

Beech 200 Super King Air, G-OWAX

AAIB Bulletin No: 7/2003	Ref: EW/G2002/07/35	Category: 1.2
INCIDENT		
Aircraft Type and Registration:	Beech 200 Super King Air, G-OWAX	
No & Type of Engines:	2 Pratt & Whitney Canada PT6A-41 turbine engines	
Year of Manufacture:	1977	
Date & Time (UTC):	23 July 2002 at 0700 hrs	
Location:	12 nm north-east of Clacton, Essex	
Type of Flight:	Public Transport (Passenger)	
Persons on Board:	Crew - 2	Passengers - 8
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to main cabin door	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	64 years	
Commander's Flying Experience:	15,100 hours (of which 3,114 were on type)	
	Last 90 days - 39 hours	
	Last 28 days - 16 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by AAIB	

History of flight

The aircraft was in the cruise at FL190, en-route from Oxford to Amsterdam, when there was a sudden bang and hissing noise and the cabin atmosphere became fogged. Having confirmed a rapid cabin decompression, by noting the climbing cabin altitude indication, the crew transmitted a PAN call and descended the aircraft to FL90. The reason for the decompression could not be identified by the crew and the aircraft returned to Oxford. After landing the main cabin door could not be opened so the passengers were disembarked through the emergency exit.

Emergency oxygen

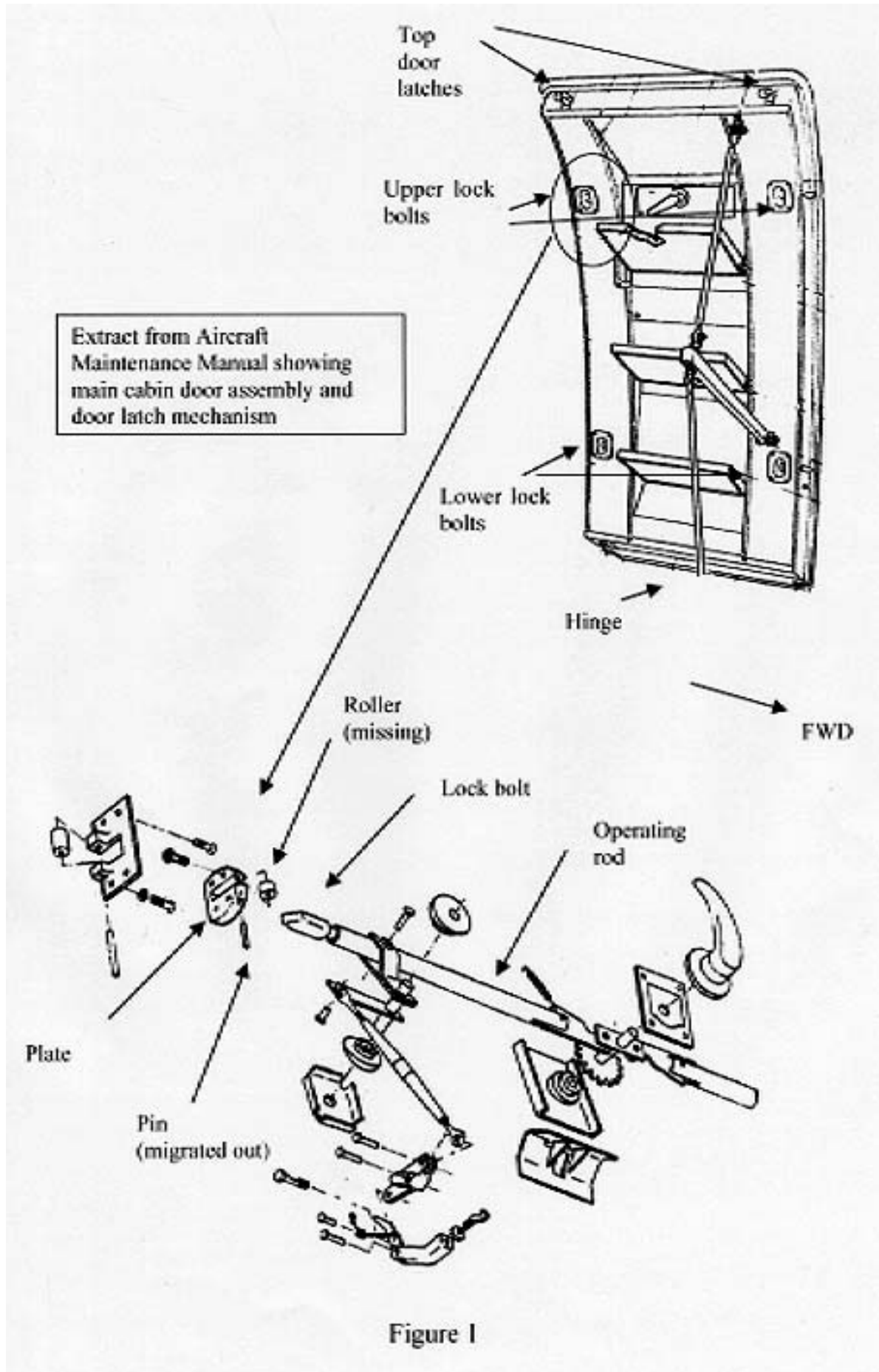
The emergency oxygen system did not deploy automatically following the decompression and the commander decided not to operate the system manually. He reported that the aircraft was already

