that the FAA evaluate the 100-hour recurring inspection interval now required in AD 80-16-06 to ascertain the need for a shorter interval, and amend the AD as appropriate.

The FAA also expressed concurrence in this safety recommendation. Subsequent to the issuance of AD 80-18-06, a cracked gusset was reported on an airplane with a total time of 39.6 hours. Three other reports identified significant damage on airplanes that had been inspected 43, 44, and 61 hours earlier. Additionally, the airplane involved in the presumed crash near Petersburg, Alaska, on August 20, 1980, had been inspected approximately 20 hours previously. Based on a worst case assumption, a 10-hour inspection interval was established for AD 80-19-17. The FAA informed the Safety Board that action on Safety Recommendation A-80-87 was also completed.

A-80-106. On May 14, 1980, an Aerospatiale 341G Gazelle helicopter was approaching a confined-area landing site when the flight-control hydraulic pressure was lost. The pilot maintained control and continued his approach. As the aircraft was flared for landing the pilot's right rudder pedal rotated from beneath his foot, causing the pilot to lose directional control of the aircraft. After several rapid rotations of the fuselage, the pilot instructed the passenger, seated in the copilot's seat, to depress the copilot's right rudder pedal. The pilot regained directional control and landed the aircraft uneventfully.

Detailed examination of the pilot's right rudder pedal revealed that the lower of two rivets (PN L2125-24-12 DCJ) which attaches the leaf spring/locking pin assembly to the pedal shaft had sheared. However,

review of the pedal installation indicated that the rivet sheared as a result of the pedal's rotating. If the pedal is fully engaged in its floor fitting, the locking pin will prevent rotation and a flat machined on the base of the pedal shaft which mates with a flat on the floor fitting will prevent rotation should the locking pin fail.

The Safety Board was concerned that other rudder pedal shafts may not have been properly installed and fully engaged and locked in their respective fittings which could result in loss of directional control. Accordingly, the Safety Board recommended that the FAA "Issue a Telert Maintenance Bulletin to require a one-time inspection of the rudder pedal shafts on the Aerospatiale 341G helicopter for proper installation."

Prior to receipt of this recommendation, the FAA had brought the details of this incident to the attention of FAA field inspectors and the aviation community in the General Aviation Alerts (AC 43-16) issued August 1980. Since this alert had been distributed by mail at least 1 month prior to receipt of the recommendation, we did not agree that a telegraphic alert was necessary. The FAA contended that the August 1980 alert satisfied the intent of Safety Recommendation A-80-106, and the Board was informed that the FAA considered action on this recommendation completed.

By letter dated January 16, 1981, the NTSB noted that the details of this accident were published in the August 1980 issue of the General Aviation Alerts (AC No. 43-16), and that, after discussions between the FAA, the French airworthiness authority, and the Aerospatiale Corporation, a company service letter would be issued. Safety Recommendation A-80-106, therefore, has been classified in an "Open--Acceptable Action" status.



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

DEC 10 1980

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

Dear Mr. Bond:

Reference is made to your letter dated October 14, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-56 through 58 issued July 16, 1980. These recommendations stemmed from our review of inadvertent landing gear retraction accidents between 1975 and 1978. We found that the number of inadvertent landing gear retraction accidents in the Beech Bonanza and Baron were significantly high in comparison with other general aviation aircraft. We attributed this to cockpit design deficiencies and recommended cockpit modifications to existing and future production aircraft.

The Safety Board is pleased to note that the Federal Aviation Administration (FAA) will make an in-depth examination of these design-induced, inadvertent landing gear retraction accidents to determine a satisfactory solution of the problem.

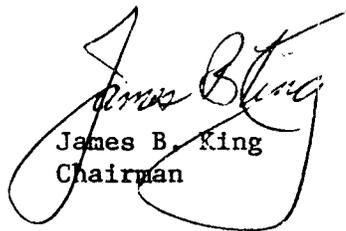
At this time, we would like to comment that the landing gear control on current Beechcraft models has a center detent, which evidently is not as effective as it should be, especially on the Baron models. The FAA should examine the mechanical latch on the landing gear control of the Piper PA-23. The arrangement seems to be effective since this aircraft has an inadvertent gear retraction incidence that is one-tenth that of the Baron. Also, we do not believe that merely alerting aircraft owners and potential purchasers to the significantly high incidence of inadvertent gear retraction in the Beech Bonanza and Baron, or to the existence of a non-standard control arrangement in any other aircraft, will satisfy the intent of our recommendations. In effect, the public has already been alerted by virtue of the Safety Board's report on this subject. We believe the FAA should address more directly the intent of our recommendations in order to alleviate the problems identified in our study.

Honorable Langhorne M. Bond

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Safety Recommendations A-80-56 through 58 will be maintained in an "Open--Acceptable Action" status pending the FAA's resolution of these recommendations.

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 14, 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-80-56 through -58 issued by the Board on July 16, 1980. These recommendations resulted from the Board's special investigation of inadvertent landing gear retraction accidents between 1975 and 1978. The National Transportation Safety Board's Special Investigation Report NTSB-SR-80-1 reflects an analysis of design-introduced landing gear retraction accidents in the years 1975-1978. The report concludes that the number of such accidents in the Beech Bonanza and Baron is unnecessarily high in comparison to other contemporary general aviation aircraft. It also states that the Federal Aviation Administration (FAA) should require certain technical changes in existing and future production Bonanza and Baron cockpits.

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

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

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

We have reviewed NTSB-SR-80-1 and have found that, as a result of our deliberations, more complex questions have arisen.

Comment:

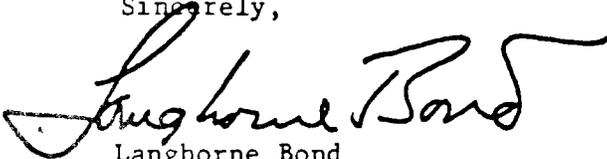
We agree that, where appropriate, cockpit control configurations should be standardized. However, these recommendations introduce a number of questions and will require further study before a sound conclusion can be reached. For example, the landing gear operating switches in current production on Bonanzas and Barons have center lock detents which require two separate motions to actuate the switch in either direction. This is in effect a latch. We are concerned that more complex latching arrangements could interfere with emergency procedures and perhaps create a more serious accident potential than now exists.

In regard to Safety Recommendation A-80-58, Beech Bonanza models up to the D35 (1953) used a secondary latch requiring a separate action to retract the landing gear, and shape-coded switches were used on the D35 and later models. Although the pre-1963 controls were not shape-coded, the majority of these airplanes are in the hands of private owners who are familiar with the controls which were originally installed. The FAA currently has no information which indicates that these older airplanes have significant inadvertent gear retraction problems.

We intend to examine this entire subject in depth to determine what alternatives are available to deal with these less serious (non-fatal or minor injury) accidents. As a part of our effort, we may consider the use of procedures which will help alert aircraft owners, and potential purchasers, of accident statistics which are higher than normal for specific aircraft models.

We will keep the Board informed of our findings as our research progresses.

Sincerely,



Langhorne Bond
Administrator

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

ISSUED: July 16, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-56 through -58

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

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

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

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

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

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

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

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

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

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

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

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


By: James B. King
Chairman
for

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 9, 1980

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-59 and 80-60 issued by the Board on July 14, 1980. These recommendations resulted from the Board's investigation of the crash of a Western Airlines McDonnell Douglas DC-10-10 at Mexico City International Airport on October 31, 1979.

A-80-59.

Revise FAA Handbook 8260.19 to require that separate standardized instrument approach charts be published for all airport approaches that require a sidestep maneuver. These charts should clearly indicate the airport approach plan view, the profile view, and the landing minima required.

Comment.

We do not concur with a requirement for separate charting of all instrument approaches that require sidestep maneuvers. Our rationale for nonconcurrence is as follows:

A sidestep maneuver (to a landing on a parallel runway) is similar to a circling maneuver in that an aircraft utilizes a NAVAID aligned to one runway and when in visual conditions maneuvers to land on another. As such, the sidestep minimums are published on the chart along with straight-in minimums for the primary runway and circling minimums. In the U.S., when an aircraft is cleared for a particular approach, the pilot is advised by air traffic control (ATC) if he is to sidestep or circle to land at the conclusion of the approach. The pilot then selects the landing minimums appropriate for his clearance. A separate instrument approach chart of the sidestep maneuver is not warranted and might be a hindrance. At Los Angeles International Airport, for

example, eight new charts would be required in addition to the 13 there now. The pilot must understand his ATC clearance if he is to select the sidestep minimums on the present combined charts. We believe this requirement is preferable to selecting the proper page if sidesteps were charted separately.

Present U.S. Government charts show sidestep landing minimums as straight-in to a parallel runway. The identification is "S-" followed by the runway number. Our Aircraft Programs Division has initiated action to substitute the word "sidestep" where appropriate. The principal American commercial aeronautical charting company has indicated it will do the same and, in addition, will eliminate presenting the sidestep minimums as a note.

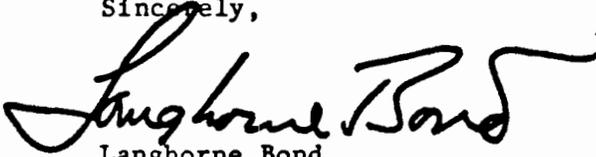
A-80-60.

Publish an Advisory Circular, or amend an existing Advisory Circular, to disseminate information on the sidestep maneuver procedures, terminal ATC communication procedures, radar separation and equipment requirements, and landing minima applicable to the use of the sidestep maneuver by American air carriers at both domestic and foreign airports.

Comment.

The Airman's Information Manual describes the sidestep maneuver, the relevant ATC communications, and sidestep landing minimums in paragraphs 380 and 381. However, Advisory Circular 90-1A, Civil Use of U.S. Government Instrument Approach Procedure Charts will be rewritten to provide the sidestep information. Once this rewrite is completed, FAA believes this action corrects the deficiencies which were of concern to the Board in Safety Recommendations A-80-59 and 60.

Sincerely,


Langhorne Bond
Administrator

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

REVISED: AUGUST 21, 1980

ISSUED: July 14, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-59 and -60

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

The crew was advised on at least four occasions by either Mexico City Air Route Traffic Control Center or the tower that they were to land on runway 23R. However, none of these air traffic control (ATC) communications contained phraseology similar to that used in United States ATC communications regarding a sidestep maneuver. ^{1/} The investigation revealed that both pilots knew that runway 23L was closed and that each had landed aircraft at the airport while the runway was closed.

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

^{1/} A visual alignment maneuver required of a pilot executing an approach to one runway while cleared to land on a parallel runway.

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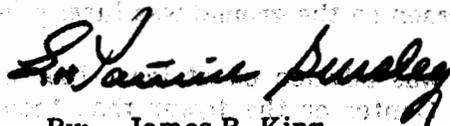
The Safety Board believes that a separate instrument approach chart is needed for the 33 airport runways that utilize the sidestep maneuver in the United States. In addition, we believe there is a need to publish more information on sidestep maneuver procedures.

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

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

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

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



By: James B. King
Chairman

for

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



National Transportation Safety Board

Washington, D.C. 20594

Office of the Chairman

December 19, 1980

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

Dear Mr. Bond:

Reference is made to your letter of October 17, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-61 through 63 issued July 21, 1980. These recommendations stemmed from our investigation of a Beech B95 fire accident at Tulsa, Oklahoma, on April 8, 1980, and a Beech B58 fire accident at Casper, Wyoming, on May 16, 1980.

Both accidents occurred on the ground while the engines were being started, causing fire and explosions in the wing areas. Investigation revealed that in both cases the fuel vent lines were disconnected at the B-nut fittings inside the wings. Inspection of another Beech 95 revealed that the vent line was disconnected at a B-nut fitting. Our concern that these unsafe conditions could lead to fire in flight led to the recommendations regarding Airworthiness Directive (AD) 78-05-06 and Beech Aircraft Corporation Service Instruction No. 0895.

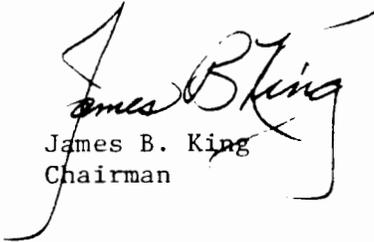
In A-80-61, we asked the Federal Aviation Administration (FAA) to require a one-time inspection of those aircraft that have been inspected in accordance with the requirements of AD 78-05-06 to ensure the integrity of the fuel vent system. In A-80-62, we recommended that the FAA immediately amend AD 78-05-06 to include a procedure that will assure vent system integrity following the inspection required by the AD. We note that the FAA intends to fulfill the intent of these two recommendations by issuing a maintenance alert advising mechanics who are responsible for compliance with AD 78-05-06 to use caution and follow the instructions set forth in the AD. We have examined the wording of the proposed alert and believe that this alternative action when implemented will fulfill the intent of these two recommendations, which we have classified in an "Open--Acceptable Alternate Action" status.

Honorable Langhorne M. Bond

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In A-80-63, we asked the FAA to require the Beech Aircraft Corporation to amend Service Instruction No. 0895 to advise all operators of Model B58 and Model B95 airplanes of the possible unsafe condition and to specify a procedure which will assure that the vent system integrity is restored following fuel tank inspection. In view of the FAA's assurance that AD 78-05-06 satisfies the intent of this recommendation and that there is no need for the Beech Aircraft Corporation to amend Service Instruction No. 0895, we are classifying A-80-63 "Closed-- Reconsidered."

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 17, 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-80-61 through -63 issued by the Board on July 21, 1980. These recommendations resulted from the Board's investigation of two similar accidents which involved explosion and fire in an aircraft wing during engine start. Both occurred in similar Beech airplanes, a Model B58 and a Model B95.

A-80-61.

Require a one-time inspection of those aircraft that have been inspected in accordance with the requirements of Airworthiness Directive 78-05-06, to ensure the integrity of the fuel vent system.

A-80-62.

Amend immediately Airworthiness Directive 78-05-06 to include a procedure that will assure vent system integrity following the inspection required by the Airworthiness Directive.

Comment.

We do not believe an Airworthiness Directive (AD) for a one-time maintenance inspection is necessary to assure that a mechanic has adequately completed an inspection that is already required by an AD. AD 78-05-06 does not relate to the integrity of the vent system, and any vent system integrity check would be a maintenance inspection item. Assuming the mechanic complies with the procedures set forth in the AD, there should be no problems with the repair procedures as outlined. However, since vent lines may have been improperly disconnected in demonstrating compliance with AD 78-05-06, we intend to issue the

following maintenance alert advising mechanics who are responsible for compliance with AD 78-05-06 to use caution and follow instructions as set forth in the AD:

GOODYEAR AEROSPACE CORPORATION

Fuel Cells, BTC-39 series construction type.

AD 78-05-06 requires inspections of those fuel cells to determine integrity. There is evidence that some maintenance facilities accomplishing this AD may have improperly disconnected vent lines within the wings and failed to reconnect them. This of course can easily lead to fuel leakage within the wings and potential hazards. Maintenance facilities are urged to assure the integrity and continuity of all fuel systems at any time work on inspections are performed. They may wish to reevaluate their procedures on any aircraft on which they have accomplished this AD.

A-80-63.

Require that the Beech Aircraft Corporation amend Service Instruction No. 0895 to advise all operators of these airplanes of the possible unsafe condition, and to specify a procedure which will assure that the vent system integrity is restored following fuel tank inspection.

Comment:

The Beech Service Instruction referenced in Recommendation A-80-63 was issued by Beech at our request and incorporated in the AD as an alternate means of compliance. The FAA does not have the authority to require the Beech Aircraft Corporation to amend their Service Instructions. Of course, if a safety hazard is determined to arise out of compliance with a manufacturer's Service Instructions, we will issue an Airworthiness Directive. However, we see no need for the Beech Aircraft Corporation to amend Service Instruction No. 0895 to specify a procedure which will assure that the vent system integrity is restored following fuel tank inspection. In FAA AD 78-05-06 we state ". . . reconnect fuel cell and fuel system, and access covers, and functionally pressure check fuel system in accordance with aircraft manufacturer's service data or item (c). . . ." We feel this statement satisfies the Board's recommendation.

FAA considers action on Safety Recommendations A-80-61 through -63 completed.

Sincerely,


Langhorne Bond
Administrator

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

ISSUED: July 21, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-61 through -63

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

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

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

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

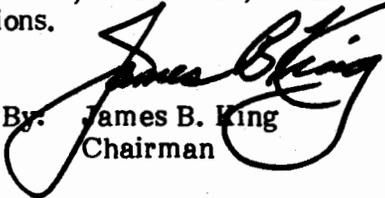
Since the inspection applies to many aircraft, the Safety Board is concerned that the unsafe condition described above could exist in other aircraft and that the condition may recur after future inspections. Therefore, the Safety Board recommends that the Federal Aviation Administration:

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

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

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

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

November 6, 1980

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations, relating to Commuter Airline operations, issued by the Board on August 8, 1980. These recommendations resulted from the Board's special investigation of the commuter industry and the elements which affect commuter airline safety. The objectives of these recommendations, for the most part, were within the scope of existing FAA programs.

As a result of its study, the National Transportation Safety Board reiterated five previously issued recommendations to the Federal Aviation Administration. The Board had been earlier advised of actions underway with respect to these recommendations. Many of these actions were developed as the result of the implementation and the issuance of amendments to Part 135 of the FAR's published at various times during calendar year 1980, or as the resolution of issues or concerns discussed during the FAA's First Commuter Air Carrier Safety Symposium held January 16 and 17, 1980. The adequacy of these actions, and other regional programs directed to commuter safety, will again be addressed at the second symposium to be held January 16 and 17, 1981. The current status of these actions is as follows:

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

Comment. As stated in our letter to the NTSB dated August 27, 1980, regulatory action was deemed appropriate, and, in fact, has been accomplished by the issuance of new FAR Section 135.244, Operating Experience, effective March 1, 1980. We believe the addition of this

requirement will further ensure that pilots involved in commuter operations are adequately trained in all pertinent operational areas, one of which includes aircraft handling characteristics at maximum takeoff gross weights. The FAA considers action on Safety Recommendation A-79-80 completed.

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

Comment. Work on this project is continuing. A supplemental notice of proposed rule making was issued on August 11, 1980, (Notice No. 78-3B, copy enclosed). This supplemental notice proposes to revise the flight and duty time limitations and rest requirements for flight crewmembers utilized by domestic, flag, and supplemental air carriers, commercial operators, and air taxi operators. This supplemental notice is based upon two notices of proposed rule making issued in 1977 and 1978 as part of the FAA's Regulatory Review Program.

Preliminary FAA analysis of the comments received on the earlier notices (and specifically Notice 78-3) indicated the need for intensive review and additional conceptual development before that rulemaking action could proceed. Consequently, in view of the conceptual similarity between the flight and duty time limitations proposed in Part 135 and the proposal in Notice 78-3, when the agency issued the amendments to Part 135, it was decided to defer changing the flight and duty time limitations in Part 135 until they could be given further consideration. Accordingly, this supplemental notice proposes changes to both Part 121 and Part 135 and includes a discussion of comments received in response to Notices 78-3 and 77-17 pertaining to flight and duty time limitations.

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

Comment. We recently updated the status of this safety recommendation in our letter of July 29, 1980. To reiterate our remarks, during August 1979 FAA received a proposed standard for a composite cockpit voice recorder/flight data recorder (CVR/FDR) from one of the major manufacturers of both CVR's and FDR's. Working with this proposed standard and other sample standards as a base, FAA has developed a proposed draft standard for a composite CVR/FDR. A new public procedure to expedite the issuance of standards for specified materials, parts, processes, and appliances used on civil aircraft was issued by FAA on June 2, 1980, with September 9 as its effective date (copy enclosed). FAA will publish its proposed standard for a composite CVR/FDR under this new procedure. A copy of the latest draft of the CVR/FDR and a copy of

draft of the CVR/FDR Standard and a copy of the new TSO procedures are enclosed. As a result of a recent NTSB recommendation, FAA is requesting SAE to develop the standard from our draft material.

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

Comment. The status of this recommendation was also updated in our letter of July 29, 1980. Although initially the FAA had planned to establish a regulatory project to develop an Advance Notice of Proposed Rule Making (ANPRM) for identification of appropriate standards, further review of the matter indicated that this regulatory procedure was not necessary. Research and development previously accomplished by the U.S. Army and by NASA was already being incorporated by several equipment manufacturers in their own development plans.

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

Comment. We also updated the status of this recommendation in our July 29, 1980, letter as follows: "In partial fulfillment of this recommendation, 14 CFR 135 was amended, as published October 10, 1978, in Vol. 43 FR 46742, to require under Section 135.151 (copy enclosed) that no person may operate a turbojet airplane having a passenger seating configuration, excluding any pilot seat, of 10 seats or more, unless it is equipped with an approved cockpit voice recorder.

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

In addition to reiterating these five recommendations, the Board made twelve additional recommendations. The Board was previously advised that the FAA had initiated or completed actions which satisfied the intent of several of these safety recommendations.

A-80-64. Establish a separate classification of commuter airline inspectors to conduct commuter airline surveillance.

Comment. A separate classification was established within the FAA GS-1825 classification guide well in advance of the issuance of this recommendation. This classification for Principal Aviation Safety Inspectors emphasizes experience requirements for the certification and surveillance of commuter airlines. This guide is currently being used in the job classification of these inspectors. (A copy of the applicable announcements are enclosed.) We consider action on Safety Recommendation A-80-64 completed.

A-80-65. Provide specialized training for inspectors assigned to commuter airlines to insure that inspectors are qualified in the equipment operated and are knowledgeable regarding commuter airline operations.

Comment. The FAA agrees with this recommendation and has initiated additional training courses for this purpose. Specialized training is being provided for inspectors assigned to commuter airlines at the Mike Monroney Aeronautical Center at Oklahoma City. Course 21618, Air Carrier Airworthiness Indoctrination (ACAI), is for general aviation inspectors and is made up of selected subjects from the air carrier inspectors indoctrination course. It was initiated in FY-79 in response to revised Part 135. Eighty inspectors completed this course in FY-79/80 and 16 inspectors are scheduled for FY-81. The second, Course 21828, Air Taxi Certification and Surveillance, covers certification requirements, operating rules, aircraft, equipment, policies, and procedures. This course was developed for airworthiness inspectors assigned to commuter airlines. In FY-79/80, the FAA trained 48 inspectors in Course 21828 and 36 inspectors are scheduled for FY-81. There are two courses for operational inspectors: Course 22100, Air Taxi Operations Certification and Inspection; and Course 21617, Air Carrier Mini Indoctrination. One hundred and seventy inspectors completed Course 22100 in FY-79/80 and 40 inspectors completed Course 21617 in FY-80 (the first year that this course was offered). For FY-81, Course 22100 has 70 inspectors scheduled for attendance and Course 21617 has 36 inspectors scheduled. With regard to flight training and qualifications, a continuing effort is being made to qualify all commuter inspectors in at least one turboprop aircraft and, where applicable, specific turbojet aircraft under their surveillance. This should be viewed as a continuing program due to such factors as manpower and fiscal restraints and personnel turnover. The FAA considers action on Safety Recommendation A-80-65 completed.

A-80-66. Allocate GADO resources to insure that all commuter surveillance and general aviation requirements can be accomplished.

Comment. 127 Flight Standards Aviation Safety Inspector positions were allocated for the FY 1981 budget appropriation. Due to a pressing need, 50 of these positions were advanced to the FY 1980 budget, and these positions have all been filled. The additional 77 positions will be filled during FY 1981. All of the 127 positions are dedicated to commuter/air taxi certification and surveillance activities. The FAA considers action on Safety Recommendation A-80-66 completed.

A-80-67. Establish a procedure for distributing surveillance of commuter airline maintenance evenly during all periods when maintenance is performed.

Comment. The FAA is in agreement with the intent of this recommendation and we believe it will be satisfied by events in progress. Work assignments for inspectors is a function of district office supervision, which provides the greatest flexibility for effective utilization of those personnel. The headquarters and regional offices periodically emphasize the need for specific surveillance by notices, such as N 8000.198, Increased Surveillance for Operator Under New Part 135 (copy enclosed).

Inspector personnel assigned to commuters have borne a time-consuming workload in the recertification of those operators under the new Part 135. With this workload behind us and hiring of new inspectors for commuter assignments now in progress, coupled with the commuter-oriented inspector programs, sufficient inspector manpower should be provided to accommodate scheduling off-hour surveillance of commuter maintenance activities. We will keep the Board advised of the results of our efforts in this regard.

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

Comment. This was accomplished on an interim basis by internal notices culminating April 1, 1980. Final implementation of this recommendation is by Advisory Circular, AC 120-27A, Weight and Balance Control, issued May 14, 1980, and by internal instructions to FAA airworthiness inspectors, which are under development. The thrust of FAA's efforts in this area is to cause the certificate holders to develop suitable weight and balance control systems that can be easily managed by pilots or other personnel responsible for loading, in accordance with methods and procedures provided by the respective certificate holder. The FAA considers action on Safety Recommendation A-80-68 completed.

A-80-69. Amend 14 CFR 135.243 to require a minimum number of multiengine flight hours for a pilot-in-command of a multiengine commuter airline flight.

Comment. In February 1980, new Section 135.244, commuter pilot-in-command operating experience requirements, was issued, which contained standards for pilots prior to designation as pilot-in-command on commuter passenger-carrying operations. These requirements established increased operating experience levels by make and model for both single and multiengine aircraft. This experience, which varies depending on whether the aircraft is piston or turbine powered, must be acquired under the supervision of a check airman employed by the certificate holder in passenger-carrying operations. The intent of this rule is to upgrade

pilot experience to adhere to a higher level of safety. A copy of this new section is enclosed for your review. Also, it should be stressed that this new section specifies requirements in addition to those in Section 135.243, which require all pilots serving in commuter operations to hold an airline transport pilot certificate. This requirement in itself, in our judgment, contributes appreciably to pilot-in-command experience, especially when complemented by the provisions of new Section 135.244. Finally, we believe the increased training program requirements contained in Subpart H of Part 135 are also a positive factor. In this regard, the operating experience under Sections 135.244 must be acquired only after satisfactory completion of the appropriate ground and flight training for the aircraft and crewmember position. Approval provisions for the operating experience must be scheduled in the operator's training program. We consider action on Safety Recommendation A-80-69 completed.

A-80-70. Amend 14 CFR Subpart B to require that dispatch and flight operations duties are supervised by personnel trained in those functions.

Comment. Due to the relative size and scope of Part 135 commuter operations, we do not, at this time, believe there is a need for a flight dispatcher as indicated in Part 121 operations. We will, of course, continue to monitor this situation for possible changes in future operations. With regard to flight operating personnel qualifications and training, we believe the current regulations are adequate. The qualification requirements for supervisory personnel are adequate to achieve the intended level of safety. Section 135.37, Management Personnel Required, requires a qualified director of operations, chief pilot, and director of maintenance. Section 135.39 specifies the qualifications that persons occupying these positions must possess. Also, Section 135.77, Responsibility for Operational Control, requires each certificate holder to list in his operating manual the name and title of each person authorized to exercise operational control. Accordingly, the FAA intends to take no further steps in this area at this time, and we consider action on Safety Recommendation A-80-70 completed.

A-80-71. Amend CFR 135.185 to require that aircraft empty weight, and that center of gravity be determined more frequently.

Comment. The FAA agrees with the intent of this proposal as it regards the importance of aircraft empty weight, operating weight, and corresponding centers of gravity (c.g.). However, we believe a well developed cumulative weight control system is the primary means of controlling operating weight and c.g. This system continuously updates operating weights and c.g.'s (or other aircraft weight references) to account for changes to the aircraft, its equipment, or standard passenger provisions such as stewardess supplies. Periodic reweighing of aircraft under

approved programs serves to confirm the cumulative weight control system. Section 185 provides for the use of approved weight and balance control systems for multiengine aircraft which includes cumulative weight control. These programs include periodic reweighing requirements for aircraft controlled on a fleet basis, as well as aircraft handled individually. In the case of aircraft fleets, aircraft within each fleet are weighed on a sampling basis to confirm the fleet weight and c.g. Therefore, reweighing periodically is imposed on the fleet rather than on individual aircraft.

Advisory Circular 120-27A, Weight and Balance Control, was issued May 18. This circular consolidates previous advisory circulars for air taxis and large air carriers, and includes cumulative weight control procedures as well as aircraft reweigh periods. The superseded advisory circular for air taxis did not include a periodic reweigh period. We do not believe further steps in this area are appropriate at this time and, accordingly, the FAA considers action on Safety Recommendation A-80-71 completed.

A-80-72. Evaluate and revise as appropriate the criteria for the authorization of single-pilot IFR operations for commuter airlines.

Comment. The FAA concurs with Safety Recommendation A-80-72. Section 135.105 was amended, effective March 1, 1980, to require that, prior to authorizing single pilot IFR operations, the pilot-in-command must have previously logged 100 pilot-in-command hours in the make and model aircraft to be flown. This increased pilot experience requirement would ensure that the pilot has aircraft familiarity and proficiency sufficient to adequately cope with IFR operational problems and to handle inflight emergencies. We consider action on Safety Recommendation A-80-72 completed.

A-80-73. Expand the ADAP program to support the development of commuter-served airports.

Comment. In 1976, Amendments to the Airport and Airway Development Act of 1970 defined commuter airports for the first time and provided specific funding for their development. In the administration of the Airport Development Aid Program (ADAP), the FAA, through use of an authorized discretionary fund, has consistently granted more for commuter airport development annually than the \$15 million identified in the Act for use at commuter locations (FY 1976, \$19.9M; FY 1977, \$23.9M; FY 1978, \$19.9M; FY 1979, \$30.7M; and FY 1980, \$21.6M).

