SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division Accident and Incident Investigation Division Form Number: CA 12-41

AIRCRAFT SERIOUS INCIDENT SHORT REPORT

CA18/3/2/1317: Nose gear collapsed during landing on Runway 29 at FAWB.

Date and time	: 15 August 2020, 0810Z
Aircraft registration	: ZS-MZU
Aircraft manufacturer and model	: Piper Aircraft Corporation, PA-28-180
Last point of departure	: Wonderboom Aerodrome (FAWB)
Next point of intended landing	: Wonderboom Aerodrome (FAWB)
Location of incident site with reference to easily defined geographical points (GPS readings if possible)	: On the right edge of Runway 29, FAWB : GPS position: 25°39'19.10" South 028°13'16.81" East
Meteorological information	: Surface wind: Light and variable; temperature: 19°C
Type of operation	: Training (Part 141)
Persons on-board	: 1 + 0
Injuries	: None
Damage to aircraft	: Substantial

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 of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011), 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 apportion blame or liability.***

Ministerial Order regarding Aircraft Accident and Incident Investigations dated 26 May 2016 issued by Minister Dipuo Peters in terms of section 100 (1)(b) of the Civil Aviation Act, 2009 (Act No. 13 of 2009):
"The Aircraft Accident and Incident Investigation unit shall report functionally to the Minister of Transport through the Deputy Director-General: Civil Aviation in so far as it relates to accident and incident investigations and reports. The South African Civil Aviation Authority (SACAA) shall be responsible for managing operational resources (technical, human, financial) to conduct investigations without hindrance".

Disclaimer:

1. SYNOPSIS

1.1 On Saturday morning, 15 August 2020 at 0810Z, a Piper PA-28-180 aircraft with registration ZS-MZU was substantially damaged when the student pilot was involved in a bounced landing incident on Runway 29 at Wonderboom Aerodrome (FAWB). The student pilot was not injured during the serious incident. Visual flight rules prevailed on the day and a flight plan was filed for the flight, which departed FAWB at 0550Z on a solo navigational flight. The flight was conducted under Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.2 The student pilot became fixated on the aircraft that was on the runway and cleared for take-off while she was on final approach for landing. This resulted in an unstable approach. The aircraft bounced upon landing, resulting in the collapse of the nose landing gear.

2. FACTUAL INFORMATION

2.1 History of flight

2.1.1 On Saturday morning, 15 August 2020, an aircraft with registration ZS-MZU took off from Wonderboom Aerodrome (FAWB) at 0550Z on a training flight. A student pilot was the sole occupant on-board the aircraft and was seated on the left front seat. She was duly authorised to conduct the flight by the Aviation Training Organisation (ATO). After departure from FAWB, she flew to Witbank Aerodrome (FAWI), then to Secunda Aerodrome (FASC), and back to FAWB for a full stop landing. She did not land at FAWI nor at FASC.

2.1.2 As she approached FAWB from the south-east, she made radio contact with air traffic control (ATC) at the aerodrome. She was instructed by ATC to standby for clearance. Approximately 1 minute and 30 seconds later, the ATC informed the student pilot to maintain 5 600 feet (ft) and to report south of Roodeplaat Dam, joining long final Runway 29. She then reported 2 miles east of the N1 Highway while on long final approach for Runway 29.

2.1.3 Approximately 5 minutes and 40 seconds later, the student pilot informed ATC that she is on short final approach Runway 29, "*but there is an aircraft on the runway, should I attempt to do a go-around or should I just land?"* She was then informed by ATC: *"You are too far from the traffic, continue with the approach",* which she acknowledged. She then continued with the approach. Approximately 1 minute and 32 seconds later, the student pilot called the tower and advised them that she was involved in a runway excursion incident. ATC then activated the crash alarm and the Aerodrome Rescue and Fire-fighting (ARFF) personnel responded to the scene. A transcript of the communication between ATC and the student pilot is attached to this report as Annexure A.

2.1.4 The pilot was issued a Student Pilot Licence on 24 February 2020. She had accumulated a total of 58.2 flying hours at the time of this serious incident, of which 38.5 hours were flown during the past 90 days prior to the serious incident.

2.1.5 The serious incident occurred during daylight at a geographical position determined to be: 25°39'19.10" South 028°13'16.81" East at an elevation of 4 095 feet above mean sea level (AMSL).

Figure 1: Propeller strike markings on Runway 29 at FAWB.

Figure 2: The aircraft as it came to rest on the right of Runway 29 at FAWB.

Figure 3: Both propeller blade tips were bent backwards following contact with the runway's surface.

2.1.6 Aircraft Information

The aircraft, a Piper PA-28-180, with serial number 28-2891 was manufactured in 1965. It had a total time of 9 538.0 airframe hours at the time of the serious incident. The last

maintenance inspection prior to the serious incident flight was performed on 3 August 2020 and the aircraft had flown a further 38.1 hours since the inspection.

2.1.7 Meteorological Information

The weather information on the table (below) was obtained from the 0800Z (Packtime: 0755Z) Meteorological Aeronautical Report (METAR) that was issued by the South African Weather Service (SAWS) for FAWB: 150800Z 06005KT CAVOK 19/06 Q1020=.

Wind Direction	060°	Wind Speed	5 kt	Visibility	+ 10km
Temperature	19°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	6°C	QNH	1020 hPa		

When the ATC cleared the student pilot to land, the wind was light and variable. The student pilot landed at 0810Z, which was 15 minutes after the Packtime of the METAR information on the table above.

2.1.8 Duties of the pilot-in-command (PIC) regarding flight operations (Civil Aviation Regulation of 2011)

Part 91.02.8(1) *The PIC of an aircraft shall, whether manipulating the controls or not, be responsible for—*

(a) the operation, safety and security of the aircraft, crew members, passengers and cargo in accordance with these regulations while he or she is in command;

(b) operational control of the aircraft unless otherwise provided for in terms of Part 93, 121, 127 or 135 under an approved operational control system;

(c) the conduct of crew members and passengers carried; and

(d) the maintenance of discipline by all persons on board.

