

ACCIDENT

Aircraft Type and Registration:	Bolkow BO 208C Junior, G-ATXZ	
No & Type of Engines:	1 Continental O-200-A piston engine	
Year of Manufacture:	1966	
Date & Time (UTC):	23 September 2006 at 1420 hrs	
Location:	Tatenhill Airfield, Staffordshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to the propeller, nose landing gear, engine exhaust, carburettor airbox and lower engine cowling	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	45 years	
Commander's Flying Experience:	144 hours (of which 57 were on type) Last 90 days - 1 hour Last 28 days - N/K	
Information Source:	AAIB Field Investigation	

Synopsis

After conducting a short local flight the pilot flew the aircraft back to the departure airfield to carry out some 'touch-and-go' landings. During the climb out from the second takeoff, following a normal touchdown and landing roll, the nose landing gear fell away from the aircraft. A metallurgical examination revealed fatigue crack growth in the nose landing gear outer tube. It was not possible to establish the length of time that the fatigue cracking had been present prior to the final failure. The nose landing gear had been fitted to the aircraft as a replacement item some 51 airframe hours prior to this accident.

History of the flight

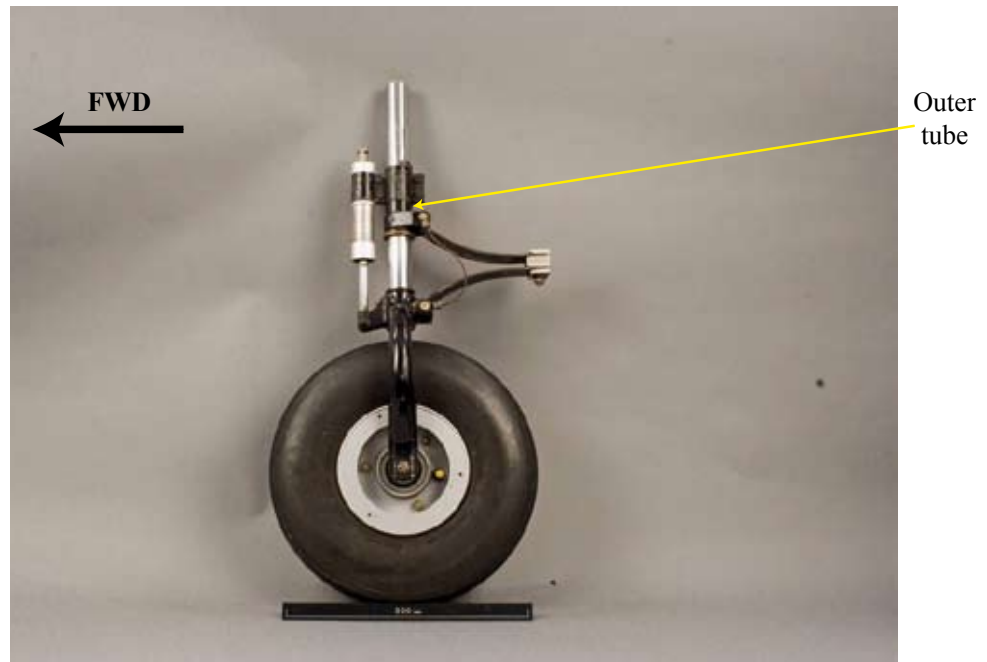
After conducting a short local flight the pilot flew the aircraft back to the departure airfield to carry out some 'touch-and-go' landings. During the climb out from the second takeoff, following a normal touchdown and landing roll, the pilot was informed by ATC that the nose landing gear (NLG) had fallen away from the aircraft. The pilot decided to land back at the airfield and informed ATC of his intentions. ATC cleared all aircraft from the circuit and runway. The landing was on the main landing gear with the fuel, magnetos and battery master switched off and the engine closed down but with the propeller slowly windmilling. The pilot held the aircraft's nose up, clear of the surface, as long as possible but as the speed decayed the nose dropped and the aircraft weathercocked

into wind, left the runway and entered the grass area at the side, where it came to rest.

Engineering examination

The detached NLG assembly (Figure 1) was taken to the Materials and Failures Department, Qinetiq, for metallurgical examination.

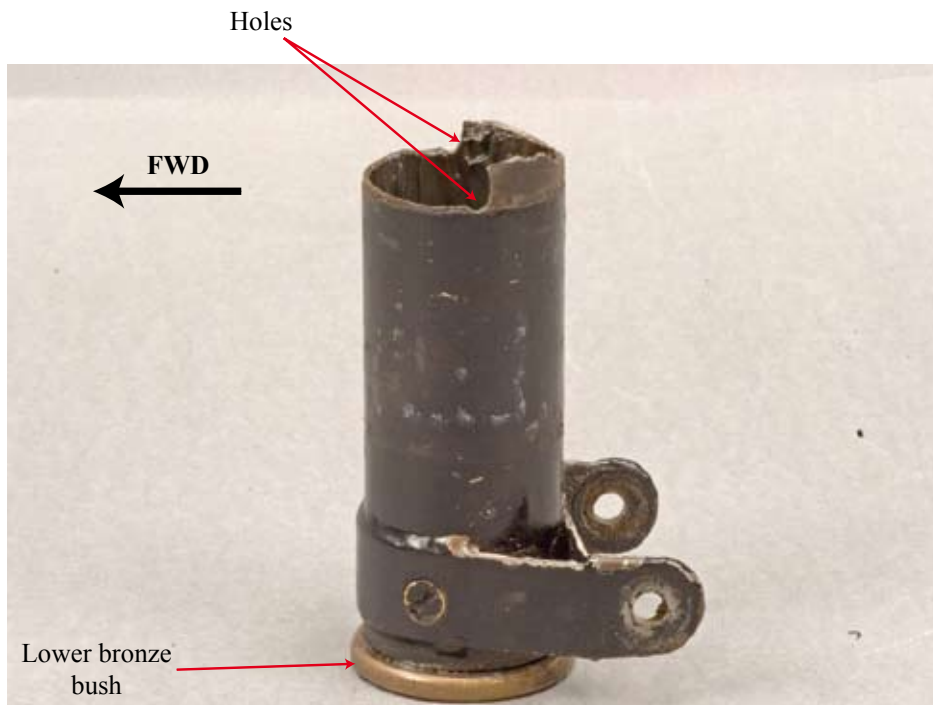
The outer tube had fractured between two holes that were located on either side of the tube in the area between the two bronze bushes (Figure 2). It was noted that the internal surface of the tube was well greased. Visual



