AIRCRAFT ACCIDENT SHORT REPORT

CA18/2/3/9760: During an out landing, the glider collided with a perimeter fence, seriously injuring the pilot.

Date and time	:	4 January 2019 at 1119Z
Aircraft registration	:	ZS-GXX
Aircraft manufacturer and model	:	Alexander Schleicher GmBh & Co, ASH 25 Glider
Last point of departure	:	New Tempe Aerodrome (FATP), Free State Province
Next point of intended landing	:	New Tempe Aerodrome (FATP), Free State Province
Location of accident site with reference to easily defined geographical points (GPS readings if possible)	:	S29°1'36" E026°9'34" elevation 4 500ft
Meteorological information	:	Surface wind: 330°/12kts; temperature: 31°C; visibility: good
Type of operation	:	Hire and fly (Part 94)
Persons on board	:	1+1
Injuries	:	1+1 (pilot - seriously injured; passenger - minor injuries
Damage to the glider	:	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.***

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1. SYNOPSIS

1.1. On 4 January 2019 at approximately 1106Z, a pilot, accompanied by a passenger, took off from Tempe Aerodrome (FATP) for a local pleasure flight. The glider was launched by a tug aircraft—a Cessna 182 (ZS-KOT)—from Runway 36 at FATP, which was the designated runway utilised for glider operations. FATP is licensed with two asphalt runways with designations 01/19 and 10/28, respectively. The aerodrome elevation is 4 526 feet (ft) above mean sea level (AMSL).

1.2. The pilot of the tug aircraft reported that ZS-GXX was the last glider out of a group of 10 gliders that were launched by the tug aircraft from Runway 36 on the day. The tug pilot stated that at 1106Z, he took off with ZS-GXX on tow. After becoming airborne, the glider climbed out to the north of FATP, the same route as with all the previous launches. The take-off and climb were uneventful. At a height of 6 050ft AMSL, the glider pilot confirmed, *"I'm off, thank you."*

1.3. The pilot was unable to fly the glider back to FATP because the glider did not have enough height to reach the runway with the prevailing weather conditions. The pilot opted for an out landing, which is a precautionary landing away from the planned aerodrome. He identified an open flat field for the out landing, however, prior to touchdown, ZS-GXX collided with a 1.8m (6ft) high perimeter fence.

1.4. The pilot, who was seated in the aft seat of the glider, sustained serious injuries and was airlifted by an Emergency Medical Service (EMS) helicopter to a hospital in Bloemfontein after paramedics attended to him on the scene. The passenger who was seated in the front seat sustained minor injuries and was transported by an ambulance to a hospital in Bloemfontein. The glider sustained substantial damage during the impact sequence.

1.5. This investigation revealed that the glider collided with a perimeter fence during an out landing on a small holding because the glider did not have enough height to reach the runway with the prevailing wind conditions at the time.

2. FACTUAL INFORMATION

2.1. History of flight

2.1.1. On 4 January 2019 at approximately 1106Z, the pilot and a passenger, both British nationals, boarded a glider with registration markings ZS-GXX at FATP for a local pleasure flight. The glider was launched by a tug aircraft—a Cessna 182 (ZS-KOT)—from Runway 36, which was the runway utilised for glider operations at this aerodrome. The flight was conducted under the provisions of Part 94 of the South African Civil Aviation Regulations (CAR) of 2011 as amended.

2.1.2. The pilot of the tug aircraft stated that he was scheduled to launch 10 gliders on the day, of which ZS-GXX was one of them. At 1106Z, he took off with ZS-GXX on tow. The glider climbed out to the north of New Tempe aerodrome, the same route as with all the previous launches. The take-off and climb were uneventful. At 6 050ft AMSL, the glider pilot confirmed, *"I am off, thank you."* The tug pilot then returned to FATP and, after landing, he shut down the aircraft in front of the hangar.