(2) The PIC of the aircraft shall have the authority—

(a) to give such commands he or she deems necessary in the interest of the safety of the aircraft, persons or property".

2.1.9 Porpoising

Source: Airplane Flying Handbook FAA-H-8083-3B, Chapter 8, Approaches and Landings:

"In a bounced landing that is improperly recovered, the airplane comes in nose first initiating a series of motions that initiate the jumps and dives of a porpoise (see Figure 4). The problem is improper airplane attitude at touchdown, sometimes caused by inattention, not knowing where the ground is, miss-trimming or forcing the airplane onto the runway.

Ground effect decreases elevator control effectiveness and increases the effort required to raise the nose. Not enough elevator or stabilator trim can result in a nose low contact with the runway and a porpoise develops.

Porpoising can also be caused by improper airspeed control, usually, if an approach is too fast, the airplane floats and the pilot tries to force it on the runway when the airplane still wants to fly. A gust of wind, a bump in the runway, or even a slight tug on the control wheel sends the airplane aloft again.

The corrective action for porpoise is the same as for a bounce and similarly depends on its severity. When it is very slight and there is no extreme change in the airplane's pitch attitude, a follow-up landing may be executed by applying sufficient power to cushion the subsequent touchdown and smoothly adjusting the pitch to the proper touchdown attitude.

When a porpoise is severe, the safest procedure is to execute a go-around immediately. In a severe porpoise, the airplane's pitch oscillations can become progressively worse until the airplane strikes the runway nose first with sufficient force to collapse the nose gear. Attempts to correct a severe porpoise with flight control and power inputs is most likely untimely and out of sequence with the oscillations and only make the situation worse. Do not attempt to salvage the landing. Apply full power while simultaneously maintaining directional control and lowering the nose to a safe climb attitude."

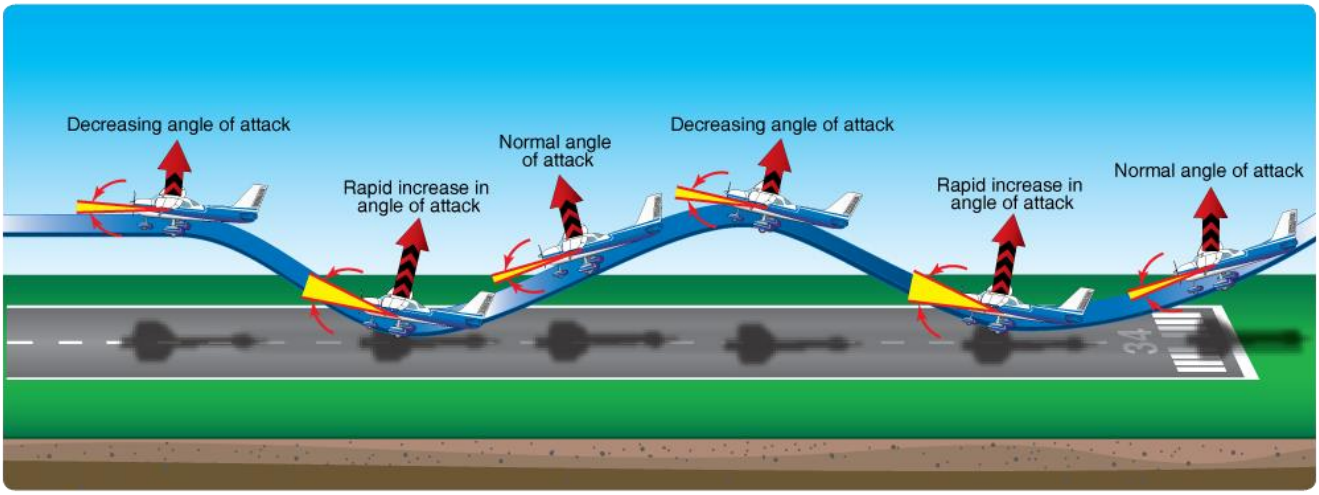


Figure 4: Illustration of porpoising.

2.1.10 Three Steps to Better Landings

Source: https://www.aopa.org/news-and-media/all-news/2020/october/pilot/finish-strong, by Ian Twombly of AOPA

"Landings as a weak point makes sense. Most mistakes at altitude are never noticed. But a mistake on landing means there's something to hit. And, as pilots, we hit it all: the runway, the runway lights, the grass, ditches, signs, hangars, other airplanes. You name it and we've pranged it.

Plus, landings are difficult. Airport environments can be tricky, the approach involves managing multiple factors at once, the airplane's energy state is constantly changing, and there's a relatively fine line between greasing it on and banging it on.

Every year general aviation airplanes are involved in about 300 landing accidents and maybe six times as many incidents. During a randomly selected 10-day period this June there were 118 aircraft incidents and accidents. Of those, 59 can be attributed to landing problems. In other words, almost six times a day someone lands gear-up, lands so hard the gear collapses, ground loops, lands short, lands long, or gets pushed off the side of the runway by a crosswind.

Stop the madness. Landings can be difficult, but they need not be complex. It can help to think of a landing in three distinct phases: (i) the approach, (ii) the round-out, and (iii) the flare.

The approach

You've heard that stable approaches make for good landings. In jets and other slippery aircraft, the safety benefit of a stable approach is undeniable. But are they as important in smaller piston-powered aircraft? I think the answer is a qualified yes.

Approaches are like a bargain piece of meat. In the hands of a good cook, a cheap cut can be transformed into a great meal, but in the hands of a lousy one, prepare to order takeout. If you are making consistently poor landings, such as landing long, then short-or if you bounce, then float-shoddy approaches could be the culprit. Experienced pilots flying low-energy airplanes off large runways can identify approach problems early, fix them, and go on to make good landings. But inexperienced pilots, or those flying off short runways or in slick airplanes, don't have either the skill or the time to identify the exact problem and apply a quick solution to guarantee a good landing.