The Administration's legislative proposal to continue an airport grant program beyond the September 30, 1980, expiration of the ADAP was developed to provide a single fund for development of all commercial service (including commuter) airports. This will allow greater emphasis to be placed on improvement of commuter airports in the post-1980

program. The latest House and Senate legislative proposals require administration of the facilities and equipment and airport development programs in a manner to maximize the use of safety facilities with highest priority for commercial service airports. This includes, but is not limited to, installation, operation, and maintenance of precision approach systems for each primary runway; grooving or friction treatment of all primary and secondary runways; nonprecision approaches for secondary runways; and electronic or visual vertical guidance on all runways.

We believe the FAA's ADAP program has been administered to support the development of commuter-served airports, and that future programs though subject to legislative approval, have also been designed to support commuter airports, and, accordingly, no further action is presently intended. The FAA, therefore, considers action on Safety Recommendation A-80-73 completed.

A-80-74. Revise the qualifying criteria to insure that a larger percentage of commuter-served airports are equipped with instrument landing systems.

Comment. An extensive evaluation of the instrument landing system (ILS) qualifying criteria was initiated. This evaluation includes a reassessment of the benefits derived from an ILS by all categories of aviation, including trunk carriers, commuter carriers, air taxi carriers, general aviation, and military. Completion of this evaluation is anticipated in the near future. We will advise the Board of the results of this evaluation as soon as they are available.

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

Comment. In February 1980 the FAA initiated an indepth analysis of all airports served by commuter airlines in the continental U.S. and Hawaii which found that 64 percent have a commissioned or programmed instrument landing system (ILS). Commuter needs at the remaining commuter-served airports are being investigated. Recommendations regarding the installation of ILSs at specific airports are anticipated in the near future and will be made available to the Board when available.

In summary, the FAA considers action completed on Safety Recommendations A-80-64, -65, -66, and -68 through -73. We intend to provide further response to the Board on Recommendations A-80-67, -74, and -75.

Sincerely,



Langhorne Bond
Administrator

Enclosures

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

August 27, 1980

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

Dear Mr. Chairman:

This is in response to your letter of July 9 and supplements our letter of January 15 to NTSB Safety Recommendations A-79-80 and 81.

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

Comment. An amendment to 14 CFR Part 135, Amendment No. 135-3, issued January 30 requiring additional operating experience for commuter pilots-in-command, was effective March 1. A notice providing specific flight testing standards for Part 135 pilots was issued on January 14 and should result in pilots being more knowledgeable about their aircraft and its limitations. Copies of both are enclosed.

The revised Part 135 provides training in weight and balance, runway limitations for takeoff and landing, aircraft performance data, and operating limitations during initial, transition, and upgrade ground training for pilots. In April 1979, increased Part 135 surveillance requirements were initiated which involved additional en route inspections and other FAA emphasis items. Crewmembers demonstrated their knowledge of weight and balance procedures and aircraft performance as part of the surveillance.

In the transmittal letter of October 17, 1979, the NTSB stated it would be impractical to accomplish flight training in an aircraft loaded to gross weight or at c.g. limits, but that pilots should nevertheless be thoroughly familiar with performance at maximum certificated gross takeoff weight and have training under conditions at or near gross weight, etc.

The revised training and testing requirements and the exposure to various weight and loading conditions that the pilot will receive during the acquisition of operating experience now required in Amendment No. 135, will provide the needed additional familiarization and knowledge of aircraft performance deficiencies. We believe these actions fulfill the intent of Safety Recommendation A-79-80.

2

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

Comment. On August 4, 1980, the FAA issued a supplemental Notice of Proposed Rule Making (NPRM) No. 78-3B, Docket No. 17669, to revise the flight and duty time limitations and rest requirements for flight crewmembers utilized by domestic, flag, and supplemental air carriers, commercial operators, and air taxi operators. I am enclosing a copy of the NPRM for the Board's review and records.

Sincerely,


Langhorne Bond
Administrator

3 Enclosures



National Transportation Safety Board

Washington, D C 20594

Office of
Chairman

July 9, 1980

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

Dear Mr. Bond:

Reference is made to the National Transportation Safety Board Safety Recommendations A-79-80 and A-79-81 issued October 17, 1979. These recommendations, which stemmed from the Safety Board's investigation of several commuter air carrier accidents, pertained to:

1. Pilots' handling of aircraft loaded to maximum gross weight.
2. Flight and duty time limitations for operations under FAR Part 135.

The Federal Aviation Administration's response of January 15, 1980, indicated actions were in progress to resolve these recommendations. To better evaluate their progress and update the public docket, we would appreciate a further report of actions taken.

Sincerely yours,

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

James B. King
Chairman



National Transportation Safety Board

Washington, D C 20594

Office of
Chairman

February 7, 1980

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

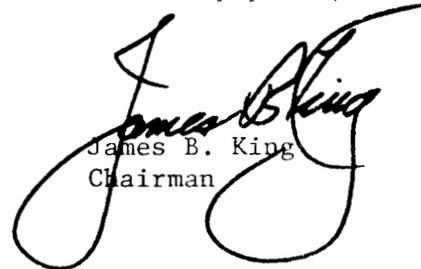
Dear Mr. Bond:

Thank you for your letter of January 15, 1980, responding to the National Transportation Safety Board's Safety Recommendations A-79-80 and 81. Our comments to your response are as follows:

A-79-80. The Safety Board is pleased to note that the Federal Aviation Administration (FAA) is proposing regulatory action to upgrade the operating experience and testing standards of Part 135 pilots. Pending the revision of the rules, A-79-80 is classified in an "OPEN--ACCEPTABLE ACTION" status.

A-79-81. It is also noted that the FAA will shortly issue Notice No. 78-3B to provide identical flight and duty time limitations for Parts 135 and 121 operations. Pending regulatory action, A-78-81 is also being maintained in an "OPEN--ACCEPTABLE ACTION" status.

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20590



OFFICE OF
THE ADMINISTRATOR

January 15, 1980

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-79-80 and 81 issued on October 17, 1979. These recommendations are based on the Board's concern that the expansion of 14 CFR 135 operations, and particularly commuter air carrier operations, be accompanied by measures to assure a level of safety comparable with that of the air carriers certificated under 14 CFR 121. These recommendations would deal with certain aspects of pilot training and with crew flight time, duty time, and rest requirements. The following are the Federal Aviation Administration's (FAA) comments and actions in response to these recommendations.

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

Comment. The FAA is in the process of amending Part 135 to require operating experience similar to that required in Part 121 for any pilot prior to designation as pilot-in-command on commuter air carrier operations. This operating experience would expose the pilot to various gross weight operations for each make and model aircraft to be flown. This operating experience will be acquired under the supervision of a company check pilot. The estimated completion date for this regulatory action is March 1, 1980.

In addition, we are issuing a directive that will be more specific as to testing standards regarding pilots as stated in Part 135. Although present training and testing requirements cover aircraft performance, this additional directive will cover this area in more detail. Estimated completion date for this directive is February 1, 1980.

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

Comment. Considerable work has been done on amending the present flight and duty time requirements for both 14 CFR 135 and 14 CFR 121 to provide compatible requirements. The final draft of the Notice of Proposed Rule Making does provide for identical requirements for Parts 135 and 121. The Supplemental Notice of Proposed Rule Making, Notice No. 78-3B, on this subject, should be issued by the end of March 1980.

Sincerely,



Langhorne Bond
Administrator

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

ISSUED: October 17, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-80 and -81

The air taxi industry, particularly the commuter air carrier segment, has enjoyed tremendous growth in recent years. U.S. commuter airlines have gained an average of 10 percent more passengers and 30 percent more freight each year since 1970. Commuter air carrier revenue passenger miles have increased from 750,048,000 in 1975 to 1,145,000,000 in 1978. The FAA has forecast a 116 percent increase in commuter passenger enplanements between fiscal 1978 and 1989. This forecast growth of the air taxi industry has prompted aircraft manufacturers to produce new and larger aircraft.

However, this expansion has been accompanied by a corresponding rise in commuter air carrier accident fatalities. For example, in the first 7 months of 1975 there were 27 commuter air carrier accidents which included 9 fatal accidents and 24 fatalities. During the first 7 months of 1979 there have been 27 commuter air carrier accidents including 10 fatal accidents and 48 fatalities.

In the past 2 years, the National Transportation Safety Board has investigated numerous commuter accidents in which the aircraft was at or above its maximum certificated gross weight or at or beyond its center of gravity (c.g.) envelope, or both ^{1/}. In all of these accidents, pilots were confronted with the two-fold problem of unfavorable weight and balance and mechanical malfunction. Safety Board investigations of

- 1/ Aircraft Accident Report: Rocky Mountain Airways, DHC-6, Cheyenne, Wyoming, February 27, 1979. (NTSB-AAR-79-10)
Aircraft Accident Report: Columbia Pacific Airlines, Beech 99, Richland, Washington, February 10, 1979. (NTSB-AAR-78-15)
Aircraft Accident Report: Antilles Air Boats, G-21A, St. Thomas, Virgin Islands, April 5, 1978. (NTSB-AAR-79-9)

2613-C

these accidents also revealed that the pilots had received no flight or ground training on the performance capabilities and handling qualities of the aircraft when loaded to its maximum certificated gross weight or at the limits of its c.g. envelope.

On March 1, 1979, a commuter air carrier flight, a Beech Model 70, Excalibur conversion, crashed during takeoff at the Gulfport-Biloxi Regional Airport, Gulfport, Mississippi. The investigation revealed that the aircraft was over its maximum certificated gross weight, and out of its c.g. envelope. It also revealed uncorrected maintenance discrepancies, that the ADF and wing flaps were inoperative, and that the starter interrupt system had been bypassed. Further, it revealed that aircraft dispatch operations were hurried and that, in particular, data for weight and balance computations were carelessly compiled. Moreover, the pilot had received no training on the performance capabilities and handling qualities of the aircraft under high gross weight conditions. The accident illustrates a typical result of poor operational practices and incomplete training. The pilot had flown the aircraft earlier that day at its maximum weight for the first time even though it was on a regularly scheduled, unsupervised passenger flight.

Safety Board investigative experience has disclosed also that air taxi/commuter flights are often conducted at high gross weights. Many of the aircraft used by these operators exhibit flight characteristics and handling qualities at high gross weights that are markedly different from those exhibited at lower gross weight.

While it may be impractical to accomplish flight training in aircraft loaded to the maximum gross weight or at the limits of the c.g. envelope, all pilots should be thoroughly familiar with the performance deficiencies which could be produced by such conditions and have training under conditions approaching these limits. Such performance deficiencies may include an increase in takeoff speed, a longer takeoff roll, a reduction in the rate and angle of climb, and a higher stall speed. These deficiencies may be compounded further by an aircraft malfunction, such as an engine failure. Training regarding these factors would have alerted the pilot in the Gulfport accident to the importance of proper weight and balance for safe flight and he might have required accurate computations to be made.

The Safety Board is aware that the Federal Aviation Administration is currently evaluating comments on NPRM 78-3, "Flight Crewmember Flight and Duty Time Limitations and Rest Requirements," as they apply to 14

CFR 121 operations. However, recent commuter air carrier accidents have given added urgency to the need to revise the crew duty time, flight time, and rest period regulations contained in 14 CFR 135 2/.

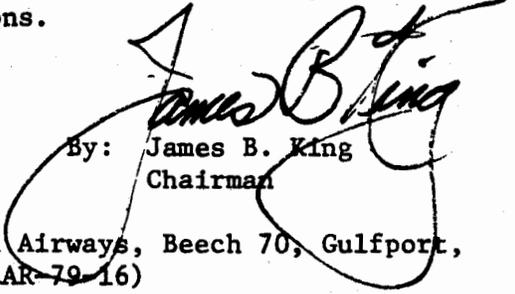
The Safety Board believes that the expansion of 14 CFR 135 operations, and particularly commuter air carrier operations, to more closely approximate those of air carriers certificated under 14 CFR 121, should be accompanied by measures to assure a comparable level of safety. Differences in the types of operational activities usually conducted by a commuter air carrier pilot are other factors which support a need for such changes. Commuter air carrier flights are usually short, and during a long-duty day a pilot can be required to make numerous approaches and landings, and numerous instrument approaches -- often conducted as single pilot IFR operations. The commuter air carrier pilot may be required to perform collateral duties such as baggage handling and aircraft refueling. These factors can all contribute to pilot fatigue, with a possible resultant deterioration of basic flying skills and judgment.

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

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

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

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


By: James B. King
Chairman

2/ Aircraft Accident Report: Universal Airways, Beech 70, Gulfport, Mississippi, March 1, 1979. (NTSB-AAR-79-16)
Aircraft Accident Report: Columbia Pacific Airlines, Beech 99, Richland, Washington, February 10, 1978. (NTSB-AAR-78-15)
Air New England, DHC-6, Yarmouthport, Massachusetts, June 17, 1979. (Currently under investigation)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

July 29, 1980

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

Dear Mr. Chairman:

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

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

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

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

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

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

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

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

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

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

Sincerely,



Langhorne Bond
Administrator

3 Enclosures



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

May 1, 1980

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

Dear Mr. Bond:

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

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

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

Sincerely yours,

A handwritten signature in black ink, appearing to read "James B. King".

James B. King
Chairman



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

October 2, 1979

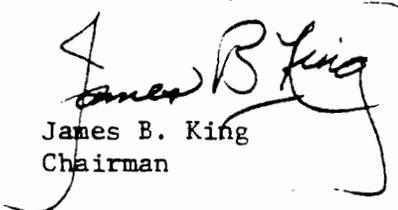
Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Dear Mr. Bond:

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

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

Sincerely yours,


James B. King
Chairman



Office of the
Chairman

National Transportation Safety Board

Washington, D.C. 20594

30 OCT 1978

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

Dear Mr. Bond:

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

Sincerely yours,

A large, stylized handwritten signature in black ink, which appears to read "James B. King". The signature is written in a cursive, flowing style with a large loop at the end.

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

September 11, 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 reply to your August 10 letter requesting the FAA to accelerate rulemaking action in response to Safety Recommendations A-78-27 and 28.

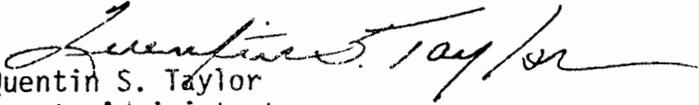
FAA regulatory proposals are now subject to the criteria contained in Executive Order 12044, "Improving Government Regulations," and the proposed Department of Transportation Regulatory Policies and Procedures, "Improving Government Regulations," as published in the Federal Register on March 24 and June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

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

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

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

Sincerely,


Quentin S. Taylor
Deputy Administrator

Enclosures 2



Office of the
Chairman

National Transportation Safety Board

Washington D.C. 20591

August 10, 1978

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

Dear Mr. Bond:

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

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

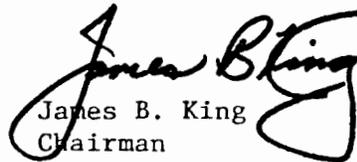
On July 12, our Bureau of Technology hosted a U.S. Army/FAA/NASA meeting to brief FAA and NASA representatives, at the technical level, on the Army program to include safety and technical requirements, cost effectiveness, and goals for the next several years. The Army program is now moving from the feasibility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

Honorable Langhorne M. Bond (2)

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

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

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

JUN 30 1973

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

Dear Mr. Chairman:

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

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

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

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

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

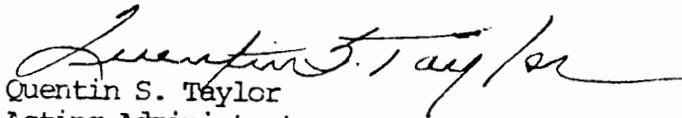
Comment. The ANPRM will solicit comments and information which we believe will obviate any need for government sponsored research and development, since several equipment manufacturers have already done preliminary work along the lines of the NTSB recommendation.

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

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

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

Sincerely,


Quentin S. Taylor
Acting Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: April 13, 1978

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-78-27 through 29

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

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

1/ Accidents under recent investigation:

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

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

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

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

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

2271-C

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

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

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

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

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

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

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

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

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

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

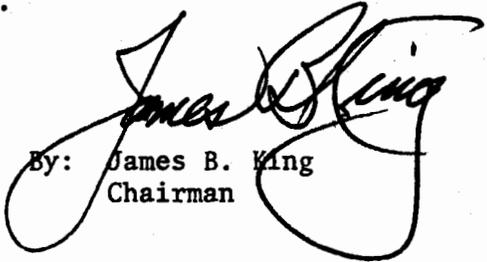
In view of the above, the National Transportation Safety Board recommends that the Federal Aviation Administration:

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

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

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

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


By: James B. King
Chairman

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

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

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

Total No.
Fatal Accidents 917

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

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

ATTACHMENT 2

FLIGHT RECORDER STANDARDS VIEWED AS FEASIBLE
BY NATIONAL TRANSPORTATION SAFETY BOARD

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

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

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

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

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

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

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

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

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

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

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

ISSUED: August 8, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-64 through -75

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



By: James B. King
Chairman



National Transportation Safety Board

Washington, D C. 20594

Office of
Chairman

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

Dear Mr. Bond:

Thank you for your letter dated October 30, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-76 and A-80-77 issued August 14, 1980. These recommendations stemmed from our investigation of an incident involving a Swearingen SA-226AT aircraft. A part of the aft cargo door separated in flight resulting in sudden decompression. We made the following two recommendations to the Federal Aviation Administration (FAA):

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

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

The Safety Board is pleased to note that on October 2, 1980, the FAA issued a telert maintenance bulletin fulfilling Safety Recommendation A-80-76, and that a General Aviation Airworthiness Alert has been prepared for insertion in Advisory Circular 43-16 to fulfill Safety Recommendation A-80-77. Both these recommendations are now classified in a "Closed--Acceptable Action" status.

RECEIVED

Sincerely yours,

A handwritten signature in black ink, appearing to read "James B. King".

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 30, 1980

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-76 and A-80-77 issued by the Board on August 14, 1980. These recommendations resulted from the Board's investigation of an incident occurring on March 8, 1980, near Albany, New York, involving N720R, a Swearingen SA-226AT aircraft. Part of the aft cargo compartment door separated in flight at 16,000 feet, resulting in rapid decompression.

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

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

Comment. The Federal Aviation Administration (FAA) concurs with Safety Recommendations A-80-76 and -77. Our Southwest Region has issued a telert maintenance bulletin advising all regions to notify operators who are operating Swearingen Models SA-226AT and SA226TC aircraft of the dangers of machining or filing any component of the latching mechanisms to ease engagement. Further, we have included in this bulletin instructions to advise operators of the unsafe conditions which can result from forcing the latching mechanism during operations, when the latches are misaligned or not properly adjusted.

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In addition, a General Aviation Airworthiness Alert has been prepared for insertion in Advisory Circular 43-16 which will reflect the information contained in both recommendations. A copy of both these documents is enclosed. The FAA considers action on Safety Recommendations A-80-76 and A-80-77 completed.

Sincerely,


Langhorne Bond
Administrator

Enclosures

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

ISSUED: August 14, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-76 and -77

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

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

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

2906-A

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

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

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

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

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

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



National Transportation Safety Board

Washington, D.C. 20591

Office of the
Chairman

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

Dear Mr. Bond:

Thank you for your letter of November 4, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-78 and 79 issued August 19, 1980. These recommendations stemmed from our investigation of an accident involving a Bell 205A-1 helicopter that crashed while returning from an offshore oil rig. The main rotor system was found 350 yards from the main impact area.

In Safety Recommendation A-80-78, we recommended that the Federal Aviation Administration (FAA):

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

This recommendation was based on a report by the operator that the aircraft had been operated approximately 440 hours since the float had been installed--60 hours short of the 500 hours specified in Airworthiness Directive (AD) 76-14-03, which requires replacement of the cross tubes.

Since the FAA has provided information to indicate that the mandatory replacement time was exceeded and since the FAA has no records of service difficulties over the past 6 years pertaining to the fixed float landing gear cross tubes installed on Bell 205A-1 and 212 helicopters, this recommendation is now classified as "Closed--Reconsidered."

Honorable Langhorne M. Bond

- 2 -

In Safety Recommendation A-80-79, we recommended that the FAA:

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

We are pleased to note that the FAA has issued an AD fulfilling this recommendation. The status of A-80-79 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

November 4, 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-80-78 and A-80-79 issued by the Board on August 19, 1980. These recommendations resulted from the Board's investigation of an accident on July 18, 1980, involving N6207N, a Bell 205A-1 helicopter. The aircraft crashed en route from an offshore oil rig to the Arcola-Houston, Texas, airport.

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

Comment. The FAA does not concur in Safety Recommendation A-80-78. As noted in the preamble to the NTSB recommendations, the operator reported that the aircraft had been operated approximately 440 hours since the float kit had been installed. We question the validity of the operator's report of 440 hours. Our review of the records resulted in a conclusion that this float landing gear cross tube, P/N 205-706-050-9 on aircraft N6207N, had attained a total time-in-service of 640 hours. A similar review of records by Bell Helicopter Textron personnel revealed a total time-in-service of 607 hours. In either case, the mandatory replacement time of 500 hours specified in Airworthiness Directive (AD) 76-14-03 was apparently exceeded.

The float landing gear in question was originally delivered to the Peruvian Navy in 1973 by Bell Helicopter Textron as loose equipment for a Model 205A-1 helicopter. Subsequently, the helicopter was wrecked, sold, and returned to the United States with the float kit. The helicopter was repaired and sold without the float kit. The float kit was then sold separately to the present operator of N6207N.

The FAA has no records of service difficulties over the past 6 years related to the fixed float landing gear cross tubes installed on Bell Model 205A-1 and 212 helicopters. Since we have no service difficulty reports and the time-in-service of the float landing gear installed on Bell Model 205A-1, N6207N, is questionable, we do not believe an immediate x-ray inspection of the cross tubes for cracks is warranted. Therefore, we intend to take no further action in regard to Safety Recommendation A-80-78.

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

Comment. We concur in NTSB Safety Recommendation A-80-79. An "immediate adopted" AD has been issued and will become effective upon publication in the Federal Register. This AD will require installation of float landing gear forward and aft cross tubes having clamp-on saddle fittings within the next 50 hours time-in-service. A copy of the AD is enclosed. Additional information regarding the subject is contained in Bell Helicopter Textron Operation's Safety Notice, OSN 205/212-80-2, dated July 29, 1980, and Bell Service Bulletins 205-80-13 and 212-80-18, each dated August 20, 1980.

The FAA considers action on Safety Recommendations A-80-78 and A-80-79 completed.

Sincerely,


Langhorne Bond
Administrator

Enclosure

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

ISSUED: August 19, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-78 and -79

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

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

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

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

3029

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

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

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

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

for
By: *James B. King*
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 2, 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-80-80 and A-80-81 issued by the Board on September 5, 1980. These recommendations resulted from the Board's continuing investigation of leaking motive flow valves, PN AV16E1182, in Learjet aircraft.

A-80-80.

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

FAA Comment.

The Federal Aviation Administration (FAA) does not concur with this recommendation. Our rationale is based on the fact that Airworthiness Directive (AD) 80-19-09 specifically prohibits field disassembly and reassembly of motive shutoff valves on Gates Learjet aircraft (see copy enclosed, paragraph A 1. d.). Since the language in the AD is very specific in this regard, we believe a Telegraphic Maintenance Alert would be redundant and is unnecessary.

A-80-81.

In the next issue of the General Aviation Airworthiness Alerts, emphasize that field service is not authorized and describe the risks and hazards associated with unauthorized field service of ITT General Controls/Aerospace Products motive flow valves installed on Learjet aircraft.

FAA Comment.

We concur with this recommendation and an alert was published in the November issue of AC 43-16, page 6. In addition, this subject will be highlighted in the Daily Summary of Aviation Standards Service Difficulty Reports (General and Commercial - dated November 18, 1980, control number 09180029). We will provide copies of these publications to the Board when available. The FAA considers action on Safety Recommendations A-80-80 and A-80-81 completed.

Sincerely,

A handwritten signature in black ink that reads "Langhorne Bond". The signature is written in a cursive style with a large initial "L" and a long horizontal stroke at the end.

Langhorne Bond
Administrator

Enclosure

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 5, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-80 and -81

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

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

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

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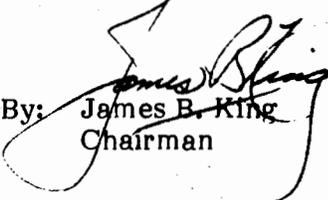
It is the opinion of ITT that unauthorized disassembly/assembly had been performed on some motive flow valves which resulted in cutting one or both of the O-rings. ITT pointed out that only ITT is authorized to perform any disassembly or repair on ITT motive flow valves that are installed in Learjet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

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

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

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

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

By: 
James B. King
Chairman



National Transportation Safety Board

Washington, D.C. 20594

Office of the Chairman

December 30, 1980

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

Dear Mr. Bond:

Thank you for your letter of November 13, 1980, responding to National Transportation Safety Board Safety Recommendations A-80-82 through 84 issued September 4, 1980. These recommendations stemmed from our investigation of an Aerospatiale Lama 315B helicopter accident near Dillon, Montana, on July 28, 1980. The aircraft had just lifted a 1,000-lb external sling load and was transitioning to forward flight when it descended rapidly, rotating about its vertical axis, and crashed.

In Safety Recommendation A-80-82, we recommended that the Federal Aviation Administration (FAA) issue a telegraphic Airworthiness Directive (AD) to require immediate compliance with the tail rotor drive system inspection criteria specified in the telegraphic bulletin issued by Aerospatiale Helicopter Company on August 14, 1980. The FAA fulfilled this recommendation by issuing telegraphic AD number T-80-19-51 on September 5, 1980. The status of this recommendation is now classified as "Closed--Acceptable Action."

In Safety Recommendation A-80-83, we asked the FAA to consider a requirement for an inspection for excessive radial motion in the tail rotor drive system as part of the existing preflight inspection. We note that the FAA fulfilled this recommendation by inserting this item in General Aviation Airworthiness Alert, FAA Advisory Circular AC-43-16, alert number 27 for October 1980. The status of this recommendation is now classified as "Closed--Acceptable Action."

Safety Recommendation A-80-84 called upon the FAA to notify all main transmission overhaul facilities of the circumstances of such occurrences as the two referenced in the recommendation letter and to emphasize the need for strict adherence to the manufacturer's buildup instructions for the main transmission pinion gear installation and proper torquing of the retaining nut.

A-80-84. Notify all main transmission overhaul facilities of these two occurrences and emphasize the need for strict adherence to the manufacturer's buildup instructions for pinon gear installation and proper torquing of the retaining nut.

Comment. The Telegraphic Airworthiness Directive, T-80-19-51, issued on September 5 covering the inspection of the tail rotor gear train, will alert repair agencies of the mandatory inspection required on the Aerospatiale SA-315 Lama 316B, 316C, and 319 Alloutte III, Tail Rotor Drive System.

The notice published in the General Aviation Airworthiness Alerts referred to in recommendation A-80-83 (above) will also serve to alert operators of the requirement to place special emphasis on the preflight checklist to check the tail rotor output shaft for excessive backlash. We also intend to prepare a notice to be published in the General Aviation Airworthiness Alerts (AC 43-16) to alert helicopter main transmission overhaul agencies to emphasize the need for strict adherence to the manufacturer's overhaul and buildup instructions for pinon gear installation and proper torquing of the retaining nut. We will make this document available to the Board as soon as it is available.

We believe the foregoing measures will resolve the safety issues which were of concern in Safety Recommendations A-80-82 through -84 and, accordingly, FAA considers actions on these recommendations completed.

Sincerely,



Langhorne Bond
Administrator

Enclosures

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

ISSUED: September 4, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-82 through -84

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

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

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

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

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

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

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

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

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

November 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 relative to NTSB Safety Recommendation A-80-85 issued by the Board on August 28, 1980. This recommendation resulted from the Board's investigation of an inflight fire occurring aboard an Aerospatiale SA-330 helicopter inbound to Quonset Point, Rhode Island, on August 26, 1980.

A-80-85.

Issue an emergency Airworthiness Directive for all Aerospatiale helicopter models SA-330 to inspect, separate, and secure electrical wires that are near hydraulic lines between fuselage stations 5295 and 5600.

Comment.

The FAA issued an emergency telegraphic Airworthiness Directive (AD) No. T80-18-51 on August 29, 1980, based upon its investigation and evaluation of the incident. A copy of this emergency AD is enclosed.

This letter serves to complete the record. We note that the NTSB classified this recommendation as "closed--acceptable action" on September 29, 1980 before the FAA official reply was issued

Sincerely,


Langhorne Bond
Administrator

Enclosure

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

ISSUED: August 28, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-85

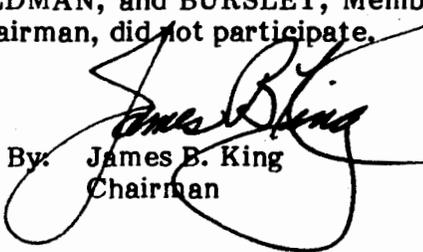
On August 26, 1980, an Aerospatiale SA-330 helicopter, N3596N, owned and operated by Petroleum Helicopters, Inc., of Lafayette, Louisiana, was inbound to Quonset Point, Rhode Island, with a crew of two and seven passengers. About 2 miles east-southeast of Quonset, the crew reported a fire in the passenger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

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

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

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

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


By: James E. King
Chairman

3051

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 9, 1980

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-80-86 through A-80-89 issued by the Board on September 10, 1980. These recommendations resulted from the Board's investigation of a presumed crash of a Cessna 340, N110RA, near Petersburg, Alaska, on August 20, 1980.

