ACCIDENT

Aircraft Type and Registration:	Denney Kitfox Mk 3, G-BTMX
No & Type of Engines:	1 Rotax 582 piston engine
Year of Manufacture:	1993
Date & Time (UTC):	6 August 2006 at 1445 hrs
Location:	Near Wheaton Ashton, Staffordshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 Passengers - 1
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	54 years
Commander's Flying Experience:	255 hours (of which 70 were on type) Last 90 days - 6 hours Last 28 days - 4 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

A few minutes into a short local flight the engine stopped without prior warning. The pilot selected a field in which to land, however as he flew closer to this field on the downwind leg he became aware of cables crossing the field. He then selected another field, but the aircraft had insufficient height to reach this and landed short in cereal crops some three to four feet high.

Both occupants, who had been wearing full harnesses, were air-lifted to hospital suffering from spinal fractures and other injuries. The engine failure was later attributed to a big-end bearing failure.

History of the flight

The aircraft was a few minutes into a short local flight and was returning to Otherton. Due to the short distance of the intended flight, the pilot decided to cruise at 1,000 ft amgl. During the flight the engine suddenly stopped and the pilot was unaware of any warning of engine failure.

The pilot selected a field and commenced a downwind leg for an approach. His passenger noticed some cables in the selected field and notified the pilot. The pilot was unable to see the cables but was conscious of the aircraft's lack of height, and quickly selected another field slightly further downwind. This field appeared, from pictures taken by the Police Air Support Unit after the accident, to be suitable in both size and surface

condition for a forced landing. However, on final approach the aircraft was too low to reach the intended field and landed approximately 80 m short in another large field containing a three to four foot high cereal crop. During the landing the aircraft slewed round 180º and decelerated rapidly.

The pilot crawled out of the aircraft through a door and called the emergency services using a mobile phone. Both occupants, who had been wearing full harnesses, were airlifted to hospital suffering from spinal fractures and other injuries.

Although the aircraft was upright and largely intact, there was damage to the propeller, left wing leading edge, both landing gear legs, the underside of the fuselage, and significant damage to the rear fuselage. As a result the aircraft was written off.

Weather

The pilot reported the wind to be light and variable. The Police Air Support Unit reported the wind near the surface to be from 265º at 6 kt, and from the Police photographs, the aircraft was tracking approximately into wind for the landing. This latter wind direction and speed agrees well with the Met Office's aftercast for the area at that time. The wind does not appear to have been a significant factor in this accident.

Pilot's comments

The pilot had 250 hours experience on all types and had made two successful forced landings on previous occasions. He also routinely practised forced landings during local flights and estimated that he would practise forced landings at least 12 times a year. On this occasion the low cruising height, due to the short distance between departure and arrival airfields, and the presence of cables in the field that was initially selected, both presented a more demanding situation than he encountered during training, and contributed to him being unable to reach the intended field.

The pilot also noted that he never used the flaps on the aircraft since the small reduction in stall speed was offset by reduced aileron effectiveness. Whilst a reduction in flying speed when the aircraft struck the crop might potentially have been obtained had the flaps been deployed prior to touchdown, not using the flaps maximised the aircraft's range in the glide.

Forced landings without power

Typical advice for pilots for choosing a suitable field for a forced landing includes selecting a field that is well within gliding range, free from obstructions (particularly in the undershoot and overshoot areas) and with a suitable surface. Once the engine has stopped the drag will increase and the glide angle is steeper than during a practice forced landing when the propeller is still rotating.

Engine information

The Rotax 582 is a two-cylinder, two-stroke engine. There are two versions, the -90 and the -99 (also known as the blue top). The engine fitted to G-BTMX was the 582-90, and for this engine the crankshaft assembly includes the big-end bearings and connecting rods. The manufacturer recommends that after 300 hours the engine should be overhauled, and this includes the replacement of the complete crankshaft assembly.

The engine was removed from the aircraft and stripped. The big-end bearing on the front cylinder was found to have failed. The engine had completed 325 hours, all with this crankshaft assembly. An inspection had been carried out at 294 hours and this included an inspection of the crankshaft and bearings; however the crankshaft assembly was not replaced.

A discussion with the UK distributor for the engine concluded that a big-end bearing with a similar utilisation and operating hours as this engine could be passed as satisfactory at an inspection and could still fail within about 10 to 15 hours of use.

Discussion

The aircraft suffered an engine failure, something which pilots of single engined aircraft are trained to anticipate, and land successfully from the subsequent forced landing. The pilot selected a field which, at a late stage, turned out to be unsuitable and he was then poorly placed to rectify the situation. As a result he was then unable to reach a suitable field and the field in which the aircraft subsequently landed contained a three to four foot high cereal crop.

Whilst the engine was not maintained in accordance with the manufacturer's recommended schedule, the replacement of the crankshaft assembly after 300 hours is not mandatory. The engine in this, and many similar small aircraft, is not certificated, and in the event of an engine failure a pilot should be able to make an adequate forced landing.

Pilots of single-engined aircraft should be aware of the importance of selecting a suitable field within gliding range given the aircraft's glide performance. They should also be aware that the glide angle will normally be steeper when the engine has stopped. Identification of cables and other obstructions at an early stage is a high priority, as late identification of such hazards can make it impossible to complete a successful forced landing.