Replica Campbell Cricket, G-BXCJ

AAIB Bulletin No: 12/99 Ref: EW/G99/09/20 Category: 2.3

Aircraft Type and Registration:	Replica Campbell Cricket, G-BXCJ
No & Type of Engines:	1 Rotax 532 piston engine
Year of Manufacture:	1997
Date & Time (UTC):	26 September 1999 at 1110 hrs
Location:	1 nm south east of Swansea Airport, South Wales
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - None
Injuries:	Crew - None - Passengers - N/A
Nature of Damage:	Damage to wheel axle and rotor blades
Commander's Licence:	Student Pilot
Commander's Age:	50 years
Commander's Flying Experience:	170 hours (of which 34 were on type)
	Last 90 days - 14 hours
	Last 28 days - 7 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

After a normal take off and initial climb straight ahead to a height of 500 feet, the pilot turned the autogyro to the left and continued climbing to 700 feet. However upon levelling at this height the autogyro failed to accelerate, despite the engine sounding normal and running at a constant speed. As the pilot turned downwind, he was unable to maintain height and, after transmitting an emergency call, elected to land in a nearby grass field. Although the engine was still running at its normal speed, the available power continued to decrease. The pilot managed to avoid cattle in the field, but landed heavily causing damage to a wheel axle and the rotor blades.

The two stroke engine fitted to this autogyro runs at high speed, and consequently drives the propeller through an integral reduction gearbox. An output gear wheel is attached to the end of the crankshaft and this meshes with another larger gear on the propeller shaft. Torque from the crankshaft is transmitted to the output gear by friction through a 1:10 taper between the gear bore and shaft. This gear is normally held tightly in contact with the taper by a central bolt screwed into the end of the crankshaft. The bolt is fitted with a spring washer and large diameter plain washer, and is also secured with a locking film applied to its threads. Additionally, the direction of rotation is such that this bolt tends to tighten when the engine is running.

Upon examination of the engine after the incident, it was found that the bolt was not tight and that the output gear had been rotating relative to the crankshaft, thereby reducing the rotational speed of the propeller. It was reported that there was evidence of locking film on the bolt threads. Although the engine was several years old, the present owner reported that it had run for only some 32 hours since new. It was not known whether during this time the engine gearbox had been dismantled. Enquires made of the import agent for this type of engine, which is no longer in production, indicated that such loss of output drive had not been known to have occurred previously.