2.1.3. The glider was equipped with Cambridge Aero Instrumentation, which included a digital variometer with integral Global Positioning System (GPS) and a flight logger. Data downloaded from the flight logger in the presence of the investigator-in-charge revealed that the glider continued to fly in a northerly direction for approximately one minute after the pilot released the tow rope from the tug aircraft and then turned back towards FATP. The owner of the glider reported that the pilot made radio contact with the Soaring Safaris ground station indicating that they were flying back to FATP for a full stop landing on Runway 18. After turning back towards the aerodrome, the glider continued on its course in a southerly direction in an attempt to reach the aerodrome, but it was unable to reach the runway and the pilot opted to perform an out landing on an open flat field of a small holding, which was approximately 900m from the threshold of Runway 18. During the landing, the glider collided with a 1.8m (6ft) high perimeter fence before coming to rest in an upright position.

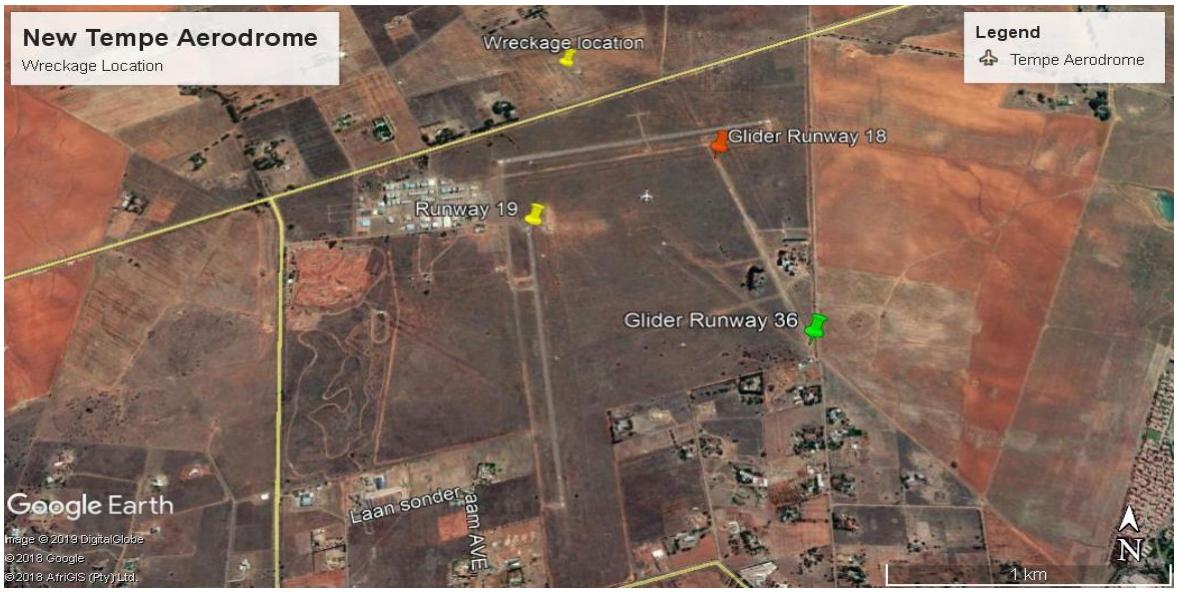

Figure 1: Google Earth overlay showing the wreckage location in relation to Runways 18 and 19

