

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9292	
Aircraft Registration	ZS-LIO	Date of Accident	13 February 2014		Time of Accident	0820Z
Type of Aircraft	Beech Baron 58		Type of Operation		Private	
Pilot-in-command Licence Type		Commercial Aeroplane	Age	51	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	5 151,4		Hours on Type	10
Last point of departure		Rustenburg Aerodrome (FARG), North West Province				
Next point of intended landing		Lanseria Aerodrome (FALA), Gauteng Province				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
The accident occurred on runway 07R at Lanseria aerodrome (GPS position: S25°56'22.89" E027°55'32.07", GL elevation 4 517 ft A)						
Meteorological Information		The pilot reported that the weather was CAVOK at the time of the accident: Wind direction: 140°–160°; Wind speed: 6–7 knots; Visibility: 10 km; Temperature: 20 °C; Dew point: Unknown; Cloud cover: Scattered; Cloud base: 2 000–2 500 feet.				
Number of people on board		1+3	No. of people injured	0	No. of people killed	0
Synopsis		<p>The pilot and three passengers were on a private flight from Rustenburg aerodrome to Lanseria aerodrome (FALA). The intention of the flight was to drop the passengers off at FALA for a connecting flight to Cape Town. A normal landing approach was carried out and after touchdown at approximately 300 metres into landing roll (Standardise), the landing gear collapsed. This resulted in the aircraft landing on its belly. The aircraft skidded on its belly until it came to a halt, damaging the bottom skin, the engines and the propeller blades.</p> <p>The investigation found that the accident occurred because the pilot was attempting to put the flaps control "UP" after landing, and moved the landing gear control instead. The inadvertent movement of the landing gear control was attributed to the pilot's being more accustomed to flying aircraft in which these two controls were in exactly opposite locations. It is possible that the pilot might have mistaken the landing gear control lever for the flap control lever as he had already landed and the aircraft was still on a ground roll. Post-accident landing gear testing and aircraft maintenance documentation all indicate that the landing gear system was serviceable prior the occurrence.</p>				
Probable cause		The pilot inadvertently selected the gear lever up instead of the flaps with the intention to lower the aircraft speed.				
Contributory factors		Lack of concentration or focus after landing.				
		Flying different types of aircraft with a retractable undercarriage.				
ASP Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Jynco Farming Consultants CC
Manufacturer : Beech Aircraft Corporation
Model : Beech Baron 58
Nationality : South African
Registration marks : ZS-LIO
Place : Lanseria Aerodrome on Runway 07R
Date : 13 February 2014
Time : 0820Z

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

Purpose of the Investigation:

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (1997) 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 to establish legal liability.***

Disclaimer:

This report is produced without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of flight

- 1.1.1 On 13 February 2014, the pilot and three passengers undertook a private flight from Rustenburg aerodrome to Lanseria aerodrome (FALA). The intention of the flight was to drop the passengers off at FALA for a connecting flight to Cape Town.
- 1.1.2 The pilot reported that they were cleared to land by air traffic control (ATC) on runway 07R at FALA and at approximately 08h15 they were on final approach to land. The front passenger, the owner of the aircraft, also confirmed three greens. A normal landing approach was carried out and after touchdown, at approximately 300 metres into landing rolls, the landing gear collapsed. The pilot kept the aircraft going as straight as possible with the runway centre line and it skidded on its belly until coming to a halt, damaging the bottom skin, the engines and the propeller blades.