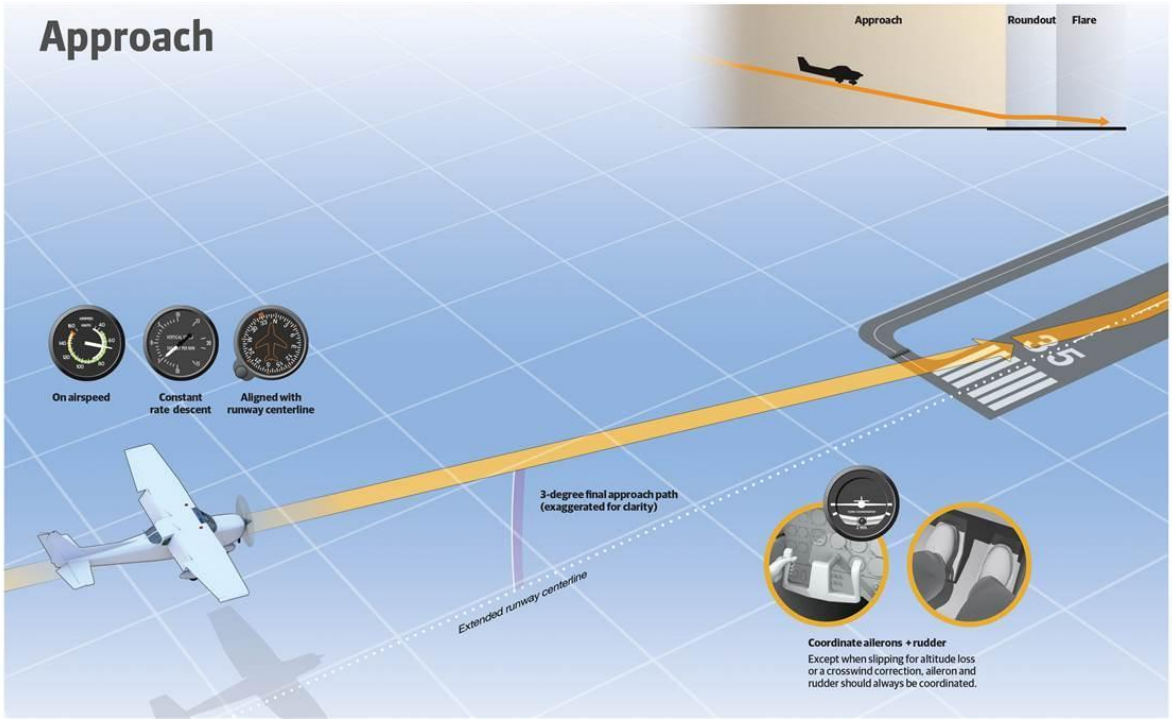


Figure 5: Illustration of an aircraft on stable approach.

If your landings aren't consistent start by looking at the approach. A good approach is simple to identify and define. It's always on glidepath, on speed, and requires a minimal amount of input from the pilot. If the wind is light and the air smooth, the approach will be a constant-rate descent with a slowly decreasing airspeed. If you're always adding power, retracting flaps, speeding up or slowing down, or consistently off the glidepath, go back to basics and work first only on improving your approaches.

Instructor and author Rod Machado think making great landings starts with rudder coordination, a skill that should be taught early, and one that can be easily evaluated on the approach. Machado cites the Ercoupe as proof of this. Designer Fred Weick claimed he repeatedly soloed Ercoupe students in fewer than five hours, in part because they didn't have to worry about rudder coordination. "Rudder and aileron coordination are the nemesis of learning to land," Machado said. "It's a testament to teaching this skill prior to teaching landings." Learn to coordinate the ailerons and rudder, and the next steps will be more successful as well.

The round-out

The hardest part of landing, and the step that most determines the landing outcome, is the round-out. This transition from descent to level flight just inches above the runway is sometimes grouped in with the flare, but it's important enough, and a distinct enough skill, that it deserves its own examination. Do it at the right height and at the right speed, and you will see your landings improve dramatically. That's easy to say but hard to do.

The tricky part comes with knowing when to begin the big pull to transition from descent to level. Some of the finesse comes from experience, but some can be taught. Machado has a great trick for this, and if you watch landing videos on YouTube you can see it in action. Assuming the airplane is on speed, about eight to 10 seconds prior to the wheels touching down the shape of the runway rapidly changes. It goes from being a gradually increasing strip of pavement in the windscreen to a fat trapezoid in just one or two seconds. Some describe it as a sensation of rushing toward the runway. This is when you start to pull. Then the only difficult part is to pull only enough to stop the descent, and not so much you start climbing again. A few low passes down the runway can help refine this technique and better acquaint you with the right sight picture.