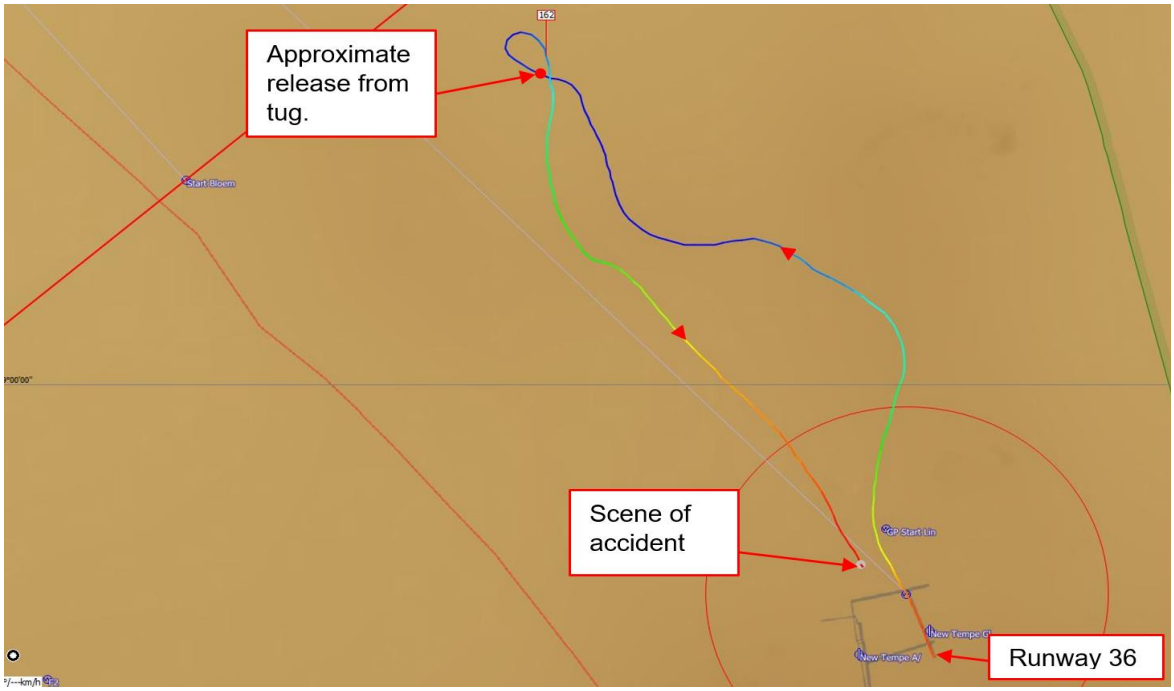

Figure 2: The flight path of the glider from take-off to ground impact, (data was downloaded from the flight logger, courtesy of the owner of the glider)

Figure 3: Flattened perimeter fence

2.1.4. An official weather report was obtained from the South African Weather Service (SAWS) after the accident. The report stated that towering cumulus clouds were present in the area with a north-westerly surface wind of approximately 12kts prevailing at the time of the accident flight. The SAWS forecast winds at flight level (FL) 050 and FL 070, which were north-westerly at 12kts and 15kts, respectively.

2.1.5. Data from the Cambridge Aero Instrumentation that was on-board the glider, which includes the direct digital variometer with Integral GPS and the flight logger, showed that the glider climbed to a height of 6 050ft AMSL under tow. The glider pilot then released the tow rope at 1112Z and, immediately, the glider gradually started to descend in the direction of FATP. The last height parameter captured before the accident was at 4 490ft at 1119Z. Data from the flight logger and the flight profile revealed that the glider turned back to FATP at a distance of approximately 33km. According to the Alexander Schleicher ASH-25 technical data sheet, the glider had a best glide ratio of 60:1. For the mentioned glide ratio, the glider required 93 600ft (28.5km) to reach Runway 19 at the New Tempe Aerodrome with the recorded height of 1 560ft above ground level (AGL) where the glider turned back to the aerodrome. The glider approached the aerodrome from a northerly direction with a north-westerly wind of 12kts prevailing at the time of the accident. With the prevailing wind conditions, it was likely that the glider did not have enough height to reach the runway at FATP.

