Chaser S, G-MVZY

AAIB Bulletin No: 9/2003	Ref: EW/C2003/04/03	Category: 1.4
Aircraft Type and Registration:	Chaser S, G-MVZY	
No & Type of Engines:	1 Rotax 377 piston engine	
Year of Manufacture:	1989	
Date & Time (UTC):	13 April 2003 at 1602 hrs	
Location:	Clitheroe, Lancashire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers - N/A
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	25 years	
Commander's Flying Experience:	93 hours (of which 50 were on type)	
	Last 90 days - 7 hours	
	Last 28 days - 7 hours	
Information Source:	AAIB Field Investigation	

History of flight

The pilot departed from Askham private farm strip near Doncaster at 1440 hrs and was intending to land at Brooks Farm strip near Blackpool. On departure there was little cloud, good visibility and a south-easterly wind of approximately 18 kt. The aircraft was last seen four miles south-west of Clitheroe, flying in a generally westerly direction at a height of approximately 100 feet, with the engine still running. One mile further west the aircraft crashed into open countryside.

Although no one witnessed the impact there were several reports from witnesses during the last five miles of the flight. They all reported that the aircraft appeared to be being thrown about by gusty wind conditions and that the pilot was experiencing a 'rough ride' but that there did not appear to be any particular problem with the aircraft or pilot.

An aftercast from the Meteorological Office at Bracknell showed that a moderate to fresh south-south-easterly wind flow was covering the British Isles with the wind in the accident area assessed to be 130°/18 kt gusting to 27 kt at the surface. The low level forecast suggested isolated moderate turbulence below 6,000 feet. At 1600 hrs that afternoon, gliders operating from Samlesbury Aerodrome, approximately seven miles south-west of the accident site, ceased flying because of turbulent conditions, with windshear experienced at low level over the airfield. The accident site is eight miles directly downwind of Pendle Hill, where a ridge of hills rises to over 1,800 feet, increasing the likelihood of turbulence in the area.

The pilot had held his microlight licence for 19 months and had flown the return route to Doncaster on several previous occasions. He had flown little over the preceding winter months but after the

aircraft had regained its Permit to Fly on 29 March 2003, he had flown three times before embarking on this flight.

The post mortem examination of the pilot did not reveal evidence of any factors which could have contributed to the accident.

GPS Route Information

The pilot was carrying a hand held GPS that recorded data on the route flown. This showed a series of sharp turns on the eastern face of Pendle Hill, 10 miles east of the accident site, which could be consistent with the pilot having engaged in ridge soaring. The data indicated that the aircraft then accelerated over the top of the hill, tracking downwind, and reached a GPS recorded groundspeed of 148 mph. The data further indicated that the aircraft then entered a series of gentle turns, with a mean easterly track, which led to the vicinity of the accident site. The last GPS readout showed the aircraft tracking 297°, with a groundspeed of 76 mph, at a position approximately 100 metres from the impact point.

Aircraft information

The Chaser S is a conventional single-seat flex wing microlight aircraft with a battened, double surface, fabric wing, which is internally and externally braced with tubes and wires. The pilot is seated within a tubular frame or tricycle (known as a 'trike'), which is suspended from the wing. The aircraft is powered by an air-cooled two-stroke engine mounted on the trike behind the pilot, driving a two-bladed wooden pusher propeller. The engine is started manually by using a handle attached to a pull cord. Trials showed that it was unlikely that the pilot could pull the starter cord from his seated position in the trike as it would have been very difficult to reach and considerable force would have been required. Had the engine stopped for any reason, the pilot would probably not have been able to restart it in flight.