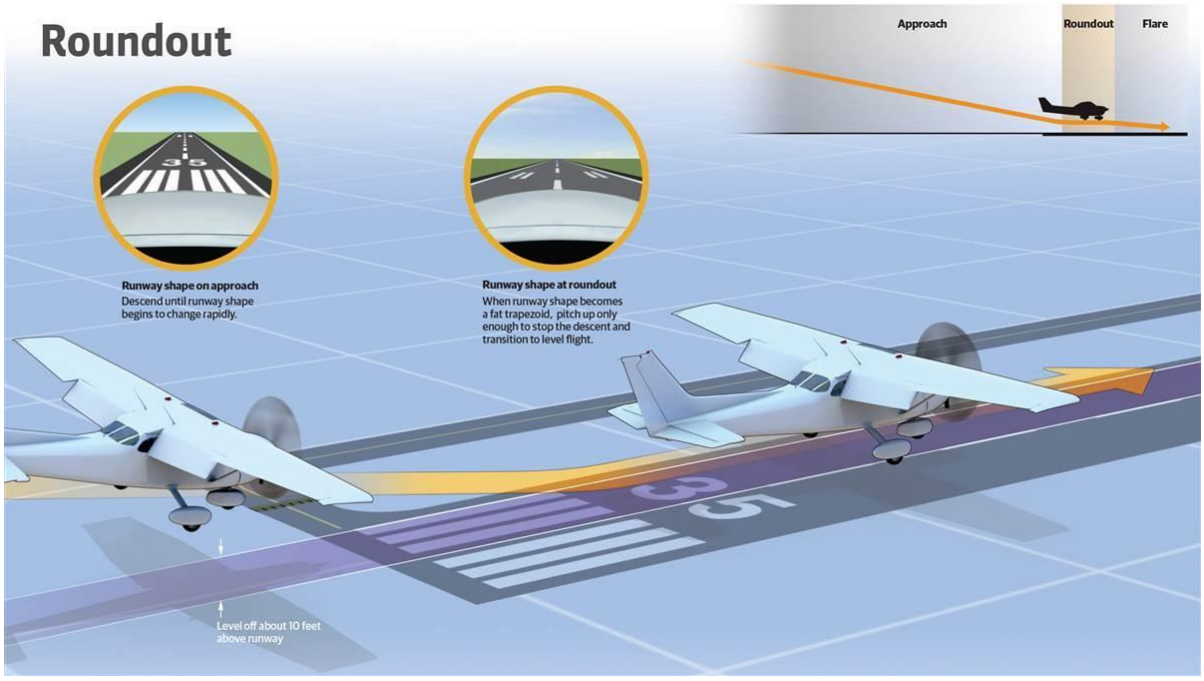


Figure 6: Illustration of an aircraft on the round-out.

The flare

If you've rounded out at the right height, all that's left to do is track the centreline and keep the airplane off the runway for as long as possible. If the round-out happened at the right speed, the flare should only last a few seconds, and the transition between the round-out and the flare will be relatively seamless. As you pull back to flatten the attitude and transition to level flight, you'll wait just a second or two, and then start pulling back to keep the airplane off the runway.

This portion of the landing is what makes pilots look good. It separates the good landing from the great landing, and it's a great time to diagnose issues. Bounces, skips, balloons,

and floats all become apparent in the flare, although most are symptoms of problems that occurred in a previous landing segment.

The goal of a flare should be to keep the airplane off the runway as long as possible. Assuming you've levelled off at the right height and on speed, this will take a smooth application of back-pressure. You must feel the airplane's energy. Pulling too quickly initially will result in the airplane ballooning, but too slowly and the wheels will touch down early. As the airplane slows and the energy draws down, you'll need more back-pressure to keep it off the ground. The motion looks like a slowly accelerating pull from neutral to full back, depending on the airplane and center of gravity.

Every pilot struggle with finding the right place to look down the runway to judge the airplane's height and avoid ballooning. Here again, Machado has a great tip. He said that most of us are taught to look over the nose of the airplane, but if you're landing properly, you shouldn't be able to see over the nose. Instead, he suggests looking at the triangle formed between the horizon, the door post, and the edge of the cowling. This will give you a horizon reference and give you a reliable place to judge the airplane's height above the runway. And especially as you age, Machado recommends physically turning your head toward the pie-shaped cut out to better take in the visual cues.

Everyone wants to make better landings, and the first step is being honest with yourself about your abilities. Don't be too proud to consult another experienced pilot or an instructor. The world's most elite athletes, top CEOs, and best artists look for ways to continually improve, and as pilots, so should we."

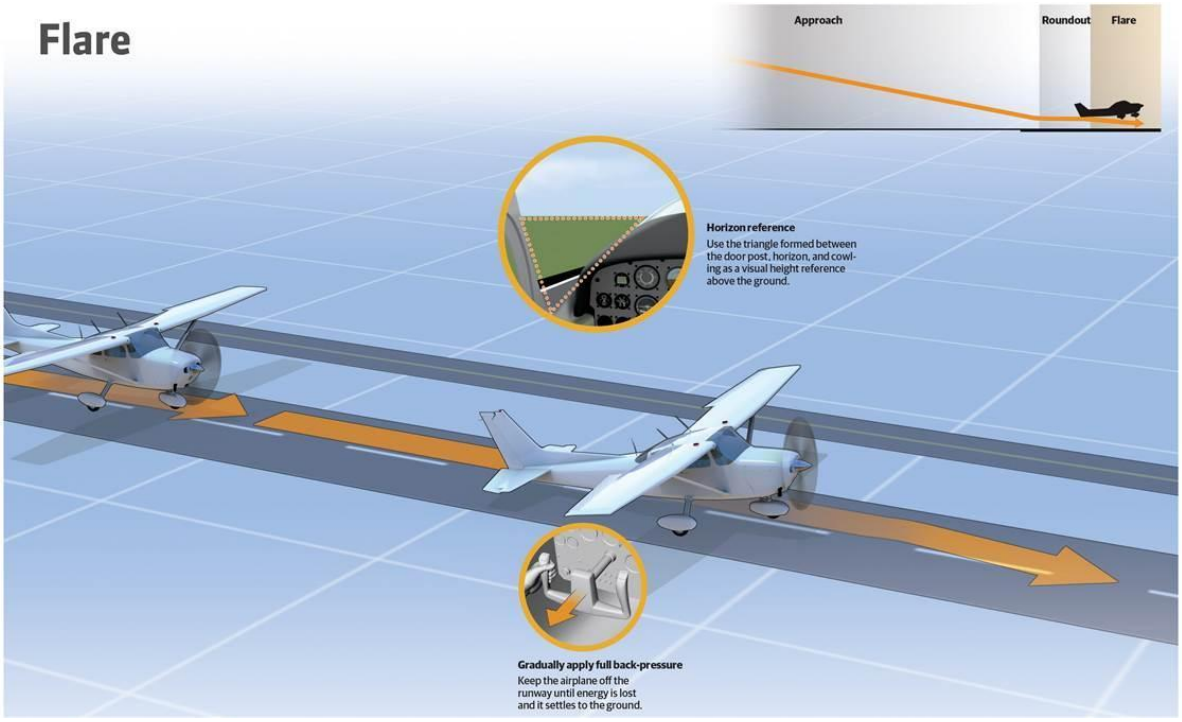


Figure 7: Illustration of the aircraft in a flare.