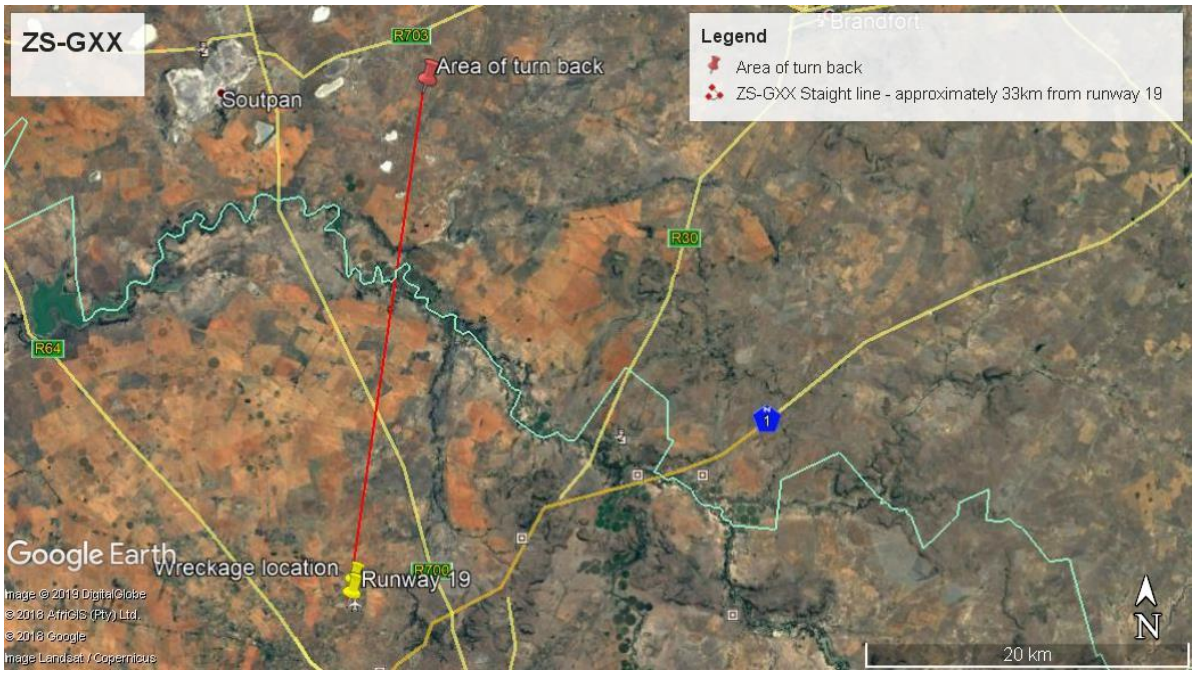

Figure 3: Google Earth overlay showing the approximate straight-line distance from the area of turn back to the aerodrome

