I-CG 1269

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 3, 1981

Forwarded to:

Honorable J. Lynn Helms
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-81-83 and -84

On June 23, 1980, a Beechcraft Model B19, N60BW, crashed shortly after takeoff from Kinston Jet Port, Kinston, North Carolina. The pilot, who received minor injuries, stated that he was not able to maintain lateral control.

The investigation revealed that the left aileron push-pull rod end, which is connected to the aileron bellcrank inside the wing, had failed. The left aileron push-pull rod was examined by an independent engineering testing company, which reported that: (1) the push-pull rod failure was caused by fatigue in reverse bending, (2) the reverse bending force was apparently transmitted from a seized bearing connection to the minimum cross-section of the rod at the root of the machined threads, and (3) the bearing connection at the failed end of the rod was seized because of inadequate bearing lubrication and the subsequent formation of corrosion products which prevented rotational and lateral movement in the bearing connection.

The aircraft records indicated that the last annual inspection was completed on August 20, 1979, 130 tachometer hours before the accident. However, the Safety Board could not determine whether the rod end bearings were lubricated during the inspection. The Beechcraft lubrication diagram in the maintenance manual recommends that the ends of the aileron push-pull rod be lubricated at every 100-hour inspection.

On July 8, 1975, Beechcraft issued a Safety Communique to all owners of Beechcraft Models B19, 23, 24, and 24R series aircraft. The communique indicated that some flight control system pivots and moving parts subject to wear may not have been lubricated adequately, and urged that the flight controls be checked for freedom of movement during each walk-around inspection and before each flight. It further recommended that the controls be serviced and lubricated at proper intervals to insure proper functioning of the flight controls.

In August 1975, Beechcraft issued Class II Service Instruction No. 0760-010, which pertained to specific Beechcraft Models B19, 23, 24, and 24R series aircraft. Service Instruction No. 0760-010 recommended, during normal maintenance, a general inspection or replacement, or both, of rod end bearings used on engine controls, landing gear retraction systems, nose landing gear steering mechanisms, and flap, aileron, elevator, rudder, and tab controls. The purpose of the service instruction, in part, was to advise all owners that, on occasion, some rod end bearings manufactured by Nippon Miniature Bearing Corporation had seized in service and that, at the owner's discretion, the rod end bearings should be replaced by corresponding parts manufactured by other vendors.

In August 1976, Beechcraft issued Class II Service Instruction No. 0858-151, which pertained to specific Beechcraft Models B19, 23, 24, and 24R series aircraft. The purpose of Service Instruction No. 0858-151 was to insure freedom of movement and proper functioning of all flight control rod ends and pivotal points. In part, the service instruction referred specifically to the aileron push-pull rod ends, indicated that restricted movement of the rod end indicates corrosion in the rod end, and further stated that if corrosion is noted both existing forward and aft rod ends should be replaced with new rod ends (P/N 169-380082-3).

The Safety Board could not determine if the aileron rod ends on N60BW were inspected in accordance with the Beechcraft Class II service instructions. However, examination of the failed forward aileron push-pull rod end indicated that the failed rod end (PN HM-4U-M) was manufactured by Heim Company. The aft push-pull rod end (PN HM-4, NMB) which did not fail was manufactured by Nippon Miniature Bearing Corporation. However, this push-pull rod end bearing did not rotate freely in all directions. Based on the identification of the failed push-pull rod end, the forward rod end was installed in accordance with Beechcraft Class II Service Instruction No. 0760-010, but the aft rod end was not replaced as recommended in that service instruction.

The Safety Board's aircraft accident data indicate that between 1964 and 1979 six accidents have involved Beechcraft Models B19, 23, and 24R aircraft in which lateral control was found to be a cause or factor. These accidents resulted in five fatal injuries, two serious injuries, and minor or no injuries to five persons. One accident resulted from frozen rod end bearings and another resulted from a failed rod end. The remaining four accidents resulted from improper installation of the aileron after maintenance.

A review of the Federal Aviation Administration's Service Difficulty Records from January 1976 through January 8, 1981, revealed 15 occurrences of problems with aileron push-pull rod end bearings on Beechcraft Models B19, 23, 24, and 24R series aircraft. Fourteen were related to seized or broken rod ends. Based on the continuing reports of similar failures, the FAA published this information in its General Aviation Alert, Advisory Circular 43-16, dated October 1980.

On earlier models of Beechcraft B19, 23, 24, and 24R series aircraft, such as N60BW, the forward aileron push-pull rod end bearings, aileron bellcrank pivotal point, and cable attachments are relatively inaccessible for routine inspections and maintenance because panels were not installed in the wings for inspection purposes. The ailerons and guard strap from the closure strip must be removed to perform an inspection or routine maintenance. To improve access to those push-pull rod ends, an aircraft and powerplants mechanic employed by a Kinston facility, on his own initiative, installed inspection access panels using approved inspection plates and doublers on a similar aircraft. The mechanic was later nominated for a General Aviation Mechanics Safety Award.

Since 1977, Beechcraft has incorporated aileron access panels in the wings on its Models B19, 23, and 24 series aircraft. The wing access panels provide an opening through which mechanics can inspect and service the forward aileron push-pull rod end bearings without removing the ailerons--thus reducing the man-hours required for inspection and maintenance and eliminating the need to remove the ailerons. The Safety Board believes that the installation of these panels in aircraft manufactured before 1977 would improve the maintainability of these aircraft by making it easier for mechanics to inspect and lubricate the rod end fittings without having to remove the ailerons. This would also reduce the possibility of an improper installation of the aileron by reducing the number of times they must be removed and reinstalled.

In view of the continuing reports on this problem and the hazards associated with a loss of aileron control, the National Transportation Safety Board recommends that the Federal Aviation Administration:

> Require that the actions outlined in Beechcraft Class II Service Instruction No. 0858-151 as revised be completed on the affected aircraft at the next 100-hour or annual inspection. (Class II, Priority Action) (A-81-83)
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> Require installation of access plates on all Beechcraft Models B19, 23, 24, and 24R series aircraft manufactured before 1977 to provide access to the aileron push-pull rods, bellcrank, and cable attachments for inspection or servicing. (Class II, Priority Action) (A-81-84)

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

By: James B. King
Chairman