

ACCIDENT

Aircraft Type and Registration:	Robin HR200/120, G-GBXF	
No & Type of Engines:	1 Lycoming 0-235-J2A piston engine	
Year of Manufacture:	1975	
Date & Time (UTC):	28 January 2008 at 1537 hrs	
Location:	Alderney, Channel Islands	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Lower section of right main landing gear detached, slight buckling to flap trailing edge and paint scoring on wing underside	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	50 years	
Commander's Flying Experience:	3,037 hours (of which 920 were on type) Last 90 days - 69 hours Last 28 days - 14 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and metallurgical examination by AAIB	

Synopsis

Following a slightly heavier than normal landing, the right main landing gear wheel/axle unit, together with the lower part of the oleo piston tube, separated from the outer tube of the leg. A failure of the oleo piston tube due to fatigue cracking was found to have been present for some time.

History of the flight

The flight was planned as 'refresher' training for the pilot under instruction, who held a PPL. After carrying out a normal visual approach in calm conditions to Runway 26 at Alderney, the instructor stated that the subsequent landing was slightly heavier than normal,

but otherwise satisfactory. However, during the landing roll, the instructor noticed the aircraft begin to veer to the right and he took control. He then became aware of the right wing dropping and he counteracted this with the application of full opposite aileron, but without effect. He also noticed sparks originating from beneath the wing. He was able to steer the aircraft onto the grass beside the runway; the aircraft gently yawed to the right, coming to rest on a heading of 022°. Both occupants exited the aircraft without difficulty.

During the subsequent inspection, it was found that the right main landing gear oleo piston tube had fractured

just above the chromium plated lower section. The torque-link bolt had also sheared which, together with a failure of the brake hose, had allowed the lower part of the oleo piston tube and wheel unit to detach from the aircraft.

Main landing gear

The Robin HR200 has a fixed tricycle landing gear. Each main landing gear unit incorporates an air/oil-filled

oleo piston tube, integral with the wheel axle, which operates within the outer cylinder to attenuate loads from the landing gear to the airframe on touchdown (Figure 1). The cylinder is connected to the axle via a torque linkage. The landing gear is maintained ‘on condition’ and there had been no history of loss in oleo pressure, or fluid leaks from the seals on the subject leg. It was not possible to establish the service history of the failed unit.