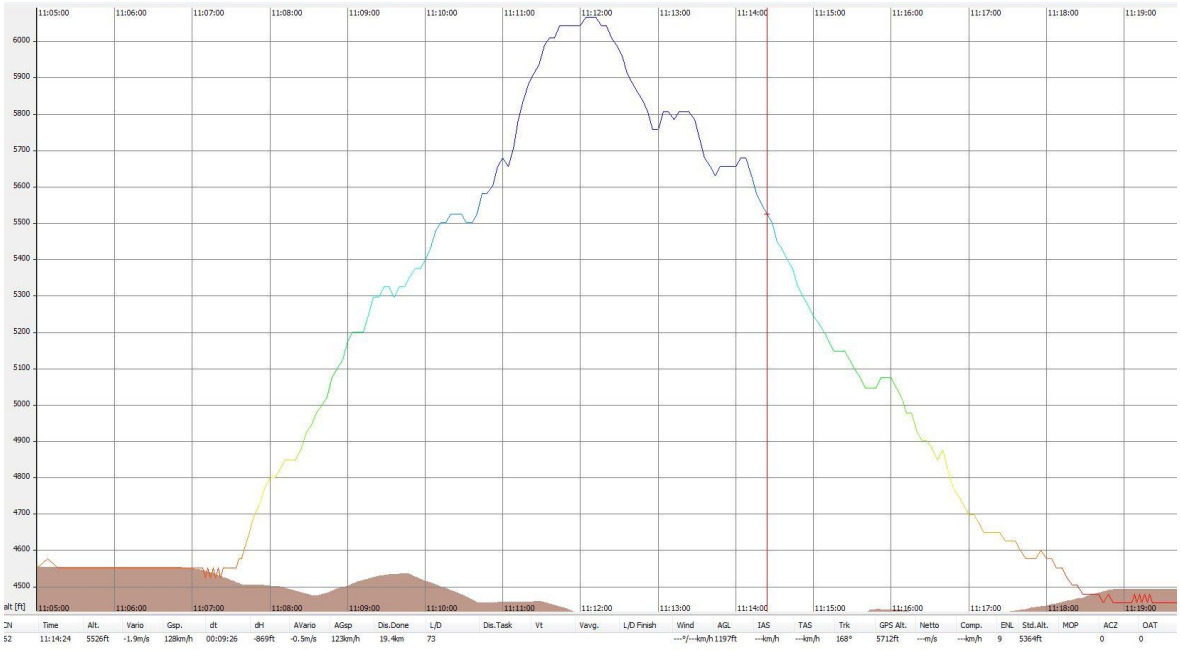

Figure 4: Graph downloaded from the flight logger (courtesy of the glider owner)

2.1.6. According to the ASH 25 Flight Manual, the glider must be trimmed between 90 to 100km/h (IAS) during approach. Data retrieved from the flight logger revealed that the glider had a ground speed of 123km/h (Global Positioning System [GPS] speed) just before it impacted with the parameter fence. The glider sustained substantial damage to the canopy, cockpit area and both wings during the impact or accident sequence.