Courtesy of QinetiQ

Figure 1

Section of NLG that detached from the aircraft



Courtesy of QinetiQ

Figure 2

Fractured outer tube removed from NLG

examination of the fracture surface showed that it was masked by grease and corrosion deposit. The majority of the fracture appeared to be angled at 45°, which is characteristic of overload failure in thin walled plate and tube. Adjacent to the holes, some areas of flat fracture were observed. After cleaning, examination of the tube showed an area on the forward section where paint had been removed and a small indent was visible from damage that had occurred prior to the application of the paint. The surrounding tube surface exhibited light grinding marks suggestive of local

blending-out of corrosion-affected areas indicating that the tube had been in use prior to the last coat of paint being applied.

The cleaned fracture surface was examined in a scanning electron microscope (SEM). Unfortunately it was so severely corroded, and had suffered post-failure mechanical damage, that little surface detail was visible. Within the areas of the flat fracture, parallel markings were observed, which could have been possible striations or 'beach marks'. However, due to the degree of corrosion, it was not possible to confirm this. To summarize, areas of flat, fatigue-like crack growth were observed adjacent to the side holes. Outside these areas the fracture surface was typical of overload failure. The rear section showed less corrosion damage so it is assumed to have failed last, allowing the NLG to detach from the aircraft. It was not possible to establish the length of time that the fatigue cracking had been present prior to the final failure.

Previous accidents

In February 2005 the aircraft was involved in a landing accident (AAIB Bulletin 6/2005) where the NLG collapsed. Following this accident major repairs were carried out which included the replacement of the NLG. The accident that is the subject of this report occurred 51 airframe hours after this repair.

In August 2005, 13 airframe hours after the accident in February, the aircraft had another landing accident which deformed the fore/aft brace strut between the NLG leg and engine firewall. The NLG was inspected, although not checked for cracks, and the brace strut repaired. Following inspection by a Popular Flying Association (PFA) Inspector, the aircraft was cleared for flight.

Nose landing gear history

The replacement NLG that was fitted to the aircraft, following the accident in February 2005, was supplied by an aircraft parts supplier in England who had sourced it from a specialist Bolkow parts supplier in Germany. The NLG outer tube had been repaired and released with a 'JAA Form One' by a JAR 145 approved organisation, also in Germany, in 2001. The worksheet associated with this repair did not indicate that any inspection for cracking had been carried out. The NLG outer tube had previously been fitted to Bolkow 208 registration D-EMFU, but enquiries with the German aviation authorities and UK-based aviation insurance databases did not reveal any reported incidents or accidents to this aircraft. It is not known when, where or by whom the replacement NLG was assembled using the repaired outer tube and no release certificate has been located, although none was required as G-ATXZ was operated on a Permit to Fly.

Airworthiness Directive and service instructions

In May 1972 Messerschmitt-Bolkow-Blohm (MBB) issued Service Bulletin (SB) No 208-32/20-1 which was upgraded to an Airworthiness Directive (AD) No 72-92 by the Luftfahrt-Bundesamt of the Federal Republic of Germany. The SB/AD required that at 100 hour intervals the outer tube of the nose landing gear leg be visually examined internally by a mirror and a light for evidence of cracking in the area between the two bronze bushes. There is currently no requirement to carry out this examination following a reported heavy landing or when damage has occurred to the NLG. The following safety recommendation is therefore made:

Safety Recommendation 2007-038

It is recommended that the European Aviation Safety Agency (EASA) review the inspection requirements of Airworthiness Directive No 72-92 to ensure the continued airworthiness of Bolkow BO 208 nose landing gears.

Other information

As of February 2007 there were 18 Bolkow BO 208 aircraft registered in the UK, seven operated on a Permit to Fly, maintained to PFA requirements, and 11 operated

on a Certificate of Airworthiness, maintained to CAA requirements. Aircraft operated on a Permit to Fly do not require 'JAA Form One' release certificates for any replacement parts fitted whereas aircraft operated on a Certificate of Airworthiness do require this. It is important that this inconsistency should not result in a reduced level of airworthiness, therefore:

Safety Recommendation 2007-039

It is recommended that the Civil Aviation Authority review the airworthiness category under which UK-registered Bolkow BO 208 aircraft are operated.