The FAA, in its review of NTSB Safety Recommendations A-80-86 through A-80-88, noted that the reference to Airworthiness Directive (AD) 80-16-06, made in each of the three recommendations is in error. The appropriate Airworthiness Directive number is 80-18-06 and has been corrected in our response.

A-80-86.

Revise Airworthiness Directive 80-18-06, dated August 23, 1980, to require an initial inspection before further flight, regardless of the aircraft's total time, and restrict the performance envelope of those Cessna models affected by the AD to that of the basic Cessna model 335/340 until the empennage structural cracking problem is resolved.

FAA Comment.

The FAA concurs in this safety recommendation and AD 80-18-06 was superseded by AD 80-19-17 on September 12, 1980. AD 80-19-17 requires an inspection before further flight, and each 10 hours thereafter, regardless of total hours or engine configuration. One hundred and thirteen reports have been received in accordance with the requirements of the AD. A review of these reports indicates that any failure or damage would be readily detectable long before it could progress to a potentially unsafe condition within the 10-hour inspection cycles, regardless of the performance envelope for the particular airplane. It should be noted that the Model 335 and the Model 340 have different performance envelopes. The FAA considers action on Safety Recommendation A-80-86 completed.

A-80-87. Evaluate the 100-hour recurring inspection interval now required in AD 80-18-06 to ascertain the need for a shorter interval, and amend the AD as appropriate.

FAA Comment.

The FAA concurs in this safety recommendation. Subsequent to the issuance of AD 80-18-06, a cracked gusset was reported on an airplane with a total time of 39.6 hours. Three other reports identified significant damage on airplanes that had been inspected 43, 44, and 61 hours earlier. Additionally, the airplane involved in the presumed crash near Petersburg, Alaska, on August 20, 1980, had been inspected approximately 20 hours previously. Based on a worst case assumption, a 10-hour inspection interval was established for AD 80-19-17. The FAA considers action on Safety Recommendation A-80-87 completed.

A-80-88.

Evaluate the design certification data of the Cessna 335/340 empennage structure to ascertain if all possible vibratory modes and structural loads to which it can be exposed have been considered and require retrofit modification to aircraft affected by AD 80-18-06 as indicated to be necessary.

FAA Comment.

The FAA concurs in this safety recommendation and we are currently evaluating certification data for a new design horizontal stabilizer and elevators. In addition to applicable Federal Aviation Regulations Part 23 requirements, this will include measured flight loads of critical tail structure and an accelerated service test program. The manufacturer presently plans to retrofit all affected airplanes when the new design is finalized. We will advise the Board when actions on this safety recommendation are completed.

A-80-89.

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

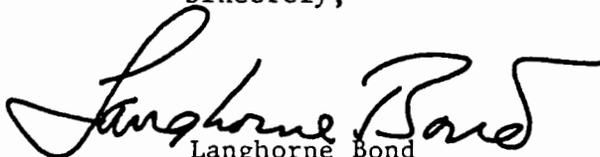
FAA Comment.

The FAA concurs in this safety recommendation. Our evaluation reveals that all data and findings to date, concerning Model 335/340 empennage structural cracking, generally reflect design deficiency rather than poor workmanship or quality control. Moreover, the

intent of NTSB Safety Recommendation A-80-89, with respect to possible quality causes, is accomplished by ongoing programs presently administered by the Wichita Engineering and Manufacturing District Office as a function of Production Certificate Management. This program includes regularly scheduled QASAR evaluations (the most recent one at Cessna Wallace Division was conducted July 15 through 24, 1980). Additional unannounced "pop-in" audits were performed at Cessna Wallace in February, June, and August 1980, and an airworthiness shakedown of a Model 340A aircraft was conducted in November 1979. Although numerous discrepancies were corrected, none of the findings represented a safety/airworthiness item. Additionally, the assigned principal inspector conducts a progressive system of airworthiness verification as an ongoing part of day-to-day certificate management.

The FAA will be alert for detection of workmanship/quality items of significance during the AD inspections. If such items are reported through the service difficulty system or directly by coordination between field offices, the Wichita District Office will evaluate the findings, conduct additional investigations as appropriate, and initiate a requirement for corrective action when concluded. All of these actions are a part of the certificate management responsibilities of the Engineering and Manufacturing District Office. The FAA considers action on Safety Recommendation A-80-89 completed.

Sincerely,

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

Langhorne Bond
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 10, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-86 through -89

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

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

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

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

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

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

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

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

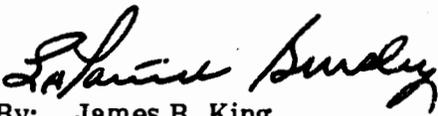
Revise Airworthiness Directive 80-16-06, dated August 23, 1980, to require an initial inspection before further flight, regardless of the aircraft's total time, and restrict the performance envelope of those Cessna models affected by the AD to that of the basic Cessna model 335/340 until the empennage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

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

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

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

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 8, 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-80-90 through A-80-95 issued by the Board on September 9, 1980. These recommendations resulted from the Board's study of general aviation accidents during 1974-1978, involving postcrash fire.

A-80-90.

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

A-80-91.

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

A-80-92.

Require after a specified date that all newly manufactured general aviation aircraft comply with the amended airworthiness regulations regarding fuel system crashworthiness.

A-80-94.

Assess the feasibility of requiring the installation of selected crash resistant fuel system components, made available in kit form from manufacturers, in existing general aviation aircraft on a retrofit basis and promulgate appropriate regulations.

FAA Comment.

The FAA believes these recommendations merit consideration, but will require indepth investigation with regard to effectivity and feasibility. A project has been established to consider the substance of these recommendations, and we intend to provide the Board a status report within 90 days.

A-80-93.

Fund research and development to develop the technology and promulgate standards for crash-resistant fuel systems for general aviation aircraft having integral fuel tank designs equivalent to the standards for those aircraft having nonintegral fuel tank designs.

A-80-95.

Continue to fund research and development to advance the state-of-the-art with the view toward developing other means to reduce the incidence of postcrash fire in general aviation aircraft.

FAA Comment.

A crashworthiness investigation team specializing in the collection of precise accident and injury information is being formed. Research and development efforts will be undertaken depending on the results of the team's findings. Any such programs will include a cost/benefit analysis to assure that the cost of installing crash-resistant tanks and fittings are commensurate with expected safety improvements. We will keep the Board informed of our efforts in this regard.

Sincerely,



Langhorne Bond
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

ISSUED: September 9, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-90 through -95

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 15, 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-80-101 through A-80-104 issued by the Board on September 25, 1980. These recommendations resulted from the Board's study of air taxi accidents which occurred in Alaska from 1974 through 1978.

The Federal Aviation Administration's (FAA) Alaskan Region, in cooperation with the State of Alaska and the National Weather Service, is currently involved in high frequency (HF) transmissions to collect weather and airport information. We are also involved in the evaluation of "meteor burst" technology and television weather observations.

A-80-101.

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

FAA Comment.

The FAA concurs in the intent of this safety recommendation and such an effort is currently in progress. The FAA's Alaskan Region is presently using HF transceivers to collect weather and airport information from remote locations. Due to the unreliable nature of HF, (atmospheric influences, skip, etc.), we plan to provide HF transceivers as needed, until they can be replaced with more reliable "meteor burst" or satellite communications.

A-80-102.

Locate and maintain permanently a Principal Operations Inspector and a Principal Maintenance Inspector at Nome, Bethel, Ketchikan, and at as many other regional aviation hubs as possible.

FAA Comment.

The FAA appreciates the intent of this recommendation, but we do not concur in substance. The establishment of GADO's or satellite offices at any location, including those in Alaska, is based upon a number of factors including the need for full-time FAA services and consideration of the various alternatives available to provide these services.

The FAA has, in the past, considered establishing additional GADO's at the locations identified in Safety Recommendation A-80-102. However, the workload historically has been cyclic, and we have been unable to justify domiciled GADO personnel at these locations. FAA inspectors from the Alaskan Region GADO's and FSDO's have provided required services through expanded travel and extended duration of assignment at these locations when activity has warranted. This flexibility of assignment has permitted FAA managers to meet the changing demands of the work situation in Alaska while still controlling growth of the Federal work force. The FAA is presently reexamining future inspector staffing requirements in Alaska. This review includes potential location assignment of domiciled inspectors. We expect to complete our study in April of 1981, and we will inform the Board of our findings and long-term staffing plans at that time.

A-80-103.

Continue to develop, in cooperation with the National Weather Service, the concept of "meteor burst" technology for transmission of weather observations from rural villages to regional aviation hubs in Alaska.

FAA Comment.

The FAA concurs in this safety recommendation, and "meteor burst" technology is presently being tested at two locations in Alaska. So far, the results have been favorable. Future plans for this concept are pending, and the FAA will continue to monitor this effort.

A-80-104.

Continue to develop and improve, in cooperation with the National Weather Service, the technology of the television weather observation system in Alaska.

FAA Comment.

The FAA concurs in this safety recommendation. "Slow scan" and "live scan" television observations are being tested at two Alaskan locations. More locations are planned subject to the outcome of these tests, and the FAA will continue to monitor this effort.

Sincerely,

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

Langhorne Bond
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

ISSUED: September 25, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-101 through -104

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

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

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

1/ For more detailed information read "Special Study--Air Taxi Safety in Alaska" (NTSB-AAS-90-3).

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

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

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

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

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

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

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

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

DEC 17 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-80-106 and A-80-107 issued by the Board on October 2, 1980. These recommendations resulted from the Board's investigation of an incident involving flight control of an Aerospatiale 341G Gazelle helicopter on May 14, 1980.

A-80-106. Issue a Telet Maintenance Bulletin to require one-time inspection of the rudder pedal shafts on the Aerospatiale 341G helicopter for proper installation.

FAA Comment. Prior to receipt of this recommendation, the FAA had brought the details of this incident to the attention of FAA field inspectors and the aviation community in the General Aviation Alerts (AC 43-16) issued August 1980 (copy enclosed). Since this alert had been distributed by mail at least 1 month prior to receipt of the recommendation, we do not believe a telegraphic alert at this time is necessary. We believe that the August 1980 alert satisfies the intent of Safety Recommendation A-80-106, and FAA considers action on this recommendation completed.

A-80-107. Review and evaluate the rudder pedal installation to determine if a stronger pedal retention design is necessary.

FAA Comment. The FAA discussed this matter with the French airworthiness authority and Aerospatiale Corporation in October 1980. It was agreed that issuance of a service letter would be sufficient to prevent recurrence of this incident. We expect publication in the near future and a copy will be forwarded to the Board when available. The FAA considers action on Safety Recommendation A-80-107 completed.

Sincerely,

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

Enclosure

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

ISSUED: October 2, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-106 and -107

On May 14, 1980, an Aerospatiale 341G G zelle helicopter was approaching a confined-area landing site when the flight-control hydraulic pressure was lost. The pilot maintained control and continued his approach. As the aircraft was flared for landing, the pilot's right rudder pedal rotated from beneath his foot, causing the pilot to lose directional control of the aircraft. After several rapid rotations of the fuselage, the pilot instructed the passenger, seated in the copilot's seat, to depress the copilot's right rudder pedal. The pilot regained directional control and landed the aircraft uneventfully.

Detailed examination of the pilot's right rudder pedal revealed that the lower of two rivets (PN L2125-24-12 DCJ) which attaches the leaf spring/locking pin assembly to the pedal shaft had sheared. However, review of the pedal installation indicates that the rivet sheared as a result of the pedal's rotating. If the pedal is fully engaged in its floor fitting, the locking pin will prevent rotation and a flat machined on the base of the pedal shaft which mates with a flat on the floor fitting will prevent rotation should the locking pin fail.

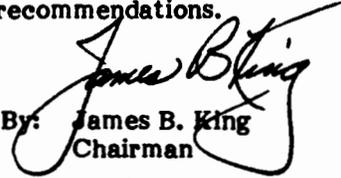
The Safety Board is concerned that other rudder pedal shafts may not have been properly installed and fully engaged and locked in their respective fittings which could result in loss of directional control.

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

Issue a Telert Maintenance Bulletin to require a one-time inspection of the rudder pedal shafts on the Aerospatiale 341G helicopter for proper installation. (Class I, Urgent Action) (A-80-106)

Review and evaluate the rudder pedal installation to determine if a stronger pedal retention design is necessary. (Class II, Priority Action) (A-80-107)

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


By: James B. King
Chairman

103/104

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National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

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

Dear Mr. Bond:

Thank you for your letter dated October 30, 1980, responding further to National Transportation Safety Board Safety Recommendation A-76-64 issued April 1, 1976. This is one of six recommendations that emanated from the Overseas National Airways DC-10 accident at John F. Kennedy International Airport, on March 11, 1976. The accident resulted from a rejected takeoff after a number of large birds were ingested into the No. 3 engine. We recommended that the Federal Aviation Administration (FAA):

"Amend 14 CFR 33.77 to increase the maximum number of birds in the various size categories required to be ingested into turbine engines with large inlets. These increased numbers and sizes should be consistent with the birds ingested during service experience of these engines."

We note that the FAA has taken steps to establish a special project to obtain meaningful data necessary for the resolution of this recommendation. We thank the FAA for actions taken thus far and would appreciate being kept informed of the results of the special project. Safety Recommendation A-76-64 remains in an "Open--Acceptable Action" status.

Sincerely yours,

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

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 30, 1980

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

Dear Mr. Chairman:

This is in further response to your letter of July 30, 1980, concerning NTSB Safety Recommendation A-76-64 issued April 1, 1976, and supplements our letter of July 26, 1976.

A-76-64. Amend 14 CFR 33.77 to increase the maximum number of birds in the various size categories required to be ingested into turbine engines with large inlets. These increased numbers and sizes should be consistent with the birds ingested during service experience of these engines.

Comment. Several attempts have been made by examining NTSB, Federal Aviation Administration (FAA) and industry engine records to determine the numbers and sizes of birds being ingested into turbine engines with large inlets. The FAA has made three such examinations since these engines entered airline service early in 1970. The most recent study of the available records was made by an ad hoc committee of the Aerospace Industries Association. All these efforts show that available records do not provide the information necessary to enable the FAA to make an intelligent revision of the sizes and numbers of birds required to be ingested for engine type certification. Furthermore, the service experience with these engines does not indicate any serious deficiency in the existing bird ingestion requirements. United States operators have accumulated over 27,000,000 flight-hours with these engines. Operations by foreign airlines bring the total experience to over 40,000,000 flight-hours. In all that operating time, there has been but one accident similar to that experienced by Overseas National Airlines wherein three or more large birds were ingested in the engine.

The FAA acknowledges the need for better data relating to the number and sizes of birds being ingested. Because the normal reporting activity of these events does not usually provide sufficient information of this kind, the FAA has taken the initial steps to establish a special project to obtain the needed data. The FAA will take appropriate action if statistically meaningful data are obtained which justify the amendment of existing standards. We will keep the NTSB informed of the results of this work.

Sincerely,



Langhorne Bond
Administrator



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

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

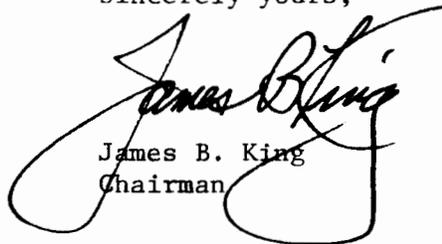
Dear Mr. Bond:

Please refer to National Transportation Safety Board Safety Recommendation A-76-64 issued April 1, 1976. This is one of six recommendations that stemmed from the Overseas National Airways DC-10 accident at John F. Kennedy International Airport on March 11, 1976. The accident resulted from a rejected takeoff after a number of large birds were ingested into the No. 3 engine. We recommended that the Federal Aviation Administration:

"Amend 14 CFR 33.77 to increase the maximum number of birds in the various size categories required to be ingested into turbine engines with large inlets. These increased numbers and sizes should be consistent with the birds ingested during service experience of these engines."

This recommendation has been kept in an "Open--Acceptable Action" status on the understanding that it is being resolved through the regulatory process. In order to evaluate its progress and update the public docket, we would appreciate an updated status report.

Sincerely yours,



James B. King
Chairman



Office of
Chairman

National Transportation Safety Board

Washington, D.C. 20594

AUG 26 1976

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

Dear Dr. McLucas:

This will acknowledge receipt of your letter of July 26, 1976, in which you indicated that the Federal Aviation Administration concurs with General Electric Company's contention that the controlled unbalance tests of the CF6-6 and CF6-50 engines demonstrated more severe conditions than could be encountered by in-service bird strikes.

While this contention may be true, the National Transportation Safety Board believes that actions to date are not responsive to the issue posed in our letter of June 25, 1976, regarding the application of test criteria contained in Advisory Circular AC 33-1A concerning the ingestion of flocks of medium-sized birds.

Therefore, the Safety Board would appreciate receiving your views on why you believe it unnecessary to apply the Advisory Circular tests.

Accordingly, we intend to hold our Safety Recommendations A-76-59 through 64 in an "open" status until we receive your views on this matter.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Webster B. Todd, Jr.", written over a horizontal line.

Webster B. Todd, Jr.
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

JUL 26 1976

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

Dear Mr. Chairman:

This supplements our April 2 and 26 responses to NTSB Safety Recommendations A-76-59 through 64.

The General Electric Company, through full-scale controlled engine failure testing, has been able to reproduce the mode of compressor failure experienced by the Overseas National Airlines DC-10 on November 12, 1975.

The failure was achieved on a CF6-50 engine at the Peebles test facility in Peebles, Ohio, on February 29 by instantaneous unbalance of the rotor in the region of the mid-span shroud to create a 50,000 gram inch unbalance. The unbalance generated causes sufficient interference to occur between the three booster stage fan blades and the epoxy shroud material to provide a fine powder which permitted auto-ignition under elevated temperature and pressures. Subsequent laboratory material tests on scale models supported the failure mode experienced on the full-scale engine tests.

In order to further confirm that the abradable epoxy material was the cause of the ONA engine failure, CF6-6 and CF6-50 engines were built up with the epoxy eliminated on the CF6-6 engine and replaced with an abradable aluminum honeycomb material on the CF6-50 engine. Both engines were configured to incorporate the modifications which were being considered for service release and field modification.

At this point, considerable thought was given to whether the engine failure should be induced by bird ingestion or through controlled fan blade failure to produce a controlled engine rotor system unbalance.

On the basis of operational experience as well as certification tests where bird ingestion damage was encountered, it appeared highly improbable that the bird ingestion would produce enough unbalance and subsequent damage to create the service failure mode. It was, therefore, considered most appropriate to simulate a bird strike by

controlled fan blade failure to a degree exceeding the most severe unbalance conditions encountered to date. It was also considered important to unbalance conditions with the abradable epoxy removed and with the abradable epoxy replaced with aluminum honeycomb material.

The tests on the CF6-50 engine were completed April 29 and on the CF6-6 engine on May 6. No indications of over pressure of the high compressor case or case separation at the bolted flanges were encountered.

The Federal Aviation Administration participated in the above test program planning and concurs that the controlled unbalance tests were more severe than could be encountered by inservice bird strikes and that a viable field modification program to the engine has been proposed by General Electric to eliminate future high pressure compressor case failures.

Notices of Proposed Rule Making (NPRMs) have been issued specifying that the modification of inservice engines commence immediately with a scheduled completion date of June 1, 1977, for CF6-50 model and July 1, 1977, for the CF6-6 model engines. The modification is being incorporated in all new production engines.

We believe that the action described above satisfies the intent of the recommendations.

Sincerely,


John L. McLucas
Administrator



Office of
Chairman

National Transportation Safety Board

Washington, D.C. 20594

June 25, 1976

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

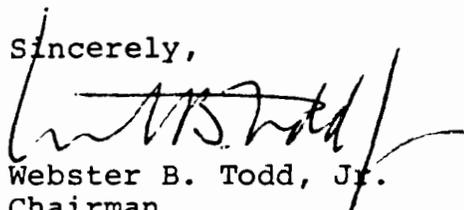
Dear Dr. McLucas:

In our last communication, you advised me that the Federal Aviation Administration would advise the Safety Board of any corrective actions resultant from our Safety Recommendations A-76-59 through 64, which were initiated as a result of the Overseas National Airways accident at John F. Kennedy International Airport, Jamaica, New York, on November 12, 1975.

We are aware of the recent tests which were conducted by the General Electric Company to demonstrate the structural integrity of the CF6 engine when subjected to fan rotor assembly imbalance. However, the Safety Board is still interested in determining the capabilities of the CF6 engine to sustain the ingestion of flocks of medium sized birds as discussed in Federal Aviation Administration Advisory Circular AC33-1A dated 6/19/68, and to then demonstrate stabilized operation at a minimum level of 75 percent thrust.

Your expeditious reply would be appreciated.

Sincerely,



Webster B. Todd, Jr.
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

April 26, 1976

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

Dear Mr. Chairman:

This is to keep you apprised of developments with regard to your Safety Recommendations A-76-59 through 64, as requested in your letter of April 9.

As you know, General Electric is planning to continue testing of the CF6 engine to validate the use of an aluminum honeycomb fan booster compressor shroud rub strip. One or more tests are planned. The first test, using a CF6 engine, is scheduled for the end of April. Further testing may be scheduled depending on the results of this test. Any decision by the Federal Aviation Administration with respect to actual bird ingestion tests will be made only after analysis of all test results.

Concurrently, the FAA is actively pursuing the problem of airport bird hazards. The special task force, formed on March 12, has now visited John F. Kennedy Airport in New York, Dulles Airport, Washington, D. C., Peachtree-DeKalb Airport in Atlanta, Georgia, Tallahassee and Jacksonville Airports in Florida, and Charleston Airport, South Carolina. These visits served to provide the task force with valuable information to be used in developing a national program of bird hazard reporting and alleviation.

As a first step, a General Notice (GENOT - an FAA internal telegraphic message) was developed and transmitted to all regions to implement a 60-day special emphasis program designed to identify airports having bird problems and to initiate action directed at alleviating the hazards at these airports. The GENOT included a list of available publications to assist field personnel in the formulation of local programs. A copy of this GENOT is enclosed.

We will keep you informed of further developments.

Sincerely,

A handwritten signature in cursive script that reads "J. W. Cochran".

J. W. Cochran
Acting Administrator

Enclosure



Office of
Chairman

National Transportation Safety Board

Washington, D C 20594

April 9, 1976

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

Dear Dr. McLucas:

This will acknowledge receipt of your prompt response of April 2 to the National Transportation Safety Board's Safety Recommendations A-76-59 through 64 concerning the General Electric Company's model CF6 engine.

We have had an opportunity to consider the views set forth in your reply to each recommendation and we make the following comments.

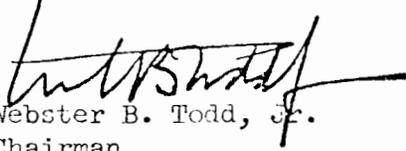
In Recommendation No. 1 the Safety Board specified that the FAA require immediate retesting of the General Electric CF6 engine to demonstrate its compliance with the complete bird ingestion criteria of AC 33-1A and, based on the results of this retesting, Recommendations 2 and 3 propose that the FAA require engine modifications to comply with the AC 33-1A criteria in all newly manufactured CF6 engines as well as those now in service.

The Board is in general agreement with the long-term actions you have contemplated with regard to the airworthiness and safe operation of the CF6 engine. We are also aware of the testing being conducted at General Electric to identify and remedy the cause of overpressure in the CF6 engine. We believe this testing is a logical step in the process of evaluating ingestion hazards; therefore, we believe that the bird ingestion tests should be conducted in accordance with AC 33-1A at the conclusion of the present testing efforts to permit the findings from the imbalance tests to be analyzed and corrective measures incorporated in the CF6 prior to bird ingestion tests. While we have every confidence that the responsible steps taken by General Electric, under your supervision, will lead to the appropriate corrective measures, it remains the view of the NTSB that the final assessment of bird ingestion tolerance of the CF6 should be demonstrated in accordance with the standards of AC 33-1A to assure that secondary damage to the core engine can be evaluated under controlled test conditions.

Until bird ingestion tests have been completed and modifications, if needed, of the engine undertaken, it is the further view of the Safety Board that Recommendation No. 4 proposing the establishment of bird patrols to sweep runways used by CF6-powered aircraft at airports having a known bird problem, is the immediate action needed to deal with this particular aviation hazard.

Please keep me informed of the specific progress that is being made.

Sincerely yours,



Webster B. Todd, Jr.
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

APR 2 1976

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

Dear Mr. Chairman:

This refers to your Safety Recommendations Numbers A-76-59 through 64 issued April 1 covering the General Electric Company Model CF6 engine.

We have reviewed these recommendations and offer the following comments. You will note that some of the actions reflected will require further development on our part and we will keep you apprised.

Recommendation No. 1. Require immediate retest of the General Electric CF6 engine to demonstrate its compliance with the complete bird ingestion criteria of AC 33-1A.

Comment. General Electric is conducting an in-depth investigation aimed specifically at determining the cause of the compressor case failure and identifying corrective action that may be needed. The test program is being run on an expedited basis and we will keep you advised of the schedule and findings.

Recommendation No. 2. Require that any engine modifications necessary to comply with the bird ingestion criteria of AC 33-1A be incorporated into all newly manufactured CF6 engines.

Comment. The test results will be assessed and used as the basis for substantiating any required modifications for newly produced engines.

Recommendation No. 3. Require that any engine modifications necessary to comply with the bird ingestion criteria of AC 33-1A be incorporated into all CF6 engines in service.

Comment. We will give careful attention to the inservice engines and, based on the program now in process, will develop appropriate corrective measures.

Recommendation No. 4. Until the CF6 engine is modified, require that a bird patrol sweep runways at all airports which have recognized bird problems and are served by CF6-powered aircraft. The sweep should be made before a runway is put into operation for CF6-powered aircraft and at sufficient intervals thereafter to assure that a bird hazard does not exist.

Comment. The FAA has a current, on-going program to identify those airports having bird problems and to seek the most viable means of reducing or eliminating any associated hazards. A special agency task force was established March 12 to pursue this program. A series of meetings are planned with airport operators, the Air Transport Association, the Airport Operators Council International, and the airlines to review bird problems experienced in the past and to solicit recommendations for future actions. The FAA will determine which techniques appear to be the most effective and feasible and will develop a national plan of implementation.

Recommendation No. 5. Advise all operators, domestic and foreign, of CF6 engines of the catastrophic consequences of foreign object damage and the need for appropriate caution to avoid such damage.

Comment. We will advise all operators of CF6 engines within seven days of this recommendation.

Recommendation No. 6. Amend 14 CFR 33.77 to increase the maximum number of birds in the various size categories required to be ingested into turbine engines with large inlets. These increased numbers and sizes should be consistent with the birds ingested during service experience of these engines.

Comment. Consistent with your recommendation, the Agency is in the process of scheduling a regulatory review with all interested parties to identify areas needing possible revision in FAR 33. Special attention to FAR 33.77 will be given.

Sincerely,

Original signed by:
John E. McLucas
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

FOR RELEASE: 6:30 P.M., E.S.T., APRIL 1, 1976

(202) 426-8787

ISSUED: April 1, 1976

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-76-59 through 64

On March 11, 1976, the National Transportation Safety Board completed its public hearing into the Overseas National Airways, Inc., accident of November 12, 1975. During that accident, the crew of a McDonnell Douglas DC-10-30F rejected takeoff from John F. Kennedy International Airport after a number of large birds were ingested into the No. 3 engine. One of the basic issues in the accident was the catastrophic disintegration of the engine.

Based on the Safety Board's evaluation of the testimony given by witnesses representing the Federal Aviation Administration, General Electric Co., and McDonnell Douglas Aircraft Corp., the Safety Board concludes that, as configured, the General Electric CF6 engine cannot safely tolerate foreign object damage of the magnitude represented by massive bird ingestion. To date, there have been three air carrier accidents or incidents in which the compressor case assembly separated.

We are fully cognizant of the joint efforts by your Engineering and Manufacturing Staff, the General Electric Co., and McDonnell Douglas Aircraft Corp., to develop remedies for this potentially hazardous condition and would appreciate being kept apprised of the developments in this area. However, until such a remedy is developed, the Safety Board is concerned that the CF6 engine is being operated worldwide, not only on DC-10 aircraft, but also on the A-300 and some 747 aircraft, in an environment that may at any time initiate conditions leading to another catastrophic engine failure.

On March 25, 1975, in its Safety Recommendation A-75-24, the Safety Board expressed concern regarding the adequacy of the bird ingestion certification criteria for large turbofan engines. In that recommendation,

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the Board noted that during actual operations, large turbofan engines have ingested more birds and heavier birds than those currently required during engine certification tests.

The Safety Board now concludes that the bird ingestion test procedures of Advisory Circular 33-1A, as they were used for the certification of the CF6, were inadequate. For example, testimony at the public hearing established that only 6 birds weighing 1 1/2 lbs. each were used during the CF6 certification tests instead of the maximum of 10 birds specified in the Advisory Circular. Furthermore, these six birds were not fired as a group as stipulated in the Advisory Circular, but were fired singly, and the engine was shut down and inspected between bird ingestions. The Board also noted that based on the number of birds per unit of inlet area specified in the Advisory Circular, as many as 39 birds should have been used.

