

ACCIDENT

Aircraft Type and Registration:	Mooney M20J, N12ZX	
No & Type of Engines:	1 Lycoming IO-360-B1E engine	
Year of Manufacture:	1991 (Serial no: 24-3227)	
Date & Time (UTC):	8 September 2012 at 1115 hrs	
Location:	Oxford Airport, Kidlington	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Propeller and engine unserviceable; abrasions to aircraft lower skin, collapsed landing gear	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	67 years	
Commander's Flying Experience:	5,088 hours (of which 4,958 were on type) Last 90 days - 67 hours Last 28 days - 24 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further information on aircraft damage	

Synopsis

The aircraft's landing gear failed to retract fully on takeoff but remained in an unlocked position. The aircraft subsequently landed on Runway 19 at Oxford (Kidlington) Airport. The gear collapsed, as anticipated by the pilot, and the aircraft came to a stop upright, with no injuries to the pilot and minor damage to the aircraft and runway.

Background

The pilot had some 4,958 hours flying Mooney aircraft and had been the sole pilot of N12ZX since she purchased it in 1994. The pilot reported that she had had "no gear trouble previously with this airplane" and that it is usual for her to do a practice emergency gear

extension while the aircraft is on jacks during annual maintenance.

The normal 50-hour maintenance items had been carried out on the aircraft on 30 August 2012. The pilot reported that prior to the reported incident she had flown 8.7 flight hours after the 50-hour check, with three 3 takeoffs and landings and "no sign of a gear problem".

History of the flight

The pilot took off from Oxford (Kidlington) Airport on an IFR flight plan for Szczecin, Poland. When the pilot operated the electrical gear retraction system it became clear "within the first minute after takeoff" that

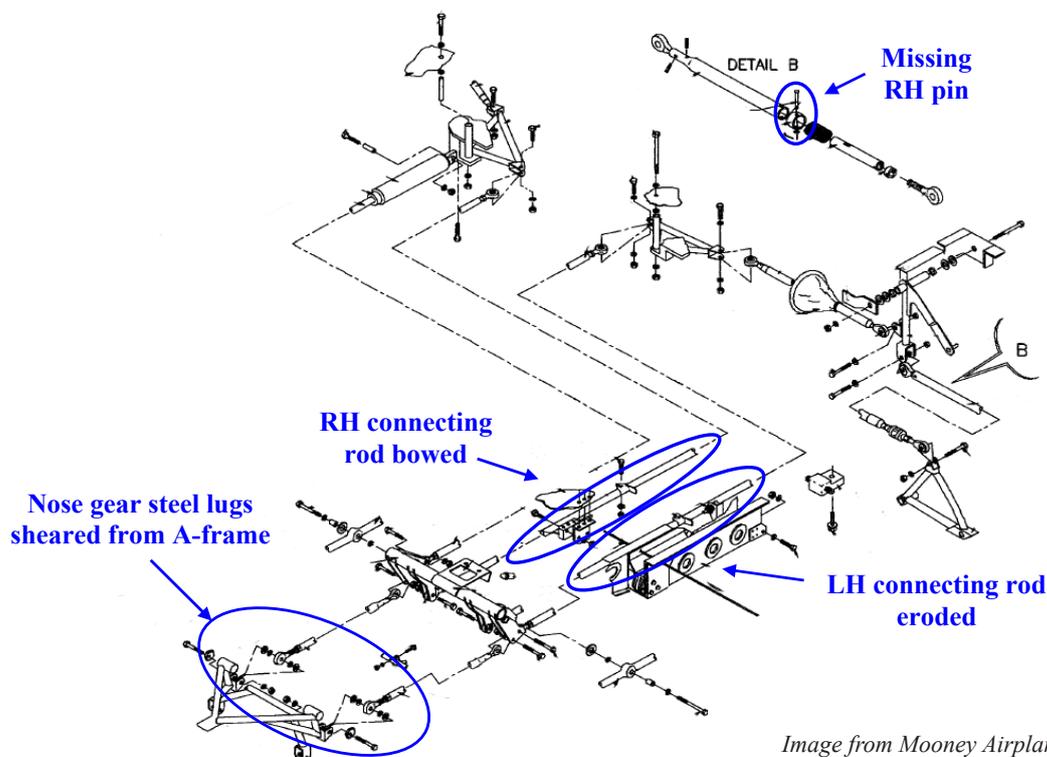
the gear had not retracted. On this aircraft there are two independent cockpit indications, one electrical and one mechanical, that indicate the status of the landing gear. The electrical indication of 'Gear Unsafe' remained lit, indicating that the gear was neither locked down nor locked up; the mechanical indication was stuck between the 'gear up' and 'gear locked down' positions. These indicated to the pilot that the gear was at least partially extended, but unlocked.

The pilot notified the Tower that she had a gear problem and flew for approximately one hour outside the ILS sector and VFR pattern, attempting to lock the gear either up or down. A manual gear extension system exists for occasions when there are electrical problems. The pilot tried "numerous times" to engage the system but with no success; it is noted that during previous 100-hour maintenance the pilot tested the system successfully whilst the aircraft was jacked up. The pilot flew past the

Tower and confirmed from ATC that the wheels were out but the landing gear was "at a strange angle". The pilot decided to land on the paved runway, rather than the grass, to minimise the risk of the aircraft flipping over. After touchdown the aircraft came to a halt safely, with no injuries to the pilot and minimal damage to the runway, and the pilot was able to exit through the door.

Inspection of damage

A recovery team removed the aircraft from the runway shortly after the incident and it was stored in a hangar at Oxford Airport. It was reported that initially the salvage crew were not able to extend the right main gear and had found a broken connecting rod in the mechanical linkage (Figure 1). Once this was removed they were able to extend the gear. The condition of the linkage prior to the accident is unknown and it is possible this damage was caused during the landing.



*Image from Mooney Airplane Company Inc.
M20J Illustrated Parts Catalogue*

Figure 1

Mooney M20J Landing Gear Retraction System

Inspection of the aircraft in the hangar revealed scrape marks on the outside of the nose gear doors, aircraft belly skin and other areas, with the damage consistent with that likely to be sustained during the landing. The steel lugs on the nose gear had also sheared from their 'A-frame' weld attachments, which indicated that the gear collapsed on landing and then folded back into the gear bay. Other damage was noted with respect to the landing gear retraction system:

- (a) RH connecting rod was bowed
- (b) LH connecting rod was eroded
- (c) Pin on RHS was missing

It is likely that damage (a) and (b) was caused during the landing. It was not possible to ascertain whether the missing pin would have caused the gear to jam.

Assessment of the cause

The pilot considers that the cause of the gear retraction failure was either an actuator failure or a structural failure within the mechanical linkage. The actuator was to be tested but the results were not available at the time of publication.