Wreckage information

The wreckage was initially inspected at the accident site. From examination of the damage to the aircraft and the nature of the impact marks in the hard soil, it was apparent that the aircraft had struck the ground with considerable force in a predominantly nose down attitude. The trike frame was extensively damaged, having contacted the ground on its nose and left side. The wing itself was largely undamaged, with the exception of the right wing leading edge tube, which had broken off at a point approximately one metre inboard of the tip, at the outboard end of a locally reinforced section. The failure of the tip was in a downwards and rearward direction. The three outermost lower surface profile battens from both the left and right wings had come out of their pockets. Of these, three were found scattered approximately 30 metres upwind and the other three up to 25 metres roughly downwind of the crash site. These battens, which help to maintain the aerofoil profile of the wing, are slid into chordwise pockets and rely on the wing tension to provide the friction to retain them in the pockets.

The propeller was completely undamaged, with no evidence of it having contacted either the ground or any part of the aircraft's structure or fabric. This suggested that the engine may have been stopped at the time of impact. The fuel tank contained approximately seven litres of fuel and there was fuel present in the fuel lines to the carburettor and within the carburettor float bowl. No debris was found in the external fuel filter or within the carburettor. The ignition switch was in the 'ON' position and the engine turned freely and was confirmed to produce compression. The spark plugs exhibited a normal coloration with no signs of contamination.

The wreckage was recovered to the AAIB facility at Farnborough where it was examined with the assistance of technical representatives from the aircraft and engine manufacturer. No fault was found with the aircraft structure and the rigging of the wing was found to be in accordance with the manufacturer's specified limitations.

The engine was test run in the 'as found' condition, using the fuel recovered from the aircraft. It started immediately and ran satisfactorily at all power settings. A test run was performed with the engine running at idle for ten minutes before making rapid applications of throttle to simulate, in as far as was possible, the effects of the engine being throttled back in flight for an extended period. The engine accelerated smoothly in all cases with no signs of hesitation.

Despite extensive investigation, no defects were found with the aircraft that could explain the apparent loss of control and impact with the ground. The nature of the damage sustained by the right wing tip was such that it could have occurred as a consequence of the impact with the ground. It is also possible that the wingtip could have failed in flight as a consequence of a download on the wing induced by the very turbulent conditions that the pilot found himself in. Had the wingtip failed in flight, it would have led to an immediate loss of control of the aircraft. The loss of the tension in the trailing edge fabric would have allowed the fabric to flutter and shake the lower battens out of their pockets whilst the aircraft was still in the air, scattering them around the crash site. There was insufficient evidence to determine which of these two scenarios was the more probable.

Aircraft maintenance history

The aircraft maintenance records were found to be in order. The aircraft had been subjected to the required annual technical inspection by a BMAA approved engineer on 29 March 2003 for the purpose of renewal of its annual Permit to Fly and was check flown on the same day by a BMAA approved check pilot. The aircraft passed the technical inspection and performed as expected during the check flight. The Permit to Fly was renewed accordingly on 29 March 2003.

Discussion

The aircraft had recently had its Permit to Fly renewed. During this process it had been subjected to a test flight by a BMAA check pilot who had passed no adverse comments on its handling characteristics. Although relatively inexperienced, the accident pilot was qualified, in current flying practise and familiar with the route he was flying. The strength and direction of the surface wind were potentially the most influential and unusual factors at the time of the accident.

The strong easterly wind would have created demanding flying conditions with the possibility of waves and rotors being produced off the hills with their associated turbulence. The evidence from the GPS indicated that the pilot may have used the wind effects to soar off the eastern edge of Pendle Hill and then flown at a high ground speed down the western side towards Clitheroe. To the west of Clitheroe, witnesses recalled that there had been turbulent conditions; these might have given rise to handling difficulties as the pilot manoeuvred at very low level. These conditions may have caused the pilot to lose control with insufficient height to allow recovery.

It is also possible that the engine may have stopped, requiring the pilot to attempt a forced landing. At low level this would require immediate manoeuvring without power into the selected forced landing area, increasing the possibility of stalling the wing and losing control in the gusty conditions.

The possibility of a structural failure in the air was also considered. However, there was insufficient evidence, from either the examination of the wreckage or eye witnesses, to indicate whether a structural failure had occurred, either as a result of overload due to the turbulence or any pre-existing aircraft defect.

It has, therefore, not been possible to determine, conclusively, the cause of this accident.