



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: December 21, 1992
In reply refer to: A-92-125 and -126

Honorable Thomas C. Richards
Administrator
Federal Aviation Administration
Washington, D.C. 20591

Since 1986, the National Transportation Safety Board has investigated 15 accidents involving military surplus helicopters certified in the restricted category and being operated under 14 Code of Federal Regulations (CFR) Part 133 - "Rotorcraft External Load Operations." The Safety Board is concerned that these helicopters were certified in several different Federal Aviation Administration (FAA) regions and that they may have been approved for civilian use by personnel who did not have adequate helicopter expertise. As a result, these helicopters may have been approved for operations for which they were never intended and where their safe operation could not be assured. The following summary of six of the accidents illustrates that drivetrain component failures were unusually common in this accident category.

On May 22, 1991, a military surplus Bell UH-1B helicopter, N87729, crashed near Smith Cove, Alaska. The helicopter was substantially damaged; the pilot was not injured. Investigation of the accident revealed that the Lycoming T53-11D engine suffered a gas producer turbine wheel failure during helicopter logging operations. The engine reportedly had operated only 213 hours since overhaul.

On February 8, 1989, a military surplus Bell TH-1L helicopter, N204AP, experienced a loss of continuity in the drivetrain to the main transmission during flight and was autorotated into a wooded area near Greenville, Florida. The helicopter was substantially damaged; the two crewmembers were not injured. Examination of the drivetrain revealed that the sprag clutch (free wheeling unit) located between the engine and main transmission had failed. Subsequent investigation revealed that the clutch installed was the improper one for the engine/transmission combination. It had been installed 140 hours before the accident.

On June 14, 1988, a military surplus Bell UH-1B helicopter, N3979C, crashed near Warm Springs, Oregon, while conducting an aerial spraying operation for the Department of Agriculture, United States Forest Service. The helicopter was destroyed, and the pilot was killed. Investigation of the accident revealed that the T53-L11D engine had failed in flight while the helicopter was over a heavily wooded area. All but three of the axial compressor blades had separated from the hub just above the blade platforms. Metallurgical examination of the fractured surfaces revealed evidence of high cycle fatigue on blades in all five compressor stages. The engine had accumulated 4,241 hours since new and 780 hours since the

last overhaul. During the investigation, it was found that the rated performance of the failed engine had been higher than that of the T53-9 engine usually installed in this model helicopter, yet the operator was using the standard T53-9 engine performance and maintenance information.

In May 1986, a Bell UH-1L involved in external load operations lost directional control and crashed near Wenatchee, Washington. Investigation disclosed that there was a failure in the 42-degree (intermediate) gear box due to a fatigue fracture of an input pinion gear tooth. Total time on the component was 1,689 hours, 195 hours since the last overhaul. The overhaul interval of the 42-degree gear box, according to the military maintenance manual, is 1,500 hours. Two other accidents, a TH-1L in July 1988, and a UH-1E in August 1988, were also initiated by failure of the 42-degree gear box. Both had been operated less than 50 percent of their expected military service life.

The Safety Board found that other external load accidents involved tail boom cracking (one progressing to an in-flight separation), main and tail rotor blade damage, and failures of hydraulic components of the flight control system. The Board believes that the airworthiness of such military surplus helicopters is being compromised because of the repetitive loadings that occur during external load operations.

A review of the service histories showed that these helicopters had been certificated for civilian use in the restricted category per Supplemental Type Certificate (STC) 1HWE24. The STC was approved in accordance with 14 CFR 21.25(a)(2), which states:

An applicant is entitled to a type certificate for an aircraft in the restricted category for special purpose operations if he shows compliance with the applicable noise requirements of Part 36 of this chapter, and if he shows that no feature or characteristic of the aircraft makes it unsafe when it is operated under the limitations prescribed for its intended use, and that the aircraft is of a type that has been manufactured in accordance with the requirements of and accepted for use by, an Armed Force of the United States and has been later modified for a special purpose.

Under such certification, the equipment is operated and maintained in accordance with the appropriate military technical manuals.

The Safety Board believes that the phrase "operated under the limitations prescribed for its intended use" is significant. Bell Helicopter, for example, designed and produced the UH-1 helicopter to meet military specifications as a utility vehicle. The military used UH-1 helicopters for observation, transportation of troops, and other utility purposes. Military operators did not typically use UH-1 helicopters for extensive heavy, external load operations. Accordingly, Bell's recommended component overhaul and retirement schedules were based on the UH-1's primary use as a utility helicopter. Many other military surplus helicopters, including the Sikorsky H-34 and HSS-1, fall into the same category.


At present, there are 12 different UH-1 and five H-34/HSS-1 supplemental type certificates. Approval of these was granted in different FAA regions. Additional military helicopters will soon be classified as surplus, and the Board expects that operators will continue to seek approval, as before, through all of the FAA's regional offices. The Safety Board believes that the FAA Southwest Region, Helicopter Directorate, which has the greatest helicopter expertise and responsibility, should be directly involved in the approval of any new helicopter supplemental type certificates and the certification of all former military helicopters to assure that the new certificates are issued appropriately and to provide greater assurance that these helicopters will be adequately maintained in the proposed operations. The existing Bell UH-1 and Sikorsky H-34/HSS-1 restricted category certificates should be reviewed and evaluated and, from these, one standard configuration for each military surplus model should be developed. The requirements for airworthiness should include replacement of critical dynamic and drivetrain system components and/or reduction of overhaul intervals to ensure the inherent safety of the helicopter's original design.

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

Develop a program requiring that all new requests for supplemental type certificate approval of military surplus helicopters submitted to any regional office be directed to the Rotorcraft Standards Office of the FAA, Southwest Region, for action. (Class III, Longer Term Action) (A-92-125)

Review existing supplemental type certificates on the Bell UH-1 and Sikorsky H-34/HSS-1 helicopters and, from these, establish standards that must be met for continued operation of these helicopters in the restricted category. (Class III, Longer Term Action) (A-92-126)

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in these recommendations.


By: Carl W. Vogt
Chairman