- 1.1.3 The ATC activated the crash alarm and the airport fire and rescue services were immediately dispatched to the accident site. When the plane came to a standstill the pilot reported that he had shut down all electrics and all occupants evacuated the aircraft unharmed. ATC and the airport manager contacted AIID to report the accident and obtain permission to remove the plane from the runway. Permission was given to remove the aircraft from the runway on condition that the airport manager to take photos of the scene, including the cockpit from the outside, clearly showing a gear down selection.
- 1.1.4 When the plane was lifted by the NAC recovery team, the main gear came down. One of the NAC technicians got into the plane to pump the gear down. The left main gear locked down, but the right main gear at first did not. They pumped the gear slightly up, a technician manipulated the linkages, and on the second attempt to pump down, the gear locked. The nose wheel did not lock down.
- 1.1.5 Following the post-accident interview with the pilot, he reported that he had no idea what could have caused the gear to collapse or to retract and that he was positive that he did not touch the gear selector or the flap selector on the ground roll after landing.
- 1.1.5 The accident occurred in daylight conditions (GPS position: S25°56'22.89" E027°55'32.07", elevation 4 517 feet AGL).

1.2 Injuries to persons:

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	1	-	3	-

1.3 Damage to aircraft:

1.3.1 The aircraft sustained substantial damage on its belly.



Figure 1: Damage to aircraft

1.4 Other damage:

1.4.1 There were impact marks on the runway where the aircraft had skidded and the propeller blades hit the runway surface.

1.5 Personnel information:

Nationality	South African	Gender	Male	Age	51
Licence number	0270113350	Licence type	Commercial		
Licence valid	Yes	Type endorsed	Yes		
Ratings	Single-engine piston, multi-engine piston, test pilot rating class 2, flight test instructor and night rating, test pilot rating class 2, instrument rating, instructor grade 2				
Medical expiry date	31 May 2014				
Restrictions	Corrective lenses and standby corrective lenses or glasses				
Previous accidents	None				

Flying experience:

Total hours	5 151,4
Total past 90 days	76,7
Total on type past 90 days	10
Total on type	20

NOTE: The pilot reported that as an instructor he taught his students to always first vacate the runway after landing before positively identifying the flaps and then cleaning up. A summary of the systems on the pilot logbook shows that he has accumulated 376,3 flying hours on retractable undercarriage aircraft. He has a total of 20 hours on the BE58 with 27 landings done. He has a total of 2 718,9 flying hours on CPL and 2 432,5 flying hours on NPL, giving a grand total of 5 151,4 flying hours up to 13 February 2013 when the accident occurred.

The pilot was found to have been rated on different types of aircraft e.g. Beech Baron, Beech Bonanza, PC 12, Cessna 210, Cessna M337 (MC337, T337) Super Skymaster, Ikarus C-42, Commander AC11, Mooney (M20T and M020), PA32 and other light aircraft with a retractable undercarriage.

1.6 Aircraft information:

Airframe:

Type	Beech Baron 58	
Serial number	TH-1358	
Manufacturer	Beech Aircraft Corporation	
Date of manufacture	1982	
Total airframe hours (at time of accident)	2 031,0	
Last MPI (date & hours)	30 August 2013	2 025,9 hours
Hours since last MPI	6,9 hours	
C of A (issue date)	19 January 1983	
C of A (expiry date)	18 January 2015	
C of R (issue date) (present owner)	28 January 2014	
Maximum take-off weight	1 983 kg	
Operating categories	Part 91	
Recommended fuel used	Avgas	

Engine 1:

Type	TCM-10-520-CB
Serial number	1000346
Hours since new	2 031,0
Hours since overhaul	10,9

Engine 2:

Type	TCM-10-520-CB
Serial number	1000436
Hours since new	2 031,0
Hours since overhaul	10,9

Propeller 1:

Type	Hartzell PAC-BYF-2UF
Serial number	ED4498B
Hours since new	2 031,0

1.11 Flight recorders:

1.11.1 The aircraft was not fitted with a cockpit voice recorder (CVR) or a flight data recorder (FDR), and neither was required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and impact information:

1.12.1 A normal landing approach was carried out and after touchdown at approximately 300 metres into landing rolls, the landing gear collapsed. The pilot kept the aircraft going as straight as possible with the runway centre line.

1.12.2 The aircraft skidded a few metres from the touchdown point and veered to the right of the runway before coming to a halt. The bottom skin, engines and propeller blades were damaged in the skid.

