No: 8/89 **Ref: EW/G89/05/08** **Category: 1b**

Aircraft Type and Registration:	Piper PA-23-250, G-AZBK
No & Type of Engines:	2 Lycoming IO-540-C4B5 piston engines
Year of Manufacture:	1971
Date and Time (UTC):	17 May 1989 at 0945 hrs
Location:	Cambridge Airport
Type of Flight:	Private (business)
Persons on Board:	Crew - 1 Passengers - 3
Injuries:	Crew - None Passengers - None
Nature of Damage:	Damage to the right undercarriage, right engine, propeller and right wing
Commander's Licence:	Commercial Pilot's Licence with Instrument Rating
Commander's Age:	43 years
Commander's Total Flying Experience:	1,675 hours (of which 900 were on type)
Information Source:	Aircraft Accident Report Form submitted by the pilot and examination of the aircraft by AAIB

Following an uneventful flight from Blackbushe, the aircraft made a normal touchdown at Cambridge Airport. During the landing run and before use of the brakes, the aircraft began to veer to the right and the right wing began to drop. The pilot kept the aircraft straight and shut down the engines, followed by the fuel and electrics when the aircraft came to rest. The passenger door was found to be jammed, so the pilot and the three occupants vacated through the emergency exit. As the aircraft was later jacked up the passenger door became free.

Examination of the right undercarriage revealed that the drag stay had failed, which in turn had allowed the undercarriage leg to pivot rearwards and jam under the wing. Specifically, the centre pivot bolt of the drag stay was found to have failed close to its mid point.

Figure 1 shows a cross section of the drag brace centre joint and, as may be seen, it is made up from three forged aluminum alloy links pivoted about a common 9/16" diameter bolt.

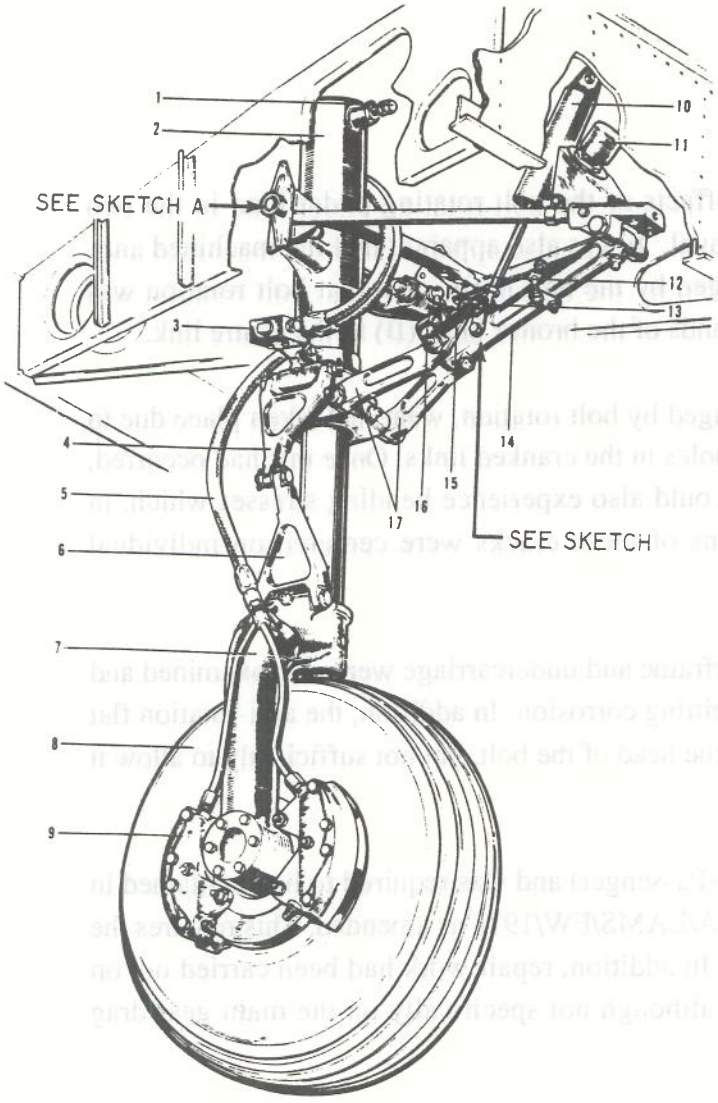
Detailed examination of this bolt revealed that it had failed in reverse bending fatigue and also that it was in poor condition generally. It was apparent that most of the shank showed signs of pitting corrosion

and there was surface damage consistent with the effects of the bolt rotating under load in the two cranked links. The bolt holes in these links (*) were oval. It was also apparent that the machined anti-rotation flat on the inboard link (A) had been damaged by the bolt head, such that bolt rotation was possible. Ovality was also present towards the outer ends of the bronze bush (B) in the centre link.

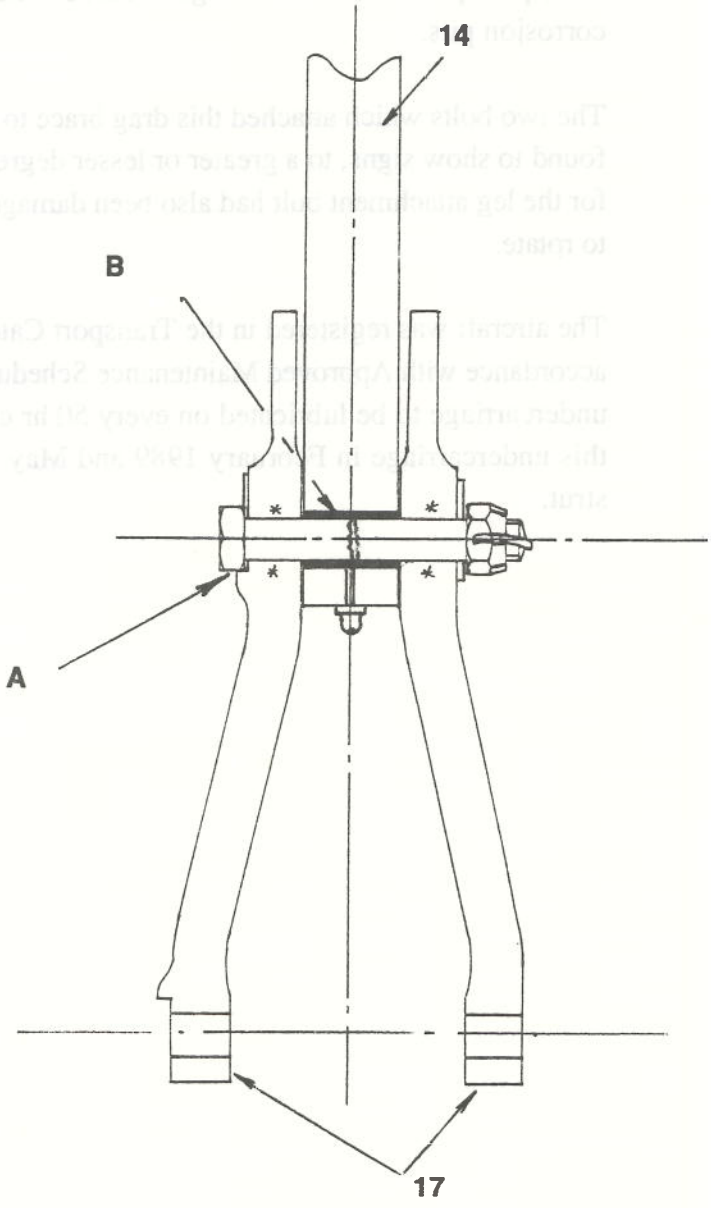
It was thus apparent that, after the flat had been damaged by bolt rotation, wear had taken place due to continued rotation in the unbushed and unlubricated holes in the cranked links. Once this had occurred, the bolt was no longer working purely in shear but could also experience bending stresses which, in turn, precipitated the two fatigue cracks. The origins of these cracks were centered on individual corrosion pits.

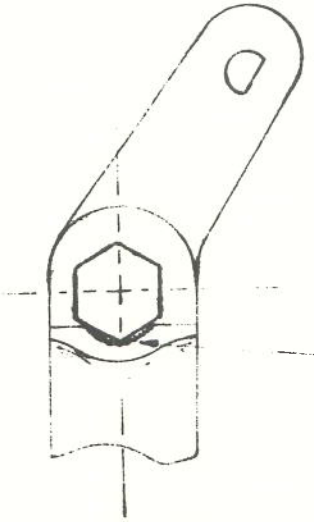
The two bolts which attached this drag brace to the airframe and undercarriage were also examined and found to show signs, to a greater or lesser degree, of pitting corrosion. In addition, the anti-rotation flat for the leg attachment bolt had also been damaged by the head of the bolt, but not sufficiently to allow it to rotate.

The aircraft was registered in the Transport Category (Passenger) and was required to be maintained in accordance with Approved Maintenance Schedule CAA/LAMS/FW/1978 as amended. This requires the undercarriage to be lubricated on every 50 hr check. In addition, repair work had been carried out on this undercarriage in February 1989 and May 1988, although not specifically on the main gear drag strut.



1. AIRCHARGE VALVE
2. GEAR STRUT HOUSING
3. ANTI-RETRACTION VALVE
4. TORQUE LINK, UPPER
5. BRAKE LINE
6. TORQUE LINK, LOWER
7. FORK ASSEMBLY
8. TIRE
9. BRAKE HOUSING
10. GEAR ACTUATING CYLINDER
11. TIME DELAY VALVE
12. RETRACTION ROD
13. LATCH ASSEMBLY
14. DRAG LINK, UPPER
15. SPRINGS
16. INDICATING SWITCH
17. DRAG LINK, LOWER





DAMAGE TO ANTI-ROTATION 'FLAT'

VIEW ON A

FIGURE 1