Figure 5: The canopy was destroyed

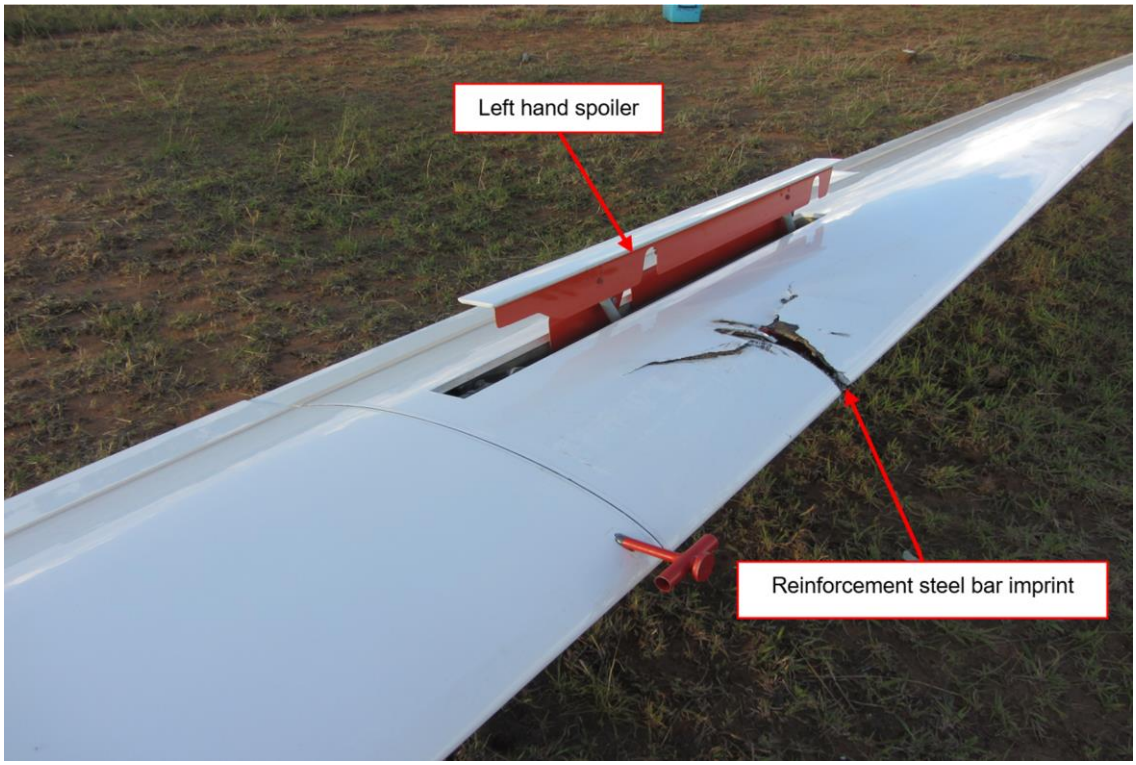

Figure 6: Damage to the left wing

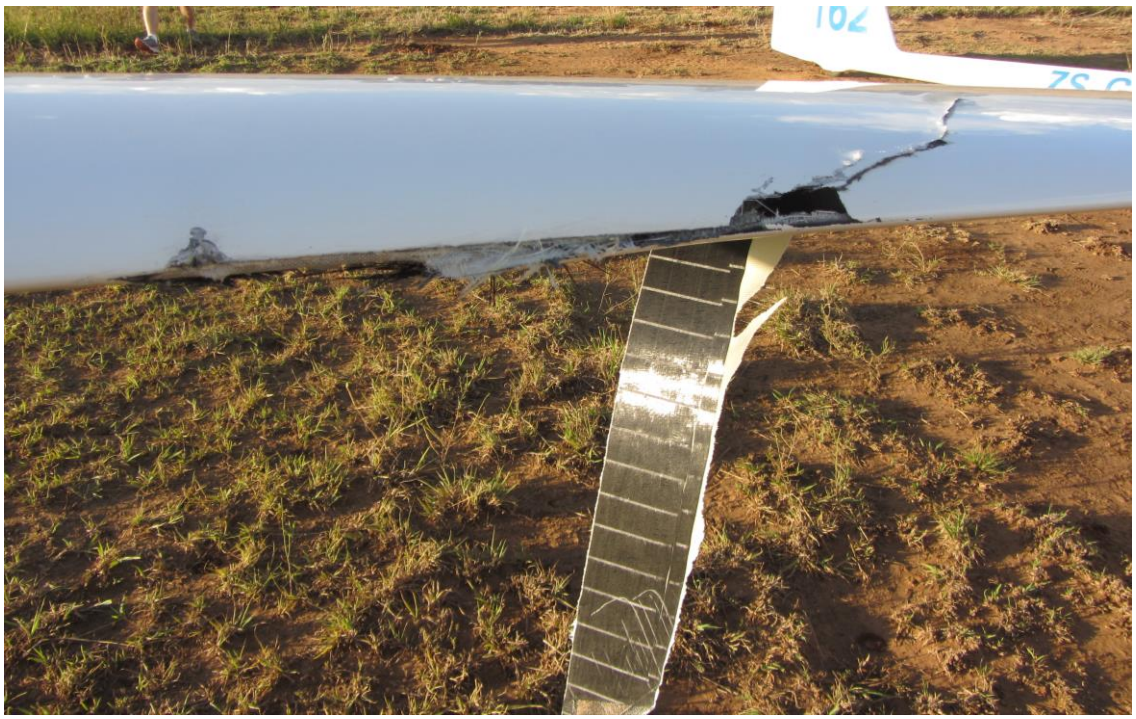

Figure 7: Damage to the right wing

2.1.7. The pilot sustained serious injuries and was airlifted by an EMS helicopter to a private hospital in Bloemfontein. The passenger sustained minor injuries and was transported by ambulance to a private hospital in Bloemfontein.

2.1.8. The flight controls of the glider were checked post impact at the accident site. The control stick was moved sideways, and the ailerons were deflected asymmetrically (left aileron up and right aileron down and vice versa). The elevators also moved simultaneously. The rudder pedals were moved, and the rudder deflected. The spoilers (one on each wing) were activated from inside the cockpit and both spoilers deployed as can be seen in Figure 6 (left wing).

2.1.9. The accident occurred during daylight conditions at a geographical position that was determined to be S29°1'32.11" E026°9'30.26" at an elevation of 4 500ft AMSL.