1.12.3 During inspections by the pilot and NAC recovery crew it was found that the undercarriage selector lever in the cockpit was in the up position and the flap lever was on the lower position.

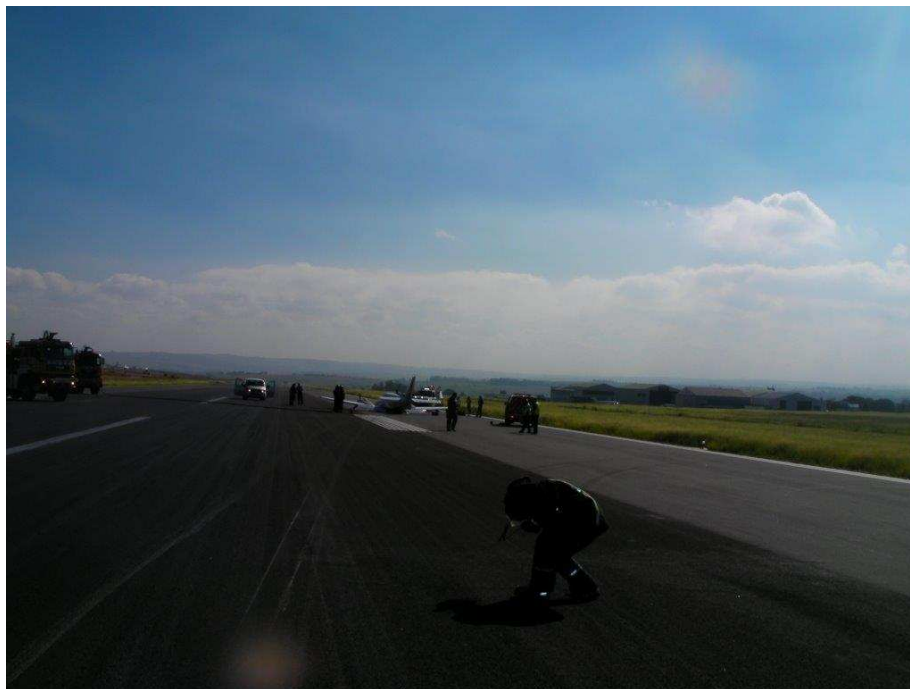


Figure 2: Aircraft after coming to a stop

1.13 Medical and pathological information:

1.13.1 There was no evidence that physiological factors or incapacitation affected the performance of the pilot.

1.14 Fire:

1.14.1 There was no evidence of pre- or post-impact fire.

1.15 Survival aspects:

1.15.1 The accident was considered survivable because the aircraft veered off the runway at a low speed and the cabin of the aircraft sustained no damage.

1.15.2 The pilot was properly restrained by the safety harnesses fitted to the aircraft.

1.16 Tests and research:

1.16.1 After the accident, the aircraft was recovered and placed on jacks. Several retraction and extension tests were performed (hydraulic system and free fall system) without any abnormalities. All cycles were completed with the gear in the down and locked position and the green position indicator light in the cockpit illuminating.

1.16.2 Several tests and inspections were conducted on the undercarriage after the accident.

1.16.3 The investigation compared the details of Bonanza and Baron cockpit features to those of other contemporary light aircraft. The comparison indicated that the cockpit design of the various models of Bonanzas and Barons differed from those of most other contemporary light aircraft, for instance the locations for the landing gear and flap controls.



Figure 3: Position of levers in incident aircraft **Figure 4:** Position of controls in Beech Baron 58

1.16.4 The following information was taken from Beech Baron 55 and 58 Maintenance Manual under general- description and operations:

Landing gear system:

The landing gear system is operated through adjustable linkage connected to an electro mechanical actuator assembly mounted behind the forward spar carrier-thru. The actuator assembly is driven by an 14 or 28 volt electric motor controlled by the landing gear position switch mounted near the lower centre of the instrument panel, the limit switches are mounted adjacent on the left hand side of the actuator assembly. The dynamic brake relay is mounted to the right side of the gear actuator. There are two ground safety switches one located on each main landing gear strut assembly (Ref. Appendices 1). The landing gear motor, dynamic brake relay, limit switches and actuator assembly are accessible by removing the front seats and spar cover.