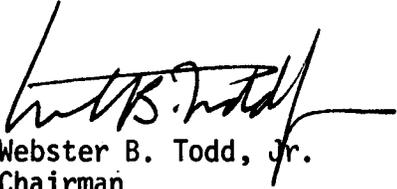
The Safety Board, therefore, believes that the approach used in the tests to demonstrate compliance with Advisory Circular 33-1A meets neither the spirit nor the intent of the Advisory Circular. Moreover, we believe that the current provisions of 14 CFR 33.77 do not provide adequate safeguards against the ingestion potentials of future large turbofan engines.

In view of the above, the National Transportation Safety Board recommends that the FAA:

1. Require immediate retest of the General Electric CF6 engine to demonstrate its compliance with the complete bird ingestion criteria of AC 33-1A. (Class I--Urgent Followup.)
2. Require that any engine modifications necessary to comply with the bird ingestion criteria of AC 33-1A be incorporated into all newly manufactured CF6 engines. (Class II--Priority Followup.)
3. Require that any engine modifications necessary to comply with the bird ingestion criteria of AC 33-1A be incorporated into all CF6 engines in service. (Class II--Priority Followup.)
4. Until the CF6 engine is modified, require that a bird patrol sweep runways at all airports which have recognized bird problems and are served by CF6-powered aircraft. The sweep should be made before a runway is put into operation for CF6-powered aircraft and at sufficient intervals thereafter to assure that a bird hazard does not exist. (Class I--Urgent Followup.)

5. Advise all operators, domestic and foreign, of CF-6 engines of the catastrophic consequences of foreign object damage and the need for appropriate caution to avoid such damage. (Class I--Urgent Followup.)
6. Amend 14 CFR 33.77 to increase the maximum number of birds in the various size categories required to be ingested into turbine engines with large inlets. These increased numbers and sizes should be consistent with the birds ingested during service experience of these engines. (Class III--Longer-Term Followup.)

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


By: Webster B. Todd, Jr.
Chairman

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

December 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 to advise you of the Federal Aviation Administration (FAA) actions taken regarding Safety Recommendation A-76-86. This recommendation was issued as a result of the Board's concern over large numbers of weather-involved general aviation accidents. The recommendation issuance also included A-76-85 which was classified as "Closed--Acceptable Action" on August 30, 1978.

Items 2 and 3 of A-76-86 have now been completed. Enclosed are copies of Advisory Circular AC 61-23C, Private Pilot - Written Test Guide, revised in 1979; and AC 61-23B, Pilot's Handbook of Aeronautical Knowledge, which was revised and completed in October 1980. This completes FAA action on this recommendation.

Sincerely,

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

Langhorne Bond
Administrator

2 Enclosures

127/128

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

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

Dear Mr. Chairman:

This will supplement our October 15 response to NTSB Safety Recommendations A-76-85 and 86.

Recommendation No. 2. Through the FAA/NWS Working Group on Improving Pilot Education, place special emphasis on the hazards associated with unfavorable winds during the landing regime by various means such as:

4. Changes in pilot Exam-O-Grams.

Comment. We have requested our Flight Standards Technical Division in Oklahoma City to study the feasibility of issuing a new or revising a present Exam-O-Gram to emphasize the hazards associated with unfavorable winds during the approach and landing regimes of flight. We expect this to be completed by June 1977.

5. Addition of appropriate questions in both written and oral pilot examinations and checks.

6. Assuring through FAA inspectors that pilot schools certificated under Part 141 highlight the problem in their training syllabi specified in Section 141.55(6)(b)(2).

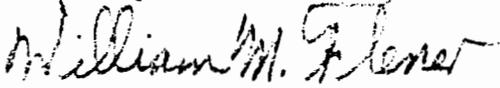
Comment. Section 61.105 (revised) requires that an applicant for a private pilot certificate must have logged ground instruction from an authorized instructor or must present evidence showing that he has satisfactorily completed a course of instruction in the recognition of critical weather situations from the ground and in flight, and the procurement and use of aeronautical weather reports and forecasts. This action is in preparation for an applicant taking a written examination.

To further complement the intended increased weather emphasis in new Parts 61 and 141, we have also placed greater emphasis on the practical application of such knowledge in the new private pilot written examinations relating to Part 61 (revised). Under new Part 61, both the private and commercial pilot flight tests stress weather information in

the following manner: "The applicant shall demonstrate that he knows what weather information is pertinent and how to best obtain this information, and that he can interpret and understand its significance with respect to his proposed flight."

We believe that the above satisfies the intent of these recommendations.

Sincerely,



John L. McLucas
Administrator

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

OCT 15 1976

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-76-85 and 86.

Recommendation No. 1. Expedite the development, for operational purposes, of a simple, economical wind measuring system for use particularly at relatively small airports which are used primarily by general aviation aircraft.

Comment. Technology is available for the development of a system which would provide a continuous voice broadcast of current wind direction and speed. This would be a very complex system. The initial, monitoring, and maintenance costs would be prohibitive for small, uncontrolled airports. We do not believe that development of a simple, economical system, which will provide wind direction and speed, is presently within the state-of-the-art.

We are evaluating a highly visible "pole and streamer" type wind indicator at Richmond, Roanoke and White Sulphur Springs Airports. Although it does not measure wind speed, this device gives a highly visible indication of direction and an indirect indication of speed. Pilots who have used these indicators reported a preference over the windsock and tetrahedron-type.

We expect our evaluation to be completed February 2, 1977. Further action will be contingent on the results of the evaluation.

Recommendation No. 2. Through the FAA/NWS Working Group on Improving Pilot Education, place special emphasis on the hazards associated with unfavorable winds during the landing regime by various means such as:

1. Discussions at safety seminars and clinics sponsored by the General Aviation Accident Prevention Program Specialists.

Comment. Slides and moving picture presentations covering possible situations generated by combinations of wind and airport environment are used in our accident investigation clinics and flight instructor recertification courses. The need for a high level of proficiency, alertness to changing conditions, and awareness of aircraft performance and limitations is stressed. We intend to continue these programs and the emphasis on these points.

2

2. Changes in the Private Pilot's Written Test Guide (AC 61-32A).

Comment. We are revising Advisory Circular 61-32A. The revisions will include questions which are designed to evaluate an applicant's knowledge concerning the recognition of critical weather situations from the ground and in flight. Publication is scheduled for January 1, 1977.

3. Changes in the Private Pilot's Handbook of Aeronautical Knowledge (AC 61-23A).

Comment. We are revising Advisory Circular 61-23A. A paragraph to emphasize the problems of unfavorable and varying wind conditions which may be encountered during the landing flare and touchdown will be added. Publication is scheduled for July 1, 1977.

Sincerely,



J. W. Cochran
Acting Administrator

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

FOR RELEASE: 6:30 P.M., E.D.T., AUGUST 4, 1976

(202) 426-8787

ISSUED: August 4, 1976

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-76-85 and 86

The National Transportation Safety Board continues to be concerned about the large number of weather-involved general aviation accidents. As you will recall, the Safety Board conducted a study of fatal, weather-involved general aviation accidents which was published in 1974. Because of its continuing concern, the Board has conducted a parallel study of nonfatal, weather-involved general aviation accidents.

The Special Study, "Nonfatal, Weather-Involved General Aviation Accidents," is based on the 7,856 such accidents which have occurred from 1964 through 1974. The Safety Board examined circumstances surrounding those accidents and drew conclusions about such factors as: Pilot time, time-in-type, time last 90 days, certificates held, geographical location, pilot age, weather briefings and weather forecasts, and time of year. Also examined were weather phenomena as a cause or a factor and actions by Government and industry designed to minimize weather-involved accidents.

As a result of its latest study, the Safety Board concluded that most nonfatal, weather-involved accidents occurred during the landing regime, either during the landing roll or during leveloff and touchdown, when unfavorable wind conditions existed and when the weather was VFR. Unfavorable winds were cited more than 5 times more frequently as a cause or factor than were low ceilings, and more than 16 times more frequently than thunderstorm activity.

Most of the pilots involved in the "unfavorable wind" accidents simply did not compensate properly for the ambient wind conditions or used poor judgement where they attempted to land. Some of the pilots may not have been aware of the exact wind conditions, but one pass over the intended runway would have revealed those conditions. On the other hand, the lack of appropriate wind measuring equipment on the ground or the misinterpretation of a windsock, for example, could have contributed to some of the accidents. As you know, a windsock can provide valuable

information concerning wind direction and some information relative to wind direction, but the windsock is of little or no value for gust information.

The Board is aware that the FAA is involved in an experimental program concerning the development of a pole and streamer device which is said to be an improvement over the windsock type of equipment. We are also aware that the FAA and the National Weather Service have established a number of working groups to work on priority items in order to improve aviation weather services and that one of the groups is concerned with pilot education.

The Safety Board believes that many of the accidents attributed to "unfavorable winds" could have been prevented by increased emphasis on the subject during pilot training and by the expedited development of a simple, economical wind-measuring system for use particularly at relatively small airports which are used primarily by general aviation aircraft.

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

Expedite the development, for operational purposes, of a simple, economical wind measuring system for use particularly at relatively small airports which are used primarily by general aviation aircraft. (Class II - Priority Followup) (A76-85)

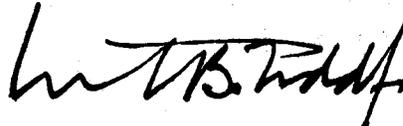
... In coordination with the National Oceanic and Atmospheric Administration/National Weather Service:

Through the FAA/NWS Working Group on Improving Pilot Education, place special emphasis on the hazards associated with unfavorable winds during the landing regime, by various means such as:

1. Discussions at safety seminars and clinics sponsored by the General Aviation Accident Prevention Program Specialists.
2. Changes in the Private Pilot's Test Guide (AC 61-32A).
3. Changes in the Private Pilot's Handbook of Aeronautical Knowledge (AC-61-23A).
4. Changes in Pilot Exam-O-Grams.
5. Addition of appropriate questions in both written and oral pilot examinations and checks.

6. Assuring through FAA Inspectors that Pilot Schools certificated under 14 CFR 141, highlight the problem in their training syllabi specified in 14 CFR 141.55 (6)(b)(2). (Class II - Priority Followup) (A76-86)

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



By: Webster B. Todd, Jr.
Chairman

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.



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

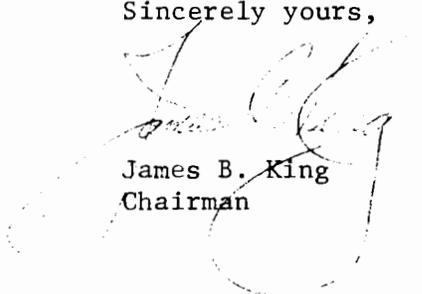
Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter dated November 4, 1980, responding further to National Transportation Safety Board Safety Recommendations A-76-124, -125, and -126 issued September 19, 1976. These are three of seven recommendations that emanated from the Safety Board's special study on "Flightcrew Coordination Procedures in Air Carrier Instrument Landing System Approach Accidents." The study was based on accidents and incidents associated with instrument approaches for the period from 1970 through 1975.

The Safety Board is pleased to see Change 3 to the Federal Aviation Administration's Air Carrier Operations Inspector's Handbook, 8430.6B. This document satisfies the intent of Safety Recommendations A-76-124 through -126 which 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

November 4, 1980

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

Dear Mr. Chairman:

This is in response to your letter of August 19, 1980, in which you request information regarding progress on Safety Recommendations A-76-124, -125, and -126.

Enclosed, please find a copy of Change 3 to the Federal Aviation Administration's Air Carrier Operations Inspector's Handbook, 8430.6B. We believe this document satisfies the intent of Safety Recommendations A-76-124 through -126. This material was previously forwarded to the NTSB (Bureau of Accident Investigations; Safety Recommendations) on April 10, 1980, and it appears the docket could have been closed at that time. In any event, the FAA considers action on these recommendations complete and we await the Board's updated determination of the current status of Recommendations A-76-124, -125, and -126.

Sincerely,

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

Langhorne Bond
Administrator

Enclosure



Office of
Chairman

**National Transportation
Safety Board**

Washington, D.C. 20594

August 19, 1980

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

Dear Mr. Bond:

Please refer to the Federal Aviation Administration (FAA) letter of July 16, 1979, and our response of August 14, 1979, regarding National Transportation Safety Board Safety Recommendations A-76-124, 125, and 126 issued September 19, 1976. These recommendations are held in an "Open--Acceptable Action" status.

The FAA letter indicated that actions were being taken to resolve these recommendations. In order to evaluate their present status and update the public docket, we would appreciate being informed about the actions taken.

Sincerely yours,

for 
James B. King
Chairman



Office of the
Chairman

National Transportation
Safety Board

Washington, D.C. 20581

August 14, 1979

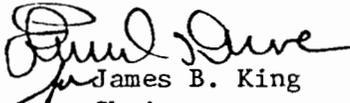
Honorable Langhorne Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter of July 16, 1979, received in response to our letter of May 23, 1979, regarding the National Transportation Safety Board's recommendations A-76-124, 125 and 126. These are three of seven recommendations that stemmed from the Safety Board's special study on "Flightcrew Coordination Procedures in Air Carrier Instrument Landing System Approach Accidents." The study was based on accidents and incidents associated with instrument approaches for the period from 1970 through 1975. Our letter of May 23, 1979, urged the Federal Aviation Administration (FAA) to reconsider its earlier response of December 29, 1978.

The Safety Board is pleased to note that the FAA intends to amend the Air Carrier Operations Inspector's Handbook, FAA Order 8430.6B, by August 31, 1979, to fulfill the intent of these recommendations. Pending the completion of the proposed actions, recommendations A-76-124, 125 and 126 are being maintained in an "Open--Acceptable Action" status.

Sincerely yours,


James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

July 16, 1979

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

Dear Mr. Chairman:

This is in response to your letter of May 23 which requests reconsideration of the Federal Aviation Administration position with respect to National Transportation Safety Board Safety Recommendations A-76-124, 125 and 126.

A-76-124. Implement flightcrew coordination procedures which will insure continuous monitoring of the aircraft's instruments from the OM to landing. The wording of monitoring tasks should be specific. Flightcrew procedures which require a transfer or exchange of visual scanning responsibilities should require that the appropriate crew-member announce that he is relinquishing previously assigned duties or responsibilities.

Comment. We believe the altitude callouts, as outlined in Order 8430.6B, are adequate and the need is for strict adherence. To incorporate more specificity in regard to changes of responsibility for instrument scan versus visual scan, a new sub-paragraph (g) will be added to paragraph 1435. This addition will require principal operations inspectors to ensure that assigned air carrier training programs include a procedure which clearly describes how the pilot who is changing scanning responsibilities will alert the other flightcrew members of the change. A specific instruction will be added to ensure that procedures will require one pilot to monitor instruments for rates of descent and airspeed all the way to roundout so as to prevent the "duck under" tendency which may occur in marginal visibility. The completion date is estimated to be August 31.

A-76-125. Develop flightcrew coordination procedures which will limit sighting callouts to those visual cues which are associated with the runway environment. Unrequired callouts which can result in the premature abandonment of instrument procedures should be prohibited.

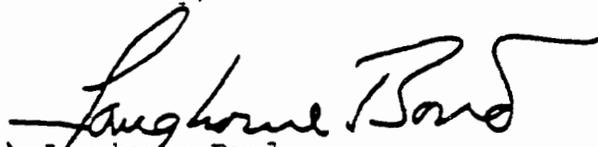
Comment. As stated in Notice 8430.277, we believe strict adherence to recommended callout procedures should suffice. To add emphasis to this, we are going to add rationale for not making other than the standardized callouts. This will be added as another note after subparagraph (f) in paragraph 1435 of Order 8430.6B. The completion date is estimated to be August 31.

A-76-126. Develop a standard flightcrew coordination procedure within each carrier for altitude callouts to be used on all approaches under all conditions.

Comment. Only one callout procedure is presently listed in Order 8430.6B. However, it is designed for use on instrument approaches. Since the rates of descent, altitude, and airspeed callouts are also applicable to all approaches to landings, instructions will be added to emphasize that the applicable callouts will be made on VFR approaches also. The completion date is estimated for August 31.

We believe that our actions are in consonance with the intent of the recommendations.

Sincerely,


Langhorne Bond
Administrator



National Transportation Safety Board

Washington, D.C. 20591

Office of
Operations

May 23, 1979

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

Dear Mr. Bond:

This is in response to your letter dated December 29, 1978, regarding the National Transportation Safety Board recommendations A-76-122, 124, 125, 126, 127, and 128. These recommendations emanated from the Safety Board's special study on "Flightcrew Coordination Procedures in Air Carrier Instrument Landing System Approach Accidents." Our comments are as follows:

A-76-122 and A-76-127

These recommendations have been classified as "Closed - Acceptable Action"; and the Secretary, Department of Transportation, was so advised by a letter from the Safety Board dated July 5, 1977. A copy of this correspondence was forwarded to the Federal Aviation Administration (FAA).

A-76-128

This recommendation has been classified as "Closed - Acceptable Action." The FAA was advised of this action by a Safety Board letter dated March 23, 1979.

A-76-124, A-76-125, and A-76-126

We do not believe the contents of FAA Notice 8430.277 are totally responsive to the above recommendations.

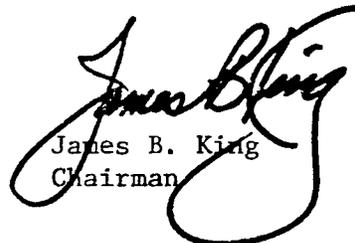
With regard to recommendation A-76-124, the procedures requiring the pilot not flying to monitor the flight instruments are generally satisfactory. However, neither the revised manual nor the notice requires that those flightcrew procedures which involve a transfer or exchange of visual scanning responsibilities specify that the appropriate crewmember announce that he is relinquishing previously assigned duties or responsibilities. We continue to believe that more specificity in this regard is essential.

Recommendation A-76-125 was concerned with limiting sighting callouts to those visual cues associated with the runway environment. Handbook 8430.6B does not make a positive statement that limits sighting callouts. We believe additional comments in 8430.6B, Page 875 (g) 2, or Page 876 (h) 1 are needed.

Recommendation A-76-126 called for standard altitude callouts to be used on all approaches and under all conditions. Although Handbook 8430.6B contains only one callout procedure to be used during an approach, it does not specify that such procedures should be the same for both visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). Since we are aware that flight manuals do, in fact, contain different approach procedures for visual flight rules than for instrument flight rules, it appears that the intent of our recommendation is not fulfilled by the provisions of the Handbook.

Because of the safety considerations which prompted us initially to submit these recommendations, we urge you to reconsider safety recommendations A-76-124, A-76-125, and A-76-126, which we are maintaining in an "Open - Unacceptable Action" status.

Sincerely yours,



James B. King
Chairman



OFFICE OF
THE ADMINISTRATOR

December 29, 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 FAA actions with respect to NTSB Safety Recommendations A-76-124, 125, 126 and 127 have been completed.

A-76-124. Implement flightcrew coordination procedures which will insure continuous monitoring of the aircraft's instruments from the OM to landing. The wording of monitoring tasks should be specific. Flightcrew procedures which require a transfer or exchange of visual scanning responsibilities should require that the appropriate crew-member announce that he is relinquishing previously assigned duties or responsibilities.

A-76-125. Develop flightcrew coordination procedures which will limit sighting callouts to those visual cues which are associated with the runway environment. Unrequired callouts which can result in the premature abandonment of instrument procedures should be prohibited.

A-76-126. Develop a standard flightcrew coordination procedure within each carrier for altitude callouts to be used on all approaches under all conditions.

A-76-127. Encourage flightcrews to keep the autopilot-coupler engaged until its minimum certified altitude has been reached.

Comment. Notice 8430.277 was issued on December 29, 1976. This notice included an appendix which contained NTSB Safety

Recommendations 122 through 128 and the FAA response to each.

We believe that this action met the intent of the recommendations. A copy of Notice 8430.277 is enclosed.

Sincerely,


Langhorne Bond
Administrator

Enclosure

NOV 30 1976

OFFICE OF
THE ADMINISTRATOR

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-76-122 through 128.

Recommendation No. 1. Expedite evaluation and developmental programs for advanced landing systems.

Comment. The FAA is already expediting two advanced landing system programs conducted by our Systems Research and Development Service. These are the Microwave Landing System (MLS) and the evaluation of a Head-Up Display (HUD). In addition, the automatic landing capability is being progressively improved and encouraged. The FAA welcomes the NTSB's endorsement of our HUD evaluation program. In order to determine, as soon as possible, whether or not the HUD can be expected to increase landing safety, I have written to the Administrator of the National Aeronautics and Space Administration (NASA) requesting their assistance in this effort. Both FAA and NASA are currently working together to develop a HUD program plan by December 1. In addition, wide-bodied aircraft and some B-727's have sophisticated Automatic Landing Systems (ALS) which will further enhance the operators' capabilities in Category II and IIIa all weather operations.

Recommendation No. 2. Institute procedures which require air traffic controllers to release an aircraft from all airspeed restrictions at least 3 to 4 miles outside of the outer marker on all ILS approaches when the reported weather is below basic VFR minima.

Comment. The following should be noted:

1. Present air traffic control procedures require all flights to be turned on the localizer at least 3 miles outside of the OM or 7 miles from the threshold, whichever is farther, during instrument meteorological conditions.

2. Air traffic control airspeed restrictions are automatically cancelled when clearance for an approach is issued. This clearance is routinely issued prior to the turnon point and, therefore, normally releases the flightcrew from speed restrictions earlier than the NTSB recommends.

3. Controllers are permitted to restate airspeed restrictions, if necessary, (to preclude S-turns or discontinuance of the approach) up to the OM, but not beyond. This option is only exercised when traffic volume dictates.
4. Pilots have the latitude to vary airspeed up to 10 knots either side of assigned speed.
5. Pilots have the prerogative to refuse any clearance which may affect the safe operation of his aircraft.

Preliminary review of the impact of adopting the recommendation disclosed that it could result in a reduction of airport acceptance rate by approximately eight aircraft per runway, per hour. Since FAA has the responsibility to promote both safety and the efficiency in air commerce, we respectfully request a copy of the evidence mentioned in the NTSB release so that we might reach a more informed decision in the matter.

Recommendation No. 3. Implement flightcrew coordination procedures which will insure continuous monitoring of the aircraft's instruments from the OM to landing. The wording of monitoring tasks should be specific. Flightcrew procedures which require a transfer or exchange of visual scanning responsibilities should require that the appropriate crewmember announce that he is relinquishing previously assigned duties or responsibilities.

Comment. The NTSB Study, AAS-76-5, acknowledges that the FAA has published guidelines which outline recommended instrument approach monitoring procedures and callouts in Handbook 8430.6A. This is guidance material for our Principal Operations Inspectors (POI) on what is considered acceptable for inclusion in air carrier training programs. Although this is not regulatory in nature, through the efforts of the principal operations inspectors and the cooperation of the operators, the procedures and callouts outlined in our handbook have been included in operators training programs and are used in line operations. The procedures involved in the transfer or exchange of visual scanning responsibilities are devised by the operator so they will be compatible with the overall callout procedures. Our handbook procedures do recommend that the pilot not flying, monitor the flight instruments during an instrument approach.

The NTSB study points out that the flightcrews and management personnel of the air carriers interviewed, all considered that their particular callout procedures were the best. We will again emphasize to all operators the need for strict adherence to established callout procedures.

It appears that noncompliance with established procedures is the primary problem rather than a lack of adequate procedures. We feel the procedures outlined in FAA Handbook 8430.6A cover the items discussed in this recommendation. Nevertheless, we plan to issue an air carrier operations bulletin by December 31, directing our field inspectors to reemphasize to the air carriers the importance of strict adherence to the recommended altitude callout procedures.

Recommendation No. 4. Develop flightcrew coordination procedures which will limit sighting callouts to those visual cues which are associated with the runway environment. Unrequired callouts which can result in the premature abandonment of instrument procedures should be prohibited.

Comment. We agree that unnecessary callouts should be eliminated. The airlines have developed acceptable flightcrew coordination and callout procedures based upon our recommended procedures. As mentioned in our response to Recommendation A-76-124, we believe that noncompliance with established procedures is the problem rather than a lack of adequate procedures. However, as stated above, we will again emphasize to all operators the need for strict adherence to the recommended callout procedures.

Recommendation No. 5. Develop a standard flightcrew coordination procedure within each carrier for altitude callouts to be used on all approaches under all conditions.

Comment. Altitude callout procedures have been prescribed in Handbook 8430.6A for many years and pertain to approaches conducted under all conditions. However, our handbook procedures for VFR approaches differ from those recommended for IFR approaches. Therefore, no further action on this recommendation is required except for our continuing emphasis to the air carriers on the need for strict adherence to callout procedures.

Recommendation No. 6. Encourage flightcrews to keep the autopilot-coupler engaged until its minimum certified altitude has been reached.

Comment. We agree that flightcrews should be encouraged to keep the autopilot-coupler engaged until reaching the minimum authorized altitude except when using some Category I ILS facilities where beam quality and glideslope threshold crossing heights may require disengagement at a higher altitude. We will request all operators through the POI's to include this information in their manuals and training programs. This will be included in the operations bulletin mentioned above.

4
Recommendation No. 7. Include in air carrier training programs flightcrew discussions of formal reports involving approach and landing accidents or incidents. Special emphasis should be placed on those mishaps involving human limitations.

Comment. A similar proposal, submitted last year for consideration during the First Biennial Operations Review, will be included in a Notice of Proposed Rule Making scheduled for issuance by the end of 1977. However, we believe air carriers should have the latitude of selecting how this information will be disseminated to crewmembers.

Sincerely,



J. W. Cochran
Acting Administrator

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

FOR RELEASE: 6:30 P. M., E.D.T., SEPTEMBER 19, 1976.

202-426-8787

ISSUED: September 19, 1976.

Forwarded to:

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

} SAFETY RECOMMENDATION(S)

} A-76-122 through 128

The National Transportation Safety Board continues to be concerned about the number of accidents that occur in low visibility environments during the completion of an instrument landing system approach. Because of that concern, the Safety Board conducted a study¹ of flightcrew coordination procedures which are applicable during the approach and landing phase, and particularly applicable during the visual transition period of instrument flight when flightcrews transfer their attention to visual cues for flightpath guidance. The 1970 through 1975 air carrier and supplemental air carrier ILS accident and incident data were examined to assess these procedures and flightcrew performance during the execution of these procedures.

The accident and incident data disclosed that almost every mishap occurred after the flightcrew had seen either the ground, the airport, or the runway environment and was trying to transition from instrument to visual flight procedures.

The study found that low visibilities compromised the quality and reliability of the visual cues on which the pilot flying relies for vertical guidance; therefore, only timely and proper integration of flight instrument data into the flight can detect or prevent undesired excursions from the correct flightpath. Consequently, continuous monitoring of the aircraft's flight instruments is necessary from the outer marker (OM) to landing, and the duty to monitor these instruments should be assigned as a specific task to a specific crewmember.

There were several approaches during which callouts of visual contact, either authorized or unauthorized in the carrier's procedures, resulted in premature abandonments of instrument flight procedures. The evidence disclosed that instrument flight procedures should be maintained to the

1/ NTSB AAS 76-5, "Flightcrew Coordination Procedures in Air Carrier Instrument Landing System Accidents."

lowest possible altitude commensurate with the approach procedure. Callouts which can result in a premature abandonment of instrument procedures should be prohibited. Sighting calls should be limited to visual acquisition of the airport, the approach lights, runway lights, or the runway, particularly during a nonprecision approach. The study found further that within each individual carrier's procedures, altitude callouts for both visual and instrument approaches should be standardized.

Evidence gathered during the study disclosed that greater use of the autopilot approach coupler will augment instrument approach safety. Depending upon the reliability of the ILS facility, if sufficient visual cues exist to continue the approach, the autopilot should remain engaged until its minimum certified altitude has been reached. Secondly, the efficiency of the autopilot-coupler and automatic landing systems would be enhanced if air traffic control procedures were adopted which would insure that the flightcrew be released from all airspeed restrictions at least 3 to 4 miles outside the OM on ILS approaches conducted in instrument meteorological conditions.

Though the Safety Board could reach no conclusions regarding the use of the heads-up instrument display (HUD) in the low visibility environment, we believe that study and evaluation of this instrument system, as well as other types of advanced landing and instrumentation systems, should be continued; therefore, we endorse FAA's current project to evaluate and determine the role of HUD.

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

Expedite evaluation and developmental programs for advanced landing systems. (Class II - Priority Followup) (A-76-122)

Institute procedures which require air traffic controllers to release an aircraft from all airspeed restrictions at least 3 to 4 miles outside of the outer marker on all ILS approaches when the reported weather is below basic VFR minima. (Class II - Priority Followup) (A-76-123)

... In conjunction with the air carriers:

Implement flightcrew coordination procedures which will insure continuous monitoring of the aircraft's instruments from the OM to landing. The wording of monitoring tasks should be specific. Flightcrew procedures which require a transfer or exchange of visual scanning responsibilities should require that the appropriate crewmember announce that he is relinquishing previously assigned duties or responsibilities. (Class III - Longer Term Followup) (A-76-124)

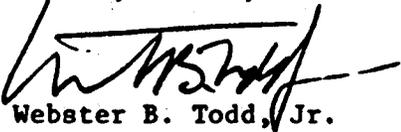
Develop flightcrew coordination procedures which will limit sighting callouts to those visual cues which are associated with the runway environment. Unrequired callouts which can result in the premature abandonment of instrument procedures should be prohibited. (Class III - Longer Term Followup) (A-76-125)

Develop a standard flightcrew coordination procedure within each carrier for altitude callouts to be used on all approaches under all conditions. (Class II - Priority Followup) (A-76-126)

Encourage flightcrews to keep the autopilot-coupler engaged until its minimum certified altitude has been reached. (Class II - Priority Followup) (A-76-127)

Include in air carrier training programs flightcrew discussions of formal reports involving approach and landing accidents or incidents. Special emphasis should be placed on those mishaps involving human limitations. (Class III - Longer Term Followup) (A-76-128)

TODD, Chairman, BAILEY, Vice Chairman, McADAMS and HOGUE, Members, concurred in the above recommendations. HALEY, Member, did not participate.