2.2 Additional Information

2.2.1. The passenger, who was seated in the front cockpit seat, suffered from a stroke in 2015. He held a sail plane pilot licence, but due to his medical condition, he was unable to continue to enjoy the privilege of such a licence. The owner of the glider reported that the passenger was not able to enter the rear cockpit seat because the canopy was restricting his access. He had to select the landing gear up and down which can only be operated from the front cockpit seat. The passenger used his left hand to operate the landing gear lever, which was located on the right-hand side of the cockpit, as his right side was impaired by the stroke. According to the owner of the glider, the passenger rehearsed the operation of the landing gear lever before they took to flight. His speech was also impaired as a result of the stroke and it was not possible to conduct an interview with him after the accident. There was no distress or Mayday call made by the pilot at any stage during the flight.

2.2.2. The owner of the glider stated that he witnessed the first part of the launch and it was completely normal. The tug aircraft returned to the aerodrome and parked in front of the hangar. The owner stated that he then returned to the office to learn that the pilot of ZS-GXX had called in on the radio to say that they will be landing back on Runway 18. The owner reported that when he could not establish radio contact with the pilot of ZS-GXX, he contacted another glider pilot in the area to assist the ground station with a possible position/location of the glider ZS-GXX. The pilot in the other glider reported that they could see ZS-GXX in a field, just north of the airfield, but no one had gotten out of the cockpit and that there were several vehicles parked on the road in proximity to the glider. The glider owner then drove to the scene of the accident where members of the public were attending to the injured occupants. Shortly after his arrival on the scene, the paramedics also arrived.

2.2.3. Out landings are standard practices for glider pilots and were discussed in detail in the information and briefing notes presented to the pilots who participate in gliding activities at FATP. Glider pilots will typically opt to do a precautionary landing away from the airfield when the glider does not have enough height to reach the selected airfield.

2.2.4. According to a witness statement, he observed the glider approaching Runway 18. The glider appeared to be lower than the normal approach position as well as downwind. He observed that the glider's attitude changed every couple of seconds as if the pilot tried to anticipate and clear possible obstacles on the approach path when he was in proximity to the ground. During the impact sequence, he witnessed a thin branch or fence post being flattened; he then rushed to the scene.

2.2.5. According to the Federal Aviation Administration Glider Flying Handbook 2013, *a pilot landing with a tail wind has a higher groundspeed for an indicated airspeed. As the surface friction slows the winds, the pilot may see an increase in airspeed before the higher inertia-induced airspeed is dissipated.* According to the Federal Aviation Administration (FAA) Glider Flying Handbook, *the pilot should aim for a touchdown zone marker past the threshold and not for the start of the runway, because a tailwind can lead to major undershoots of the approach path and landing short if the winds are strong enough.*

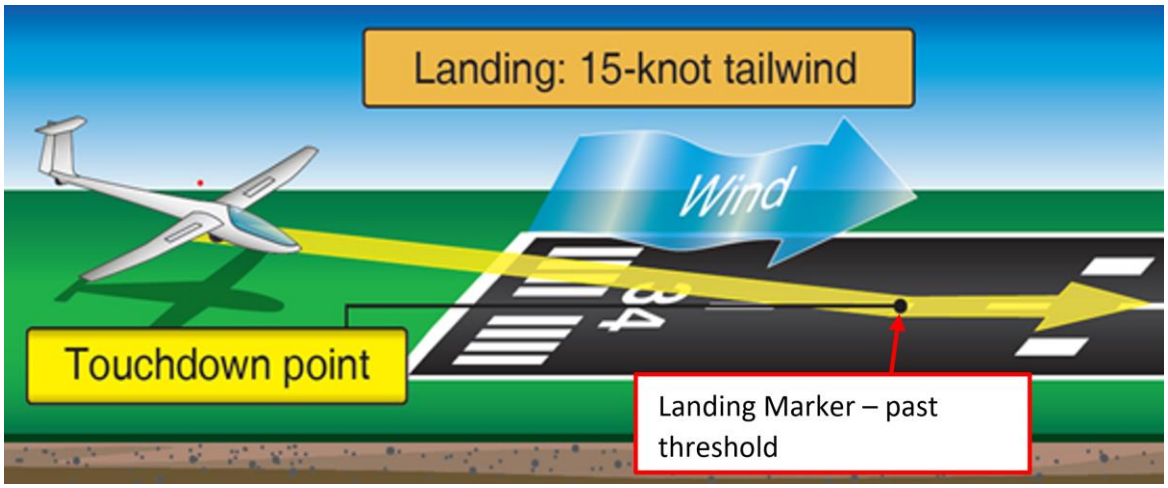

Figure 8: Illustration showing a typical landing marker with a tailwind

(Source: FAA Glider Flying Handbook, 2013)