3. FINDINGS

3.1 The pilot was issued a Student Pilot Licence on 24 February 2020. She held the necessary ratings to fly the aircraft and had flown a total of 58.3 hours.

3.2 The student pilot was issued a Class 2 aviation medical certificate on 14 February 2020 with an expiry date of 14 February 2025, without any restrictions.

3.3 The student pilot was issued a Radiotelephony Certificate (Restricted) on 9 July 2020. She had written and passed her theoretical exam on 19 June 2020.

3.4 The student pilot was manipulating the controls of the aircraft, and was responsible for the operation, safety and security of the aircraft as per Part 91.02.8(1)(a) of the Civil Aviation Regulations (CAR) 2011 as amended.

3.5 The ATC was issued an Air Traffic Control Licence on 24 January 2013. He was issued a medical certificate with an expiry date of 30 June 2023.

3.6 The ATC's workload was assessed as high with normal complexity.

3.7 This was a training flight conducted under the provisions of Part 141 of the CAR 2011 as amended. The ATO was issued an ATO certificate by the South African Civil Aviation Authority (SACAA).

3.8 The aircraft was issued a Certificate of Airworthiness on 27 August 2014 with an expiry date of 31 August 2020.

3.9 The aircraft was issued a Certificate of Release to Service on 3 August 2020 with an expiry date of 3 August 2021 or at 9 599.9 airframe hours, whichever occurs first.

3.10 The aircraft was issued a Certificate of Registration on 21 July 2017.

3.11 The last scheduled mandatory periodic inspection (MPI) that was carried out on the aircraft prior to the serious incident flight was certified on 3 August 2020 at 9 499.9 airframe hours. The aircraft had accumulated an additional 38.1 airframe hours since its last inspection.

3.12 The flight was conducted under visual flight rules (VFR) by day.

3.13 The ATC reported the wind to be light and variable when he cleared the aircraft to land. After landing, the student pilot called the tower and advised them that she was involved in a runway excursion incident.

3.14 The aircraft sustained substantial damage.

3.15 The student pilot was not injured during the serious incident sequence.

3.16 The serious incident occurred on a licensed aerodrome and the ARFF personnel responded swiftly to the accident scene after the crash alarm was activated by ATC.

3.17 The investigation was conducted off site by AIID.

4. PROBABLE CAUSE

4.1 The student pilot became fixated on the aircraft that was on the runway and which had been cleared for take-off while she was on final approach for landing. This resulted in an unstable approach with a steep nose-down approach path, as well as speed acceleration which caused a balloon effect on the round-out. The aircraft bounced several times, which resulted in the collapse of the nose landing gear.

5. CONTRIBUTING FACTOR

5.1 Lack of experience by the student pilot.

6. REFERENCES USED IN THE REPORT

6.1 Pilot questionnaire (form CA 12-03)
6.2 Operator questionnaire (form CA 12-04)
6.3 Aircraft maintenance documentation
6.4 Student pilot training record (Radiotelephony Certificate - Restricted)
6.5 Transcript as well as audio between FAWB ATC and the student pilot of ZS-MZU (Information was obtained from Air Traffic Navigational Services [ATNS]).
6.6 Federal Aviation Authority (FAA) Airplane Flying Handbook, FAA-H-8083-3B, Chapter 8, Approaches and Landings.
6.7 Website: https://www.aopa.org

7. SAFETY RECOMMENDATION

7.1 None.

8. ORGANISATION

8.1 This was a training flight which was conducted under the provisions of Part 141 of the CAR 2011 as amended.

8.2 The ATO was issued an ATO certificate No. CAA/0398 by the South African Civil Aviation Authority (SACAA) on 1 December 2017 with an expiry date of 30 November 2022.

8.3 The last mandatory periodic inspection (MPI) that was carried out on the aircraft prior to the serious incident flight was certified on 3 August 2020 at 9 499.9 airframe hours. The aircraft maintenance organisation (AMO) was issued an AMO approval certificate No. 278 by the SACAA on 28 August 2019 with an expiry date of 31 August 2020.

9. APPENDICES

9.1 Annexure A (Transcript of communication between ATC and pilot of ZS-MZU)

9.2 Annexure B (FAWB Aerodrome Chart)

This report is issued by:
Accident and Incident Investigations Division (AIID)
South African Civil Aviation Authority
Republic of South Africa

ANNEXURE A

AUDIO TRANSCRIPT

Transcript of voice recordings on *(FAWB 118.35 MHz), (Date – 15/08/2020)* regarding: RUNWAY EXCURSION

- The transcript was made by (Name removed) from the ATS recording. The recording is of operational frequency 118.35 MHz;
- Times in HH:MM:ss UTC;
- Source may be either of the following: RTF, Intercom, ATS DS, composite;
- Station refers to any aircraft, ATC position or vehicle making the transmission;
- Text of transmission is the contents of the transmission for that specific time;
- For easy reading letters in the phonetic alphabet should be transcribed as uppercase italic letters only, even though the full word is used on the RT;
- Comments are for the investigator when analysing the context of the transmissions.

