

Log 855

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: September 14, 1977

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Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-77-61 and 62

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On June 14, 1977, a Sikorsky S-58FT helicopter crashed 6 miles south of Golconda, Nevada. The helicopter was being operated under contract to the Energy Research and Development Administration and was conducting a flight to survey the area for uranium deposits. The pilot was killed and the magnetometer operator was seriously injured.

The aircraft struck the ground in a tail-low attitude at an elevation of 5,220 feet m.s.l. Density altitude for the ambient conditions was determined to be 7,800 feet. The vertical impact was so severe that the helicopter structure was compressed from 14 to 7 feet. Visual examination of the main and tail rotor systems on-site revealed minimal rotational damage at impact, indicating that possible abrupt power loss caused the rapid vertical descent.

During disassembly and examination of the engines and combining gearbox, contaminants were found within the fuel inlet side of the oil-to-fuel heater of both engine power sections. While tests conducted by Pratt & Whitney of Canada tend to discount contamination of the heaters as a factor in this accident, we are concerned that such a restriction of fuel flow could limit an engine's power output. The power available might then not be sufficient for sustained operation at high-density altitudes and high helicopter gross weights.

The helicopter involved in this accident had been converted to an S-58FT in accordance with Supplemental Type Certificate (STC) SH871EA and Sikorsky Service Instruction SI-155. This modification replaces the R-1820 reciprocating engine with a Pratt & Whitney of Canada PT6T-3 Twin-Pac turboshaft engine configuration. Included in this modification was the installation of the two oil-to-fuel heaters. The heaters are

located upstream of the engine main fuel pump filters. Initially, the fuel bypass warning lights, located on the cockpit advisory panel, were illuminated whenever fuel flow was restricted across the fuel pump 10 micron filter.

As a result of a reported power degradation problem on the same model helicopter because of clogged oil-to-fuel heaters, Sikorsky Aircraft issued Service Bulletin No. 58B30-12A on June 13, 1975. This service bulletin required that the upstream connection of the pressure sensing switches be relocated from the inlet side of the fuel pump filter to the inlet side of the fuel heater. This provided an earlier indication of an impending filter bypass condition. The bulletin also provided inspection and heater-backflushing procedures should a bypass light illuminate during operation. The latest revision to the basic service bulletin, 58B30-12C, was issued January 12, 1976. The records for the accident helicopter indicated that this had been complied with on February 5, 1976.

Review of maintenance records also indicated that the No. 1 engine's oil-to-fuel heater was changed on the morning of the accident because the pilot had reported that the No. 1 fuel bypass warning light, which indicated an excessive pressure drop across the heater and filter, remained on through all power settings.

The Safety Board is concerned that the current S-58T installation does not comply with the intent of 14 CFR 27.997, which requires a strainer or filter installation to prevent fuel starvation because of contamination of fuel pumps or fuel metering devices. Since there are no filter elements before the oil-to-fuel heater, it is possible for a buildup of contaminants to restrict fuel flow through the heaters. We believe that this possibility increases the hazard of engine power degradation or stoppage in Sikorsky S-58T helicopters modified in accordance with STC 871EA. About 113 aircraft have been or will be modified.

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

Issue an Airworthiness Directive, applicable to the Sikorsky S-58T helicopters, to require the installation of a fuel strainer or filter between the fuel tank outlet and the inlet of the oil-to-fuel heater assembly to prevent contaminants of a sufficient size to clog oil-to-fuel heater passages, or, if the filter installation is not technically feasible because of physical constraints, require modification of the existing oil-to-fuel heater to include a fuel bypass path activated by a pressure differential sensing device and an impending bypass warning light system. (Class I--Urgent Followup) (A-77-61)

Advise Designated Engineering Representatives (DERs) and cognizant engineering personnel responsible for approving newly designed fuel systems or modifications to existing ones that the intent of the applicable sections of 14 CFR 23, 25, 27, 29, and 33 is to provide a fuel strainer or filter between the fuel tank outlet and the inlet to the first engine fuel system component which is susceptible to restricted fuel flow because of contaminants. (Class I--Urgent Followup)  
(A-77-62)

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



By: Kay Bailey  
Acting Chairman

