ACCIDENT

Aircraft Type and Registration:	RL7A XP Sherwood Ranger, G-CHHD	
No & Type of Engines:	1 Jabiru 2200A piston engine	
Year of Manufacture:	2012 (Serial no: LAA 237A-15054)	
Date & Time (UTC):	16 August 2015 at 1605 hrs	
Location:	Druridge Bay Airfield, Northumberland	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Minor)	Passengers - N/A
Nature of Damage:	Damage to propeller, engine cowlings and wings; engine shock-loaded	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	70 years	
Commander's Flying Experience:	855 hours (of which 16 were on type) Last 90 days - 12 hours Last 28 days - 12 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Summary

During a takeoff run, the right main wheel failed and the aircraft nosed over. The failure was probably the result of insufficient torque being applied to the wheel's attachment nuts during original assembly.

History of the flight

Following an uneventful flight into Druridge Bay Airfield earlier in the day, the pilot was taking off from the grass runway for the return flight to his home base at Eshott. Approximately 8 seconds into the takeoff run, just as the aircraft was about to become airborne, the right main wheel suddenly failed, with the broken remains of the wheel digging into the ground and causing the aircraft to nose over. The aircraft came to rest in an inverted attitude, at an angle to the runway heading. With some difficulty, the pilot managed to release his harness and he dropped onto the ground; he was then able to escape from the aircraft having sustained minor injuries.

The investigation

The right wheel was constructed from two aluminium halves which were bolted together. It was found that the outer half had failed circumferentially, which had allowed the outer rim to separate.

This aircraft was administered by the Light Aircraft Association (who published an article on this accident in the October 2015 edition of their '*Light Aviation Magazine*') and the components were sent to them for examination. Figures 1 and 2 show the wheel in the as-received condition.

Photo: LAA

Figure 1

G-CHHD right main wheel

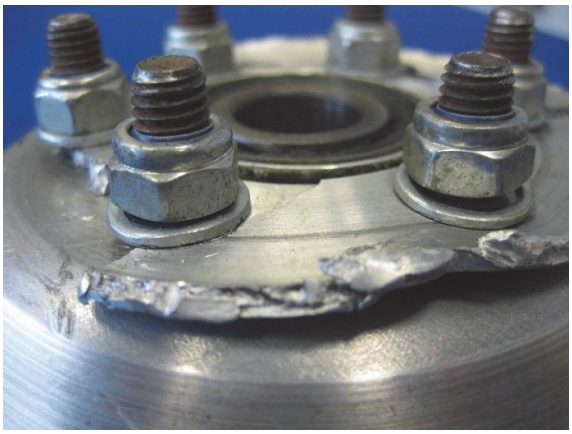

Photo: LAA

Figure 2

G-CHHD right main wheel - detail

The LAA's examination revealed that two of the six attachment bolts were not fully tightened down, which left a gap of around 1.5 mm (see Figure 2), with another bolt noted as being loose. Corrosion products were observed near one of the loose bolts (see Figure 3), with evidence pointing to fretting that occurred as a result of relative movement between the two halves in service.

Photo: LAA

Figure 3

Showing corrosion products and radial crack

A radial crack is visible in Figure 3, which would have occurred during the circumferential progression of what was determined to be a low-cycle fatigue crack. The remainder of the failure was attributed to overload. It was concluded that the failure probably resulted from insufficient torque being applied to the attachment nuts during the initial assembly. (Note: this aircraft was constructed by a previous owner).

The LAA commented that as far as they were aware, this was the first failure of this nature over many years of use of this aircraft type. G-CHHD was in fact a Group 'A' aircraft as it was the heaviest of the Sherwood Ranger variants. However, the LAA stated that adequate strength had been demonstrated by conducting drop tests at the highest aircraft weight.

Of some concern in this accident was that the pilot risked more serious injury by releasing his harness whilst inverted, such that he dropped head-first onto the ground. Many people were on the airfield at the time; however, rather than await rescue, the pilot reported that he could smell escaping fuel, which prompted him to take immediate action.