SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10204						
Classification	Accident	**Date**	11 August 2022		**Time**	1710Z	
Type of Operation	Private (Part 91)						
Location							
Place of Departure	Port Elizabeth Airport (FAPE), Eastern Cape Province	Place of Intended Landing	Port Elizabeth Airport (FAPE), Eastern Cape Province				
Place of Occurrence	On Runway 08 at Port Elizabeth Airport (FAPE), Eastern Cape Province						
GPS Co-ordinates	Latitude	33° 59'26.76"S	Longitude	025° 36'21.32"E	Elevation	229 ft	
Aircraft Information							
Registration	ZS-TLS						
Make; Model; S/N	Mooney M-20M; (Serial Number: 27-0217)						
Damage to Aircraft	Substantial	Total Aircraft Hours	856				
Pilot-in-command							
Licence Type	Commercial Pilot Licence (CPL)	Gender	Male	Age	19		
Licence Valid	Yes	Total Hours	255	Total Hours on Type	30.1		
Total Hours 30 Days	5.2	Total Flying on Type Past 90 Days	10.3				
People On-board	1+2	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Thursday, 11 August 2022, a pilot and two passengers on-board a Mooney M-20M aircraft with registration ZS-TLS were on a private flight from Port Elizabeth International Airport (FAPE), Eastern Cape province, with the intention to land back at FAPE. The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot stated that the flight was his first night circuit flight in this specific aircraft type. After taking off from Runway (RWY) 08 at approximately 1600Z, he conducted the first circuit, followed by a touch-and-go landing. During the second circuit whilst on the right downwind at 1200 feet (ft), the air traffic control officer (ATCO) asked the pilot to expedite and turn short final to accommodate scheduled traffic that was inbound, to which the pilot complied. After turning for final approach, the pilot realised that the aircraft was high; he then descended and opted to execute another touch-and-go landing. As the pilot flew over the threshold of RWY 08, there was a loud grinding noise from the underbelly of the aircraft with sparks on either side of the fuselage as it slid for a few metres before it came to a halt in the middle of the runway. After the aircraft had stopped, the pilot noticed that the landing gear control lever was still in the UP position.

The aircraft sustained scratches to the underbelly skin and the landing gear doors; the propeller blades were bent at the tips. None of the occupants sustained any injuries during the accident sequence.

What was found:

- Post-accident, a checklist was found in the cockpit.
- The landing gear was cycled, and it was found to be serviceable at the time of the flight. The unsafe landing gear warning horn was tested and found to be serviceable.

Figure 1: The instrument panel showing the landing gear control lever in the UP position. (Source: Operator)

Figure 2: The aircraft at the accident site. (Source: Operator)

Figure 3: The bent propeller blades. (Source: Operator)

Figure 4: The scratched underbelly cover. (Source: Operator)

- The Description and Operation of the Landing Gear System (Source: Mooney Executive Operators Manual)

  Landing Gear System

  The tricycle landing gear allows maximum taxi vision and ground manoeuvring. Hydraulic disk brakes and a steerable nose wheel aid in positive directional control during taxiing and crosswind landings.
  The landing gear is electrically retracted. A gear warning horn along with a green "gear down" light help prevent inadvertent gear-up landings. The retraction system incorporates a squat switch that prevents gear retraction when the landing gear mechanism is compressed by the weight of the aircraft. An emergency gear extension system is provided.

- According to Section 4 – Normal Procedures from the Mooney M20M Operators Manual

  Before-Landing Check

  1. Seat Belts--FASTENED.
  2. Fuel Selector Handle--SET for the fuller tank.
  3. Electric Fuel Pump--ON.
  4. Mixture Control--FULL RICH.
  5. Ram Air Control--CLOSED; warning light off.
  6. Airspeed--REDUCE to 120 MPH (104 Knots).

7. Propeller--FULL INCREASE.

8. Landing Gear--DOWN and LOCKED; green annunciator light on.

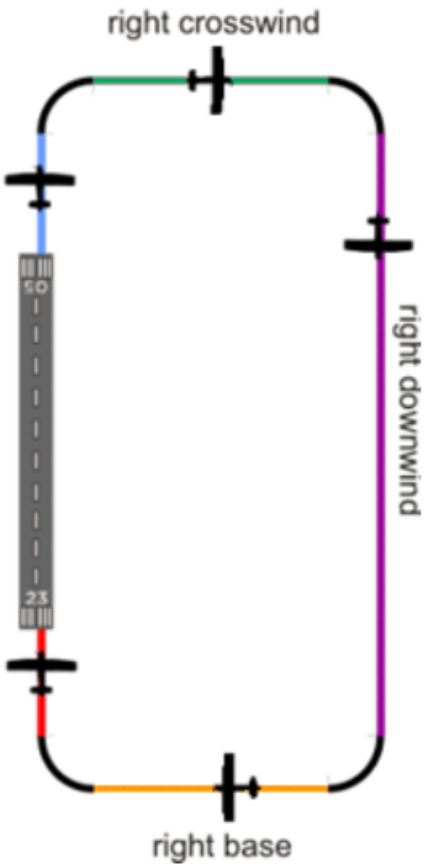
9. Flaps--As required.