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.



National Transportation Safety Board

Washington, D.C. 20594

Office of the Chairman

16

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

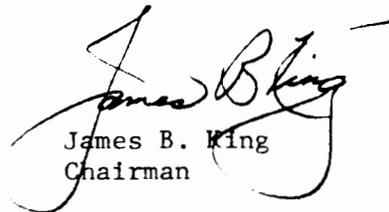
Dear Mr. Bond:

Thank you for your letter dated October 14, 1980, reporting the status of National Transportation Safety Board Safety Recommendations A-77-43 and 44 issued June 20, 1977. These recommendations called for investigative and maintenance actions to prevent the recurrence of crankshaft fatigue failures in the Teledyne Continental Motors (TCM) IO-520 series engine.

We are pleased to note that TCM is now manufacturing the IO-520 engine with a newly designed crankshaft, and in more than 3200 of the new engines delivered there has been no instance of crankshaft fatigue failure. We are also pleased with Federal Aviation Administration (FAA) Advisory Circular (AC) 20-103, "Aircraft Engine Crankshaft Failure," dated March 7, 1978, recommending procedures and practices to minimize crankshaft failures.

However, the Safety Board has been informed that approximately 18,690 crankshafts, with part number 633620, were manufactured by TCM from 1963 to 1978. We are concerned that these crankshafts which are presently in service, or are available for usage, may still have or be subjected to undetected subsurface defects. We continue to maintain both recommendations in an "Open--Acceptable Action" status pending the FAA's further review.

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 14, 1980

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

Dear Mr. Chairman:

This letter is in response to your letter of July 28 which requests an updated status report on NTSB Recommendations A-77-43 and 44. This supplements our letter of January 31, 1979.

The situation is essentially the same as it was described by our January 31, 1979, letter. Teledyne Continental Motors (TCM) has continued to manufacture and deliver the redesigned crankshafts. These crankshafts undergo an ultrasonic inspection prior to assembly of the engine. More than 3200 IO-520 engines having crankshafts of this new design have been delivered since its introduction in June 1978 and no crankshafts have failed. This record convinces us that the corrective measures adopted by TCM have been successful.

However, we have not yet arrived at a satisfactory procedure for inspecting the old design crankshafts in the field. TCM has concluded that the ultrasonic inspection is too sophisticated a process requiring too much specialized expertise to be used by repair stations. We have not accepted the TCM conclusion at this time and have not yet determined a satisfactory alternate procedure for use by repair stations. We are now reviewing the reported failure rate in order to determine the effect, if any, of the practices recommended in the Advisory Circular AC-20-103, and whether further action is necessary.

We will advise the Board when our action on this matter is completed.

Sincerely,


Langhorne Bond
Administrator



Office of
Chairman

National Transportation Safety Board

Washington, D.C. 20594

July 28, 1980

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

Dear Mr. Bond:

Reference is made to National Transportation Safety Board Safety Recommendations A-77-43 and 44 issued June 20, 1977. These recommendations called for investigative and maintenance actions to prevent the recurrence of crankshaft fatigue failures in the Teledyne Continental 10-520 series engine.

On receipt of the Federal Aviation Administration's (FAA) followup letter of January 31, 1979, we responded on March 9, 1979, stating that the status of these recommendations had been classified as "Open--Acceptable Action." We also requested the FAA to inform the Safety Board when the problem of the 10-520 series crankshaft failures was fully identified and resolved. In order to evaluate the progress of these recommendations and update the public docket, we would appreciate an updated status report.

Sincerely yours,

A handwritten signature in black ink, appearing to read "James B. King".

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

January 31, 1979

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

Dear Mr. Chairman:

This is in response to your letter of December 1, 1978, which requests the status of actions with respect to the Teledyne Continental Motors (TCM) IO-520 series engine crankshafts.

The mechanism of the fatigue failure of the crankshaft involved in the Beech Model 58 accident at Chillicothe, Missouri, on August 8, 1976, is not fully understood. However, TCM has undertaken several programs to improve crankshaft reliability.

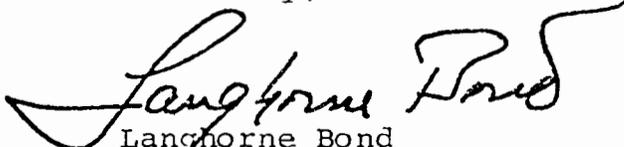
All crankshafts are being inspected at the factory using ultrasonic techniques. A similar method is being developed for use by qualified technicians in the field during overhaul and should be available early this year. This technique will require special ultrasonic equipment and operating expertise because of the complex geometry of the area to be inspected. We will advise you when the field inspection technique is implemented.

TCM has made two product improvements. They are now using vacuum arc remelt steel instead of the previously used air melt alloy. In addition, the crankshaft geometry has been redesigned to reduce the working stress in the fillets. Approximately 5000 crankshafts have been produced with either one or both of these improvements. No failures of the type found in the Chillicothe accident have been discovered.

2

In addition to the above, the FAA issued Advisory Circular (AC) 20-103, "Aircraft Engine Crankshaft Failure," on March 7, 1978. This provides information and suggests procedures to increase crankshaft service life and to minimize crankshaft failures. A copy of the AC is enclosed.

Sincerely,


Langhorne Bond
Administrator

Enclosure



Office of the
Chairman

National Transportation Safety Board

Washington D.C. 20594

1 DEC 1978

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

Dear Mr. Bond:

As a result of a Beechcraft Baron 58 accident at Chillicothe, Missouri, on August 8, 1976, the National Transportation Safety Board on June 20, 1977, issued Safety Recommendations A-77-43 and 44. These recommendations called for investigative and maintenance actions to prevent the recurrence of crankshaft fatigue failures in the Teledyne Continental IO-520 series engine. The Federal Aviation Administration's (FAA) letter of August 19, 1977, stated that "... it is premature to issue instructions to inspect the IO-520 series crankshaft for incipient or developed cracks of the type under investigation until such time as an adequate inspection means is identified." The responsive actions suggested on these two recommendations have been evaluated as "Open - Acceptable Alternate Action."

The Safety Board would appreciate being informed of FAA's subsequent actions taken for the resolution of these recommendations.

Sincerely,

A handwritten signature in black ink that reads "James B. King".

James B. King
Chairman



OFFICE OF
THE ADMINISTRATOR

August 19, 1977

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-77-43 and 44.

The following is a summary of events which have taken place regarding the subject of fractured crankshafts.

FAA Engineering personnel have been working in close coordination with Teledyne Continental Motors (TCM) in a continuing effort to determine the cause of the IO-520 series crankshaft failures.

Metallurgical examination of the fractured crankshafts revealed that material or processing defects were not evident. The fractures involve low-stress, high-cycle fatigue in bending; but, to date, the investigation has failed to disclose the cause of this specific type of fracture.

Operators of aircraft which have experienced failures are being contacted to determine if there is any operational pattern that might lead to cause of failure. These findings will be correlated with engine endurance tests which are now in progress.

The FAA is presently investigating maintenance and operational factors that could contribute to crankshaft failures. We will provide advisory information to the public suggesting maintenance and operational techniques that could help preclude crankshaft failures on all engines.

A-77-43 Comment. The FAA rejects this recommendation. Basically, maintenance alert bulletins would not be used by the FAA to alert overhaul shops or manufacturers. Other methods would be more suited to this problem.

The IO-520 crankshafts have failed from subsurface fatigue cracks. The present method of inspecting crankshafts is magnaflux, a procedure which is not capable of detecting subsurface cracks. The use of an ultrasonic inspection procedure for detecting subsurface cracks is presently under investigation at TCM. Accordingly, it is premature to issue instructions to inspect the IO-520 series crankshaft for incipient or developed cracks of the type under investigation until such time as an adequate inspection means is identified.

A-77-44 Comment. The FAA rejects this recommendation. A Directed Safety Investigation is used as a means of gathering data about a specific problem utilizing the FAA field force of inspectors.

In the case of the fractured cheeks on crankshafts, it would be of little help to gather further information as to the number of failures. From the number of known failures, we agree that there is a problem which needs corrective action. The real problem lies in identifying the cause of the failures and the proper corrective action. We believe the continued joint effort of our FAA personnel working closely with TCM Engineering is the best course of action.

Sincerely,



J. W. Cochran
Acting Deputy Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 20, 1977

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-77-43 and 44

On August 3, 1976, a Beechcraft Baron 58 crashed after takeoff from the Chillicothe Municipal Airport, Chillicothe, Missouri. The six persons aboard the aircraft died in the crash. Investigation revealed that the left engine, a Teledyne Continental IO-520, failed after takeoff when the aircraft was between 50 and 100 feet above the runway. The engine failed when the crankshaft broke at the No. 7 short crankcheek after a fatigue crack, which had originated below the surface, had propagated almost through the section. Postaccident metallurgical examinations failed to disclose evidence of any preexisting defects in the crankcheek which could account for the fatigue.

As of August 1976, over 15,000 crankshafts, part No. 633453, had been installed in IO-520 engines since engine certification in 1963. We are aware that 12 other of these crankshafts have fractured at the No. 7 crankcheek because of a subsurface fatigue crack. The failures were randomly distributed with regard to engine operating time. The cause of fatigue was not determined in any of these occurrences.

Although none of the other failures resulted in a fatal accident, we are concerned that the repetition of this type of failure is indicative of a continuing problem. We recognize that the FAA is aware of the postaccident tests conducted by Continental and their continuing efforts to determine the cause of the fatigue failure. We believe that until such a cause can be determined and corrected, positive action is necessary to minimize the risk of future engine failures.

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

Honorable Langhorne M. Bond

- 2 -

Issue a maintenance alert bulletin to advise engine overhaul and repair facilities to inspect the IO-520 series crankshafts for incipient or developed cracks, preferably using an inspection means capable of detecting subsurface cracks, in the vicinity of the short crankcheeks any time that the crankshafts are available for inspection. (Class II-Priority Followup) (A-77-43)

Conduct a directed safety investigation consisting of a review of overhaul and repair facility inspection results to determine if the frequency and distribution of detected fatigue cracks indicates a deficiency in the IO-520 engine. (Class II--Priority Followup) (A-77-44)

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



for By: Webster B. Todd, Jr.
Chairman



Office of the
Chairman

National Transportation Safety Board

Washington D.C. 20594

OCT 29

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

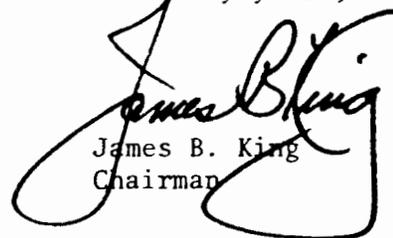
Dear Mr. Bond:

Thank you for your letter of October 2, 1980, updating the status of National Transportation Safety Board Safety Recommendations A-77-46 and 47 issued June 24, 1977. These recommendations pertain to procedures for the search and rescue of missing aircraft.

We have examined Federal Aviation Administration (FAA) Order 7840.1 dated June 28, 1978, on the subject of computer data for search and rescue activities. We note that it supplements the Air Traffic Controller's Handbook, Chapter 8, and is responsive to Safety Recommendation A-77-46. This recommendation is now classified in a "Closed--Acceptable Action" status.

Since the National Rescue Coordination Center participated in the procedures established by FAA Order 7840.1, the intent of Safety Recommendation A-77-47 has also been accomplished and its status classified as "Closed--Acceptable Action."

Sincerely yours,

A handwritten signature in black ink, appearing to read "James B. King".

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 2, 1980

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

Dear Mr. Chairman:

This is in response to your letter of July 28 requesting an updated status report on the Federal Aviation Administration (FAA) action to the National Transportation Safety Board Recommendations A-77-46 and 47.

Recommendation A-77-46. Revise the Air Traffic Controller's Handbook, Chapter 8, to include specific instructions to relay to the National Rescue Coordination Center at Scott Air Force Base, Illinois, information on the last known location of a missing aircraft obtained from the computer-stored radar information.

Recommendation A-77-47. Inform the National Rescue Coordination Center of the NAS radar system computer capabilities and advise them to include in their procedures provisions for updating more rapidly information on last known positions of missing aircraft.

Comment. FAA Order 7840.1 (enclosed) was initiated in June 1978 to supplement the Air Traffic Controller's Handbook, Chapter 8. The Order establishes the procedures for our Computer Display Channel equipped Air Route Traffic Control Centers (ARTCCs) utilizing computer generated data to aid search and rescue authorities in locating missing or suspected downed aircraft.

The National Rescue Coordination Center participated in the review of the Order and established their internal procedures for coordination with the ARTCCs and field units. This coordination includes passing updated information on the last known position of missing aircraft received from the ARTCCs' computer generated data to the field units.

Currently, 15 ARTCCs have the proper equipment for extracting the computer generated data. A task is underway to develop a new computer technique to allow all 20 centers to have the capability of using computer generated data to aid search and rescue authorities. This task is estimated to be completed within 18 months.

Sincerely,

A handwritten signature in black ink, appearing to read "Langhorne Bond". The signature is written in a cursive, flowing style with a long horizontal stroke at the end.

Langhorne Bond
Administrator

Enclosure



Office of
Chairman

National Transportation Safety Board

Washington, D.C. 20594

July 28, 1980

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

Dear Mr. Bond:

Reference is made to National Transportation Safety Board Safety Recommendations A-77-45 through 47 issued June 24, 1977. These recommendations were made as a result of a Piper PA-28 accident, 33 miles northeast of Farmington, New Mexico, on November 26, 1976. The crashed aircraft was located after six days. The recommendations pertained to search and rescue missions.

On receipt of the Federal Aviation Administration's (FAA) response of September 9, 1977, Safety Recommendation A-77-45 was evaluated and its status classified as "Closed--Acceptable Action." However, Safety Recommendations A-77-46 and A-77-47 were evaluated and classified in an "Open--Acceptable Action" status pending the completion of further actions by the FAA. In order to evaluate the progress of these recommendations and update the public docket, we request an updated status report.

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

September 9, 1977

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

Dear Miss Bailey:

This is in response to the NTSB Recommendations A-77-45, 46, and 47.

Recommendation No. 1. Alert all ATC personnel of the circumstances of this accident and emphasize to them the importance of transmitting to search and rescue personnel all available information on the last known location of a missing aircraft.

Comment. The use of computer position recording capability for locating lost aircraft is a relatively new idea and is still in the development stage. In order to provide best use of the existing capability while the National Program is being developed, we have directed all regions by letters of August 5, 1976, January 7, and April 15, 1977, to provide the fullest possible cooperation with the National Rescue Coordination Center (NRCCs) in providing computer derived position information.

Recommendation No. 2. Revise the Air Traffic Controller's Handbook, Chapter 8, to include specific instructions to relay to the National Rescue Coordination Center at Scott Air Force Base, Illinois, information on the last known location of a missing aircraft obtained from the computer-stored radar information.

Comment. Considering the program development effort underway and limitations that must be considered until the National Program is implemented, we feel it is premature to forecast the specific actions that will apply to the NTSB recommendations. Program guidance, under development, will encompass the automation methodology function and the procedures for coordination with the NRCCs. We are coordinating with the Air Force Rescue Coordination Center (AFRCC), Scott Air Force Base, Illinois, in our documentation and program development effort.

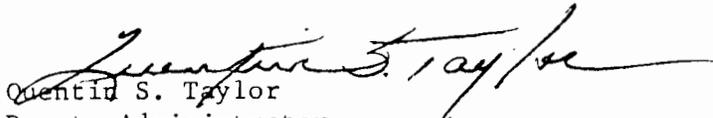
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Recommendation No. 3. Inform the National Rescue Coordination Center of the NAS radar system computer capabilities and advise them to include in their procedures provisions for updating more rapidly information on last known positions of missing aircraft.

Comment. Close coordination with the National Rescue Coordination Center (Scott AFB) in this effort is a continuing process. The procedure for having radar data on aircraft targets recorded on tape where it can be retrieved in the form of a computer print-out was originally developed for testing the new computerized air traffic control system. The technique was extended two years ago to search and rescue use after personnel at the Denver Air Route Traffic Control Center recognized its potential in that area, and worked out procedures in cooperation with the Air Force Rescue Coordination Center at Scott AFB, Illinois.

At present, special training is needed for the delicate task of tracing an aircraft flight path on the print-out to the point where it disappears from the radar screen. Currently 15 Air Route Traffic Control Centers have the proper equipment for that purpose. However, we expect that within the next two years the task can be simplified and a new computer technique developed so that all 20 Centers will have the capability of searching for missing aircraft position by means of computer derived information.

Sincerely,


Quentin S. Taylor
Deputy Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 24, 1977

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-77-45 through 47

On November 26, 1976, N4208F, a Piper PA-28-181, crashed about 33 miles northeast of Farmington, New Mexico. Before the crash, the pilot had contacted the Farmington Flight Service Station (FMN FSS) and stated that he was lost. The FSS advised the pilot to squawk code 7700 (emergency) on his transponder; it then contacted the Denver Air Route Traffic Control Center (ARTCC) and confirmed the position of N4208F by reference to the ARTCC radar. The FSS was attempting to give N4208F a DF steer to the Farmington Airport when radio contact was lost. Denver ARTCC lost the target about 2 minutes later.

The radar controller at Denver ARTCC attempted to determine the aircraft's last position on his scope by moving the electronic cursor on the scope to the last position that he recalled and entering the latitude and longitude of that position. The coordinates he determined were immediately transmitted to the National Rescue Coordination Center (NRCC) at Scott Air Force Base, Illinois. Search and rescue personnel did not find the aircraft until the afternoon of December 3, 6 days after the accident. Both occupants had died on impact; the aircraft's emergency locator transmitter also was destroyed on impact.

Denver ARTCC has a NAS Stage-A computer which stores radar target information (DART). The information included a D-log plot of Code 7700 from N4208F; according to personnel at the NRCC, the last known position obtained from this plot was transmitted to NRCC more than 24 hours after the accident. This position was about 6 miles from the position given originally. For some reason, field personnel did not receive the updated coordinates until 2 days after the accident. According to rescue personnel, if the efforts expended during the first 2 days of search had been expended near the area of the updated coordinates, the aircraft would have been located sooner.

Honorable Langhorne M. Bond - 2 -

Although the survival of the occupants is not in question in this case, in other instances, a rapid and effective search and rescue effort may mean the difference between survival and death. To insure the best possible search and rescue efforts, the most accurate information on an aircraft's last known location should be transmitted to search and rescue personnel as soon as it is available.

Air Traffic Controller's Handbook 7110.65, Chapter 8, contains instructions for handling an emergency such as the loss of N4208F. Instructions are included for notifying the National Rescue Control Center at Scott Air Force Base and for "... making all possible facilities available for use of searching agencies." The Safety Board believes that more definitive instructions should be given controllers such as including the need to obtain the computer information regarding lost aircraft when that information is available and readily accessible so that it may be transmitted without delay to the NRCC, and subsequently to search and rescue personnel. In addition, the NRCC should be made aware of the availability of such information along with its potential accuracy and limitations.

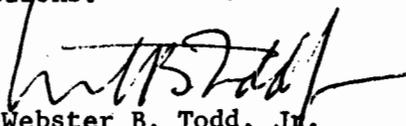
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Alert all ATC personnel of the circumstances of this accident and emphasize to them the importance of transmitting to search and rescue personnel all available information on the last known location of a missing aircraft. (Class II - Priority Followup)
(A-77-45)

Revise the Air Traffic Controller's Handbook, Chapter 8, to include specific instructions to relay to the National Rescue Coordination Center at Scott Air Force Base, Illinois, information on the last known location of a missing aircraft obtained from the computer-stored radar information. (Class II - Priority Followup)
(A-77-46)

Inform the National Rescue Coordination Center of the NAS radar system computer capabilities and advise them to include in their procedures provisions for updating more rapidly information on last known positions of missing aircraft. (Class II - Priority Followup)
(A-77-47)

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


By: Webster B. Todd, Jr.
Chairman



National Transportation Safety Board

Washington, D.C. 20594

Office of the Chairman

16

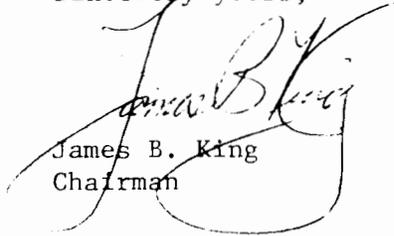
Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter of November 13, 1980, responding further to National Transportation Safety Board Safety Recommendation A-78-43 issued July 7, 1978. We had recommended that the Federal Aviation Administration (FAA) incorporate all of the essential elements of the ground and flight training increments developed in the "General Aviation Pilot Stall Awareness Training Study," or their equivalent, in FAR Parts 61 and 141.

The Safety Board is pleased to note that the FAA is planning a regulatory review of FAR Parts 61 and 141 during this fiscal year and will include the "General Aviation Pilot Stall Awareness Training Study" in the agenda. We will view with interest the upgrading of these regulations. We are also pleased to note that the FAA has written to flight instructors and pilot examiners emphasizing training in stall spin awareness. Safety Recommendation A-78-43 is now classified in an "Open--Acceptable Action" status.

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

November 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 further response to NTSB Recommendation A-78-43 issued July 7, 1978, and supplements our letter of September 1, 1978. This also responds to your request for a progress report contained in your letter of October 8, 1980.

A-78-43. Incorporate all of the essential elements of the ground and flight training increments developed in the "General Aviation Pilot Stall Awareness Training Study," or their equivalent, in FAR Parts 61 and 141.

Comment. The stall awareness training study will be included, in its entirety, into FAR Parts 61 and 141 agenda for consideration in the upgrading of pilot training standards. The FAA is planning a regulatory review of FAR Parts 61 and 141 during the current fiscal year. We are fully aware of the importance of this action and are hopeful that work can begin during this calendar year.

In the meantime, the FAA has written to all industry sponsors of FAA-approved flight instructor refresher courses to include training on stall spin awareness. Further, the FAA Examiner Standardization Section has included a unit of instruction on stall spin awareness to all pilot examiners. The intent of these actions is to inform the flight instructors and pilot examiners of the elements of stall spin awareness training.

In our judgment, these actions will satisfy the intent of Safety Recommendation A-78-43. We will keep the Board informed of the status of upgrading FAR Parts 61 and 141.

Sincerely,

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

Langhorne Bond
Administrator



Office of
Chairman

National Transportation Safety Board

Washington, D.C. 20594

OCT 8 1978

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

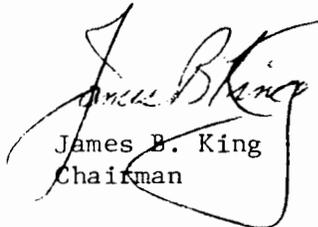
Dear Mr. Bond:

Please refer to the Federal Aviation Administration (FAA) letter of September 1, 1978, responding to National Transportation Safety Board Safety Recommendation A-78-43 issued July 7, 1978. This recommendation stemmed from the Safety Board's concern at the alarming statistics of stall/spin accidents. We recommended that the FAA:

"Incorporate all of the essential elements of the ground and flight training increments developed in the "General Aviation Pilot Stall Awareness Training Study," or their equivalent, in FAR Parts 61 and 141."

The FAA letter indicated that a survey was expected to be completed by March 1979, and if the results of the survey indicated rulemaking to be appropriate, regulatory projects would be established. In order to evaluate the status of this recommendation and bring the public docket up-to-date, we would appreciate a progress report.

Sincerely yours,



James B. King
Chairman



National Transportation Safety Board

Washington, D.C. 20594

Office of the
Chairman

July 19, 1979

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

Dear Mr. Bond:

Thank you for your letter dated June 18, 1979, responding to National Transportation Safety Board recommendation A-78-44. This recommendation stemmed from the Board's concern at the alarming statistics of stall/spin accidents.

From 1974 to 1976, there were 723 stall/spin accidents, which resulted in 668 fatalities and 246 serious injuries. We recommended that the Federal Aviation Administration (FAA) distribute the "General Aviation Pilot Stall/Spin Awareness Training Study" to all certificated flight schools and commercial flight instructors. We note that the FAA has written to all industry sponsors of FAA-approved flight instructor refresher courses with reference to incorporation of the flight training syllabus from the "General Aviation Pilot Stall/Spin Awareness Training Study" in their training clinics. We also note that stall/spin information has been incorporated in the FAA Examiner Standardization Section. We feel that FAA's action in response to this recommendation together with the FAA's remedial actions following our many other stall/spin recommendations will help to reduce the frequency of these accidents. The status of recommendation A-78-44 is now being classified as "Closed--- Acceptable Action."

Sincerely yours,

A handwritten signature in black ink that reads "James B. King". The signature is stylized and written over a large, loopy flourish that extends below the name.

James B. King
Chairman

187/188

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

June 18, 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 (FAA) actions with respect to National Transportation Safety Board Safety Recommendation A-78-44 have been completed.

A-78-44. Send the detailed stall/spin ground and flight training syllabus developed in this training study to all certificated flight schools and commercial flight instructors.

Comment. A letter expressing the FAA concern in several areas of aviation operations was sent to all industry sponsors of FAA approved flight instructor refresher courses. This letter includes reference to and recommendations for use of the "General Aviation Pilot Stall/Spin Awareness Training Study," (copy enclosed).

In addition, the FAA Examiner Standardization Section has incorporated stall/spin information into the standardized training course.

We believe that the above actions are the most feasible methods of disseminating the information and meet the intent of the recommendation.

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

September 1, 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-78-43 and 44.

A-78-43. Incorporate all of the essential elements of the ground and flight training increments developed in the "General Aviation Pilot Stall Awareness Training Study," or their equivalent, in FAR Parts 61 and 141.

Comment. We believe that certain elements contained in the "General Aviation Pilot Stall Awareness Training Study" should be surveyed for possible incorporation into the sections of FAR Parts 61 and 141 which deal with training in stall awareness and recovery. Action is currently underway to identify relevant elements and incorporate them into regulatory proposals for upgrading pilot training standards. We expect to complete this survey by March 1979. If the results of this survey indicate rulemaking is appropriate, regulatory projects will be established and assigned priorities.

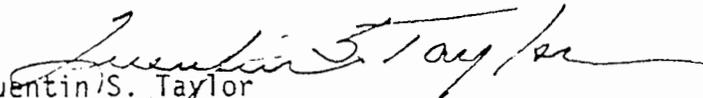
A-78-44. Send the detailed stall/spin ground and flight training syllabus developed in this training study to all certificated flight schools and commercial flight instructors.

Comment. While we agree that the "General Aviation Pilot Stall Awareness Training Study" should be widely distributed to persons engaged in the training and certification of pilots, we feel that a direct mailing of the magnitude suggested is not likely to have the desired results.

There are approximately 45,000 certificated flight instructors and over 5,000 pilot schools and other organizations offering pilot training. Many flight instructors do not renew their certificates upon expiration and there is a continuing input of newly-certificated instructors. Therefore, distribution of the complete report at approximately \$10 per copy or even a portion of the report at a lesser price would not be cost effective.

Instead of distribution through a direct mailing, we have investigated the possibility of extracting the stall/spin ground training syllabus developed in the study and providing a wide distribution through other channels. This would include a special printing in the Flight Standards publication (General Aviation News) and dissemination of the material to flight instructors through the flight instructor revalidation clinics and the pilot examiner standardization course. In addition, we are considering a means to utilize this material in certain of our training courses for agency inspectors. We expect to initiate a distribution program by the end of this year.

Sincerely,


Quentin S. Taylor
Deputy Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 7, 1978

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-78-43 and 44

The National Transportation Safety Board is concerned by the continued occurrence of stall/spin accidents in recent years. The accident statistics are alarming and reinforce our belief that positive, innovative action by the Federal Aviation Administration must be taken to alleviate the situation. From 1974 to 1976, there were 723 stall/spin accidents which resulted in 668 fatalities and 246 serious injuries. Many of these accidents could have been prevented if FAA had implemented past Safety Board recommendations relating to stall/spin problems.

When it recognized that directed remedial measures were imperative to reduce stall/spin accidents, particularly in view of the growing general aviation fleet, the Safety Board conducted a special study of these types of accidents.^{1/} As a result, the Safety Board made nine recommendations to FAA. Several of these dealt with improved and supplemental pilot training which the Board considered essential in preventing stall/spin accidents. In response, the FAA contracted for a related study entitled, "General Aviation Pilot Stall Awareness Training Study." The objective of this study was to determine the weaknesses of current flight training syllabi, the methods of training used, and the flight instruction provided in the stall/spin area; to conceive an experimental stall/spin increment to an established flight and ground training syllabus; and to conduct flight and ground test evaluations of this syllabus change and the flight instruction techniques required. The study concluded that:

- o Additional ground training in the subject of stalls and spins tends to reduce the occurrence of unintentional stalls and spins.

^{1/} NTSB-AAS-72-8, Special Study: General Aviation Stall/Spin Accidents 1967-1969, September 13, 1972.

o Additional flight training on stall awareness or intentional spin training, or both, has a positive influence toward reducing inadvertent stalls and spins.

o The most effective additional training was slow flight with realistic distractions, which exposed the subjects to situations where they are likely to experience inadvertent stalls.