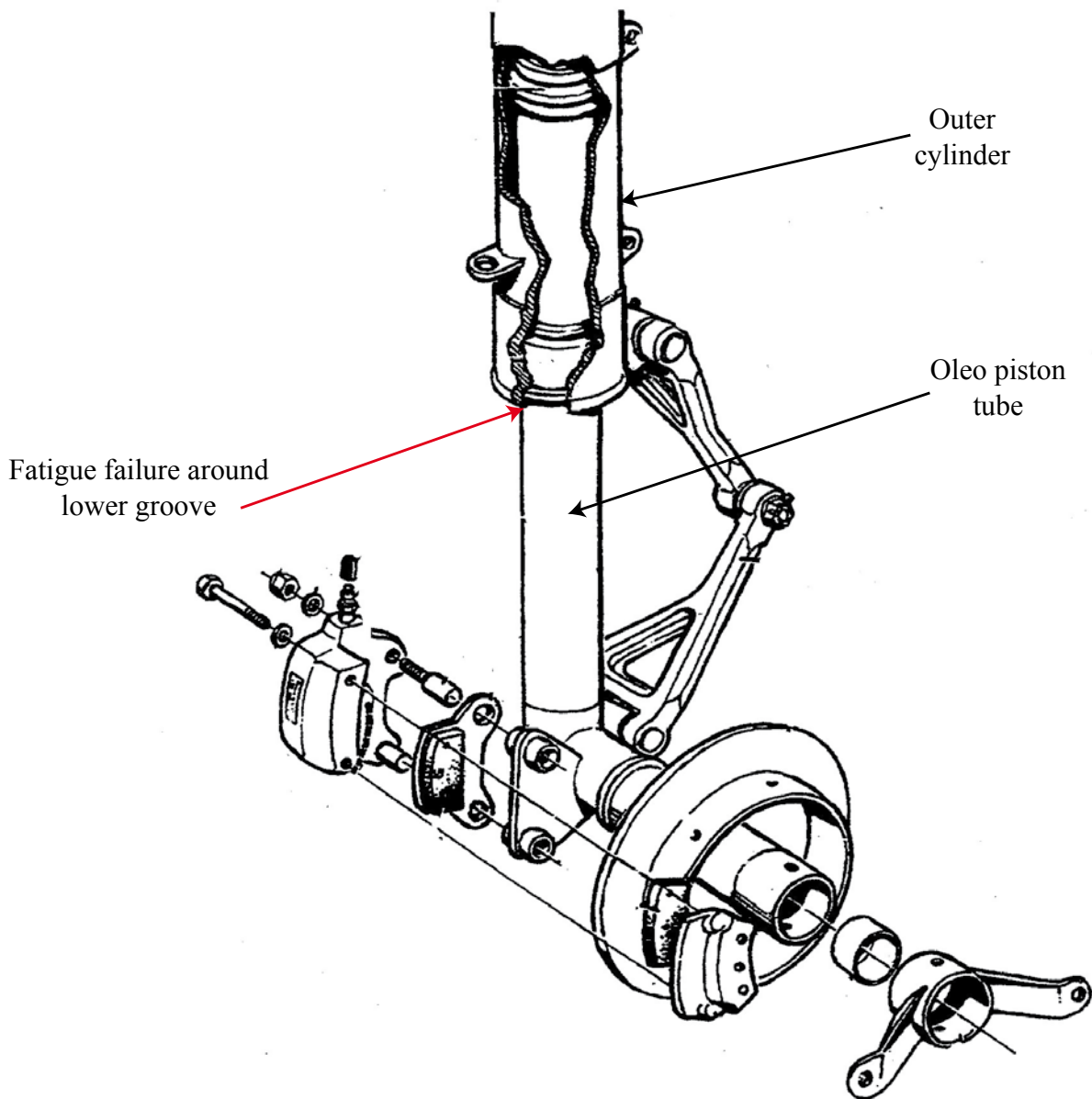


Figure 1
Diagram of the Robin HR200 Main Landing Gear unit

Metallurgical examination

Metallurgical examination of the fractured oleo piston tube showed that it had failed along the lower of two grooves, where a circlip and seal are normally located, Figure 2. The piston tube had been separated for some time, as evidenced by debris recovered from within the unit and damage to the fracture surfaces. This damage meant it was difficult to determine the cause of the failure, other than that it had been associated with a fatigue cracking mechanism. No previous occurrences of this type of failure have reportedly occurred.

Conclusions

It is likely that the piston tube, having been failed at this location for some time, had continued to operate normally within the shock strut, with the torque links just being

able to retain the lower section within the outer cylinder when in flight. As such, when on the ground, the landing gear would have had a normal appearance. However, on the subject flight it is possible that the piston tube may have exited the outer cylinder on takeoff or, more likely, that the heavier than normal touchdown loads allowed the tube to deflect rearwards and separate from the leg, before sliding back in to the outer casing and operate apparently normally. The failure of the torque link bolt and brake hose appeared to have occurred after the separation of the piston tube from the outer cylinder.

The origin of the fatigue cracking and/or the initiating event could not be established due to damage to the fracture surfaces brought about by the gear remaining in service after the piston tube had completely failed.

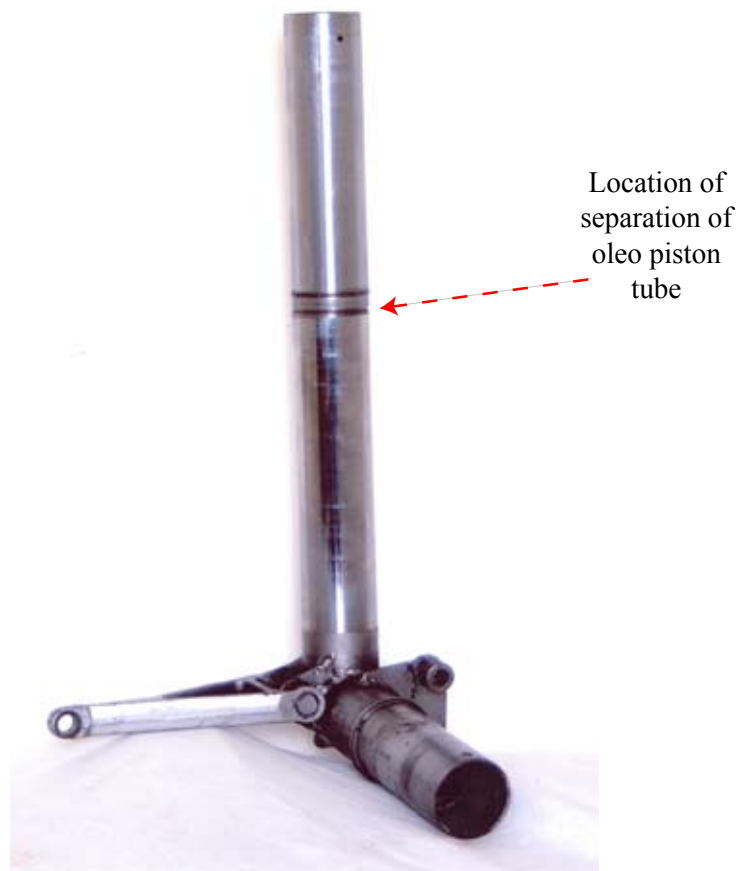


Figure 2
Right Main Landing Gear oleo piston tube