10. Trim--As required.

Retarding the throttle below 12 inches of manifold pressure causes the gear warning horn to emit a regular, intermittent tone, unless the gear is down and locked.

Circuits and Landings

(Source: flight-training-made-simple.com)



Circuit Checks

In the circuit, there are certain checks that are mandatory as well as advisable. One is expected to memorise, unlike the ground checks for which one is expected to use the checklist.

These are:

- *After Take-off checks - to be started by 300ft Above Ground Level (AGL) at the latest.*
- *Downwind checks - abeam the tower (or when you get a word in edge-ways on Downwind).*

- *Finals checks - to be started by 300ft AGL latest, before your landing. During your training, you will be learning some checks for items that do not exist in your training aircraft. Here's why: Training aircraft are by their nature very basic. As soon as you have your PPL, you may convert to larger and usually more complex aircraft. If the checks for these more complex aircraft are not already entrenched in you, you are very likely to forget them, which could have disastrous and expensive results. These checks are "gear down", "pitch", "fuel pump on/off", (high wing gravity fed training aircraft don't have fuel pumps, but their low wing counterparts do. It is advisable to have this check in your check list arsenal even if you initially train on high wings). For the time being, the circuit checks you don't understand are "place-markers" for when you graduate to more complex aircraft.*

Downwind Checks

B Brakes ---------- ON/OFF for pressure
U Undercarriage -- DOWN
M Mixture ---------- RICH/SET
P Pitch ---------- SET
P Power ---------- SET-CHECK WHITE ARC
F Flaps ---------- 10°
F Fuel pump ------ ON
H Harnesses ------- SECURE
H Hatches ---------- SECURE
L Landing lights - ON

Finals Checks

C Carb heat -------- COLD
U Undercarriage -- CHECK DOWN
F Flaps ---------- 30° or as required

Findings

The Pilot

(i) The pilot was initially issued a Commercial Pilot Licence (CPL) on 23 November 2021. His last validation was conducted on 25 May 2022 with an expiry date of 30 June 2023. The Mooney M-20M aircraft was endorsed on his licence. A Class 1 medical certificate was issued to the pilot on 31 May 2022 with an expiry date of 31 May 2023 with no restrictions. At the time of the accident,

the pilot had flown a total of 255 hours, of which 30.1 hours were on the aircraft type. The pilot was licensed and qualified for the flight in accordance with (IAW) the existing regulations.

The Aircraft

(ii) The aircraft's current owner was issued a Certificate of Registration (C of R) on 12 July 2018. The aircraft was issued a Certificate of Airworthiness (C of A) on 26 April 2022 with an expiry date of 31 April 2023. The aircraft was considered airworthy prior to the accident flight.

(iii) According to the aircraft's latest Certificate of Release to Service (CRS) and logbooks, the last 100-hour annual inspection was certified on 5 August 2022 at 849.7 total airframe hours. At the time of the accident, the aircraft had accumulated 856 airframe hours. It had been flown a further 6.3 hours since the last annual inspection.

(iv) The last 100-hour inspection was carried out by the aircraft maintenance organisation (AMO) with a valid approval certificate. The aircraft maintenance engineer (AME) who certified the last inspection was appropriately licensed to carry out maintenance on the aircraft type. The maintenance records indicated that the aircraft was equipped and maintained IAW the existing regulations and approved procedures.

(v) The landing gear selector lever was found to be in the UP position.

(vi) Post-accident, the pilot stated that he forgot to select the landing gear lever to the DOWN position as he was hurrying to accommodate the inbound scheduled traffic. He further stated that he did not hear the landing gear unsafe warning horn sound prior to landing, and was not sure if the aircraft had a warning horn installed.

(vii) According to the POH, the aircraft was equipped with a landing gear warning horn.

(viii) The pilot reported that there were no mechanical malfunctions or failures with the landing gear system that would have precluded normal operation. According to the investigation, it is possible that the aircraft was landed in a high-power setting as the pilot was told to hasten. Therefore, it is possible that the manifold pressure was above 12 inches when the aircraft was on approach, which would have resulted in the landing gear warning horn not activating to alert the pilot that the landing gear was not in the down and locked position.

(ix) Post-accident, the aircraft was placed on jacks and the landing gear was lowered and locked into place without any anomalies when the aircraft was lifted from the runway.

(iix) Fine weather conditions prevailed at the time of the flight; the weather had no bearing to this accident.

Probable Cause

The landing gear lever was not selected to the down position on final approach, which led to a belly landing.

Contributing Factor

- The pilot did not complete the downwind checks as per the POH.
- The ATC's instructions to the pilot to hasten due to inbound scheduled traffic.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desktop inquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not apportion blame or liability.

Disclaimer

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa