

Yak-50, RA44461

AAIB Bulletin No: 1/2004	Ref: EW/C2003/08/10	Category: 1.3
Aircraft Type and Registration:	Yak-50, RA44461	
No & Type of Engines:	1 M14P piston engine	
Year of Manufacture:	1984	
Date & Time (UTC):	14 August 2003 at 1517 hrs	
Location:	Shoreham Airport, Sussex	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to underside of aircraft	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	41 years`	
Commander's Flying Experience:	5,200 hours (of which 520 were on type)	
	Last 90 days - 210 hours	
	Last 28 days - 75 hours	
Information Source:	AAIB Field Investigation	

History of flight

The aircraft, accompanied by another Yak, was returning to Shoreham having participated in the Eastbourne Air display. When the landing gear was selected down the starboard main leg failed to lower. Both aircraft climbed in the overhead to hold at 2,000 feet in an attempt to resolve the problem. The landing gear was cycled at various airspeeds and 'g' load conditions, and the emergency system was used but to no avail. The right main landing gear was confirmed visually to be fully retracted, so the remaining gear was raised and fuel was burned off to minimum levels in anticipation of a gear up landing to be carried out on grass Runway 21. A normal approach was made, and on short finals when landing was assured, the magneto switches were selected off, the fuel shut-off valve was pulled and the battery turned off. The aircraft touched down wings level and decelerated rapidly. When it came to a stop the pilot was able to leave the aircraft normally. The airport fire services were rapidly in attendance, but there was no fire.

Aircraft examination

The aircraft was subsequently raised on airbags and inspected by a licensed engineer. It was found that the right gear up-lock was engaged, and a turnbuckle linkage rod in the up-lock release mechanism had fractured. The up-lock was released manually and the gear lowered normally.

During gear extension, the initial extension of the actuator causes the actuator body to move slightly, moving a bell-crank, which is connected to the up-lock mechanism input lever by a short turnbuckle linkage. The linkage consists of a rigid rod with a 'turnbuckle type' eye-end at each end. The eye-end fitting at the actuator end of the rod had broken under the head of the fork. The eye-end itself was found to be very stiff. This would cause bending each time the landing gear was operated. The other end of the linkage was undamaged and moved freely. It is necessary to lubricate these parts periodically and it is more difficult to gain access to the end of the linkage where the broken end occurred, although this may not have been a factor relevant to the cause. The maintenance organisation considered that over tightening, subsequent repainting or lock wire misrouting might all have been factors in restricting free movement of the eye-end. Detailed examination of the broken

eye-end fitting at the AAIB showed that it had fractured due to a reverse bending fatigue mechanism oriented in the plane of the bending induced by the stiffness in the linkage.

Follow-up action

As a consequence, the maintenance organisation amended the Maintenance Schedule to include a close visual inspection of the turnbuckle linkage, and a check for free movement. As a result one other aircraft was found to have a stiff turnbuckle linkage, although no cracks were found. The maintenance organisation now renews any turnbuckle linkage eye-ends found to be stiff.