The landing gear may be operated electrically UP or DOWN and also may be lowered manually. By tripping the landing gear motor circuit breaker and extending the hand crank located on the actuator assembly then turning clockwise (average 50 turns to full down and locked), this should be done in an emergency only. The landing gear circuit consists of the landing gear position switch, UP and DOWN limit switches, two ground safety switches, resettable circuit breaker, drive motor and a dynamic brake relay.

When the landing gear switch is placed in the UP position and the aircraft is airborne, the two safety switches become latched then dynamic brake is activated applying power to terminal 1 of the relay, which applies power to the UP windings of the drive motor and arming the braking circuit in the relay. As the landing gear UP limit switch is tripped the dynamic brake power relay relaxes and applies a ground to the opposite winding thru terminal 2 of the dynamic relay to the drive motor, this creates a braking action within the drive motor.

The landing gear retract mechanism is a complex system with very small clearances between working parts. Adjustments should be made only at a Hawker Beechcraft Corporation authorized service facility. Any malfunction should be corrected by an authorized service facility.



Figure 5: Positions of controls in Pilatus 12



Figure 6: Positions of controls in Beech Baron

1.17 Organisational and management information:

1.17.1 This was a private flight. The owner of the aircraft, who happened to be the principal of the pilot, was sitting with the pilot in the cockpit at the time of the accident.

1.17.2 The aircraft is maintained by an approved aircraft maintenance organisation (AMO). The AMO had a valid operating certificate at the time of drafting this report.

1.18 Additional information:

1.18.1 The following information was extracted from the Beech Baron 58 checklist.

Approach	
Localizer Level Flight :	
Landing Lights	ON
Propeller	HIGH RPM
Mixture	FULL RICH
Speed: Establish	145 KIAS
Flaps	SET APPR
Speed: Establish	120 KIAS
Landing Gear	DOWN
Turning toward runway: set flaps	FULL DOWN
Final Glideslope Descent :	
Speed:- Establish	100 KIAS
Parking Brake	VERIFY OFF
Landing	
Landing Gear	CHECK DOWN, 3 GREEN
Autopilot	OFF
Wing Flaps	As Desired
Landing Speed	95 KIAS
Taxi to Ramp	
Strobe light	OFF
Flaps	RETRACT
Taxi Lights	ON
Landing lights	OFF
Anti-ice	OFF
Speed	Max.20 knots
Cowl flaps	OPEN
Elevator trim	TAKEOFF SETTING
Avionics/Radios	AS REQUIRED

1.18.2 The following information was extracted from the Beechcraft Baron 58 Maintenance manual, Serial TH773 and after, SECTION VII, systems Description (Reference Appendice 1):

SAFETY SWITCH

To prevent inadvertent retraction of the landing gear on the ground, a main strut safety switch opens the control circuit when the strut is compressed.

CAUTION:

Never rely on the safety switch to keep the gear down during taxi or on take-off, landing roll, or in a static position. Always make certain that the landing gear switch is in the down position during these operations.

WARNING HORN:

If either or both throttles are retarded below an engine setting sufficient to sustain two engine flight with the landing gear retracted, a warning horn will sound intermittently. During one engine operation, the horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit.

MANUAL EXTENSION:

The landing gear can be manually extended, but not retracted by operating the handcrank on the rear of the pilots seat. The landing gear handle must be in the down position and the landing gear MOTOR circuit breaker must be pulled before manually extending the gear. When the electrical system is operative, the landing gear may be checked for full down with the gear position lights, provided the landing gear RELAY circuit breaker is engaged. After the landing gear is down, disengage the hand crank. For electrical retraction of the landing gear after a practice manual extension use procedures outlined in the EMERGENCY PROCEDURES.