established in the descent and he thought that releasing the oxygen masks would add further stress and confusion to the passengers. It was subsequently found that the system had not been armed.

The oxygen system arming knob on G-OWAX is different to that fitted to some other aircraft of this type. On types usually flown by the crew the oxygen is selected on by pulling the knob to the ON position so that it extends approximately three inches from its mounting compared with the adjacent emergency oxygen deploy knob. On G-OWAX, however, the oxygen arming knob is mounted approximately three inches proud from its mounting when stowed in the OFF position. Neither pilot had seen this type of installation before and they consequently believed that the arming knob was in the ARMED position when it was actually selected to OFF.

Main cabin door assembly

The main cabin door is hinged at the bottom and pivots downwards to provide a stairway for passenger and crew entry and exit. The locking mechanism (see Figure 1) is operated via a handle located centrally in the door. Rotation of the handle to the closed position causes two top door latches to hook into the top of the door frame and two upper (one each side) and two lower (one each side) lock bolts on the sides of the door to extend outwards into the door frame.



The lock bolts move outwards over a roller located within a slot inside a plate on the side of the door. The roller is secured by a pin, which is held in position by 'staking'. 'Staking' is performed after the pin is placed through the roller and involves striking the plate around the pin with a centre punch, causing deformation of the plate material, thus preventing movement of the pin.

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Subsequent examination of the cabin door by the repair organisation revealed that the pin from the rear upper roller had migrated from its position (see Figure 2). This had allowed the roller to come out of its position within the plate. The loss of the roller had removed the support from the lock bolt allowing cabin pressure to force the bolt into the surrounding structure (see Figure 3). This had allowed the door to open slightly and cause the loss of pressurisation. The roller was not recovered.



Figure 2 - Migration of pin



Figure 3 - Damage to door structure
(photographs courtesy Signature Aircraft Engineering)

The operating rod within the door structure attached to the lock bolt had become distorted during the depressurisation and prevented the mechanism from opening the main door after the aircraft had landed.

Maintenance history

The aircraft came onto the UK register in February 2000. On the date of the incident the aircraft had flown 9,754:40 hours. The main cabin door lock bolts are required to be replaced at 6,000 hours; this was carried out in May 1992 at 6,218 hours. No maintenance activity on the cabin door had taken place in the UK.

Service Instruction No 1224, issued in August 1983, required an inspection of the main cabin door roller assembly for proper 'staking'. The manufacturer recommended that this inspection be accomplished as soon as possible, but no later than the next service. There was no requirement for any repeat inspection in this area.

Discussion

The components removed from the aircraft were returned to the AAIB for examination. There was evidence (see Figure 4) on the two upper plates of 'staking' marks. It was not possible to conclude when the pin had begun to migrate, though it is likely that this migration had occurred over a period of time. As soon as the movement of the pin was sufficient to release the roller the differential pressure within the cabin would have caused the door to move.