The flight training syllabus given to flight instructors participating in the above study included scenarios of typical flight situations where stall/spin accidents frequently occur such as engine failure on takeoff or initial climb, go-around with full noseup trim, and cross controlled turns to final approach. The syllabus also included stall avoidance practice at minimum controllable airspeed, spin avoidance practice (rudder effectiveness in delayed stalls), and full spin training.

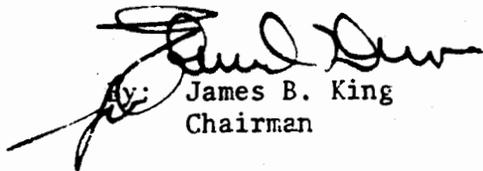
The Safety Board believes that the supplemental, uniquely oriented training developed and outlined in this study can be effective in avoiding stall/spin accidents. However, the Board is aware of no effort or plans on the part of FAA to implement the results of this study through the pilot training requirements contained in 14 CFR Parts 61 and 141.

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

Incorporate all of the essential elements of the ground and flight training increments developed in the "General Aviation Pilot Stall Awareness Training Study," or their equivalent, in FAR Parts 61 and 141. (Class I, Urgent Action) (A-78-43)

Send the detailed stall/spin ground and flight training syllabus developed in this training study to all certificated flight schools and commercial flight instructors. (Class I, Urgent Action) (A-78-44)

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

November 4, 1980

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

Dear Mr. Chairman:

This is in response to your letter of July 21, 1980, requesting an updated status of Safety Recommendations A-79-9 and A-79-10. These recommendations were issued as a result of the May 8, 1978, National Airlines B-727 crash into Escambia Bay. This status report supplements our letter of June 14, 1979.

A-79-9. Revise Air Traffic Control Handbook 7110.65, paragraph 1190, to require controllers to provide recommended altitudes to pilots on airport surveillance radar (ASR) approaches without pilot request. Revise the Airman's Information Manual, Pilot/Controller Glossary, and other operating and training documents that describe ASR approaches to reflect the revised controller procedures.

A-79-10. Develop, with industry, requirements for depicting final approach fixes and minimum altitudes for each mile on final approaches on ASR instrument approach procedures.

Comment. The NTSB Safety Recommendations for mandatory altitude callouts during ASR approaches have been studied by a panel of representatives from various technical disciplines within FAA, with background human factors analysis and research work performed by the Engineering and Development field office at NASA Ames. A determination has been made that an insignificantly small number of accidents or incidents occurred during ASR approaches as opposed to all other data base reports (9 out of approximately 18,000 in the NASA ASRS data base). In the judgment of the panel, the inclusion of mandatory callouts probably would not have had a positive impact on the pilot error involved. The panel concluded that no change to the current procedures is warranted by recent accident data or the interviews of controllers and pilots conducted as part of this effort. We,

therefore, consider these tasks completed and a final report is in preparation at the NASA Ames FAA field office. We will provide a copy of this final report to the Board when available. With the issuance of this report, FAA considers action of Safety Recommendations A-79-9 and -10 completed.

Sincerely,

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

Langhorne Bond
Administrator



Office of
Chairman

National Transportation Safety Board

Washington, D.C. 20594

July 21, 1980

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

Dear Mr. Bond:

Reference is made to your letter dated June 14, 1979, responding to National Transportation Safety Board Safety Recommendations A-79-9 and A-79-10. These recommendations stemmed from the National Airlines B-727 crash into Escambia Bay, on May 8, 1978. Your letter indicated that the Federal Aviation Administration's final decision on these recommendations would be contingent on further study.

In order to evaluate the progress of these recommendations and update the public docket, we would appreciate an updated status report. Both recommendations are presently held in an "Open--Acceptable Action" status.

Sincerely yours,



James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

June 14, 1979

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

Dear Mr. Chairman:

NTSB Safety Recommendations A-79-9 and 10 have been considered by the Federal Aviation Administration (FAA). We have preliminarily concluded that, based upon the following, these recommendations should not be adopted, but believe that this decision must be confirmed by a human factors evaluation.

A-79-9. Revise Air Traffic Control Handbook 7110.65, paragraph 1190 to require controllers to provide recommended altitudes to pilots on airport surveillance radar (ASR) approaches without pilot request. Revise the Airman's Information Manual, Pilot/Controller Glossary, and other operating and training documents that describe ASR approaches to reflect the revised controller procedures.

Comment. On February 8, 1977, the FAA issued Proposal AAT-322-77-1, calling for a revision of FAA Handbook 7110.65-1190, "Altitude Information (Surveillance Approaches)." Comments were solicited from industry, FAA regions and headquarters, and from the Controllers' Operations/Procedures Committee (COPCOM). The proposal offered options of deleting paragraph 1190 entirely, requiring recommended altitudes with each ASR approach that is conducted, or leaving the procedures as they were. Although the NTSB was included among those solicited for comments on the proposal, no response was recorded. The overwhelming majority of comments favored leaving the procedures as established in paragraph 1190, calling for the controller to provide recommended altitudes on final approach if the pilot requests such assistance. On October 13, 1977, the FAA made final disposition of the proposal in favor of option 3, "leave the procedures as they are."

In our opinion, nothing in the NTSB Aircraft Accident Report AAR-78-13, the background information furnished by NTSB with Safety Recommendations A-79-9 and 10, or information obtained by FAA concerning the National Airlines May 1978 crash into Escambia Bay, suggests an essential need to

change these procedures, since we do not agree that "no critical altitude information" was available to the crew of N4744NA, nor that controller-recommended altitudes would likely have altered the outcome any more than did the visual cues and aural alarms that were available to the pilot. Accident Report AAR-78-B indicates that the ground proximity warning system (GPWS) was disregarded and then disconnected because "the loudness of the aural warning made verbal communications between crewmembers difficult." The minimum descent altitude (the critical altitude) was provided to the pilot along with position advisories during the approach.

This is essentially the same information (except position advisories) available in other nonprecision approaches, such as the VOR/DME referenced in the NTSB Safety Recommendation. VOR/DME approach charts do not usually provide recommended altitudes for each mile of the final approach.

The pilot on an ASR approach is authorized to descend to the MDA at his/her discretion (unless an altitude limiting stepdown fix exists) within aircraft operating specifications for a safe rate of descent. The pilot is not required to adjust his/her rate of descent to match the recommended altitudes that are furnished by the controller each mile on final. Accordingly, most user responses to our proposal for mandating altitudes (airline and general aviation included) indicated that the added communications of recommended altitudes are generally unwanted and unnecessary for normal usage.

Recommended altitudes provided by controllers upon a pilot's request are not minimum safe altitudes as implied in the NTSB recommendation. The recommended altitudes represent a descent gradient based on the altitude that must be lost in a prescribed distance during the approach. We are aware of at least one case wherein it was alleged that the accident was caused by the issuance of an admittedly erroneous altitude, resulting in a missed approach attempt and resultant accident. Also, it would delay the transition to an altitude at or above the MDA where actual visual conditions exist. Thus, it is possible that other accident causing conditions could be introduced by the recommendation for change.

A-79-10. Develop, with industry, requirements for depicting final approach fixes and minimum altitudes for each mile on final approaches on ASR instrument approach procedures.

Comment. This recommended action was considered in conjunction with FAA's Proposal AAT-322-77-1, issued in February 1977. The consensus was to leave the procedures unchanged, and no new data has surfaced to change these findings.

Pilots are aware that airport surveillance radar procedures now provide for recommended altitudes each mile on final approach, if requested. Published tabular information and the controller instructions provide the pilot the guidance necessary to safely fly the airport surveillance radar (ASR) approach. The use of a graphic presentation could delay a pilot's transition to a suitable backup approach in the event of radar or communication failure.

While we believe that existing ASR procedures are safe and effective if followed by both the pilot and the controller, it is our intention to initiate a study to develop information from which an analysis, considering human factor concerns, can be made. If Board personnel have information or views which might be of assistance in this regard they should contact Mr. Harlan Hosler, Office of Aviation Safety.

Sincerely,



Langhorne Bond
Administrator

Enclosure:
FAA Proposal AAT-322-77-1

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: March 16, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)
A-79-9 and -10

On May 8, 1978, a National Airlines B-727 crashed into Escambia Bay while executing an airport surveillance radar (ASR) approach to runway 25 at Pensacola Regional Airport. The National Transportation Safety Board determined that the probable cause of this accident was the flightcrew's unprofessionally conducted nonprecision instrument approach, in that the captain and the crew failed to monitor the descent rate and altitude, and the first officer failed to provide the captain with the required altitude and approach performance callouts.

The Safety Board believes that this accident illustrates a lack of redundancy between flightcrews and air traffic controllers with respect to altitude management. The current ASR procedures in FAA's Air Traffic Control Handbook 7110.65, paragraph 1194, Final Approach Guidance, require controllers to inform flightcrews of aircraft distance from the runway, airport, or missed approach point at each mile on final approach. Paragraph 1190 requires controllers to provide recommended altitudes on final approach only if pilots request them, and the National crew did not request them. If both elements of aircraft position and recommended altitude information are provided, routinely and without request, flightcrews can compare their actual altitude for each mile on final with the recommended minimum altitude. These comparisons will allow the flightcrew to assess the need to correct rate of descent and airspeed. Most importantly, the flightcrew would be made aware of gross excursions from minimum safe altitudes by the controller's distance and recommended altitude advisories.

The Safety Board reviewed the Airman's Information Manual (AIM), "Basic Flight Information and ATC Procedures," and noted in the discussion of Pilot/Controller Roles and Responsibilities the following:

"In order to maintain a safe and efficient air traffic system, it is necessary that each party fulfill his responsibilities to the fullest.

"The responsibilities of the pilot and the controller intentionally overlap in many areas providing a degree of redundancy. Should one or the other fail in any manner, this overlapping responsibility is expected to compensate, in many cases, for failures that may affect safety."

The controller procedures specified for an ASR approach in the AIM, and the Pilot/Controller Glossary are consistent with the controller's Handbook, except that they do not recommend that pilots request altitudes on final approach. A lack of guidance to pilots in this area is not consistent with the philosophy put forth in the Roles and Responsibilities discussion.

The Pensacola ASR approach plate did not, nor was it required to, depict or tabulate the location of the final approach fix and those minimum altitudes known to the controller for each mile on final approach. Therefore, there was no critical altitude information available to the crew to periodically and independently determine the stability of their approach when the controller advised the crew of their position on final.

By mandating controllers to provide altitudes and distance advisories, pilots would associate ASR approaches with the more common VOR/DME approach procedures, which provide both distance and minimum altitude information on approach plates.

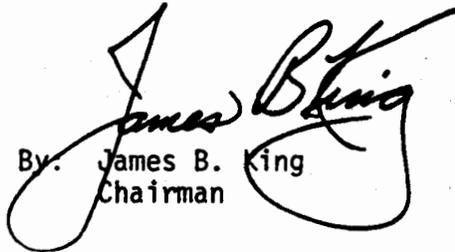
The Board is aware that the FAA did request industry views of paragraph 1190, Altitude Information, 15 months before the Escambia Bay accident and that most respondents elected to retain the current procedures. In light of the Escambia Bay accident and the infrequent use of ASR approaches, the Safety Board believes that controllers should provide altitude information on ASR approaches as a standard practice.

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

Revise Air Traffic Control Handbook 7110.65, paragraph 1190 to require controllers to provide recommended altitudes to pilots on airport surveillance radar (ASR) approaches without pilot request. Revise the Airman's Information Manual, Pilot/Controller Glossary, and other operating and training documents that describe ASR approaches to reflect the revised controller procedures. (Class II - Priority Action) (A-79-9)

Develop, with industry, requirements for depicting final approach fixes and minimum altitudes for each mile on final approaches on ASR instrument approach procedures. (Class II - Priority Action) (A-79-10)

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


By: James B. King
Chairman



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

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

Dear Mr. Bond:

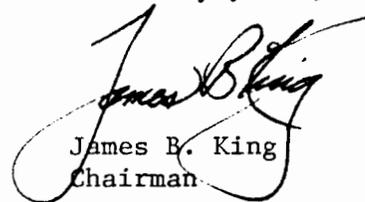
Thank you for your letter of November 4, 1980, responding to National Transportation Safety Board Safety Recommendations A-79-25 and -26 issued April 19, 1979. These two recommendations emanated from the New York Airways, Inc., Sikorsky S61L helicopter accident at Newark International Airport, on April 18, 1979.

In A-79-25, we recommended that the Federal Aviation Administration (FAA) withdraw the airworthiness certificates of Sikorsky S61L helicopters until a means of detecting potential tail rotor blade failures can be devised and implemented.

Since we are now informed that the crack propagation time is 31 hours, and since the inspection interval of 6 hours provides for a safety factor greater than 5, the status of A-79-25 is classified in a "Closed--Acceptable Action" status.

In our letter of May 29, 1979, we informed you that companion recommendation A-79-26 had been classified in a "Closed--Acceptable Action" status.

Sincerely yours,



James B. King
Chairman



OFFICE OF
THE ADMINISTRATOR

November 4, 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-79-25 and A-79-26 issued April 19, 1979, and supplements our letter of May 3, 1979. Safety Board Recommendations A-79-25 and A-79-26 stemmed from the New York Airways, Inc., Sikorsky S61L helicopter accident at Newark International Airport, on April 18, 1979.

A-79-25. Withdraw the airworthiness certificates of Sikorsky S61 helicopters until a means of detecting potential tail rotor blade failures can be devised and implemented.

A-79-26. Notify foreign operators of Sikorsky S61 aircraft of this action.

In regard to A-79-25, the Safety Board agreed that the FAA's telegraphic airworthiness directive of April 20, 1979, provided a satisfactory inspection procedure. However, there still remained some question as to whether the 6-hour ultrasonic inspection interval for blades having over 1200 hours operating time was satisfactory. If results indicated less than 6 hours of propagation time to failure, a requirement to decrease the inspection interval would be necessary. Consequently, this recommendation has been held in an "Open--Acceptable Action" status. The FAA agreed to keep the Board apprised of the results of the fatigue striation count, which was accomplished at the United Technology Research Laboratory, East Hartford, Connecticut.

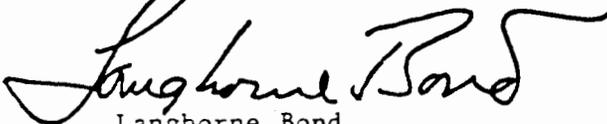
The most recent data submitted to us by Sikorsky to substantiate the Sikorsky S61 tail rotor inspections is a report on their fatigue test program to determine crack propagation time. These full-scale fatigue tests were correlated with the detection of the crack initiation by the ultrasonic inspection methods of the Sikorsky Service Bulletin and the airworthiness directive now in effect for S61 helicopters in service. We consider this report to be a more accurate determination of the crack propagation time than the striation counting method.

Based on this full-scale fatigue testing and analysis, the crack propagation time is 31 hours. This is the time from detection of the crack with the ultrasonic inspection used in the field to spar separation. The present inspection interval of 6 hours, therefore, has a factor of safety slightly greater than 5. This provides for five inspections before failure could occur based on the existing AD. The results of these tests are documented in Sikorsky Report No. SER 61740, "S61 Honeycomb Tail Rotor Blade Crack Propagation Test Results" dated April 1, 1980.

The FAA believes this analysis reflects conservative results and, accordingly, we consider action on Recommendation A-79-25 completed.

Regarding Recommendation A-79-26, the Board accepted FAA's notification procedures taken in accordance with ICAO, Annex 8, Paragraph 4, and this recommendation is now classified in the "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



National Transportation Safety Board

Washington, D.C. 20591

May 29, 1979

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

Dear Mr. Bond:

Reference is made to the Federal Aviation Administration's (FAA) letter of May 3, 1979, responding to National Transportation Safety Board recommendations A-79-25 and A-79-26. These two recommendations stemmed from the New York Airways, Inc., Sikorsky S61L helicopter accident at Newark International Airport, on April 18, 1979. In A-79-25, the Safety Board recommended that the FAA withdraw the airworthiness certificates of Sikorsky S61L helicopters until a means of detecting potential tail rotor blade failures can be devised and implemented. In A-79-26, we recommended that the FAA notify foreign operators of Sikorsky S61 aircraft of this action.

In regard to the FAA's response to A-79-25, the Safety Board is of the view that the FAA's telegraphic airworthiness directive of April 20, 1979, provides a satisfactory inspection procedure for (1) establishing tail rotor gear box housing lug integrity and (2) locating cracks in the rotary rudder blade skins and/or identifying water entrapment inside the blades. However, only the results of fatigue striation count on the blade spar fracture surface will determine whether the 6-hour ultrasonic inspection interval for blades having over 1200 hours operating time is satisfactory. If results indicate less than 6 hours of propagation time to failure, a requirement to decrease the inspection interval will be necessary. For the present, we are maintaining this recommendation in an "Open--Acceptable Action" status. We would appreciate being kept apprised of the results of the fatigue striation count, which is being accomplished at the United Technology Research Laboratory, E. Hartford, Connecticut.

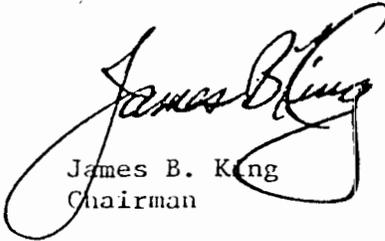
Regarding FAA's response to recommendation A-79-26, we are satisfied that the notification procedures taken in accordance with ICAO, Annex 8,

Honorable Langhorne Bond

- 2 -

paragraph 4, will fulfill the intent of this recommendation, which is now classified in the "Closed--Acceptable Action" status.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "James B. King". The signature is written in black ink and is positioned above the typed name and title.

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

May 3, 1979

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

Dear Mr. Chairman:

This is in response to National Transportation Safety Board Safety Recommendations A-79-25 and 26.

A-79-25. Withdraw the airworthiness certificates of Sikorsky S61 helicopters until a means of detecting potential tail rotor blade failures can be devised and implemented.

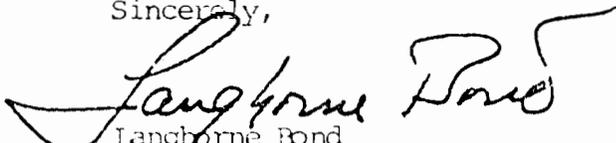
Comment. The Federal Aviation Administration (FAA) issued a telegraphic airworthiness directive (AD) on April 20. This AD requires a dye penetrant inspection of the inboard 32-inch section of the tail rotor blades prior to further flight and daily not to exceed 6 hours time in service. It also requires visual and ultrasonic inspections for those blades with more than 1200 hours time in service. In addition, a one-time dye penetrant inspection of the tail rotor gear box mounting feet is required.

A-79-26. Notify foreign operators of Sikorsky S61 aircraft of this action.

Comment. All ADs are distributed to the Civil Aviation Authority in each country which has notified the FAA of its registration of a particular type of aircraft. This is done in accordance with the ICAO Annex 8, paragraph 4, "Continuing Airworthiness of Aircraft." In addition, distribution is also made to countries with which the United States has specific bilateral agreements.

Copies of the AD, Manufacturer's Service Bulletins, and ICAO procedures are enclosed.

Sincerely,


Langhorne Bond
Administrator

4 Enclosures

213/214

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: APR 19 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)
A-79-25 and A-79-26

New York Airways, Inc., Flight 972, a Sikorsky S61L helicopter with 15 passengers and a crew of 3 crashed on Newark International Airport at 1825 on April 18, 1979, shortly after takeoff. Three passengers were killed, 9 others and the crewmembers were injured.

Preliminary evidence obtained in the National Transportation Safety Board's investigation disclosed that a 35-inch outboard section of one of the tail rotor blades separated in flight. It appears that the resultant unbalance caused a massive failure in the tail rotor gear box. The gearbox and the remainder of the tail rotor assembly separated before the aircraft could effect a safe landing.

The failed tail rotor blade was examined in the Safety Board's metallurgical laboratory. This preliminary examination disclosed a fatigue crack through approximately 90 percent of the leading edge spar. The aluminum skin covering the spar also exhibited a fatigue crack extending from the leading edge approximately 2 inches. This crack may not have been detectable by visual examination prior to flight.

The Safety Board believes that the serious consequences of this failure and the potential for other accidents justifies the need for immediate Federal Aviation Administration action. Pending more detailed investigative examination, establishment and implementation of suitable corrective actions, the Safety Board believes that further flight operations with the S61 aircraft should be suspended.

Honorable Langhorne M. Bond

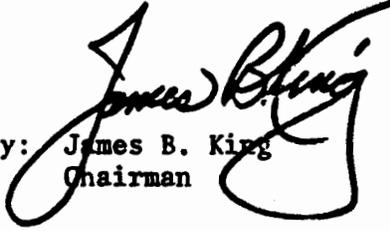
- 2 -

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

Withdraw the airworthiness certificates of Sikorsky S61 helicopters until a means of detecting potential tail rotor blade failures can be devised and implemented. (Class I--Urgent Action) (A-79-25)

Notify foreign operators of Sikorsky S61 aircraft of this action. (Class I--Urgent Action) (A-79-26)

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 30, 1980

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

Dear Mr. Chairman:

This is in response to your letter of July 9, 1980, requesting an updated status of Safety Recommendations A-79-62 through A-79-65. These recommendations were issued as a result of the December 28, 1978, United Airlines DC-8 accident at Portland, Oregon. This status report supplements our letter of November 23, 1979.

A-79-62. Issue an Air Carrier Maintenance Bulletin clarifying the content of 14 CFR 25.811(d) regarding the conspicuity of passenger emergency exit signs when exits are open and the requirement for exit signs to be relocated in aircraft which have signs affixed on the exit closure.

Comment. The Federal Aviation Administration (FAA) concurs in the intent of Safety Recommendation A-79-62 and, as an alternative action, has directed a letter dated September 11, 1980, to all Regional Flight Standards Division Chiefs. This letter advised each region that certain DC-8 and DC-9 series aircraft, operated by various airlines, have floor level emergency exit identifying signs located on the doors rather than next to the exits.

The FAA regions have been advised the correct interpretation of 14 CFR 121.310 (b)(1)(ii) and 14 CFR 25.811 (d)(2) requires that the exit signs must be next to the exit and not on the door. The preambles of Section 121.310, Amendment 121.2, effective June 7, 1965; Amendment 121-30, effective October 24, 1967; and Section 25.811, Amendment 25-15, effective October 24, 1967; confirm the intent and requirement of the rule. These documents state that the exit signs be next to or above each passenger exit for those aircraft type certificated under Civil Air Regulations (CAR) Part 4b and Federal Aviation Regulations (FAR) Part 25 or operated pursuant to FAR Part 121.

The regional principal airworthiness inspectors assigned to DC-8/9 operators were requested to verify that each floor level emergency exit marking is located next to each exit. Those operators with aircraft that do not comply must be advised of the regulatory requirements. It was also requested that all other aircraft be inspected to assure compliance with the requirements. A copy of the September 11, 1980, letter to Regional Flight Standards Division Chiefs is enclosed for your information.

We believe this alternate action satisfies the intent of Safety Recommendation A-79-62.

A-79-63. Expedite research with a view toward early rulemaking on a means to most effectively restrain infants and small children during in-flight upsets and survivable crash landings.

Comment. The FAA concurs in Safety Recommendation A-79-63 and published in the October 2, 1980, issue of the Federal Register, a request for comment on a draft technical standard order (TSO). The draft TSO-C100 prescribes the minimum performance standard that child restraint systems must meet in order to be identified with the TSO marking "TSO-C100." The comment period on TSO-C100 closes January 2, 1981. A copy of the request for comment is enclosed for your information.

A-79-64. Expedite the release of Operations Review Program Notice No. 13 containing the Safety Board's 1974 recommendation regarding a power source for public address systems independent of the main aircraft power supply in passenger-carrying aircraft.

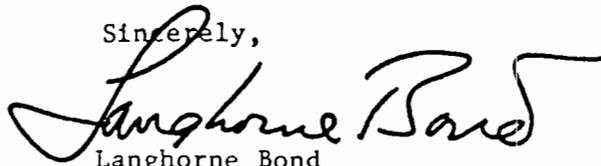
Comment. The FAA concurs in Safety Recommendation A-79-64 and the Board's 1974 recommendation, regarding a power source for public address systems independent of the main power supply in passenger-carrying aircraft, which is now contained in Operations Review Program Notice No. 11. It was moved from Notice No. 13 to Notice No. 11 to expedite its issuance. The notice of proposed rule making for Notice No. 11 is currently in final drafting coordination and issuance is expected during December 1980.

A-79-65. Include in the anticipated new rule a requirement for domestic and flag air carriers to maintain passenger lists with the proviso that both ticketed and nonticketed passengers' names be provided.

Comment. The FAA concurs in Safety Recommendation A-79-65 and the final rule on Operations Review Amendment No. 8, Proposal 8-19, was published in the Federal Register on June 19, 1980. FAR Part 121, Subsection 121.693(e) was changed, effective August 31, 1980, and requires the names of all passengers be maintained by the air carrier or commercial operator. A copy of Operations Review Program Amendment No. 8, final rule on Proposal 8-19, is enclosed for your information.

The FAA considers action completed on Safety Recommendations A-79-62 through A-79-65.

Sincerely,


Langhorne Bond
Administrator

Enclosures

**National Transportation
Safety Board**

July 9, 1980

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

Dear Mr. Bond:

Reference is made to the National Transportation Safety Board Safety Recommendations A-79-62 through A-79-65 issued August 24, 1979. These recommendations pertained to crash survival and stemmed from the Safety Board's investigation of the United Airlines DC-8 accident at Portland, Oregon, on December 28, 1978. The Federal Aviation Administration's response of November 23, 1979, indicated actions underway to resolve these recommendations. In order to evaluate their progress and update the public docket, we would appreciate an updated status report.

Sincerely yours,



James B. King
Chairman



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

January 4, 1980

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

Dear Mr. Bond:

Thank you for your letter of November 23, 1979, responding to safety recommendations A-79-62 through A-79-66. These recommendations stemmed from the National Transportation Safety Board's investigation of the United Airlines DC-8 accident at Portland, Oregon, on December 28, 1978. Our comments to the Federal Aviation Administration's (FAA) responses are as follows:

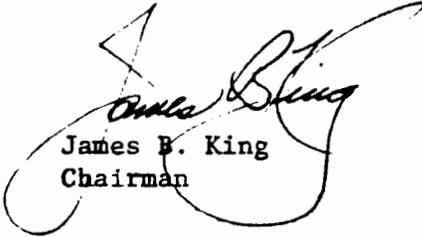
Recommendations A-79-62 through A-79-65

The Safety Board appreciates the ongoing efforts of the FAA to satisfy the intent of these recommendations. In the meantime, they will be classified in an "Open--Acceptable Action" status.

Recommendation A-79-66

The Safety Board is pleased that the FAA expedited the issuance of Operations Bulletin No. 8-79-3 which emphasizes the benefits of special training in flight resource management. The Bulletin fulfills the intent of the recommendation. The status of A-79-66 is now classified as "Closed--Acceptable Action."

Sincerely yours,


James B. King
Chairman



OFFICE OF
THE ADMINISTRATOR

November 23, 1979

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendations A-79-62 through 66.

A-79-62. Issue an Air Carrier Maintenance Bulletin clarifying the content of 14 CFR 25.811(d) regarding the conspicuity of passenger emergency exit signs when exits are open and the requirement for exit signs to be relocated in aircraft which have signs affixed on the exit closure.

Comment. The Federal Aviation Administration's (FAA) regions responsible for type certification of air carrier aircraft are currently reviewing compliance with 14 CFR 25.811(d) regarding locations of passenger emergency exit signs. If an Air Carrier Maintenance Bulletin is deemed appropriate, we shall issue one. We will advise the Board of our final actions in response to this recommendation.

A-79-63. Expedite research with a view toward early rulemaking on a means to most effectively restrain infants and small children during in-flight upsets and survivable crash landings.

Comment. An FAA task force was established early in 1979 to develop the options available regarding agency actions needed to permit the manufacture and use of effective aircraft child restraint systems. The proposed standards covering child restraint systems are scheduled for issuance early in 1980.

A-79-64. Expedite the release of Operations Review Program Notice No. 13 containing the Safety Board's 1974 recommendation regarding a power source for public address systems independent of the main aircraft power supply in passenger-carrying aircraft.

Comment. The Board's 1974 recommendation regarding a power source for public address systems independent of the main power supply in passenger-carrying aircraft is now contained in Operations Review Program Notice No. 11. This Notice of Proposed Rule Making should be issued during December 1979.

A-79-65. Include in the anticipated new rule a requirement for domestic and flag air carriers to maintain passenger lists with the proviso that both ticketed and nonticketed passengers' names be provided.

Comment. A resolution of the issues supporting this recommendation is anticipated as the result of the issuance of Operations Review Amendment No. 8 in the near future.

A-79-66. Issue an Air Carrier Operations Bulletin which will provide guidance and criteria to FAA Inspectors in determining the scope, quality, and effectiveness of training programs with respect to communication and coordination among crewmembers.

Comment. An Air Carrier Operations Bulletin has been prepared and is presently in final coordination. It should be printed and distributed by the end of this year.

Sincerely,



Langhorne Bond
Administrator

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 24, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-62 through 66

During the Safety Board's investigation of the United Air Lines DC-8 accident at Portland, Oregon, on December 28, 1978, 1/ several problems were discovered which affected adversely the survivability of the aircraft occupants. The Board believes that these problems are not limited to this particular air carrier or to this particular aircraft; thus they may affect persons involved in future accidents.

