

ACCIDENT

Aircraft Type and Registration:	Mooney M20F Executive, G-CEJN	
No & Type of Engines:	1 Lycoming IO-360-A1A piston engine	
Year of Manufacture:	1966	
Date & Time (UTC):	8 August 2009 at 1218 hrs	
Location:	Wellesbourne Mountford Airfield, Warwickshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to the engine cowling, cowl flaps, propeller, nose landing gear, lower fuselage, wing and the engine shock-loaded	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	39 years	
Commander's Flying Experience:	106 hours (of which 14 were on type) Last 90 days - 31 hours Last 28 days - 4 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The flight was for the pilot/owner to verify the satisfactory operation of the landing gear system following the replacement and subsequent adjustment of a landing gear limit switch. After a successful test flight, during which the landing gear was cycled three times, the pilot returned to the departure airfield. A final landing check was carried out during which the pilot confirmed that the landing gear was DOWN AND LOCKED. A normal flare and touchdown on the mainwheels was carried out and the nosewheel gently lowered onto the runway. After a short period (a second or two) the propeller struck the runway, stopping the engine. The pilot noticed that neither the green landing gear DOWN AND LOCKED nor

the amber IN TRANSIT lights were illuminated. The aircraft slid along the runway centreline on its lower fuselage for about 100 metres before swinging through 90° to the left and coming to rest.

Examination of the aircraft revealed that the retention link, part number 53001-013, an item in the landing gear downlock system, had been fitted upside down.

History of the flight

The flight was a one-hour local VFR flight and was for the pilot/owner to verify the satisfactory operation of the landing gear system following the replacement, and

subsequent adjustment, by a maintenance organisation of a landing gear limit switch. Following a normal departure the pilot levelled the aircraft at 3,000 ft, at a speed of approximately 95 kt, and commenced cycling the landing gear. He carried out three extensions/retractions using the normal landing gear system and all indications were satisfactory. After the third retraction the pilot reduced the engine power and the aircraft's speed and checked that the landing gear warning horn operated satisfactorily, which it did.

Following these satisfactory landing gear checks the pilot flew the aircraft back to the departure airfield. As the aircraft entered the airfield overhead position he extended the landing gear and noted that the green DOWN AND LOCKED light was illuminated and the visual landing gear position indicator showed that it was in the extended position. He also noted that the aircraft's speed reduced due to the drag of the extended landing gear. A normal circuit and approach to Runway 18 was carried out and after turning the aircraft onto the final approach the pilot selected the third stage of flap. ATC gave the pilot clearance to land at his discretion and gave the wind as 270° less than 5 kt.

The pilot carried out a final landing check, during which he confirmed that the green landing gear DOWN AND LOCKED light was illuminated and the visual landing gear position indicator showed that it was in the extended position. A normal flare and gentle touchdown on the mainwheels was carried out at about 65 kt and the nosewheel gently lowered onto the runway. After a short period (a second or two) the propeller struck the runway, stopping the engine. The pilot noticed that neither the green landing gear DOWN AND LOCKED nor the amber IN TRANSIT lights were illuminated. The aircraft slid along the runway centreline on its lower fuselage for about 100 metres before swinging through 90° to the left and coming to rest. After making a

PAN call the pilot selected the electric master switch OFF and safely evacuated the aircraft.

The AFISO observed the landing and confirmed that it appeared to be normal.

Engineering examination

Airfield staff who attended, and subsequently recovered the aircraft, found that all three landing gears had collapsed and that the weight of the aircraft was being held on the propeller and the lower rear fuselage. They also noted that the landing gear selector in the cockpit was in the DOWN position. When the aircraft was lifted all three landing gears partially extended under gravity. An attempt was made to lower the gear using the manual gear extension system, but it was ineffective. After applying sustained physical force to the landing gear legs, the airfield staff managed to get them into their extended positions and the aircraft was towed from the runway.

The aircraft's landing gear downlock is only fitted to the nose landing gear. The main landing gears are attached to the nose landing gear by a series of rods which allows the nose landing gear downlock to retain the main landing gears in the DOWN position.

Further examination by the local aircraft engineering staff and the AAIB found that the nose landing gear downlock mechanism would not engage into the full overcentre position due to mechanical interference. This resulted in a 'soft' downlock. Further examination by the maintenance organisation revealed that the nose landing gear downlock Retraction Link, part number 53003-013 (Figure 1), was fitted upside down and did not have either of the two grease nipples fitted in their threaded holes¹. In the illustration (Figure 1) the Retraction Link,

Footnote

¹ The aircraft manufacturer has not been informed of any previous events where the retraction link has been fitted incorrectly.

