ACCIDENT

Aircraft Type and Registration:	Alpi Pioneer 400, G-CGVO
No & Type of Engines:	1 Rotax 914-F piston engine
Year of Manufacture:	2011
Date & Time (UTC):	29 August 2011 at 1015 hrs
Location:	Shobdon Aerodrome, Herefordshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Detached noseweheel, damage to propeller tips, paint damage and detached left door
Commander's Licence:	Private Pilot's Licence
Commander's Age:	67 years
Commander's Flying Experience:	1,551 hours (of which 43 were on type) Last 90 days - 21 hours Last 28 days - 9 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and additional AAIB inquiries

Synopsis

As the aircraft rotated during takeoff, the left-hand door suddenly opened and became detached. The aircraft landed heavily on its nose landing gear on the runway, resulting in the nosewheel breaking off and consequent damage to the propeller tips. The aircraft featured doors of a 'gull-wing' design and it is likely that there was insufficient engagement of the latching bolts with the door frame. The latching mechanism has subsequently been redesigned.

Aircraft details

The Alpi Pioneer 400 is a low-wing monoplane and is a four-seat development of the Pioneer series of aircraft, with access to the interior being via gull-wing doors, as opposed to sliding-canopy designs used on earlier models. The aircraft did not yet have a full Permit to Fly in the United Kingdom; progress towards this objective was being managed by the Light Aircraft Association (LAA) in conjunction with the CAA and, at the time of the accident, was being operated under a Permit Flight Release Certificate granted by the LAA. This enabled a programme of test flights to be undertaken.

History of the flight

Prior to the accident flight the aircraft had been loaded to within a few kilograms of its maximum all-up weight

for the first time. The pilot stated that he had checked that the doors were secure but, just as the aircraft was rotating into the takeoff attitude, the left-hand door suddenly opened and detached from the aircraft. The pilot landed the aircraft back on the runway from a height of around 5 ft but the touchdown was initially on the nosewheel and was sufficiently heavy to cause it to break off. The propeller tips were damaged as the aircraft nose contacted the ground.

The aircraft had achieved a total of 12 hrs 50 mins total flight time over 23 flights.

The investigation

On this aircraft type, the cabin entry doors are made from carbon fibre with some internal foam stiffening; the windows are moulded Perspex. The gull-wing design entails each door being attached to the fuselage at the top edge by a hinge on an extension. In fact the hinge functions more as a ball joint, as there are no conventional hinge pins; thus there is a lack of rigidity in comparison to a door with two separate hinges. The door latching mechanism consists of three conical pins which emerge from the door frame at the front, lower centre and rear, operated by an over-centre handle. The three pins engage a blind, shallow hole in the front door post, a deeper hole in the rear post and an override plate on the door sill.

The detached left door was recovered from the runway and it was noted that the handle was in the closed position.

The aircraft was later examined by an LAA Inspector, who made several comments on the design of the door mechanism. These included the apparent limited engagement depth of the pins and the fact that the handle rotated through 90º as opposed to the more usual 180º. Also, the blind hole at the front appeared unnecessarily shallow, with the attendant possibility of a 'crippling' load being applied to the door in the event the pin 'bottomed out'.

The LAA reported that the aircraft manufacturer has redesigned the door latching mechanism to include significantly greater depth of engagement of the locking pins.