

No: 11/92

Ref: EW/G92/06/23

Category: 1c

Aircraft Type and Registration:	Avid Flyer Commuter, G-BTNP	
No & Type of Engines:	1 Rotax 582 piston engine	
Year of Manufacture:	1992	
Date & Time (UTC):	25 June 1992 at 1845 hrs	
Location:	Swardeston, Norfolk	
Type of Flight:	Private (Test flight)	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - Minor
Nature of Damage:	Nose-wheel broken off, propeller broken, damage to engine cowling, wing support struts and fuselage longerons	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	47 years	
Commander's Flying Experience:	1,570 hours (of which 6 were on type) Last 90 days - 5 hours Last 28 days - 3 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, telephone enquiries and engine strip-examination carried out under AAIB supervision.	

The pilot reported that he was carrying out a test flight to investigate handling at higher all-up weight. Following a gentle descent from approximately 1,600 feet to 900 feet and a left turn through 90°, the engine 'coughed' and shortly afterwards stopped. The pilot then selected a field for a forced landing. He carried out an unsuccessful attempt to start the engine during the final approach, which was reportedly conducted at about 75 mph, some 15 mph higher than normal. Despite this excess speed, and full up elevator the pilot was unable to prevent the aircraft hitting the ground nose-wheel first, then travelling some 15 yards forward before becoming inverted.

A partial strip- examination of the engine was carried out by the United Kingdom importer of the Rotax engine type, in the presence of an AAIB Engineering Inspector. The ignition system was also functionally tested. This work revealed no evidence of any mechanical or electrical failure in the engine. A number of factors were noted, however, which may have influenced the engine's operation.

These were as follows:-

- 1 A bolt attaching the tubular support frame for the exhaust system was found to be loose.
- 2 The pressure-pulse tube between the crank-case and the fuel pump was found to be loose at its crank-case connection.
- 3 The small residue of fuel in one of the carburettors appeared to be mixed with oil.

The bolt mentioned in item 1 was also one of the four bolts which secured the face of the rotary-valve casing to the crank-case. Slackness of any of these bolts is thought to be capable of permitting some air leakage into the induction system downstream of the carburettor. Any such leakage would weaken the mixture.

The pressure-pulse tube allows the rapid pressure changes in one of the crank-case chambers to be transmitted to the fuel-pump where it causes the pump diaphragm to oscillate, thus pumping fuel to the carburettors. It is understood that the engine requires a head of fuel considerably in excess of that provided by the gravity effect of the fuel system alone, in order to function correctly. Pressure leakage at the connection to the crank-case could thus lead to loss of effectiveness of the fuel pump, leading to possible low float-chamber fuel-levels and resulting weak mixture under some circumstances.

The material of the tube was a transparent plastic, with textile reinforcement, which appeared to have hardened somewhat in service. The 'Jubilee' type clip securing it was of a larger type than that normally used with tubing of this small diameter. It appeared that use of the clip had caused the tube to be clamped in an imperfectly circular form and the local hardening of the tube material may have further contributed to a loss of sealing at the joint.

This variant of the engine type has a pump system which supplies oil from an oil tank into the the mixture downstream of the carburettors. The engine manufacturers state that in addition to this oil system, a fuel-oil mix should be used for the initial run of a new engine of this type to ensure adequate lubrication. Continued use of a fuel-oil mix in the fuel-tank after initial running, however, can result in too great a ratio of oil to fuel arriving at the cylinders, leading to plug-fouling. The owner stated that he had used a fuel-oil mix in the fuel tank for the initial run as recommended and had thereafter used only pure 4 star fuel. It is considered possible that some residue of oil may have remained in the fuel-system after the initial run and flowed to the engine at a later date affecting sparking-plug performance.