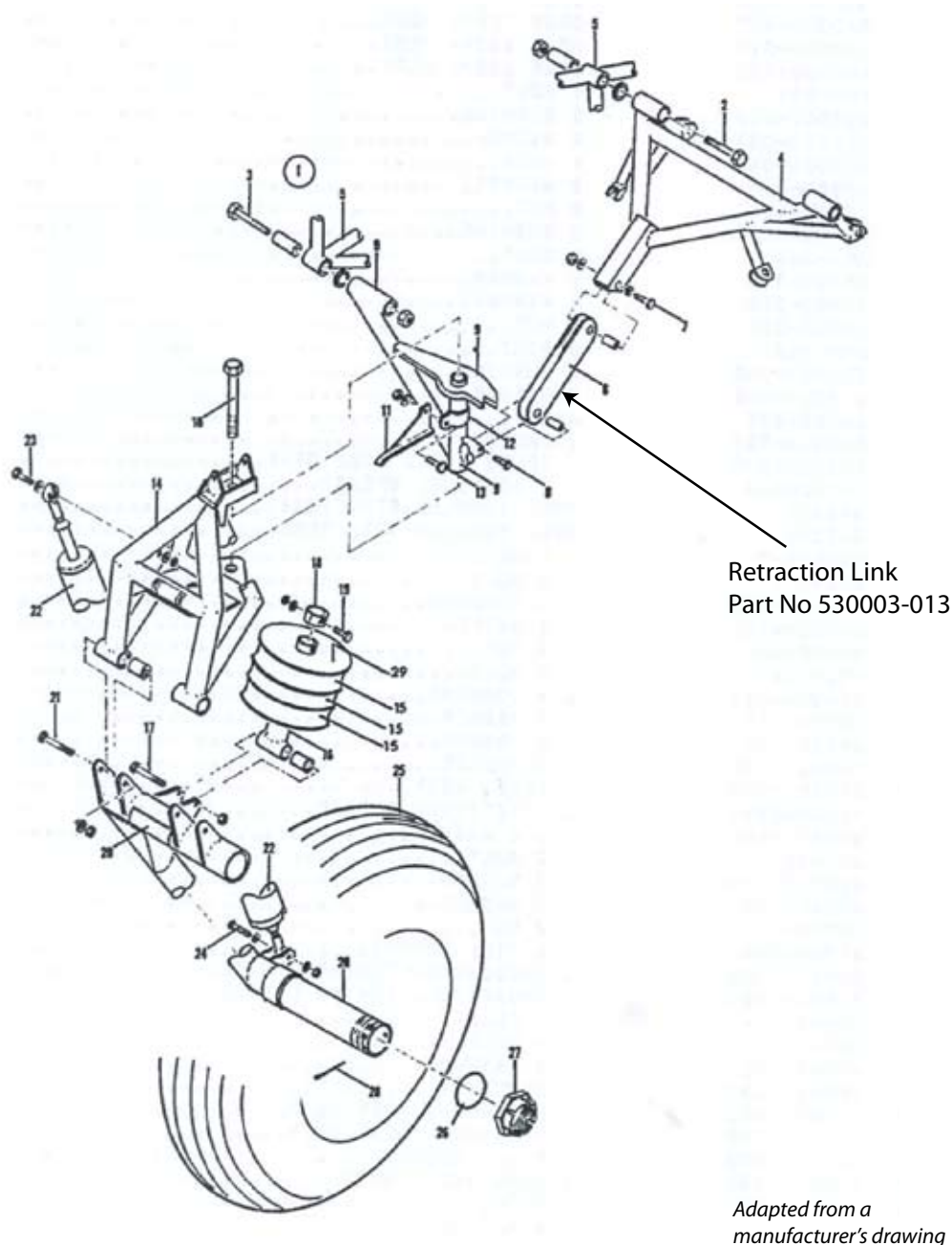


Figure 1

Nose landing gear assembly

part number 530003-013, appears symmetrical but the difference in profile between the upper and lower surfaces requires correct orientation during assembly.

After correctly fitting the retraction link the downlock mechanism went into a 'hard' overcentre lock (Figure 2).