Exits

Passengers probably opened all of the four overwing exits. The exit markings for these exits were affixed to the exit hatches. Federal Aviation Regulations (14 CFR 25.811) specify that exit markings must be recognizable from a distance equal to the width of the cabin; be visible to occupants approaching along the main passenger aisle(s); and be conspicuously marked. Although the intent of this regulation may have been met when the overwing exit hatches were in place, the opened exits were no longer marked after the hatches were removed and placed on the floor. Fortunately, the cabin emergency lighting system reportedly provided adequate illumination and there was no smoke inside the cabin to interfere with vision. However, had there been a failure of the cabin emergency light or had smoke been present, the occupants might have experienced difficulties in locating these four opened exits. The Safety Board believes that all cabin exit signs must be visible whether the exits are opened or closed.

Child Restraint

Among the 181 passengers and 8 crewmembers aboard this aircraft, there were 6 "infants-in-arms" (24 months or younger) and 6 children

1/ For more detailed information read "Aircraft Accident Report -- United Air Lines, Inc., N80820, Portland, Oregon, December 28, 1978, NTSB-AAR-79-7, June 7, 1979."

ranging in age from 25 months to 8 years. Two crewmembers and eight passengers, including two infants and one child, located in the forward portion of the aircraft were killed at impact.

The two fatally injured infants and the child probably would not have survived the accident regardless of the means of restraint because they were located in the destroyed section of the aircraft. However, one infant who was located in the forward left cabin was ejected during the crash and miraculously escaped injury. We know of no injuries to any of the remaining infants and small children on this aircraft. Nevertheless, the lack of adequate restraint for infants and small children on passenger-carrying aircraft is of great concern to the Board.

The Safety Board is encouraged to learn that the FAA is examining methods to restrain infants and children in order to prevent or to minimize injuries in survivable accidents. The recently issued report by the FAA's Civil Aeromedical Institute ^{2/} on the inadvisability of using automotive infant seats in aircraft vividly illustrates that much work remains to be done to develop a practical method of protecting infants and small children in survivable accidents. The Safety Board urges close cooperation between the FAA, the aviation and auto industries, and other Federal agencies in developing an effective, economical, integrated restraint system which will be compatible for use in surface vehicles as well as in aircraft.

Public Address System

There was no preimpact warning given to the passengers via the aircraft's public address system. Just before the aircraft struck the ground, the senior flight attendant was seen talking into the handset and then seen saying words to the effect that there was no power. Fortunately, other flight attendants looked outside and noted the airplane's proximity to the ground; they shouted to the passengers to assume the preimpact brace positions. However, it is not known whether all passengers heard these warnings.

The Safety Board's special study "Safety Aspects of Emergency Evacuations from Air Carrier Aircraft" dated November 13, 1974 (NTSB-AAS-74-3) contained a recommendation (A-74-111) to the FAA that the public address system be capable of operating on a power source independent of the main aircraft power supply.

^{2/} FAA AM-78-12 "Child Restraint Systems for Civil Aircraft," R. F. Chandler and E. M. Trout, Civil Aeromedical Institute, Federal Aviation Administration, Oklahoma City, Oklahoma, March 1978.

On September 11, 1975, the FAA, in NPRM 75-31, proposed to amend 14 CFR 121.318 to require after a certain date that public address systems be capable of being operated from a power supply independent of the main aircraft power supply. However, this proposed rule change was withdrawn, and it subsequently was submitted as proposal No. 452 in the FAA's Biennial Operational Review Program Notice No. 13 which solicited comments on proposed changes to 14 CFR 121.318. It is not known what form these proposed rules will take nor if the intent of the Safety Board's 1974 A-74-111 recommendation will be followed. The Safety Board urges early release of this Notice so that a suitable rule may be implemented as soon as possible.

Passenger Manifest

Just before the accident the flightcrew, on three separate occasions, discussed the total number of persons on board in response to queries from Portland Approach. The numbers that were discussed and those that were relayed to the ground were incorrect.

It was not until several days after the accident that the total number of passengers was known and a list of passenger names was made available. One problem which contributed to the delay was that infants were not considered as ticketed passengers and were not included in the passenger count. This same problem of determining the total number of passengers on board was also experienced following the American Airlines DC-10 accident at Chicago, Illinois, on May 25, 1979. The Safety Board believes that it is vital that fire/rescue personnel be provided with an accurate number of persons on board the aircraft so that their search for survivors will be timely.

The Safety Board notes that 14 CFR 249.13(e)(2) of the Civil Aeronautics Board's rules specifies that passenger lists shall be preserved by air carriers for a set period of time. Since these lists are required to be maintained, the Board believes that air carriers must make every effort to assure that they are accurate, whether or not the passenger is ticketed.

Our staff has learned that the FAA will soon issue a rule to require domestic and flag air carriers to maintain passenger lists like those currently required of supplemental air carriers and commercial operators by 14 CFR 121.693. We believe that the FAA and the Air Transport Association should jointly examine methods to develop a system that can be used by air carriers to record accurately the number of ticketed and nonticketed passengers onboard their aircraft and further, to develop a means to provide those numbers to fire/rescue personnel as expeditiously as possible following an accident.

Crew Coordination

The Safety Board determined that the landing gear malfunctioned about 1712 P.s.t. The surviving flight attendants recounted that shortly after the malfunction they began to review on their own initiative emergency procedures contained in their manuals. More than 1/2 hour later, at about 1745, the captain and the senior flight attendant discussed preparing the cabin and passengers for a possible emergency evacuation at Portland International Airport. Shortly thereafter, the captain requested via the public address system that the passengers pay attention to the flight attendants' instructions. About 1757, the second officer visited the cabin for a second time (he had done so earlier to observe the landing gear indicators in each wing). He returned to the cockpit about 1801 and informed the captain that the cabin preparations would be completed in 2 or 3 minutes. About 1803, the captain informed Portland Approach Control that they would be ready in 3 to 5 minutes; about 1806, the senior flight attendant came to the cockpit and told the captain, "Well, I think we're ready." Almost simultaneous with this comment the second officer said, "I think you just lost number four engine." The accident occurred about 1815. Thus, more than 20 minutes elapsed between the time that the captain discussed with the senior flight attendant preparations for the landing and the time he was informed that the preparations were completed.

The captain testified that he did not specify to the senior flight attendant a time when the prelanding preparations had to be completed, nor did he ask her how long the preparations would take. He said he thought that the preparations would take from 10 to 15 minutes and that some of the procedures could be completed during the aircraft's final approach to the airport. The senior flight attendant did not ask the captain how much time remained to complete the preparations. These omissions by the captain and the senior flight attendant were contrary to procedures contained in the flightcrew and flight attendant manuals.

The subject of communication and coordination between cockpit and cabin crews has been discussed by the Safety Board in previous accident reports. 3/ A recent FAA report also cites the lack of

3/ Aircraft Accident Reports:

"Overseas National Airlines, Inc., DC-9, St. Croix, Virgin Islands, May 2, 1970" (NTSB-AAR-71-8).

"Jugoslovenski Aerotransport (JAT), B-707, New York, New York, August 13, 1972" (NTSB-AAR-73-7).

"Overseas National Airlines, Inc., DC-8, Bangor, Maine, June 20, 1973" (NTSB-AAR-74-1).

"Continental Air Lines, Inc., B-727, Denver, Colorado, August 7, 1975" (NTSB-AAR-76-14). (Cont'd on P. 5)

communications and coordination as a problem during emergencies. 4/

The Safety Board on June 9, 1976, recommended (A-76-74) that the FAA issue an Air Carrier Operations Bulletin to require Principal Operations Inspectors to review emergency evacuation programs to insure that adequate emphasis is placed on crew coordination, team effort, and awareness of individuals' responsibilities as leaders of an evacuation. An Operations Notice was issued on October 1, 1976, which directed that training programs be surveyed and deficiencies corrected; this Notice was canceled on April 1, 1977. In view of the deficiencies uncovered in this accident, the Board believes that the necessity for each crewmember to understand unequivocally his/her mutually supportive role during emergencies is not being emphasized strongly in training. The Board believes that the FAA should issue an Air Carrier Operations Bulletin on this subject as was originally recommended in Safety Recommendation A-76-74. Likewise, accidents in which crew coordination and communication were deficient should be discussed by crewmembers during training sessions.

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

Issue an Air Carrier Maintenance Bulletin clarifying the content of 14 CFR 25,811(d) regarding the conspicuity of passenger emergency exit signs when exits are open and the requirement for exit signs to be re-located in aircraft which have signs affixed on the exit closure. (Class II, Priority Action)(A-79-62)

Expedite research with a view toward early rulemaking on a means to most effectively restrain infants and small children during in-flight upsets and survivable crash landings. (Class II, Priority Action)(A-79-63)

3/ (Cont'd)

Special Studies:

"Passenger Survival in Turbojet Ditchings (A Critical Case Review)," April 5, 1972 (NTSB-AAS-72-2).

"In-Flight Safety of Passengers and Flight Attendants Aboard Air Carrier Aircraft," March 15, 1973 (NTSB-AAS-73-1).

"Safety Aspects of Emergency Evacuations from Air Carrier Aircraft," November 13, 1974 (NTSB-AAS-74-3).

4/ D.W. Pollard, "Injuries in Air Transport Emergency Evacuations," Civil Aeromedical Institute, Federal Aviation Administration, Oklahoma City, Oklahoma, February 1979.

Expedite the release of Operations Review Program Notice No. 13 containing the Safety Board's 1974 recommendation regarding a power source for public address systems independent of the main aircraft power supply in passenger-carrying aircraft. (Class II, Priority Action) (A-79-64)

Include in the anticipated new rule a requirement for domestic and flag air carriers to maintain passenger lists with the proviso that both ticketed and nonticketed passengers' names be provided. (Class II, Priority Action) (A-79-65)

Issue an Air Carrier Operations Bulletin which will provide guidance and criteria to FAA Inspectors in determining the scope, quality, and effectiveness of training programs with respect to communication and coordination among crewmembers. (Class II, Priority Action) (A-79-66)

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


By: James B. King
Chairman



Office of
Chairman

National Transportation Safety Board

Washington, D C 20594

NOV 3

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

Dear Mr. Bond:

Thank you for your letter of October 2, 1980, responding further to National Transportation Safety Board Safety Recommendation A-79-75 issued October 2, 1979. We have reviewed Federal Aviation Administration (FAA) measures to inform the aviation community of the hazards associated with flight in white-out conditions. We are satisfied that actions taken and ongoing fulfill the intent of this recommendation which we now classify in a "Closed--Acceptable Action" status.

Sincerely yours,

for 
James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 2, 1980

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

Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendation A-79-75 issued October 2, 1979, and supplements our letter of December 6, 1979.

A-79-75. Initiate action to disseminate additional information to the general aviation community to make it more fully aware of the hazards associated with flight in white-out conditions in Alaska and other regions with similar environmental conditions; and undertake an aggressive educational program to correct apparent misconceptions regarding visual flight rules (VFR) operations in white-out conditions.

Comment. Consistent with our December 6, 1979, response to NTSB Safety Recommendation A-79-75, we have analyzed Federal Aviation Administration (FAA) educational and informational efforts with respect to the "white-out" hazard to flight operations. We have taken other measures in addition to the slide presentation and the "Cold Weather Safety" publication issued by the FAA Alaskan Region which we referred to in our December 6, 1979, letter. Specifically we have instructionally addressed this hazard in FAA Advisory Circular (AC) 60-4, Pilot's Spatial Disorientation, and in AC 91-13C, Cold Weather Operations of Aircraft. The FAA has also periodically published articles in the FAA General Aviation News dealing extensively with this subject. Copies of these publications are enclosed.

The FAA considers action on this recommendation completed.

Sincerely,

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

Langhorne Bond
Administrator

3 Enclosures

233/234



Office of the
Chairman

National Transportation Safety Board

Washington D C 20591

December 17, 1979

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

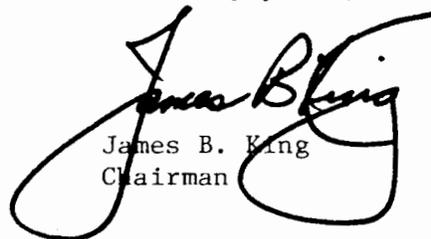
Dear Mr. Bond:

This is to acknowledge the Federal Aviation Administration's (FAA) letter of December 6, 1979, responding to the National Transportation Safety Board's recommendation A-79-75, which was issued as a result of a Cessna 207 accident in Chevak, Alaska, on December 21, 1978.

Recommendation A-79-75 asked FAA to initiate action to disseminate information regarding hazards associated with flight in white-out conditions and to undertake an educational program to correct apparent misconceptions regarding visual flight rule (VFR) operations in such conditions.

The FAA's response, which cited previous efforts regarding the white-out phenomena, indicated that an analysis of educational material and information dealing with this hazard will be conducted by June 1, 1980. Until the analytical results are provided to the Safety Board, the recommendation will be classified as "Open--Acceptable Action."

Sincerely yours,

A handwritten signature in black ink, which appears to read "James B. King". The signature is stylized and fluid, with a large loop at the end.

James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 6, 1979

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

Dear Mr. Chairman:

This is in response to NTSB Safety Recommendation A-79-75.

A-79-75. Initiate action to disseminate additional information to the general aviation community to make it more fully aware of the hazards associated with flight in white-out conditions in Alaska and other regions with similar environmental conditions; and undertake an aggressive educational program to correct apparent misconceptions regarding visual flight rules (VFR) operations in white-out conditions.

Comment. We are aware that the white-out phenomenon is a distinctive hazard to flight conducted in conducive meteorological conditions. The Federal Aviation Administration (FAA) accident prevention program has dealt with the hazard in an educational approach for a number of years. For example, the program includes a slide presentation on the white-out phenomenon, a film titled, "Some Thoughts on Winter Flying," and an excerpt from Chapter 2, Cold Weather Safety, published by the FAA Alaskan Region in January 1969, copies of which are enclosed. However, the FAA will analyze its education and information efforts with respect to the white-out hazard and will advise the Board by June 1, 1980, of actions determined to be appropriate as a result of our analysis and your recommendation.

Sincerely,


Langhorne Bond
Administrator

2 Enclosures

237/238

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

ISSUED: October 2, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-79-75

On December 21, 1978, a Cessna 207, N7378U, crashed while on approach to Chevak, Alaska, resulting in two fatalities and serious injuries to four other persons. Occasional "white-out" conditions near Chevak at the approximate time of the accident were reported by another pilot.

Safety Board accident records indicate that in 27 accidents from 1973 through 1977, white-out was listed as a cause/factor. All of these accidents involved general aviation aircraft.

Our investigations indicate there is a belief prevalent among pilots in Alaska that, based on the prevailing visibility and ceiling, they are "technically" operating in visual meteorological conditions (VMC) while flying in white-out conditions.

A pilot operating in white-out conditions is engulfed in what appears to be a uniformly white glow. Neither clouds, horizon, nor shadows are distinguishable; all sense of depth and orientation is lost; and only very dark, nearby objects can be seen.

In United States weather-observing practice, visibility is defined as the greatest distance in a given direction at which it is possible to see and identify with the unaided eye (a) in the daytime, a prominent dark object against the sky at the horizon, and (b) at night, a known, preferably unfocused, moderately intense light source.

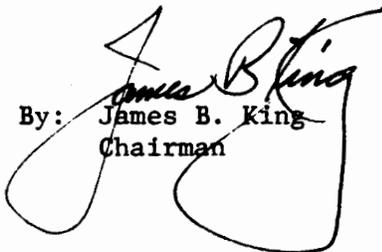
Based on the visibility definition, daytime estimates of visibility are subjective evaluations of atmospheric attenuation of contrast. In white-out conditions this contrast is nonexistent. It is our belief, therefore, that a pilot is not "technically" operating in VMC while flying in white-out conditions.

We note that the Airman's Information Manual, in Chapter 8, Medical Facts for Pilots, cautions against the hazards of reduced or impaired vision. We note also that Advisory Circular AC 91-13B, dated January 17, 1978, advises pilots to be prepared for white-out conditions. Neither publication, however, incorporates a complete discussion of this meteorological phenomenon and its associated hazards which is comparable to the indepth discussion accorded the nature and hazards of thunderstorms as a meteorological phenomenon in Chapter 6 of the Airman's Information Manual. We conclude that more detailed information should be made available to assure that all pilots who fly regularly in Alaska and other regions with similar environmental conditions are fully aware of white-out hazards.

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

Initiate action to disseminate additional information to the general aviation community to make it more fully aware of the hazards associated with flight in white-out conditions in Alaska and other regions with similar environmental conditions; and undertake an aggressive educational program to correct apparent misconceptions regarding visual flight rules (VFR) operations in white-out conditions. (Class II - Priority Action) (A-79-75)

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


By: James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

December 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 further response to NTSB Safety Recommendation A-80-8 issued January 21, 1980, and supplements our letter of April 18, 1980. This also responds to your letter of June 6, 1980, in which you requested the FAA to reconsider this recommendation.

The following are FAA's comments in response to this 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.

Our previous nonconcurrence with NTSB Recommendation A-80-8 was based on our contention that selected information relative to control problems associated with high-speed asymmetrical leading edge slat configuration on B-727 aircraft is not meaningful and could, in fact, be misleading. Specifically, we refer to information such as that contained in Boeing Operations Manual Bulletin 75-7 and TWA Flight Operations Safety Bulletin 79-3.

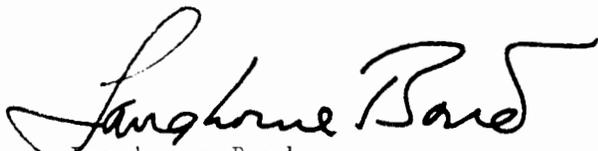
Certain information referred to in the TWA Safety Bulletin was predicated upon developmental simulator tests conducted by the Boeing Company. To the best of our knowledge, no FAA representatives were involved in this testing, and the conclusions obtained have not been validated by the FAA. We are, therefore, reluctant to agree that such information should be widely disseminated throughout industry.

Further discussions with representatives of the Boeing Company relative to this subject revealed that a viable flight-test program began in July 1980. This program involves the use of a Boeing-owned B-727 which has been dedicated for use in the test program.

It is anticipated that conditions similar to those which led to the TWA Flight 841 upset will be investigated at length. A detailed report of findings will be made available to the NTSB, FAA, and industry.

Pending the outcome of this test series, we intend to take no further action in regard to Safety Recommendation A-80-8. Once the results of this test effort are evident, we will further advise the Board of the FAA actions relative to Safety Recommendation A-80-8.

Sincerely,



Langhorne Bond
Administrator



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

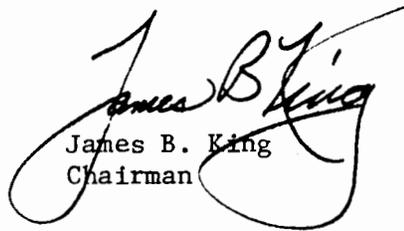
Honorable Langhorne Bond

- 2 -

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



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 _{.80} ; and
- (3) flight spoilers were extended.

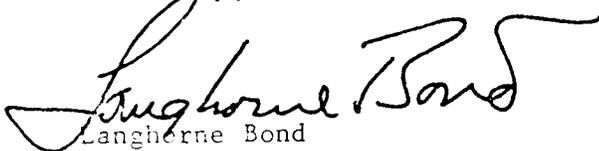
It is extremely improbable that the above would happen at all, and certainly not without considerable advance indications of slat malfunction through slow actuation, incomplete stowage, or other symptoms readily identifiable on the flight deck during normal system operations. (To the best of our knowledge, 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,


Langherne Bond
Administrator

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

ISSUED: January 21, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-8

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.

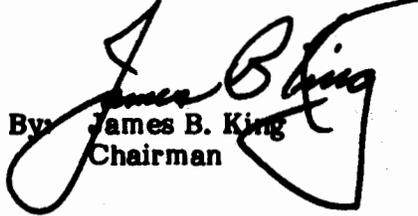
During its investigation, the Safety Board examined the effects of full extension of the No. 7 slat on aircraft performance and control during level flight and descent. Using a Boeing engineering simulator, it was determined that the extended slat will generate a right roll which will be countered by 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.

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



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

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

Dear Mr. Bond:

Thank you for your letter of October 14, 1980, responding further to National Transportation Safety Board Safety Recommendation A-80-11 issued February 5, 1980. This recommendation stemmed from our investigation of a Cessna Model 120 crash near Vicksburg, Mississippi, on September 29, 1979. The right wing separated in flight.

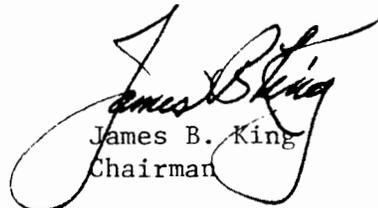
The Safety Board recommended that the Federal Aviation Administration (FAA):

"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."

We note that the FAA has now issued Advisory Circular No. 43-16, General Aviation Alerts, Alert No. 24 of July 1980 to advise Cessna 120/140 operators of the wing strut fitting problem. Since no Malfunction or Defect Reports pertaining to this problem have been received, and in light of the fact the FAA will continue to screen Malfunction or Defect Reports for this condition, we now evaluate the status of this recommendation as "Closed--Acceptable Alternate Action."

We thank you for your continuing commitment to aviation safety.

Sincerely yours,


James B. King
Chairman

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591

October 14, 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 further response to NTSB Safety Recommendation A-80-11 issued February 5, 1980, and responds to your letter of July 30, 1980. This recommendation resulted from the crash of a Cessna Model 120 near Vicksburg, Mississippi, on September 29, 1979. The accident investigation disclosed that the wing separated after the forward wing strut upper rod-end spherical fitting had failed. Both persons aboard, an instructor pilot and his student, were killed.

The Safety Board recommended that the Federal Aviation Administration (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."

In our letter of May 5, 1980, the FAA nonconcurred in this recommendation on the grounds that the failure was related to inattentive maintenance over an extended period of time. However, the Board requested that the FAA reevaluate Safety Recommendation A-80-11 and take the same expeditious action as that taken with regard to Recommendation A-80-26. This Recommendation related to an associated problem involving high-wing model Piper aircraft, and FAA responded by issuing an emergency Airworthiness Directive to Piper aircraft owners.

We have now completed a reevaluation and our comparative review of Recommendations A-80-26 and -11 reveals a related problem with unrelated causes. The problem is failure in a wing lift strut. However, the causes are different. In the case of the affected Piper airplanes, it was fatigue, and in the case of the Cessna 120/140 airplanes, it was maintenance inattentiveness over an extended period of time. Since the fatigue was design influenced, we agree with the Directive action for that situation. Fatigue was not involved in the Cessna case. Therefore, we believe the action outlined in our letter of May 5, 1980, is still appropriate.

The Airworthiness Alert mentioned in that letter was issued July 1, 1980. This alert requested that a Malfunction or Defect Report, FAA Form 8010-4, be submitted when corrosion, pitting, and related service conditions are found. To date, no reports have been received. However, we will continue to screen these reports for the above mentioned conditions and take further action as justified. Authorized inspectors, repair stations, General Aviation District Offices,

Flight Standards District Offices, and certain aviation oriented organizations are on automatic distribution for Airworthiness Alerts. Therefore, those individuals who would be expected to uncover the conditions mentioned above have been alerted.

We believe the actions that have been taken in these two separate situations are appropriate and reasonable. Accordingly, FAA considers action on Safety Recommendation A-80-11 completed and believes a "closed" status is now in order.

Sincerely,



Langhorne Bond
Administrator



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

JUL 30 1980

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

Dear Mr. Bond:

This concerns your response of May 5, 1980, to National Transportation Safety Board Safety Recommendation A-80-11, issued February 5, 1980. This recommendation resulted from the crash of a Cessna Model 120 near Vicksburg, Mississippi, on September 29, 1979. The accident investigation disclosed that the wing separated after the forward wing strut upper rod-end spherical fitting had failed. Both persons aboard, an instructor pilot and his student, were killed.

The Safety Board recommended that the Federal Aviation Administration (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."

This accident causes serious concern about the structural integrity of several thousand other Cessna 120/140 aircraft now remaining in service. Critical questions are raised about the airworthiness of the aircraft and about the wing strut fittings. The FAA attributes the failure of the fittings to inattentive maintenance over an extended period of time and states that an Airworthiness Alert will assure adequate inspection in the future. An Airworthiness Alert, however, is advisory only, and as such, will not have the mandatory impact of an Airworthiness Directive. We believe that, in this instance, mandatory action will prove more effective in assuring adequate inspection and directing proper and immediate attention to the hazard.

Honorable Langhorne Bond

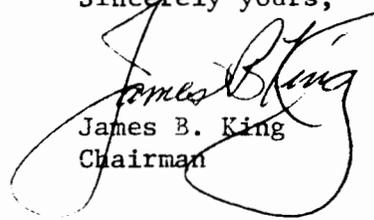
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On April 9, 1980, the Safety Board issued Safety Recommendation A-80-26, relating similarly to a hazardous wing-lift strut fitting condition found among various high-wing model Piper aircraft. The FAA responded to that recommendation by immediately issuing an emergency Airworthiness Directive to Piper aircraft owners.

Because the same urgency exists, and because the airworthiness of Cessna Model 120 and 140 aircraft is likewise suspect, the Safety Board requests that the FAA reevaluate Safety Recommendation A-80-11 and take the same expeditious action as that taken with regard to Recommendation A-80-26.

Recommendation A-80-11 will remain in an "Open--Unacceptable Action" status pending your reconsideration and reply.

Sincerely yours,

A handwritten signature in black ink, appearing to read "James B. King". The signature is stylized and somewhat cursive, with a large loop at the end.

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.

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

Forwarded to:

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

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.

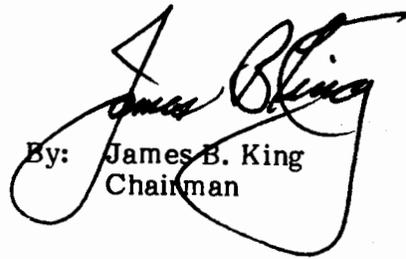
Wing strut fittings similar to the one which failed are also installed on many Cessna Model 140 airplanes. As of December 31, 1978, a total of 3,486 Cessna Model 120/140 aircraft were registered with the Federal Aviation Administration, the newest of which are approaching 30 years in service.

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)

2866

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

December 2, 1980

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

Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendation A-80-24 issued March 27, 1980, and supplements our letter of June 25, 1980. This also responds to your letter of August 12, 1980, in which you request that the FAA reevaluate this recommendation.

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 airplane 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.

FAA Comment.

As previously stated in our letter of June 25 we believe that an adequate checkout of a pilot in any aircraft is essential to the safe operation of that aircraft.

We have reviewed computer printouts from the FAA Safety Data Branch in Oklahoma concerning accidents involving tailwheel aircraft during the takeoff and landing ground roll phase of flight. These data indicate that the causal factors were not peculiar to tailwheel aircraft or significantly different from those of nosewheel aircraft accidents. Ground loops, loss of directional control, and runway overruns were also factors common to accidents in both aircraft types.

The circumstances surrounding the crash of the PA-18 Super Cub at Lebanon, New Hampshire, on April 21, 1979, indicate that a lack of pilot proficiency in general, rather than characteristics peculiar to tailwheel aircraft, may have contributed to that tragedy. We have determined that the pilot received 1 hour of flight instruction from a certificated flight instructor immediately prior to his departure from Lock Haven, Pennsylvania.

An amendment to FAR 61.31 would not necessarily provide a solution to the concerns outlined in Safety Recommendation A-80-24. To require a private or commercial pilot to receive flight instruction from an authorized flight instructor in tailwheel aircraft, with an appropriate endorsement in his pilot log, would not ensure that the pilot's checkout was adequate. In this instance, the dual flight instruction received was apparently not adequate to preclude this tragedy.

The responsibility for determining the adequacy of a checkout rests with the flight instructor. In our judgment this is a proper assignment of responsibility. For these reasons, the FAA does not believe that the regulatory action recommended by the Board pertaining to tailwheel aircraft is justified, and accordingly, we consider action on Safety Recommendation A-80-24 completed.

Sincerely,


Langhorne Bond
Administrator



Office of
Chairman

National Transportation Safety Board

Washington, D C 20594

August 12, 1980

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

Dear Mr. Bond:

This is in connection with your letter of June 25, 1980, regarding the National Transportation Safety Board's Safety Recommendations A-80-24 and -25.

The Safety Board, after careful review of your letter, does not believe that the comments contained therein relate directly to Safety Recommendation A-80-24. For example, you concur with the Safety Board that an adequate checkout of pilots in tailwheel aircraft is essential and reference several FAA educational publications which provide information relating to the operation of tailwheel aircraft. Safety Recommendation A-80-24, however, deals not with the availability of educational material, but with a proposed amendment to 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.

The Safety Board is aware of the educational publications mentioned in your letter and does not dispute the availability of operational information which, as you point out, could serve as the basis for a comprehensive checkout in tailwheel airplanes. The Safety Board is simply recommending that such a checkout, flight instruction, or endorsement be required by regulation in a manner similar to the flight instruction/certification required under FAR 61.31(e) dealing with high performance airplanes.

In context with Safety Recommendation A-80-25, you indicate that FAA will consider currency requirements for differently configured aircraft during the next review of FAR Part 61. It is our understanding

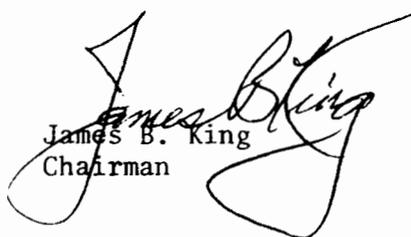
Honorable Langhorne M. Bond

- 2 -

that such a review is planned for the latter part of 1980 and your projected consideration of this recommendation at that time constitutes an adequate interim response.