If the landing gear was extended for emergency reasons, do not move any landing gear controls or reset any switches or circuit breakers until the aircraft is on jacks, to prevent a gear retraction on the ground. These procedures are outlined in the EMERGENCY PROCEDURES section.

1.19 Useful or effective investigation techniques:

1.19.1 No useful or effective investigation techniques were applied.

2. ANALYSIS:

2.1 Pilot (man):

2.1.1 The pilot was appropriately licensed for the flight. He had a total of 5 151, 4 flying hours, with 22,7 of those hours being on type. The pilot flew this particular aircraft for a period of hours in the last 90 days without any incident. His flying medical certificate was also valid and issued without any restrictions. The pilot was found to have been rated on different types of aircraft, e.g. Beech Baron, Beech Bonanza and other light aircraft with a retractable undercarriage.

2.1.2 The investigation also considered the fact that the owner of the aircraft was on board the aircraft. It is possible that the pilot might have been communicating with him after landing, which resulted in the pilot's attention being diverted after landing and leading to the pilot's not following the full checklist after the landing, which requires that the flaps should be retracted and not the undercarriage as it was the case in this accident.

2.1.3 It is therefore concluded that this accident occurred because the pilot was attempting to put the flaps control "UP" after landing while taxiing, and moved the landing gear control instead. The inadvertent movement of the landing gear control was attributed to the pilot's being more accustomed to flying aircraft in which these two controls were in exactly opposite locations. It is possible that the pilot might have mistaken the undercarriage selector lever for the flap lever as he had already landed and the aircraft was taxiing. It is also possible that the pilot might not have visually checked which lever he was supposed to select before selecting it.

2.2 Aircraft (machine):

2.2.1 The aircraft undercarriage was serviceable prior to departure for the flight. The aircraft landed uneventfully and taxied for 300 metres, where after the undercarriage collapsed due to the undercarriage lever being selected up instead of the flap lever as per the checklist. Following the incident, the undercarriage system was inspected and it was found that there was no mechanical failure that could have contributed to the incident.

2.2.2 Post-accident landing gear testing and aircraft maintenance documentation all indicate that the landing gear system was serviceable prior the occurrence. It seems likely that the reason that the interlock system did not prevent the landing gear selector being moved to the UP position was that the airspeed at the time was high enough to provide sufficient lift (insufficient weight on wheels) to prevent the interlock system from activating as the pilot inadvertently selected the gear lever up instead of the flaps with the intention clear the flaps before taxiing or vacating the runway in use.

2.2.3 The safety switches typically work based on the compression of the oleo strut, which in this case opens the electrical circuitry and disables the operation of the retraction system. However, such can still happen on the ground, especially during the landing roll, when the airplane is still light on the wheel and the oleo strut have not fully compressed to activate the switches.

2.3 Environment:

2.3.1 The weather conditions at the airfield did not contribute to the accident. The airfield was grass and it assisted in minimising the damage to the aircraft.

3. CONCLUSION:

3.1 Findings:

3.1.1 The aircraft had a valid Certificate of Airworthiness and a valid Certificate of Registry and had been maintained in compliance with the regulations.

3.1.2 The aircraft was airworthy when it was dispatched for the flight.

3.1.3 The pilot was licensed and qualified for the flight in accordance with existing regulations.

3.1.4 The pilot's actions and statements indicated that his knowledge and understanding of the aircraft systems were adequate.

3.1.5 There was no evidence that incapacitation or physiological factors affected the flight crew performance.

3.1.6 The pilot inadvertently selected the landing gear control up instead of the flaps control.

3.1.7 The pilot stated that after a normal landing approach was carried out and after touchdown at approximately 300 metres into landing rolls, the landing gear collapsed.

