ACCIDENT

Aircraft Type and Registration:	Easy Raider, G-CCJS
No & Type of Engines:	1 Jabiru 1600 piston engine
Year of Manufacture:	2007
Date & Time (UTC):	27 April 2007 at 1100 hrs
Location:	Near Andreas Airfield, Isle of Man
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Serious) Passengers - 1 (Serious)
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	69 years
Commander's Flying Experience:	5,000 hours (of which 10 were on type) Last 90 days - 30 hours Last 28 days - 15 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB

Synopsis

The newly constructed aircraft was undertaking the second in a series of test flights for the issue of a Permit to Fly. After takeoff the aircraft's climb performance was inadequate to maintain sufficient terrain clearance with rising ground ahead and the pilot attempted to return to the airfield. During this manoeuvre the aircraft stalled at low level, impacting the ground seriously injuring the two occupants.

Background

The aircraft was undergoing flight tests to enable issue of its initial CAA Permit to Fly. It was fitted with a Jabiru 1600 engine: the first time the British Microlight Aircraft Association (BMAA) had experienced this type of engine. The aircraft type is normally fitted with the Rotax 503 engine, which has a similar power rating to the Jabiru 1600, or the Jabiru 2200, which is a more powerful derivative. BMAA inspections, during and on completion of construction, revealed no problems with the aircraft. These inspections included tests of the flying controls and appropriate control surface deflections.

The pilot had flown a single flight on the aircraft prior to the accident. This had been a solo flight, taking off from Runway 11 at Andreas Airfield on the Isle of Man. The pilot stated that the flight had been successful, although he noted that one-fifth right rudder was continuously required to maintain directional control.

The pilot intended to conduct the next flight at approximately 90% of the aircraft's maximum takeoff weight. In order to achieve this, the owner of the aircraft had been specifically approved by the BMAA to act as an observer, sitting in the rear seat during the flight. There are no controls or flying instruments associated with the seating position. The aircraft was loaded with 20 kg of fuel which gave a stated takeoff weight of 430 kg, 20 kg under the aircraft's maximum permitted takeoff weight of 450 kg.

History of the flight

The aircraft took off from Runway 05 at Andreas Airfield shortly before 1100 hrs at which time the surface wind was 060/12-15 kt. The pilot reported that the takeoff was normal but the initial climb, flown at 40 kt IAS, seemed "sluggish" with a rate of climb of no more than about 300 ft/min. Due to rising ground beyond the end of the runway the aircraft's terrain clearance did not increase significantly. The pilot recalled that at a height of about 200 ft agl, the aircraft began to sink, probably due to a downdraft caused by the effect of the wind acting on two adjacent hills in the area. During a left turn back towards the airfield, the aircraft then stalled and entered an incipient spin to the left. There was insufficient height to recover and the aircraft hit the ground in a steep nose-down attitude and banked to the left.

The pilot received serious injuries including multiple fractures to both legs and the aircraft owner suffered a broken ankle. However, the owner was able to pull the pilot clear of the aircraft. It was severely damaged in the accident and fuel was leaking from the wreckage although there was no fire.

Analysis

The pilot questioned whether the aircraft's climb performance met the standard required under the flight test schedule of being able to achieve 1,000 ft in four minutes under ISA conditions. He also commented on the need to use continuous right rudder during the first flight which he believed could probably have been resolved by the fitting of a fixed trim tab to the rudder. He stated that no adjustments had been made to the flying controls or control surfaces between the flights and that right rudder was again required to maintain direction during the second flight.

The pilot assessed the cause of the accident as a combination of the rising terrain after takeoff, poor climb performance of the aircraft and the wind conditions. In an attempt to maintain clearance from the terrain, the pilot probably maintained a steep climbing attitude with a correspondingly low airspeed. At the same time he was correcting the aircraft's constant left yaw with right rudder. In banking the aircraft left to return to the airfield it is probable that the stall speed was raised sufficiently to induce a stall with a combination of rudder input and bank angle causing the wing to drop to the left.

Conduct of BMAA test flights

The BMAA consider that the carriage of approved observers during flight tests can enhance safety by helping with such tasks as recording information and looking out for other aircraft. Normally such observers are qualified pilots and it is considered that they are therefore aware of the risks entailed by such flights. Where they are not qualified pilots, the BMAA stated that they explain such risks to them in writing as part of the observer approval process. The BMAA considers the benefits of flying with a suitably qualified observer outweighs any increased risk such test flights impose, especially as the majority of types flown already have well established flight characteristics. They also added that ballast does not necessarily replace an observer; it just allows aircraft to be loaded for performance testing.

As this accident demonstrates, however, it may be more appropriate to use ballast instead of an observer where there is no danger of the ballast itself causing potential problems and where an observer can contribute little to the safety of the flight. The BMAA currently provides no information on the use of ballast during test flights.

General advice from the BMAA on the planning, risk assessment and conduct of test flying is not currently available although it is understood that a test pilot's handbook is currently being compiled. The following Safety Recommendation is therefore made:

Safety Recommendation 2007-125

It is recommended that the British Microlight Aircraft Association provide written advice on appropriate planning, risk assessment and conduct of test flights that specifically includes use of ballast during such flights.