Avid Speed Wing, G-BTRC

AAIB Bulletin No: 10/99 Ref: EW/G99/06/30 Category: 1.3

Aircraft Type and Registration:	Avid Speed Wing, G-BTRC
No & Type of Engines:	1 BMW 1000cc piston engine
Year of Manufacture:	1991
Date & Time (UTC):	25 June 1999 at 0834 hrs
Location:	Chichester Airfield, Goodwood, West Sussex
Type of Flight:	Private (test)
Persons on Board:	Crew - 1 - Passengers - None
Injuries:	Crew - None - Passengers - N/A
Nature of Damage:	Minor damage to nose and left main landing gears
Commander's Licence:	Private Pilot's Licence
Commander's Age:	58 years
Commander's Flying Experience:	382 hours (of which 320 were on type) Last 90 days - 35 hours Last 28 days - 18 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and AAIB telephone inquiries

The aircraft is a homebuilt two-seat high-wing monoplane with tricycle landing gear. It was on its first flight after the installation of a converted BMW motorcycle engine in place of the normal Rotax 582 engine. The aircraft was operating on a Permit to Fly and had a valid Certificate of Fitness for Flight for the test flight, issued by the PFA. The flight was recorded on video. The weather was good, with wind light and variable. The aircraft took off on Runway 14 at Chichester (Goodwood) Airfield, a grass runway 1,287 metres long with a good surface that was dry at the time.

It was reported that take off was normal and the aircraft was climbed at the normal speed of 65 mph. Approximately 10 seconds into the climb at a height of around 50 feet agl the engine abruptly lost power. The pilot lowered the nose but found that the speed and height were insufficient to flare adequately and a heavy landing occurred. Minor damage resulted to the nose leg and the left main landing gear. There were no injuries.

The replacement powerplant was a 1000 cc twin-cylinder air-cooled engine rated at approximately 80 bhp that had been modified for the application, with twin electronic ignition and a gravity-fed carburetted fuel supply. The engine drove a reduction gearbox with a centrifugal clutch that was intended to eliminate possible problems of torsional vibration at low rotational speed and had the

effect of stopping the propeller at low engine RPM. The original Rotax engine had an integral vacuum-driven fuel pump. Testing before the flight had included a check of engine operation with the aircraft in a nose-up attitude, obtained by rotating it about the mainwheels until the rear fuselage contacted the ground. After the accident it was considered that this attitude may not have been steep enough to represent the aircraft's climb attitude and further testing was carried out with the mainwheels on 9 inch pallets and the rear fuselage on the ground. In this attitude the engine lost power and ran roughly after 10 seconds at full power. The carburettor inlet fuel pressure was found to be approximately 0.3 psi. It was therefore concluded that the accident had been caused by fuel starvation.

It appeared possible that in the accident circumstances the centrifugal clutch could prevent the windmilling propeller from driving the engine and restarting it when the lowering of the aircraft's nose allowed gravity fuel feed to the carburettor to resume. A restart would then require operation of the electric starter. However, the aircraft owner had found that the clutch disengaged only when the engine was at idle and the airspeed was very low and the evidence indicated that this combination had not been present on the accident flight.

After repair of the minor damage the fuel system was modified to include two electric fuel pumps, one running continuously and one selected on for take off, with a return bleed to prevent overpressure. The aircraft has subsequently flown for a number of hours without a repeat of the problem.