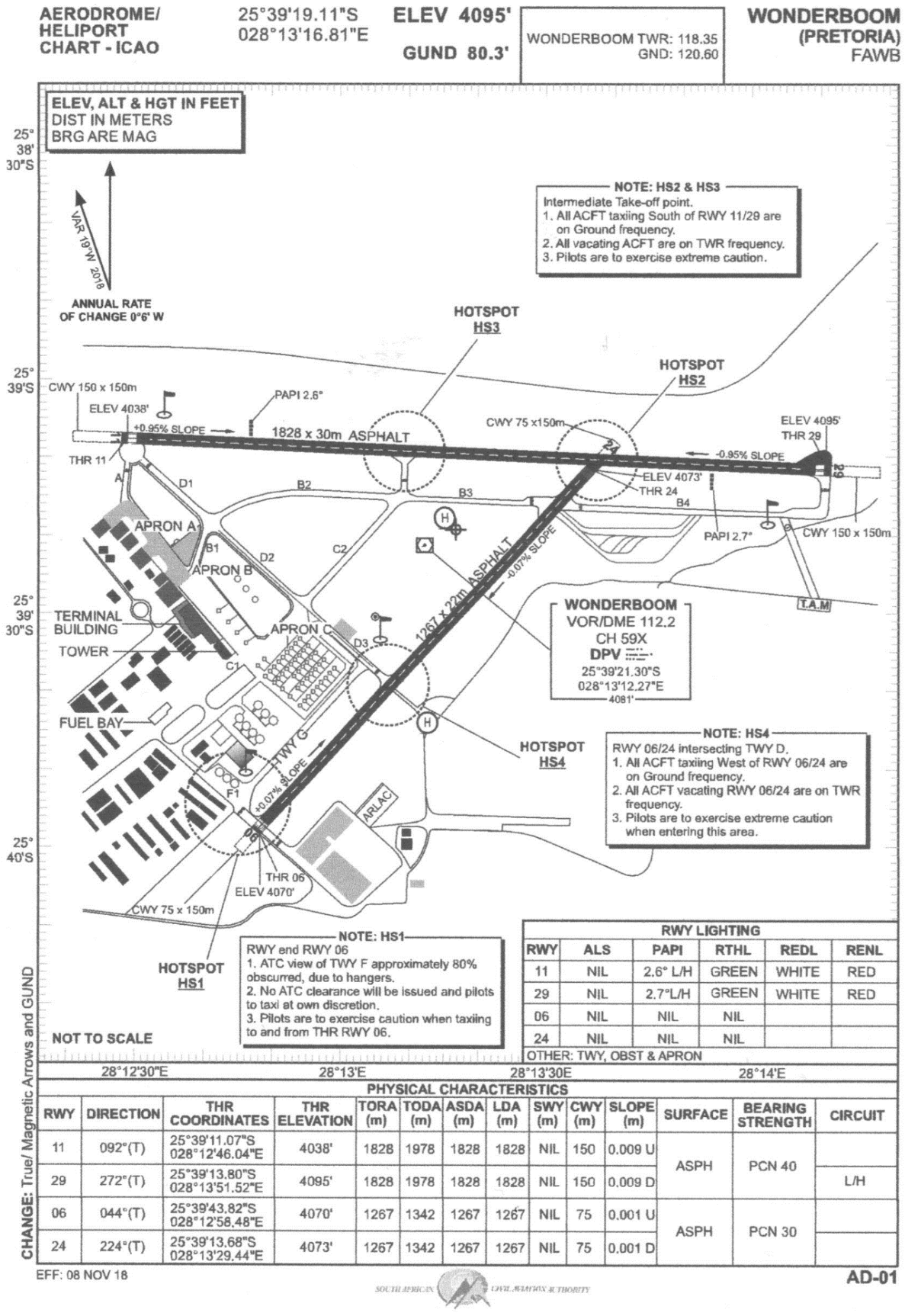
Time	Source	Station	Text of transmission
07:49:14	RTF118.35	ZS-MZU	Wonderboom tower good day, ZS-MZU
07:49:17	RTF118.35	ZS-CBB	CBB ready
07:49:20	RTF118.35	ZS-CTY	FAWB tower CTY inbound from er
07:49:29	RTF118.35	TWR	MZU standby for the inbound clearance and break-break, PFC RWY 29 cleared for touch and go, report right downwind, surface wind is calm
07:49:43	RTF118.35	ZS-PFC	Cleared touched and go, RWY 29 report right downwind next PFC
07:49:40	RTF118.35	TWR	CTY go ahead?
	RTF118.35		Double transmission (Dx)
07:49:54	RTF118.35	TWR	CTY Go ahead?
07:49:57	RTF118.35	TWR	CTY Wonderboom, go-ahead?
07:50:01	RTF118.35	ZS-CTY	Wonderboom, CTY inbound from Pretoria GF 1 overhead power station at 5 600' request for joining instructions and correction 3 circuits please?
07:50:13	RTF118.35	TWR	CTY cleared inbound 5 600' report right downwind RWY 29, QNH 1021
07:50:20	RTF118.35	ZS-CTY	QNH 1021, er 5 600' report left downwind RWY 27
07:50:27	RTF118.35	TWR	RWY 29, Sir and break-break traffic ready in run-up bay taxi Bravo holding point 29
07:50:35	RTF118.35	ZS-CTY	Er right downwind RWY 29 next CTY
07:50:39	RTF118.35	TWR	RMW continue the approach number 2
07:50:41	RTF118.35	ZS-RMW	Continue approach, RMW
07:50:47	RTF118.35	TWR	NTO your traffic is on final approach a Cherokee six about 1 mile, report number 2 final approach behind
07:50:57	RTF118.35	ZS-NTO	Report er final approach number 2, NTO
07:51:01	RTF118.35	TWR	MZU go ahead?
07:51:03	RTF118.35	ZS-MZU	MZU is overhead Mamelodi request your joining and landing?
07:51:09	RTF118.35	TWR	MZU cleared inbound 5 600' report south of Roodeplaat Dam, joining long final RWY 29, QNH 1021
07:51:18	RTF118.35	ZS-MZU	QNH 1021 report South of Roodeplaat Dam
07:51:26	RTF118.35	ZS-KWR	Wonderboom tower from KWR?
07:51:29	RTF118.35	TWR	KWR go-ahead