Maintenance and Parts Manuals

Neither the Maintenance Manual nor the Parts Manual gives any guidance on the correct orientation of the Retraction Link, part number 530003-013, when fitted to the aircraft. There are no pictures or diagrams showing the grease nipples fitted to the retraction link and there is

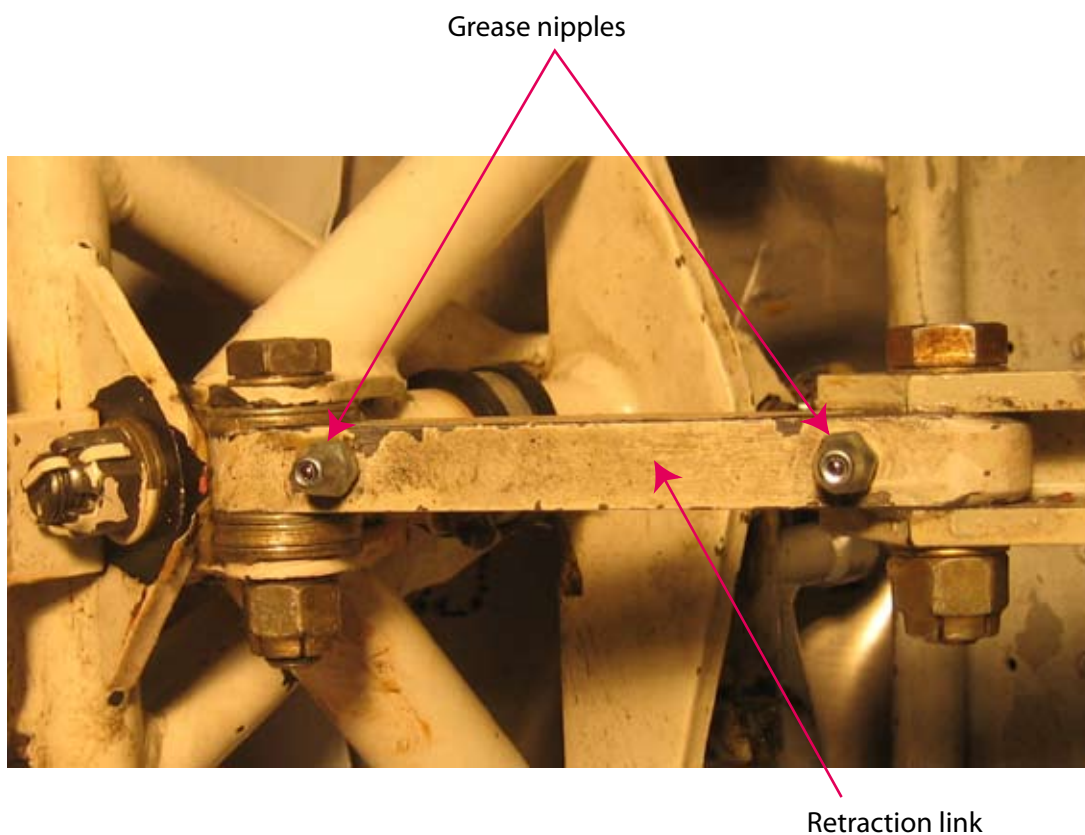


Figure 2

Nose landing gear retraction link with grease nipples fitted and correctly orientated

no listing for the grease nipples within the Parts Manual. The aircraft manufacturer has stated that they supply the Retraction Link with the grease nipples fitted.

Other information

The aircraft, which was on the French register, was involved in an accident on 22 June 2001 at Etempts, France which resulted in the collapse of all three landing gears. The wreckage was transported to the UK where extensive repairs were carried out over a number of years and the aircraft eventually placed on the UK register in February 2007. Four days prior to the accident (8 August 2009) that is the subject of this report, there was a problem with the landing gear in that it would not extend using the electrical system; it had to be extended manually. An engineering investigation by a local maintenance organisation found that the down

limit microswitch, located in the area of the electric extension/retraction mechanism, had failed, which was replaced and adjusted. A number of static landing gear extension and retraction tests were carried out and the system was found to perform satisfactorily.

The aircraft had flown 51 hours since the major repair following the accident in France and the date of this accident.

Safety Recommendation 2010-044

It is recommended that the Federal Aviation Administration require the aircraft manufacturer, Mooney Airplane Company, to publish guidance material on the correct orientation of the nose landing gear Retraction Link part number 530003-013.