The Safety Board has assigned an "Open--Unacceptable Action" status to FAA's response to Safety Recommendation A-80-24 and requests that FAA reevaluate this recommendation. Safety Recommendation A-80-25 has been assigned an "Open--Acceptable Action" status on an interim basis pending final evaluation by FAA at the forthcoming review of FAR Part 61.

Sincerely yours,


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).

2

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

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-24 and -25

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.

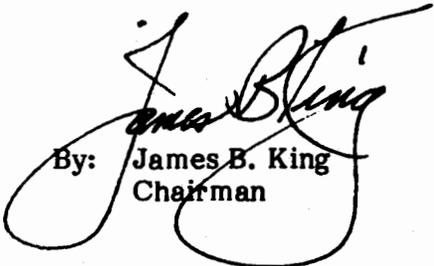
The safe operation of tailwheel airplanes requires a unique measure of operational familiarization that is not transferable from experience in tricycle gear aircraft. Tailwheel airplanes are especially prone to loss of directional control during takeoff and landing, and to severe bouncing if the landing 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 1/ 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

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



Office of the Chairman

National Transportation Safety Board

Washington, D.C. 20594

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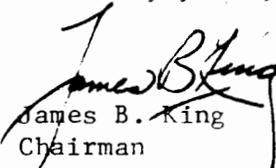
Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Dear Mr. Bond:

Thank you for your letter dated October 22, 1980, responding further to National Transportation Safety Board Safety Recommendation A-80-49 issued June 11, 1980. We recommended that the Federal Aviation Administration (FAA) 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.

We are pleased to note that the FAA has issued Air Carrier Operations Bulletin No. A-80-3, Altimeter Setting, Aerospatiale Alouette III Helicopters, fulfilling this recommendation, which is now classified in a "Closed--Acceptable Action" status.

Sincerely yours,


James B. King
Chairman

267/268

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20591



OFFICE OF
THE ADMINISTRATOR

October 22, 1980

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

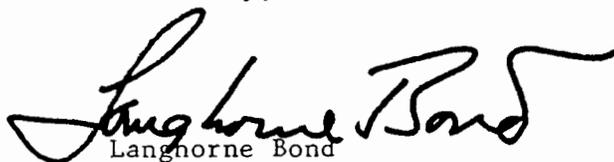
Dear Mr. Chairman:

This is in further response to NTSB Safety Recommendation A-80-49 issued by the Board on June 11, 1980, and serves as a followup to our September 9, 1980, letter. This recommendation resulted from the Board's investigation of the crash of an Aerospatiale Alouette III helicopter near Ogden, Utah, on December 14, 1978.

In our letter of September 9 we stated that we would forward a copy of Air Carrier Operations Bulletin, A-80-3, Altimeter Setting, Aerospatiale Alouette III Helicopters. The change to Order 8430.17, Chapter 10, paragraph 1002, outlines the action taken by the Federal Aviation Administration (FAA) regarding this recommendation. We have enclosed a copy of the bulletin for your information.

The FAA considers action completed on Safety Recommendation A-80-49.

Sincerely,


Langhorne Bond
Administrator

Enclosure

269/270



National Transportation Safety Board

Washington, D.C. 20594

Office of
Chairman

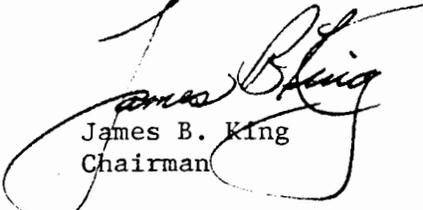
Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Dear Mr. Bond:

Reference is made to your letter of September 9, 1980, responding to National Transportation Safety Board Safety Recommendation A-80-49 issued June 11, 1980. This recommendation stemmed from our investigation of an Aerospatiale Alouette III helicopter accident near Ogden, Utah, on December 14, 1978. We asked the Federal Aviation Administration (FAA) to 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.

The Safety Board is pleased to note that the FAA is processing an Air Carrier Operations Bulletin to satisfy the intent of this recommendation. Pending the issuance of the bulletin, Safety Recommendation A-80-49 is being maintained in an "Open--Acceptable Action" status.

Sincerely yours,


James B. King
Chairman

271/272



OFFICE OF
THE ADMINISTRATOR

September 9, 1980

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

Dear Mr. Chairman:

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

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

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

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

Sincerely,


Langhorne Bond
Administrator

273/274

**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

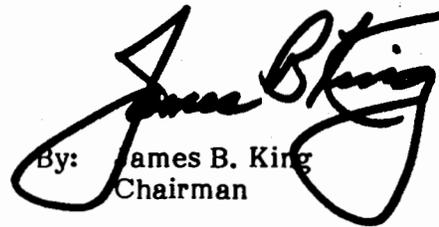
14 CFR 91.81 as clear and unambiguous in the requirement that altimeters be set to read altitude above mean sea level and that these operators are clearly in error by setting altimeters to standard barometric pressure.

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: October 2, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-106 and -107

On May 14, 1980, an Aerospatiale 341G Gazelle helicopter was approaching a confined-area landing site when the flight-control hydraulic pressure was lost. The pilot maintained control and continued his approach. As the aircraft was flared for landing, the pilot's right rudder pedal rotated from beneath his foot, causing the pilot to lose directional control of the aircraft. After several rapid rotations of the fuselage, the pilot instructed the passenger, seated in the copilot's seat, to depress the copilot's right rudder pedal. The pilot regained directional control and landed the aircraft uneventfully.

Detailed examination of the pilot's right rudder pedal revealed that the lower of two rivets (PN L2125-24-12 DCJ) which attaches the leaf spring/locking pin assembly to the pedal shaft had sheared. However, review of the pedal installation indicates that the rivet sheared as a result of the pedal's rotating. If the pedal is fully engaged in its floor fitting, the locking pin will prevent rotation and a flat machined on the base of the pedal shaft which mates with a flat on the floor fitting will prevent rotation should the locking pin fail.

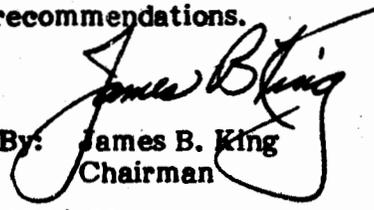
The Safety Board is concerned that other rudder pedal shafts may not have been properly installed and fully engaged and locked in their respective fittings which could result in loss of directional control.

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

Issue a Telert Maintenance Bulletin to require a one-time inspection of the rudder pedal shafts on the Aerospatiale 341G helicopter for proper installation. (Class I, Urgent Action) (A-80-106)

Review and evaluate the rudder pedal installation to determine if a stronger pedal retention design is necessary. (Class II, Priority Action) (A-80-107)

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

By: 
James B. King
Chairman

277/278

291
3030

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: October 9, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-108 and -109

On January 10, 1980, N3839M, a Piper Arrow aircraft, crashed into a mountain after departing the Kalispell City Airport, Kalispell, Montana. All three persons aboard were killed.

The Safety Board's investigation disclosed that the pilot, who was employed at the Kalispell City Airport as an instrument flight instructor, had been issued, before takeoff, an IFR clearance to the Calgary Airport via direct to the Kalispell VOR, direct to the Calgary VOR. The clearance, issued by the Salt Lake City Air Route Traffic Control Center, included a climb to 14,000 feet and a transponder code. After acknowledging the clearance, the pilot asked, "Are we going to get vectors northbound?" The controller replied, "I could vector you to the Canadian border; after that I'm not sure if Canada can." The pilot answered, "We'll be receiving Lethbridge by that point."

As the aircraft reached the Kalispell VOR, the controller said "radar contact" and requested the aircraft's altitude. After the pilot reported leaving "five point five," the controller made the following transmission: "Three niner mike roger Lethbridge (unintelligible) bearing (unintelligible) five report reaching one four thousand." About 1 minute later, the pilot asked the center "...to let us know coming up on some high terrain if you would." The controller replied, "...are you in the clouds now?" The pilot said that they were. There were no more transmissions from N3839M.

The Kalispell Airport has no published instrument approach procedures and, thus, no published IFR departure procedures. An approach by visual reference to the terrain is the only means of access to this airport. However, there are no procedures which prohibit a pilot from filing an IFR flight plan and receiving an IFR clearance for departure from this airport or other airports not having published instrument departure procedures. Normally, a pilot files a route that may include a published Minimum En Route Altitude (MEA), a Standard Instrument Departure (SID), a Standard Arrival Route (STAR), a published IFR Departure Procedure for small airports, or a published

Instrument Approach Procedure, all of which provide sufficient altitude obstruction clearance. However, a departure clearance from an airport, such as the Kalispell Municipal, does not provide obstruction clearance. In fact, paragraph (5)(c), Instrument Departures, Obstruction Clearance During Departure, of the Airman's Information Manual, states,

"... At airports where instrument approach procedures have not been published, hence no published departure procedure, determine what action will be necessary and take such action that will assure a safe departure."

Thus, in IFR conditions, such departures involve a hazard because the pilot does not have available any published procedures for instrument flight. Furthermore, he cannot get radar vectors until the aircraft climbs to the minimum vectoring altitude (MVA). The ATC issuance of an IFR clearance for the portion of a flight before it reaches "protected airspace," or airspace that insures terrain avoidance, gives the pilot implied permission to fly under actual IFR conditions via the IFR flight plan in an area where the flight can only be accomplished safely under VFR. The Safety Board believes that, in order to assure terrain clearance, a departure of this nature must be conducted visually, and that the controller-issued IFR clearance should begin only at a point that provides separation from the terrain.

During its investigation, the Safety Board interviewed pilots who said that they expect the controller to be able to issue radar vectors after saying "radar contact." The ATC handbook prohibits vectoring aircraft below the MVA. Pilots have no access to MVA information because it is contained in documents in individual ATC facilities. These are not given general distribution. During the investigation, the controller stated that the MVA for the flight was 12,500 feet, that radar contact was established as the aircraft left 5,500 feet, that the target was non-mode C, and that the bearing to Lethbridge was an "information only" item.

The Safety Board believes that, in this accident, based on the controller's transmission, the pilot expected radar vectors and was not aware that the controller had no terrain information and therefore was unable to issue vectors until the aircraft was above the MVA. Because this misconception apparently is shared by many pilots, we believe a change in procedure is warranted.

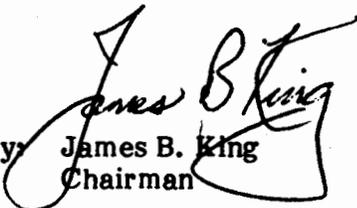
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Amend Air Traffic Control Handbook 7110.65B so that the term "radar contact," when used in communications with pilots, means that the target is identified and that the controller is able to vector the aircraft, and to require that, if there is an operational advantage to either the controller or pilot for the controller to state "radar contact" when vectors cannot be provided, the pilot should be expressly informed that vectors cannot be provided. (Class II, Priority Action) (A-80-108)

Amend Air Traffic Control Handbook 7110.65B, paragraph 350, to require that when a pilot requests an IFR clearance from an airport with no published instrument departure procedures, the controller-issued IFR

clearance shall originate only from some point in space that insures terrain separation and that the pilot shall be instructed to remain VFR until reaching that point. (Class II, Priority Action) (A-80-109)

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: October 24, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-110

The National Transportation Safety Board is investigating an incident involving a Cessna Model 421B, N82169, which occurred at Terre Haute, Indiana, on March 20, 1980. Although the investigation is not complete, the Safety Board has identified a problem affecting occupant escape and survival in this incident which we believe merits remedial action by the Federal Aviation Administration.

Examination of the wreckage revealed that the forward end of the writing table and the paneling associated with the table installation overlapped the lower rear corner of the emergency escape hatch frame. The overlap restricted the removal of the emergency escape hatch. In addition, the cup holder on the forward end of the writing table further impeded the removal of the emergency escape hatch. This table configuration was optional equipment for about 240 model 414 aircraft (S/N 414-0357 through 414-0800) and 508 model 421 aircraft (S/N 421B-0301 through 421B-0970), which were manufactured between 1973 and 1975. A design installation change was made with respect to the optional table installation on these models for aircraft manufactured subsequent to 1975; therefore this problem does not exist on the later aircraft.

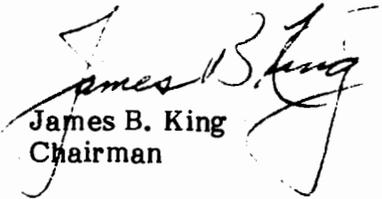
Numerous recommendations and proposals to improve occupant escape have been made over the years by Government and industry organizations, and significant improvements have been made. However, access to the escape hatch on these aircraft is still marginal. This incident might have resulted in fatalities if a postcrash fire had erupted, and it illustrates the need to review and monitor cabin design to insure that interior installations do not obstruct the removal and use of emergency escape hatches.

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

Require a modification to the table configuration on Cessna Model 414 aircraft (S/N 414-0357 through 414-0800) and Cessna Model

421 aircraft (SN 421B-0301 through 421B-0970) to eliminate interference of the table installation with the escape hatch. (Class II, Priority Action) (A-80-110)

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: November 7, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-111

On December 27, 1979, a Hamilton Standard propeller blade (P/N 6353A-18) separated from the right engine of a Douglas DC-3C aircraft, N100SD. The separated blade damaged the underside of the fuselage and one of the left propeller blades.

Metallurgical examination of the butt end of the separated blade (metallurgist's factual report No. 80-58) revealed that the fracture was caused by the presence of high cycle, low stress fatigue cracking which had progressed through a substantial part of the blade cross section. The primary fatigue crack initiated from an area of corrosion on the shank of the blade adjacent to the butt fillet blend. Additional areas of severe corrosive attack were found on the shank and fillet, and dried oil sludge and rusted rollers were found on the roller bearing from this area. The metallurgical examination indicated that the separated blade met engineering drawing requirements for the fillet radius, material hardness, microstructure, and chemical composition.

Aircraft logbook entries indicated the failed blade was previously installed on a propeller of a different aircraft which had accumulated less than 1,000 hours of service between 1971 and 1978. The Safety Board believes that the corrosive attack of the blade began within this time, most likely during an extended idle period when the corrosion protection provided by the oil in the hub may have been lost.

In addition to the above blade failure, the Federal Aviation Administration's (FAA) service difficulty report file revealed that, in the last 5 years, at least six instances of corrosion-related damage to the shank or fillet of Hamilton Standard Hydromatic propeller blades have been reported.

The aircraft industry has recognized the problem of corrosion damage to propeller components for many years. Hamilton Standard Service Bulletins No. 329, issued November 18, 1954, and No. 329A, issued September 15, 1960, recommended that blades be visually examined at least every 18 months. Currently, however, there are no Federal regulations that require blades to be inspected at any specific calendar interval. Hamilton Standard personnel have estimated that a visual examination would take 4 to 6 man-hours per propeller.

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

Make compliance with Hamilton Standard Service Bulletins No. 329 and 329A mandatory. (Class II, Priority Action) (A-80-111)

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: November 14, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-112 through -114

On February 12, 1979, an Allegheny Airlines Nord 262 crashed on takeoff from Clarksburg, West Virginia. The accident resulted in two fatalities and seven serious injuries. At the time of takeoff, there were light snow showers at the airport with an estimated accumulation rate of approximately 1 inch per hour. Deicing of the aircraft, with a 78-percent solution of an ethylene glycol-based deicing fluid and water, was completed 25 to 40 minutes prior to takeoff. Witnesses reportedly saw snow on the exposed horizontal surfaces of the aircraft when it taxied out. The probable cause of the accident was determined to be, in part, the loss of lateral control and lift due to snow on the wings and empennage when the aircraft climbed out of ground effect. The presence of frozen snow on the upper horizontal airfoil surfaces was confirmed by photographs after the accident.

On February 18, 1980, a Redcoat Air Cargo, Ltd., Bristol Britannia 253, crashed shortly after takeoff from Logan International Airport, Boston. The accident resulted in seven deaths and one serious injury. Light snow had fallen throughout the period of flight preparation, taxi, and takeoff at a rate of between 0.5 and 0.8 inch per hour. The aircraft had been deiced with a 30-percent solution of an ethylene glycol-based deicing fluid 45 to 60 minutes prior to takeoff. Evidence indicates that wet snow, which accumulated on the wings and horizontal stabilizer prior to takeoff, was a major factor in this accident.

Although an ethylene glycol-water mix is useful as a deicing agent, only the undiluted fluid is recommended by the manufacturer as an anti-icing agent. In the above accidents, the very fact that the exposed airfoil surfaces were wetted may have actually enhanced the accumulation of wet snow and created a condition in which the wet snow was not blown off by air moving over the surfaces.

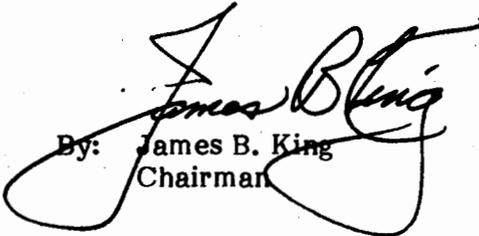
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Advise operators of the potential hazard of an accumulation of wet snow on airfoil surfaces after deicing with a diluted ethylene glycol solution. (Class I, Urgent Action) (A-80-112)

Initiate a study of the effectiveness of ethylene glycol-based deicing fluid concentrations as an anti-icing agent under differing icing and snow conditions. (Class II, Priority Action) (A-80-113)

Publish and distribute to operators detailed information regarding the characteristics of deicing/anti-icing fluids and guidelines regarding their use. (Class II, Priority Action) (A-80-114)

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: November 19, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-115 through -119

On June 12, 1980, an Air Wisconsin Swearingen SW-4 crashed during an encounter with a level 5 or greater thunderstorm in eastern Nebraska. Thirteen persons were killed and two persons were seriously injured.

During its flight, the aircraft had been under the control of the Minneapolis Air Route Traffic Control Center's (ARTCC) Omaha low altitude sector, as well as other sectors within the same ARTCC. However, the Safety Board's investigation has revealed that none of the sector controllers transmitted information to the flightcrew regarding the location and intensity of the thunderstorm system in the path of the flight although other ARTCC air traffic control (ATC) and meteorological personnel had some information regarding the potential intensity characteristics of the storm system. Testimony given at a public hearing held in Omaha, Nebraska, during September 1980 indicated that the full extent of the area of precipitation and accurate intensity characteristics of convective meteorological phenomena are not portrayed on a controller's plan view display (PVD) because the weather fixed map unit (WFMU) is designed to be selective in its display of precipitation and is limited in its capability to display weather echo intensity levels. A controller's only alternative to obtain a more complete view of the precipitation in the area is to switch to the older broadband presentation; however, this equipment also does not have the capability of showing the various weather echo intensity levels. Further, the broadband presentation may not show aircraft which have already penetrated precipitation areas, essentially rendering this radar useless for purposes of vectoring aircraft out of areas of precipitation.

On February 24, 1980, a Beechcraft Bonanza BE-35 aircraft crashed near Valdosta, Georgia, during an encounter with severe thunderstorms. All the occupants aboard were killed when the aircraft experienced an inflight breakup. On August 26, 1978, two persons were killed when a Piper PA-28 aircraft experienced an inflight breakup during an encounter with a severe thunderstorm near Bolton, North Carolina. In both accidents, ARTCC controllers attempted to provide weather information and avoidance vectors around areas of precipitation observed on the PVDs by switching to broadband presentations to obtain a more complete characterization of the weather than that displayed on the narrowband WFMU.

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In the investigations of the three accidents cited above, ATC personnel alluded several times to the fact that, in some instances, inconsistencies between the weather displayed on the PVD and the actual weather encountered by the aircraft limited their ability to confidently assist aircraft.

Following the accident involving a Southern Airways DC-9 on April 4, 1977, at New Hope, Georgia, ^{1/} the Safety Board recommended the expeditious development and implementation of a weather subsystem for en route and terminal radar environments which would be capable of providing real-time displays of precipitation or turbulence or both, and which would incorporate a multiple-intensity classification scheme (Safety Recommendation A-77-63). We believe the selective display of precipitation in the WFMU is an operationally sound concept where a limited distinction of precipitation levels is acceptable, but that it does not provide sufficient discrimination for effective and safe use of airspace in the vicinity of convective meteorological activity.

As part of its investigation of the June 12, 1980, crash, the Safety Board examined the National Weather Service (NWS) weather radar color remote displays located at the Cleveland ARTCC. We understand that the FAA intends to test the possible use of similar displays as an adjunct to the present narrowband WFMU system, and we believe such use would significantly contribute to aviation safety. For that matter, one practical application of the use of NWS weather radar information has already been demonstrated.

On the evening of September 22, 1980, an unusually large area of extreme convective weather extended from Ontario, Canada, south to Jonesboro, Arkansas. Several supervisors and controllers at the Cleveland ARTCC reported that, while experiencing difficulty in correlating the NWS radar maps with the ATC PVD maps, they were able to achieve sufficient correlation to issue advisories to aircraft regarding the extreme weather displayed on the NWS weather radar color remote displays in the center. In one notable instance, the PVD display of weather over the Detroit airport did not show the presence of the ongoing thunderstorm activity which was displayed clearly on the NWS weather radar color remote display. The controllers were able to use the NWS weather radar information to divert aircraft away from the Detroit airport. Throughout the evening of September 22, numerous air carrier flights were assisted in avoiding the weather which was characterized as severe and extreme on the NWS weather radar color remote displays. The comments by the ATC personnel involved were almost unanimously positive regarding this potential use of the NWS weather radar color display, even in the face of the problems of map correlation and weather intelligence updating which the FAA is seeking to resolve before the test program is begun.

The Safety Board is aware that the FAA's contemplated tests cannot begin until some remaining mapping graphics problems have been solved. However, we are concerned that the testing period may not be scheduled during the seasonal period when the most intensive evaluation of convective activity might be achieved. Moreover, the Safety Board is aware that, in the immediate future, the Cleveland ARTCC's Center Weather Service Unit (CWSU) is scheduled to acquire 25-inch NWS weather radar color remote displays which will enable the CWSU meteorologists to obtain real-time weather information directly from NWS weather radars. We believe that installation of these

^{1/}Aircraft Accident Report: "Southern Airways Inc., DC-9-31, N1335U, New Hope, Georgia, April 4, 1977" (NTSB-AAR-78-3).

displays in all ARTCCs having CWSUs should be expedited to provide real-time depiction of the location and intensity of all convective meteorological phenomena affecting a center's airspace. Had such systems been in place before the accidents cited herein, the likelihood of their occurrence could have been greatly diminished.

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

Expedite the delivery of NWS weather radar color remote displays to all Air Route Traffic Control Centers' Center Weather Service Units (Class I, Urgent Action) (A-80-115)

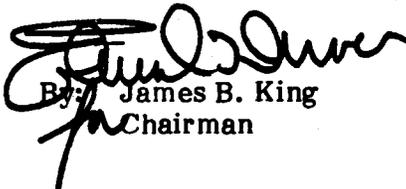
Schedule the planned testing of NWS weather radar color remote displays at the Cleveland Air Route Traffic Control Center to encompass the next season of frequent convective meteorological activity. (Class II, Priority Action) (A-80-116)

Expedite the development of appropriate graphic mapping techniques for correlation of the NWS weather radar color remote display and the air traffic controller's radar display presentation. (Class II, Priority Action) (A-80-117)

Expedite the development of an integrated weather radar/air traffic control radar single video display system capable of providing multiple weather echo intensity discrimination without derogation of air traffic control radar intelligence. (Class II, Priority Action) (A-80-118)

Require air route traffic control centers to make maximum use of the existing National Weather Service radar sites as inputs to the color remote displays at their facilities. (Class II, Priority Action) (A-80-119)

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: NOV 21 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-120 through -122

On Monday, November 17, 1980, a Piper PA-38 crashed and two persons were killed near Santa Rosa, California, when the plane's engine failed shortly after takeoff. The engine, a Lycoming O-235-L2A, was manufactured in 1979 and had accumulated about 70 hours at the time of the accident.

Safety Board investigators and a representative of the engine manufacturer disassembled the engine and found that two intake valve pushrods had failed, and as a result their length had been shortened. One of the pushrods was too short to operate the rocker arm; the other pushrod was still operating its rocker arm, but the amount of valve opening and the valve timing had been reduced considerably.

The pushrods consisted of a hollow aluminum tube with a steel ball-end insert which was pressed into the end of the tube. When the rods failed the aluminum tube bulged immediately below the flange of the steel insert. One aluminum tube had split longitudinally and had peeled back, and as a result, the steel insert had been forced into the tube more than one-fourth inch. The operator of the PA-38 is inspecting all O-235 engines in his fleet. Thus far he has discovered two other engines with similar pushrod damage. Both were Lycoming O-235-L2C. In one case, the tube bulging was visible on two rods but was not considered severe; the engine had 350 service hours since new. In the other case, all eight tubes were severely compressed or bulged and were beginning to split; this engine had 1,050 service hours since new.

The engine manufacturer has indicated that it is aware of pushrod problems in service, but that it has not been aware of any failures that have progressed to the point of engine failure. According to the manufacturer, the rate of occurrence of these failures has been decreasing, and it has no plans to take further corrective action.

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However, in view of the potentially serious consequences associated with an engine failure, the Safety Board believes that immediate action to preclude further engine failures of this type is warranted.

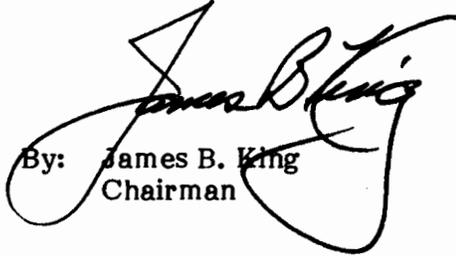
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an emergency Airworthiness Directive requiring, before further flight, (1) the immediate inspection of pushrods, of all Lycoming O-235-L2A and -L2C engines and (2) replacement of damaged or bulging aluminum pushrods. (Class I, Urgent Action) (A-80-120)

Establish, in consultation with the manufacturer, an inspection interval which will assure that damaged pushrods are discovered before the damage progresses to the point of engine failure. (Class II, Priority Action) (A-80-121)

Issue an Airworthiness Directive requiring that all Lycoming O-235-L2A and -L2C engines be inspected at the established interval and that damaged pushrods be replaced. (Class II, Priority Action) (A-80-122)

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: December 9, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-123 and -124

On May 9, 1980, a Bell 206B helicopter operating as an unscheduled air-taxi passenger flight crashed near Brighton, Utah, during an emergency autorotation following an engine flameout. There were no injuries, but the aircraft was damaged substantially. At the time, investigators were unable to determine the cause of the engine flameout. About 2 weeks later another Bell 206 from the same operation had four flameouts in one flight, with successful engine relight each time. The investigation determined that a drain valve on the engine-driven fuel pump in this second aircraft was leaking. Based on this determination, further investigation and testing of the Brighton accident engine determined that when the engine, an Allison 250C-20B, is operated without the fuel boost pumps operating, air can enter the fuel lines through loose fittings or a partially open valve and then be trapped in the fuel filter of the engine-driven pump. When this trapped air migrates through the engine fuel system, it causes fuel flow interruption and engine flameout or loss of power.

Some helicopter manufacturers install a drain valve on the engine-driven fuel pump low-pressure filter. Some of these valves have been found to leak, which permits air to enter the filter during engine operation. If the boost pump is not operating, air can also enter the system when the valve is opened to drain the filter during preflight.

The engine manufacturer, Detroit Diesel Allison, recognized over a year ago that air could be trapped in the filter housing. In June 1979, the manufacturer issued Service Letter CSL-1081 which advised operators of the possibility of trapped air and presented a procedure for purging air from the engine system.

Following the two cited incidents, Detroit Diesel Allison advised all helicopter manufacturers using the 250C-20 engine that air from any number of sources, when ingested into the fuel system, can cause a power loss or flameout. Specifically, the manufacturer cited the filter drain valves as a source of the introduction of air into the fuel system and recommended that the system be purged using the procedure in Service Letter CSL-1081 any time the system is opened. A review of several FAA-approved

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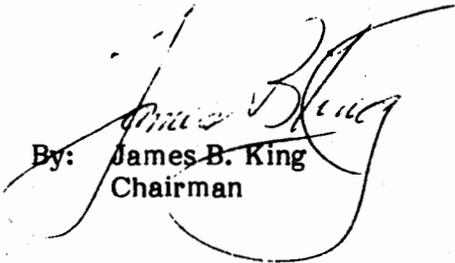
flight manuals for helicopters using the 250C-20 engine revealed that the procedures for draining this filter during preflight inspection are vague and do not require that the system be pressurized to insure that air will not enter the filter when the valve is opened. Detroit Diesel Allison has stated that the system should be purged after opening the valve, or the system should be pressurized by means of the boost pumps before opening the valve.

Because of the serious consequences which can result from engine flameout or power loss, the Safety Board believes that positive action is necessary to preclude the loss of power from air trapped in the engine low-pressure filter. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require, for all helicopters powered by Detroit Diesel Allison 250C-20 engines, the revision of the FAA-approved flight manual to include a detailed preflight procedure for draining the engine-driven fuel pump low-pressure filter which will preclude the entrance of air into the fuel system, or alternatively a procedure for purging the system of air after draining the filter. (Class II, Priority Action) (A-80-123)

Review fuel system designs with helicopter manufacturers to determine if drain valves on the Detroit Diesel Allison 250C-20 engine-driven fuel pump low-pressure filters are necessary. If determined to be unnecessary, issue appropriate Airworthiness Directives to require removal. (Class III, Longer Term Action) (A-80-124)

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


By: James B. King
Chairman