

<b>Aircraft Type and Registration:</b>	Socata TB20 Trinidad, G-HGPI	
<b>No &amp; Type of Engines:</b>	1 Lycoming IO-540-C4D5D piston engine	
<b>Year of Manufacture:</b>	1988	
<b>Date &amp; Time (UTC):</b>	1 December 2004 at 1455 hrs	
<b>Location:</b>	Bournemouth International Airport, Dorset	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Damage to aircraft underside, right wing and stabilator	
<b>Commander's Licence:</b>	National Private Pilot's Licence	
<b>Commander's Age:</b>	77 years	
<b>Commander's Flying Experience:</b>	925 hours (of which 770 were on type) Last 90 days - 8 hours Last 28 days - 3 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

### History of the flight

The aircraft was returning to Bournemouth Airport after a cross country flight from Cherbourg, France. When the pilot selected the landing gear down, only the nose gear 'down and locked' green light illuminated. The pilot recycled the landing gear up then down, but again only the nose gear indicated down and locked. The pilot then tried to lock the main gear down by pulling the emergency gear extension knob, but this was unsuccessful. After reporting the problem



to the control tower he performed a low fly-by. During the fly-by the tower controller reported that the main landing gear appeared to be extended. The pilot carried out a normal circuit to the right to land on Runway 08. Upon touchdown the right main gear leg collapsed and the right wing tip struck the runway. The aircraft came to rest on the runway and the occupants vacated the aircraft unassisted. The airfield's fire and emergency services arrived on the scene soon afterwards but there was no fire.

## **Description of the landing gear system**

The Socata TB20 Trinidad has a retractable tricycle landing gear that is hydraulically actuated. The landing gear selector sends an electric signal to an electro-hydraulic generator. The generator provides pressurized hydraulic fluid to the landing gear actuators. When the landing gear is fully extended, hinged struts lock the gear in place and microswitches are actuated that illuminate the green 'down and locked' light. In the 'up' position the landing gears are not locked but are held up by hydraulic pressure trapped in the actuators. The emergency landing gear extension system is operated by pulling a knob which opens a valve that releases the trapped hydraulic pressure, permitting the landing gear to free-fall under gravity. A compensating actuator on the nose landing gear and compensating springs on the main gear actuators assist in locking the gear down when the emergency system is operated.

## **Landing gear examination**

An examination of the landing gear system was carried out by a maintenance organisation. The aircraft was raised on jacks and it was discovered that the left and right main gear hinged struts were stiff in operation. The nuts on the hinged struts were loosened and then gear retraction and extension tests were carried out. Even with the loosened hinges the electro-hydraulic generator appeared to be 'weak' and only barely able to extend and retract the gear. The electro-hydraulic generator was stripped and inspected but no obvious fault was found that would have reduced its effectiveness. The generator was cleaned and fitted with new O-ring seals prior to re-assembly. The left and right main gear hinged struts were removed, treated for corrosion, lubricated and then re-fitted. Following this work the gear retracted and extended satisfactorily. The emergency gear extension system was also tested and operated satisfactorily.

## **Maintenance history**

The most recent maintenance carried out on the aircraft was a 50 hour check on 14 September 2004. During this check both the normal and emergency gear extension systems were tested and operated satisfactorily. It was also noted in the worksheets that the landing gear legs were 'lubricated as required'. This work was beyond that required by the manufacturer's maintenance manual which specified landing gear maintenance tasks to be carried out annually or every 100 hours. Following this check the aircraft logged 15 hours during the two and a half month period leading up to the accident. The aircraft's previous annual maintenance check was a star annual, completed on 3 February 2004. The aircraft's total flight time at the time of the accident was 1,783 hours. The pilot reported that the aircraft was not kept in a hangar but parked outside with a cover.

## **Discussion and conclusions**

The maintenance engineer who examined the aircraft believed that the stiffness in the hinged struts was the primary reason why the landing gear did not lock down. Once the hinges were lubricated and the corrosion treated, the landing gear could be extended and retracted normally. According to maintenance records the hinges had been lubricated during the 50 hour check less than three months before the accident, but the aircraft was parked outside during this period so rain and lack of frequent use could have contributed to a deterioration of the state of the hinges.