McDonnell Douglas Hughes 369E, G-SIVA

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Aircraft Type and Registration:	McDonnell Douglas Hughes 369E, G-SIVA
No & Type of Engines:	1 Allison 250-C20B turboshaft engine
Year of Manufacture:	1989
Date & Time (UTC):	21 August 1999 at 1130 hrs
Location:	Shoreham Airfield
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - None
Injuries:	Crew - Nil - Passengers - N/A
Nature of Damage:	Tail rotor blade damaged beyond repair
Commander's Licence:	Private Pilots Licence
Commander's Age:	53 years
Commander's Flying Experience:	Approx. 1,000 hrs total
	Approx. 500 hrs rotorcraft (of which 60 were on type)
Information Source:	AAIB Field Investigation

History of the flight

The helicopter had been flown from Manchester to its owner's private landing site, in eastern Kent, by another pilot. During his pre-flight check at Manchester, this pilot had not observed any damage on the tail rotor. On arrival at the owner's site, the owner boarded the helicopter and flew it himself to Shoreham, the airfield from which it was occasionally operated. Neither pilot could subsequently remember whether the owner had boarded the helicopter with the rotors running, or if it had been shut-down and restarted, and consequently were uncertain as to whether a pre-flight inspection had been performed. After an uneventful 20 minute flight, the helicopter landed at Shoreham where it was shut down and left parked outside the operator's hangar.

The owner was planning to return home in his helicopter, but during his pre-flight inspection on this occasion he noted what appeared to be an 'open cut' in the leading edge of one tail rotor blade. The helicopter was therefore declared unserviceable and the AAIB then informed of the damage.

Examination of the damaged tail rotor blade

Subsequent examination of the tail rotor blade found that the shape and edge characteristics of the cut were consistent with it having been made by an impact with a thin, square faced, metallic object presented 'edge-on' to the rotor blade when the rotor had been running. The cutting action of the impact had sheared out and coiled a narrow strip of blade leading edge material, confirming a high energy impact, and had left sharp corners on both sides of each end of the cut. Forked fatigue fractures had propagated from two of the corners (one on each face of the rotor blade) and the longest had extended to about 1 cm (see Figures). The object which had caused the cut could not be identified from the impact damage but the degree of damage indicated that it had been fairly small. The extent of the fatigue cracks indicated that it was unlikely that they had been developing during the flight time from Manchester.

The owner had just had a new hangar and landing pad constructed at his home site. Being conscious of the hazards, he had taken measures to ensure that all associated debris had been cleared from the site before he attempted to use it. Following this occurrence, a further search of the site did not discover any debris of the type which appeared to have inflicted the damage on the rotor blade.