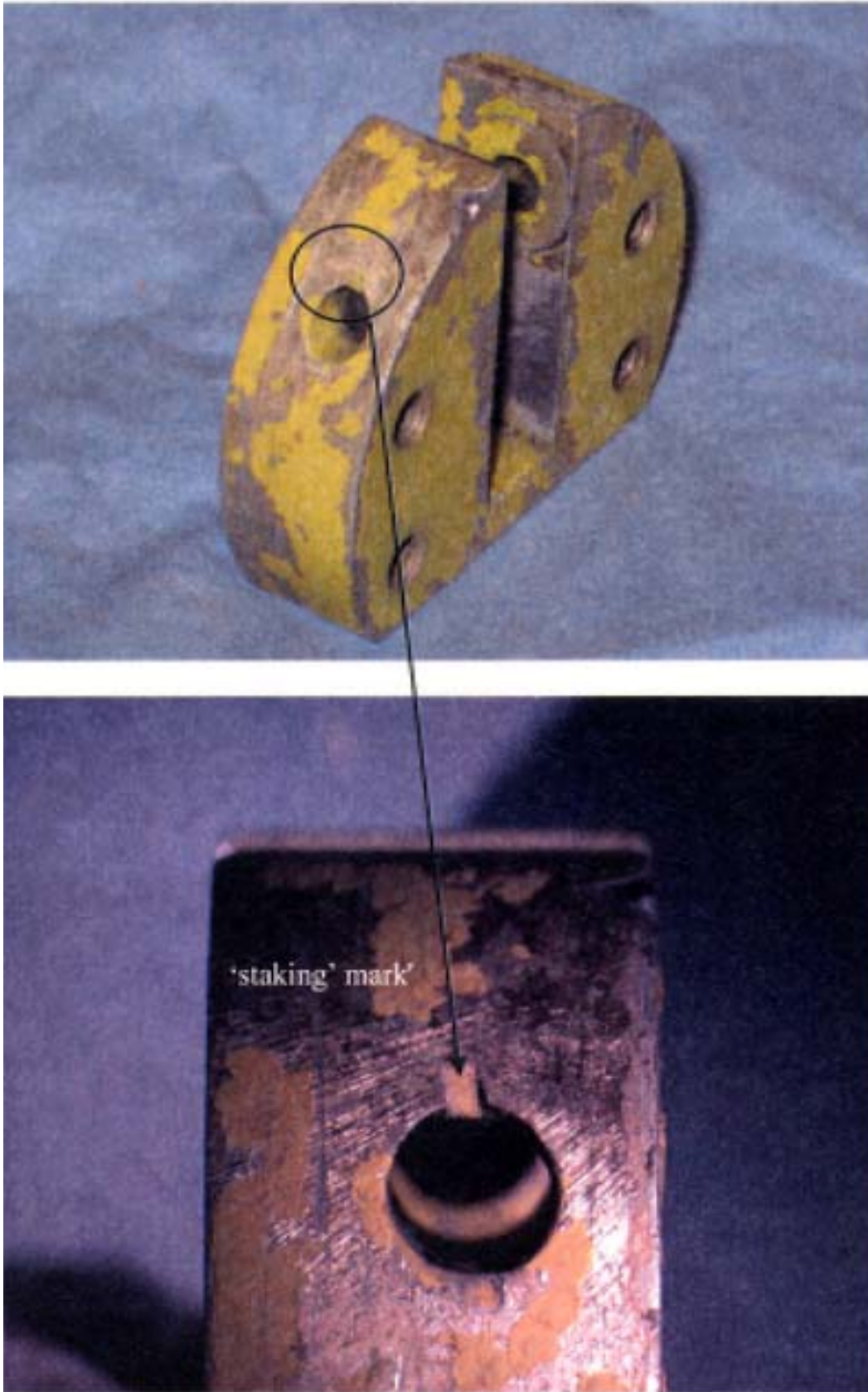


Figure 4 - upper rear plate showing 'staking' mark

Following this event the repair agency examined two other aircraft of this type and found that on one a pin had become displaced, although it had not migrated sufficiently to allow the release of the roller. The manufacturer also identified two reports where the pin was found to have migrated, although again the associated roller was not released.

The following recommendation is therefore made:

Safety Recommendation 2003-36

It is recommended that the Federal Aviation Administration, in conjunction with Raytheon Aircraft Company, review the method of securing, or the inspection requirements of, the main cabin door latch roller assembly on Beech 200 aircraft with a view to preventing roller retaining pin migration.