Time	Source	Station	Text of transmission
07:51:30	RTF118.35	ZS-KWR	KWR currently 2 miles north of power station 6 000 feet, request your joining and landing
07:51:34	RTF118.35	TWR	KWR cleared inbound 5 600' traffic is a 172 ahead report on the right downwind, QNH 1021, RWY 29
07:51:45	RTF118.35	ZS-KWR	Cleared inbound 5 600, QNH 1021 we'll keep a lookout for your traffic we'll report right downwind RWY 29, KWR
07:51:52	RTF118.35	TWR	RWM cleared to land RWY 29, wind calm
07:51:56	RTF118.35	ZS-RMW	Cleared to land 29, RMW
07:52:00	RTF118.35	ZU-JAK	Wonderboom good day, ZU-JAK
07:52:02		TWR	JAK go ahead?
07:52:04	RTF118.35	ZU-JAK	Good day Sir, JAK is a L21 Cup, were 2 crew on board Newtam facility with 3 hours fuel, request your taxi for a flight to Rhino Park
07:52:14	RTF118.35	TWR	JAK report at the holding point of RWY 29 ready and QNH 1021
07:52:20	RTF118.35	ZU-JAK	1021 and we will position behind the Cherokee ready for holding point 29, JAK
07:52:26	RTF118.35	ZU-ADI	Good morning Wonderboom tower ZU-ADI
07:52:30	RTF118.35	TWR	ADI good day go-ahead
07:52:32	RTF118.35	ZU-ADI	Good morning to you could you please accommodate us crossing Foxtrot 06 to Warbirds from the eastern hangars
07:52:39	RTF118.35	TWR	ADI cleared to cross 06 on Foxtrot
07:52:43	RTF118.35	ZU-ADI	ADI cleared to cross 06 on Foxtrot
07:52:48	RTF118.35	ZS-MZU	MZU is south of Roodeplaat Dam for long final approach
07:52:52	RTF118.35	TWR	MZU maintain 5 600' report 2 miles east of N1 highway
07:52:58	RTF118.35	ZS-MZU	Maintain 5 600' report 2 miles east of N1 highway, MZU
07:53:05	RTF118.35	TWR	RWM taxi C D G F
07:53:09	RTF118.35	ZS-RWM	C D G F, RWM
07:53:11	RTF118.35	TWR	NTO what is your distance on final approach?
07:53:15	RTF118.35	ZS-NTO	About 2miles were turning finals now NTO
07:53:18	RTF118.35	TWR	CBB RWY29 cleared for take-off report on the right downwind surface wind is calm
07:53:25	RTF118.35	ZS-SFR	SFR at holding point 29 sir
07:53:28	RTF118.35	TWR	Confirm your number 1?
07:53:30	RTF118.35	ZS-SFR	Affirm Sir
07:53:31	RTF118.35	TWR	Copied SFR cleared for the take-off climb to 6000' report outbound surface wind is calm
07:53:35	RTF118.35	ZS-SFR	Take-off 6000' outbound 2 miles east of the power station, SFR
07:53:39	RTF118.35	ZS-SHV	Wonderboom SHV, morning
07:53:42	RTF118.35	TWR	SHV morning go-ahead
07:53:43	RTF118.35	ZS-SHV	Abeam Rosslyn 5600', QNH 1021, your joining and landing?
07:53:46	RTF118.35	TWR	SHV join the non-standard left downwind RWY29 at 5600' report south of the tower
07:53:56	RTF118.35	ZS-SHV	Join non-standard left downwind RWY29 south of the tower next SHV
07:54:01	RTF118.35	TWR	SHV at 5 600' and QNH 1021
07:54:08	RTF118.35	ZS-SHV	5 600' QNH 1021, SHV
07:54:11	RTF118.35	TWR	CTY what is your position?
07:54:15	RTF118.35	ZS-CTY	Wonderboom, CTY right downwind RWY 29, at 5 600'
07:54:19	RTF118.35	TWR	NTO cleared T+G RWY 29 report right downwind, surface wind calm