3.1.8 Prevailing weather conditions at the time of the accident did not have an effect on this accident.

3.1.9 The pilot was properly licensed, medically fit and adequately rested to operate the flight. The pilot and the passenger were not injured during the accident.

3.1.10 There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.

- 3.1.11 The aircraft was not equipped with an flight data recorder (FDR) or a cockpit voice recorder (CVR); neither was required by regulation.
- 3.1.12 There was no reported evidence of airframe failure, engine failure or system malfunctions prior to the accident.
- 3.1.13 All control surfaces were accounted for, and all damage to the aircraft was attributed to the severe impact forces.
- 3.1.14 The pilot was found to have been rated on different types of aircraft e.g. Beech Baron, Beech Bonanza, PC 12, Cessna 210, Cessna M337 (MC337, T337) Super Sky master, Ikarus C-42, Commander AC11, Mooney (M20T and M020), PA32 and other light aircraft with a retractable undercarriage.
- 3.1.15 The safety switches typically work based on the compression of the oleo strut, which in this case opens the electrical circuitry and disables the operation of the retraction system. However, such can still happen on the ground, especially during the landing roll, when the airplane is still light on the wheel and the oleo strut have not fully compressed to activate the switches.
- 3.1.16 Post-accident landing gear testing and aircraft maintenance documentation all indicate that the landing gear system was serviceable prior the occurrence. It seems likely that the reason that the interlock system did not prevent the landing gear selector being moved to the UP position was that the airspeed at the time was high enough to provide sufficient lift (insufficient weight on wheels or oleo strut) to prevent the interlock system from activating as the pilot inadvertently selected the gear lever down instead of the flaps with the intention to lower the aircraft speed.

3.2 Probable cause/s:

- 3.2.1 The pilot inadvertently selected the gear lever down instead of the flaps with the intention to lower the aircraft speed.

3.3 Contributory factor:

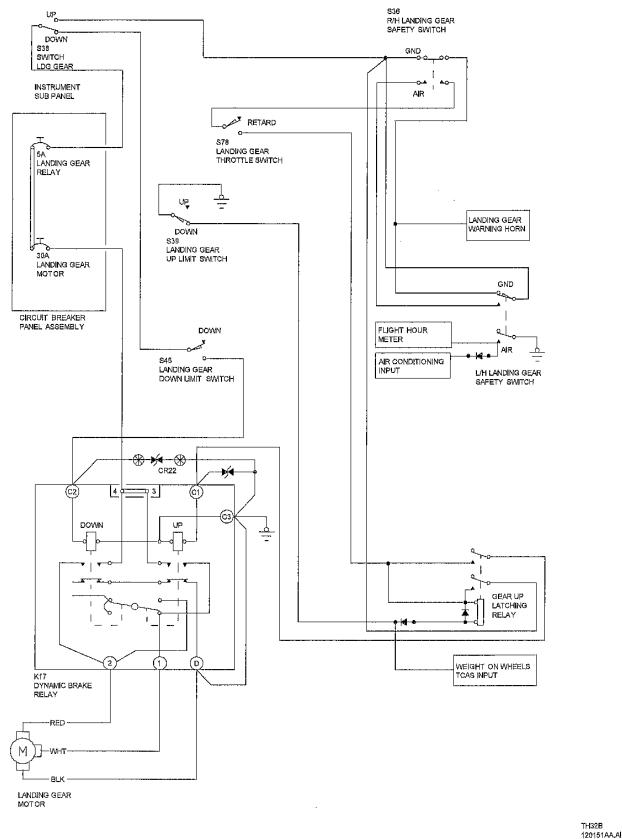
- 3.3.1 Lack of concentration or focus after landing.
- 3.3.2 Flying different types of aircraft with a retractable undercarriage.

4. SAFETY RECOMMENDATIONS:

- 4.1 None.

5. APPENDICES:

- 5.1 Appendice 1.



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Fig 1 (Rev.) - Landing Gear System
 Printed from Beechcraft Corporation Interactive Maintenance Library (IML).
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