

**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594**

October 13, 2010

Addendum 4 to:

Airworthiness Group Chairman's Factual Report

Of September 10, 2009

NTSB ID No.: LAX08PA259

A. ACCIDENT:

Location: Weaverville, California
Date: August 05, 2008
Time: About 7:41 PM Pacific Daylight Time (PDT)
Aircraft: Sikorsky S-61N Helicopter

B. SUMMARY

On August 5, 2008, about 1941 Pacific Daylight Time, a Sikorsky S-61N helicopter, N612AZ, impacted trees and terrain during the initial climb after takeoff from Helispot 44, located at an elevation of about 6,000 feet in mountainous terrain near Weaverville, California. The airline transport pilot, the safety crewmember and seven firefighters were killed; the commercial copilot and three firefighters were seriously injured. Impact forces and a post crash fire destroyed the helicopter. The helicopter was being operated by the United States Forest Service (USFS) as a public flight to transport the firefighters from Helispot 44 to another location. The helicopter was registered to Carson Helicopters, Inc. (CHI) of Grants Pass, Oregon, and leased to Carson Helicopter Services, Inc. (CHSI) of Grants Pass. The USFS had contracted with CHI for the services of the helicopter. Visual meteorological conditions prevailed at the time of the accident, and a company visual flight rules flight plan had been filed.

This addendum summarizes the NTSB's findings from a review of work orders of the JFC-26 fuel control units (Government and commercial) that were overhauled by Columbia Helicopters Inc. during the period January 1, 2005 through December 31, 2008.

C. DETAILS OF THE INVESTIGATION:

Representatives from the NTSB convened in Aurora, Oregon at the Columbia Helicopters, Inc. (Columbia) facility on August 10 and 11, 2010 to review data contained within 583 JFC-26 work orders. Columbia provided tabulated data for both their own FCU component maintenance work as well as their customers. Columbia provided tabulated data which included the following:

- Date the FCU was received
- Customer Information
- FCU part and serial number
- Reason for removal
- Discrepancies
- Details of contamination if found

During the period January 1, 2005 through December 31, 2008 Columbia removed 159 FCUs from their aircraft for overhaul or for non-routine removal. During this same period, customers (Government and commercial) sent Columbia a total of 424 FCUs for overhaul or for repair due to non-routine removal.

According to Columbia, if a FCU is received with an easily understandable discrepancy such as a broken stud, leaking from tachometer housing drain, broken safety wire, etc, it will go directly to repair without a preliminary functional test on a hydraulic test bench. For discrepancies (such as a hot start, failure to accelerate, fluctuations, etc) that require a preliminary functional test, the FCU may be subjected to the following inspections prior to being installed on a hydraulic test bench: an external inspection, filter inspection, and possibly a pressure regulating valve inspection. If it is determined that the FCU is contaminated, the FCU is fully disassembled, cleaned, and all areas inspected for possible cause. If during the preliminary inspection, it is determined that the FCU is not contaminated, the FCU will undergo a preliminary functional test with the result of the test determining the scope of the repair process.

Columbia also stated that metal contamination within the FCU on the CT-58-140 engine can result in the following:

- 1) A slow response to acceleration in which the engine RPM will take longer than 9 seconds to accelerate from idle in a no load condition to its maximum RPM, (Reference SEI 183 Rev 25 72-00, Page 752) or the engine RPM will hang up and not reach its full topping speed;
- 2) A fluctuation of Ng speed from 526 RPM to 1,052 RPM. The engine will still be able to produce horsepower, however, the operating line will move within this RPM range.

An engine flame out is a failure mode that can be induced by the Centrifugal Fuel Purifier (CFP). A flame out can occur when air leaks between the two housing sections of the CFP, allowing air to be ingested into the fuel system and causing a loss of prime within the system. The result of a flame out is a drastic loss of engine RPM followed by a decrease in engine temperature.

Columbia's records were reviewed for repetitive items, maintenance trends, and discrepancies relating to contamination. The review identified several reasons why fuel control units were sent to Columbia for repair. The following provides a summarized list of reasons for the replacement as well as findings noted during overhaul of the FCUs:

1. Columbia Helicopters:
 - A. Reasons for removal:
 - (60%) Normal Overhaul

- (11%) Possible contamination in unit
- (4%) Fuel pressure fluctuating
- (3%) Engine slow to respond
- (2%) Inconsistent or can't maintain topping
- (2%) Fails to respond to increase in power
- (1%) High T5
- (17%) Various other reasons (NF fluctuating, engine flame out, engine lagging)

B. Findings during repair or overhaul for non-routine repairs:

Of the 159 FCUs removed from Columbia's helicopters, 63 were removed for non-routine work. Contamination (typically metal) was found in about 17 of the 63 FCUs in the areas of the filter and the PRV. The specific quantity and size of the reported contamination was not documented within the work orders, and therefore could not be determined from the paperwork review. Additionally, none of the work orders described the contamination as fiberglass.

2. Returns from Government/ Other Customers:

A. Reasons for removal:

- (64%) Normal Overhaul
- (5%) Inspect and functional check, repair
- (4%) Fluctuating or erratic NG
- (2.5%) Possible Contamination in unit
- (2%) Topping issues
- (2%) Fuel leaking from FCU
- (2%) Engine fails or is slow to respond to accelerate (power demand)
- (1%) Fuel pressure fluctuating
- (1%) Fluctuation of engine parameters
- About (16%) Various other reasons (over temp on start, IGV remain open, lost power, torque surge)

B. Findings during repair or overhaul for non-routine repairs:

Of the 424 FCUs removed from customer helicopters, 152 were removed for non-routine work. Contamination (typically metal) was found in about 38 of the 152 FCUs in the areas of the filter and the PRV. Of these 38 units, 8 were noted as having contamination throughout the unit. The specific quantity and size of the reported contamination was not documented within the work orders, and therefore could not be determined from the paperwork review. Additionally, none of the work orders described the contamination as fiberglass.

Mike Hauf
Systems Group Chairman