Time	Source	Station	Text of transmission
07:54:21	RTF118.35	ZS-NTO	Cleared T+G RWY 29 NTO request simulated
07:54:29	RTF118.35	TWR	Copied report recovered
07:54:30	RTF118.35	ZS-NTO	Report recovered thanks, NTO
07:54:31	RTF118.35	TWR	CTY descend as required report final RWY 29, number 1
07:54:	RTF118.35		Double transmission (Dx)
07:54:43	RTF118.35	TWR	Last call is a double transmission CTY report on finals RWY 29, number 1
07:54:50	RTF118.35	ZS-MZU	MZU is 2 miles North of the N1 highway
07:54:56	RTF118.35	TWR	Confirm north or east?
07:54:58	RTF118.35	ZS-MZU	East, correction, MZU
07:55:01	RTF118.35	TWR	CTY have you turned your base?
07:55:03	RTF118.35	ZS-CTY	Negative sir
07:55:05	RTF118.35	TWR	Copied standby for that base position behind solo student 2 miles east of N1 highway, number 2, report on final
07:55:12	RTF118.35	ZS-CTY	We'll call you final approach number 2 we'll keep a lookout, CTY
07:55:17	RTF118.35	TWR	MZU descend as required continue approach number 1
07:55:21	RTF118.35	ZS-MZU	Descend as required report final approach number 1, MZU
07:55:26	RTF118.35	TWR	PFC have you crossed the N1 on the downwind?
07:55:30	RTF118.35	ZS-PFC	Er late hand er late right downwind RWY 29
07:55:38	RTF118.35	TWR	PFC your traffic is a 172 ahead of you report on final approach number 3, behind the traffic
07:55:46	RTF118.35	ZS-PFC	Final approach number 3, I have the traffic in sight, PFC
07:55:50	RTF118.35	TWR	Number 1 at the holding point your call sign
07:55:	RTF118.35		Double transmission (Dx)
07:55:54	RTF118.35	TWR	Confirm LSC
07:55:56	RTF118.35	ZS-CBB	Negative, CBB ready
07:55:58	RTF118.35	TWR	CBB RWY 29 cleared for the take-off report right downwind surface wind is calm
07:56:03	RTF118.35	ZS-CBB	Cleared take-off RWY 29, right downwind CBB
07:56:07	RTF118.35	TWR	KWR confirm on the right downwind?
07:56:10	RTF118.35	ZS-LSC	LSC is 2 miles east of the N1 highway we have to turn base
07:56:16	RTF118.35	TWR	LSC standby for the base
07:56:19	RTF118.35	ZS-KWR	Wonderboom from KWR
07:56:21	RTF118.35	TWR	Go ahead?
07:56:23	RTF118.35	ZS-KWR	KWR currently late right downwind got the traffic in sight ahead of me
07:56:28	RTF118.35	TWR	Confirm traffic is a low wing?
07:56:31	RTF118.35	ZS-KWR	Affirm
07:56:33	RTF118.35	TWR	KWR copied follow that traffic, solo student you'll be reporting on a long final number 5, final approach RWY 29
07:56:40	RTF118.35	ZS-MZU	MZU final approach RWY 29, traffic on runway in sight, should I attempt a go-around, or should I continue to land?
07:56:50	RTF118.35	TWR	You are far from traffic, continue approach
07:56:53	RTF118.35	ZS-MZU	Continue approach, MZU
07:56:55	RTF118.35	ZS-PFC	And PFC have you turned base
07:57:01	RTF118.35	ZS-OSP	Wonderboom tower ZS-OSP good day
07:57:04	RTF118.35	TWR	MZU Cleared to land RWY 29 wind is calm
07:57:06	RTF118.35	ZS-MZU	Cleared to land, MZU

Time	Source	Station	Text of transmission
07:57:09	RTF118.35	TWR	OSP standby, and PFC have you turned base?
07:57:18	RTF118.35	TWR	PFC tower?
07:57:24	RTF118.35	ZS-PFC	Er PFC er im following traffic
07:57:33	RTF118.35	TWR	PFC just relax turn base report final approach ill sort you out
07:57:40	RTF118.35	TWR	LSC climb to 5 600’
07:57:43	RTF118.35	ZS-PFC	Ill report final approach next, PFC
07:57:46	RTF118.35	TWR	LSC climb to 5 600’ and report final approach RWY 29
07:57:52	RTF118.35	ZS-LSC	Climb to 5 600 and we’ll call you final approach LSC
07:57:56	RTF118.35	TWR	KWR just be advised I have 2 solo students ahead of you er just follow that low wing traffic ill keep you advised it’s on a climb to 5 600 your separated from 172 traffic joining ahead by 6 500’
07:58:09	RTF118.35	ZS-KWR	ER we’ll keep a lookout and and got the one final im currently 1 mile east of N1 highway 5 100’
07:58:23	RTF118.35	ZS-KVE	KVE is ready for departure
07:58:25	RTF118.35	ZS-MZU	Tower, MZU crash landed on RWY 29
07:58:31	RTF118.35	TWR	MZU copied I have assistance coming for you shortly, mam just relax
07:58:36	RTF118.35	ZS-CTY	Wonderboom tower CTY continue on finals for 29
07:58:39	RTF118.35	TWR	CTY continue the go-around for neutral circuit crash landing on RWY
07:58:48	RTF118.35	ZS-CTY	OK we’ll do a go around we’ll call you right downwind CTY
07:58:51	RTF118.35	TWR	PFC plan for neutral circuit RWY 29
07:59:01	RTF118.35	ZS-PFC	PFC im turning final now
07:59:03	RTF118.35	TWR	PFC copied continue the approach
07:59:07	RTF118.35	ZS-PFC	Continue approach can I please make it a full stop PFC?
07:59:13	RTF118.35	TWR	PFC copied ill keep you advised
07:59:16	RTF118.35	TWR	And R1 and company traffic is a Cherokee she crashed just short of RWY 11 to the right, just short RWY 11 to the right render assisted as required, cleared to enter RWY 29
07:59:26	RTF118.35	ROMEO 1	Traffic at 11, cleared to enter and render service, Romeo 1 and company.

ANNEXURE B



RWY LIGHTING

RWY	ALS	PAPI	RTHL	REDL	RENL
11	NIL	2.6° L/H	GREEN	WHITE	RED
29	NIL	2.7°L/H	GREEN	WHITE	RED
06	NIL	NIL	NIL		
24	NIL	NIL	NIL		

OTHER: TWY, OBST & APRON

PHYSICAL CHARACTERISTICS

RWY	DIRECTION	THR COORDINATES	THR ELEVATION	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	SWY (m)	CWY (m)	SLOPE (m)	SURFACE	BEARING STRENGTH	CIRCUIT
11	092°(T)	25°39'11.07"S 028°12'46.04"E	4038'	1828	1978	1828	1828	NIL	150	0.009 U	ASPH	PCN 40	
29	272°(T)	25°39'13.80"S 028°13'51.52"E	4095'	1828	1978	1828	1828	NIL	150	0.009 D			L/H
06	044°(T)	25°39'43.82"S 028°12'58.48"E	4070'	1267	1342	1267	1267	NIL	75	0.001 U	ASPH	PCN 30	
24	224°(T)	25°39'13.68"S 028°13'29.44"E	4073'	1267	1342	1267	1267	NIL	75	0.001 D			

CHANGE: True/ Magnetic Arrows and GUND

EFF: 08 NOV 18

AD-01