3. FINDINGS

3.1. The pilot was in possession of a Sail Plane Pilot Licence that was issued by the United Kingdom Civil Aviation Authority (European Union). He applied for a validation in South Africa that was issued on 9 January 2019, which was 5 days after the accident flight. The expiry date of the validation was 28 March 2019.

3.2. The pilot was in possession of a valid class 2 aviation medical certificate, issued on 27 April 2018, with an expiry date of 27 April 2019. The pilot was required to wear corrective lenses during flight.

3.3. The pilot had accumulated a total of 2 630 flying hours on gliders, of which 27 hours were on the ASH 25 type glider. He had flown 8.1 hours on type 90 days prior to the accident.

3.4. The passenger suffered a stroke in 2015; he held a pilot licence several years prior to this flight and was also unable to communicate verbally.

3.5. The glider was in possession of a valid Authority to Fly issued on 9 October 2018 and expiring on 7 September 2019.

3.6. The last annual inspection that was carried out on the glider prior to the accident flight was certified on 9 October 2018 at 5 631.57 airframe hours.

3.7. Towering Cumulus (TCu) clouds reported by the weather service are known to contain a majority of updrafts as they are in the development stage to a Cumulonimbus cloud. In this case, the Bloemfontein weather office reported TCu closer to the time of the accident with the wind being north-westerly between 12 and 15kts from surface level to FL070. According to the official weather report, this was not conclusive as the wind at 6 050ft where the glider pilot was released from the tug aircraft was different from the observed and forecasted winds.

3.8. The pilot executed an out landing in an open field close to FATP. During the out landing, the glider impacted with a perimeter fence. The barbed wire fence penetrated the canopy and cockpit area, causing serious injuries to the pilot. The fence and supporting poles caused damage to the wings. The surface wind was north-westerly at 12kts. The glider was executing an out landing with a tail wind component.

3.9. The recorded ground speed, according to Cambridge Aero Instrumentation, was 123km/h before impact, which was indicative of a tailwind which could have influenced the anticipated touchdown point.

4. PROBABLE CAUSE

4.1 The glider collided with a parameter fence during an out landing on a small holding because the glider did not have enough height to reach the runway with the prevailing wind conditions at the time.

5. CONTRIBUTING FACTOR

5.1. At the time of landing, the surface wind was from the north-west at 12kts, which accounted to a tailwind component.

5.2. The rate of descent (ROD) was approximately 240ft/min from the time the glider pilot released the tow rope until the glider was on the ground.

5.3. Absence of thermal activity at the time or the pilot releasing too soon from the tug aircraft to benefit from thermal activity in the area resulted in an immediate descent profile of the glider as captured in Figure 4.

6. REFERENCES USED IN THE REPORT

6.1. Soaring-Safaris – briefing notes

6.2. Glider Flying Handbook: U.S. Department of Transportation Federal Aviation Administration flight standards service, 2013

6.3. SAWS report

6.4. Owner questionnaire

6.5. Pilot questionnaire

6.6. Cambridge Aero Instrumentation

7. SAFETY RECOMMENDATION

7.1. None.

8. ORGANISATION

8.1. The glider was privately owned and was operated by Soaring Safaris at the time of the accident. They provide glider pilots an opportunity to experience glider flying in South Africa on a hire-and-fly basis. The pilot had been visiting South Africa for the past 13 years and had accumulated over 1 000 glider flying hours while flying in South Africa during this period.

9. TYPE OF SAFETY ACTION

9.1. None.