

ACCIDENT

Aircraft Type and Registration:	Pegasus Quantum 15, G-MZIU	
No & Type of Engines:	1 Rotax 582-48 piston engine	
Year of Manufacture:	1997	
Date & Time (UTC):	6 August 2009 at 0849 hrs	
Location:	Lepton, near Huddersfield, West Yorkshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - 1 (Serious)	Passengers - None
Nature of Damage:	One propeller blade detached and damage to the engine	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	49 years	
Commander's Flying Experience:	2,414 hours Last 90 days - 45 hours Last 28 days - 11 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The aircraft was en-route from Rufforth Airfield to Crosland Moor Airfield when a blade of the three-bladed propeller detached near its root. The consequent severe vibration caused an upset from controlled flight and led to components detaching from the engine. When control was regained, the pilot performed a successful forced landing, although he suffered spinal injuries during the event and after exiting the aircraft.

Rufforth. After about 20 minutes, having climbed to 1,800 ft amsl, the pilot descended to 1,100 ft amsl for a scenic view of a canal and, after doing this, he set a 'cruise-climb' power level of 6,200 rpm to reach an altitude of 2,200 ft amsl (1,700 ft agl). He spoke to Leeds Bradford Airport to reset his transponder code and requested a radio frequency change to Crosland Moor Airfield.

History of the flight

The aircraft had been housed, fully rigged, in a hangar at Rufforth Airfield when the pilot and passenger arrived for a flight to Crosland Moor Airfield, some 30 minutes flying time away. After a normal pre-flight inspection, they departed the tarmac runway at

As the aircraft was climbing with a bank to the right of about 20°, the pilot reported that there was suddenly, and with no warning, "an incredibly loud banging and violent shaking" and the aircraft rolled to the right to more than 60° and entered a spiral dive. The pilot recalled that he heard a "SINK RATE SINK RATE PULL UP

PULL UP” message from his GPS-based terrain warning equipment, indicating that he had exceeded 1,500 fpm rate of descent in the dive. The engine stopped and he manoeuvred the aircraft using full control inputs to arrest the spiral and slow the aircraft to its minimum rate of sink speed. He had made a ‘MAYDAY’ call to Leeds Bradford Airport and they replied that they were able to track his position from his transponder code.

Having regained control, the pilot asked the passenger to look behind and report the damage, receiving the reply that “half the propeller is gone, the carburettors and airbox are missing and the engine is ‘hanging off’”. As the pilot turned his attention back to navigating the aircraft, he heard the GPS equipment call “TERRAIN TERRAIN PULL UP PULL UP” which signified that the aircraft was below 500 ft agl. He selected a large field on a hillside in front of him which, although far from ideal, was the only landing option available to him. A satisfactory forced landing was performed on the 15° upslope, which was sufficiently steep for the aircraft to roll backwards despite the application of full braking. The passenger climbed out and held it from behind until the Air Ambulance helicopter arrived. The pilot commented that its arrival was “very prompt”.

The pilot, whose helmet was severely damaged by an impact from the ‘A’ frame during the initial loss of control, exited the aircraft in a dazed condition. It later transpired that this impact had caused a fracture of his neck vertebrae and disc damage. He was also diagnosed as having damaged vertebrae in his lower back when he had fallen during his evacuation of the aircraft. He subsequently was hospitalised for thirteen days after the accident.

Examination of the aircraft

One complete propeller blade had detached at its root whilst in-flight but the missing portion of the blade was not recovered. The resulting imbalance had caused severe vibration leading to the detachment of the carburettors and exhaust, and damaged the engine mounts. The aircraft did not appear to have been damaged further during the subsequent forced landing.

The piece of propeller blade remaining in the hub was removed and examined. The construction was typical of such propellers inasmuch as it comprised a glass and carbon fibre reinforced outer skin with a white foam core. The blade had fractured close to where the composite material was bonded into a metal blade grip. Visual examination by a specialist organisation did not suggest that there was an obvious reason for the failure, although the owner had reportedly shown the piece to an associate with expertise in composite fractures who had reported that there were signs of a pre-existing crack in the fracture region. Anecdotal evidence has suggested that the aircraft may have previously been involved in a minor accident, and although it is not known whether the propeller sustained any damage during this previous accident, it had not been replaced.

A report was published in AAIB Bulletin 7/2010 of an accident involving an X’ Air 582(1) microlight aircraft (G-BZAF) which had an in-flight delamination of a similarly constructed propeller blade, made by a different manufacturer from that fitted to G-MZIU. This propeller blade had not detached completely, but the consequent severe vibration and subsequent forced landing resulted in the aircraft being damaged beyond economic repair. Discussion with the British Microlight Aircraft Association (BMAA) does not

suggest that there are any current significant safety issues with composite propeller integrity, although both they and the AAIB are continuing to monitor trends.