

Log 1617

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: February 1, 1984

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Forwarded to:  
  
Honorable Michael J. Fenello  
Acting Administrator  
Federal Aviation Administration  
Washington, D.C. 20591  
  
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SAFETY RECOMMENDATION(S)  
  
A-84-4 through -6

On September 5, 1983, a Cessna Model 402C airplane, N29PB, was involved in an accident at the Tampa International Airport, Tampa, Florida. Upon touchdown, the nose landing gear collapsed as a result of a fatigue failure of the bearing (part No. MS-21242S-4K) in the rod end of the hydraulic actuator. Similarly caused accidents in the Cessna Model 400 series have occurred at Gainesville, Florida, on May 6, 1983, (Model 421C); at Kahului, Hawaii, on March 13, 1982 (Model 402C); at Santa Maria, California, on March 4, 1982 (Model 421C); at Newark, New Jersey, on January 15, 1981 (Model 421C); and at Hutchinson, Kansas, on February 19, 1980 (Model 414A).

Until recently, the bearings installed in the actuator rod end were produced for Cessna by several vendors. The original specifications and standards for their design and manufacture were those contained in Military Standard MS-21242. On January 31, 1978, they were superseded by those in Military Specification MIL-B-81935, the currently applicable specifications standards. However, the Safety Board's investigations of the accidents at Tampa and Gainesville disclosed that the bearings did not conform to either. Specifically, the slope of each of the respective bearing housings, measured relative to the bearing's longitudinal axis, exceeded the maximum specified angle of 35°. This resulted in a reduction in the size and strength of the bearing housings which, the Safety Board concluded, contributed to the structural fatigue of these parts.

The Safety Board believes that there may be other nose landing gear actuator rod end bearings currently in service which do not conform to design specifications and standards. Cessna is preparing a service letter and accompanying Service Kits SK-441-76 (applicable to Model 441 and 425 airplanes) and SK-421-121 (applicable to Model 402C, 404, 414A and 421C airplanes) to correct this situation. The service letter, to be released about March 15, 1984, will recommend that all nose landing gear hydraulic actuator rod end bearings currently installed in these airplanes be replaced by installing service kit SK-441-76 or SK-421-121, as appropriate. The service kits contain replacement rod end bearings produced by a single, named vendor.

Rod end bearings identical or very similar to those used on Cessna Model 400 series nose landing gear assemblies, and produced to the same design specifications and standards are also used on Cessna Model 404 and 441 flap actuators and flap control rod assemblies and on Cessna Model 421C and 425 landing gear door actuators. Some of these bearing housings may also have been manufactured somewhat smaller than specified. Therefore, the Safety Board believes that the Federal Aviation Administration should conduct an engineering analysis to ascertain whether any further action is necessary to assure bearing load compatibility and safety in these applications.

Accordingly, in order to prevent any further accidents resulting from incorrectly manufactured rod end bearings, in various applications on Cessna airplanes, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Verify by appropriate sampling or other methods that all hydraulic actuator rod end bearings, Cessna part No. MS-21242S-4K, and variations thereof, are manufactured in accordance with applicable design specifications and standards. (Class II, Priority Action) (A-84-4)

Issue an Airworthiness Directive applicable to Cessna Model 441, 404, 421C, 414A, 402C, and 425 airplanes to require the installation of Cessna Service Kit SK-441-76 or SK-421-121, as appropriate. (Class II, Priority Action) (A-84-5)

Conduct an engineering analysis to determine whether the stress margins of rod end bearings which do not conform to design specifications and standards installed on Cessna Model 400 series flap actuators, flap control rod assemblies, and landing gear doors are adequate and, if indicated, initiate action to require replacement of any inservice bearings not conforming to Military Standard MS-21242 or Military Specification MIL-B-81935. (Class II, Priority Action) (A-84-6)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY and ENGEN, Members, concurred in these recommendations. GROSE, Member, did not participate.

By:   
Jim Burnett  
Chairman