



Log 2475

**National Transportation Safety Board**  
Washington, D.C. 20594  
**Safety Recommendation**

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Date: April 11, 1994

In reply refer to: A-94-79

Mr. Michael Rogerson  
President  
Rogerson Aircraft Corporation  
Irvine, California 92714

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On March 21, 1992, a Hiller UH-12E helicopter crashed during agricultural spraying operations near Huron, California. The helicopter was destroyed, but the pilot was not injured. The helicopter was being operated as an aerial application flight under Title 14 Code of Federal Regulations Part 137 when the accident occurred. According to the pilot, the helicopter experienced a violent main rotor vibration just before the accident, and the pilot observed one side of the control rotor blade assembly separate from the helicopter. The control rotor blade assembly extends from the head of the main rotor mast and generates the forces that change the pitch on the main rotor blades.

Examination of the wreckage indicated that one of the rotor cuffs of the control rotor blade assembly was separated. Metallurgical examination of the broken cuff (P/N 36124-3) at the Safety Board's materials laboratory revealed that the rotor cuff separation occurred as a result of fatigue cracking that initiated from areas of corrosion on the outside diameter of the cuff, adjacent to the inboard retaining bolt hole.

The control rotor cuff is subject to Federal Aviation Administration (FAA) Airworthiness Directive (AD) 77-07-05. This AD requires the removal and dye penetrant inspection of the rotor cuff for evidence of corrosion and cracking, with particular attention given to the four holes for the two retaining bolts. The AD also requires that the inspection be repeated at an interval not to exceed 100 hours of service.

The broken cuff from the accident helicopter had been inspected on September 22, 1991, about 6 months before the accident. In the 6 months between this inspection and the accident, the helicopter had accumulated only 88.8 hours of operation. The operator reported that the helicopter was not utilized during the winter months and was parked outside when not in use. The AD does not impose a calendar time limit on the frequency of inspection. A review of the FAA Service Difficulty Report (SDR) data base

revealed that from January 1, 1986, to February 16, 1994, there were three reports of defective cuff assemblies that were detected during AD inspections.

A representative of your company has reported that, worldwide, there are about 500 helicopters of the type addressed in the AD. The number operating in the United States and subject to the provisions of the AD was not known. The UH-12E helicopter is still being produced, and each new helicopter is subject to the AD.


The Safety Board is concerned that the amount of calendar time elapsed since the previous inspection could have allowed corrosion to worsen and could have caused premature initiation of cracking and ultimate separation of the cuff in less than 100 hours of operation. To reduce the possibility of a cuff separation under these conditions, the National Transportation Safety Board has recommended that the FAA revise Airworthiness Directive 77-07-05 to incorporate a maximum calendar time interval between inspections of the control rotor blade cuff on applicable Hiller UH-12 series helicopters.

AD 77-07-05 establishes a 6,860 hour life limit for the cuff. This means that a given cuff could be inspected at least 68 times before it reaches its life limit. The Safety Board is concerned that this large number of removal and reinstallation cycles on the components increases the possibility of damage that could cause additional failures, and that this large number of inspections may produce complacency with regard to the inspection procedure. Furthermore, revision of the AD to include a calendar time interval would be expected to further increase the potential number of inspections of the cuff. Because of these concerns, the National Transportation Safety Board recommends that Rogerson Aircraft Corporation:

Improve the design of the control rotor assembly cuff on UH-12 series helicopters to eliminate the need for the repeated inspections required by Airworthiness Directive 77-07-05. (Class II, Priority Action) (A-94-79)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation A-94-79 in your reply.

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HAMMERSCHMIDT, and HALL concurred in this recommendation.

  
By: Carl W. Vogt  
Chairman