

SOUTH AFRICAN



Section/division

Accident and Incident Investigations Division

Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9381	
Aircraft Registration	ZS-LJT	Date of Accident	9 December 2014		Time of Accident	0655Z
Type of Aircraft	Rockwell S2R-T34		Type of Operation	Agriculture Part 137		
Pilot-in-command Licence Type		CPL	Age	50	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	5 420		Hours on Type	2 002
Last point of departure		Ugie Aerodrome, Eastern Cape Province				
Next point of intended landing		Ugie Aerodrome, Eastern Cape Province				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
PG Bison Plantation, 8.63 nm north-west of Ugie central business district (GPS co-ordinates: S31°06'55" E028°06'21")						
Meteorological Information		Wind: 290° variable, visibility: 10 km sky clear, Temperature: 22°C, Dew point: 13°C				
Number of people on board	1 + 0	No. of people injured	0	No. of people killed	1	
Synopsis						
<p>An aerial spray company was contracted to spray herbicide on a pine tree plantation. Two aircraft (ZS-LJT and ZS-IJM), each carrying 1 200 L, were delayed for two hours due to weather before commencing with their spraying duties. At 0605Z, ZS-LJT took off from Ugie Airfield with its first load and flew low level to the spray site. On his return, the pilot indicated to the safety officer that the terrain was not level. The pilot continued to load the second load. He flew to the same spray site but took longer to return. This observation was made by camera operators belonging to the contracting company, who were watching the two aircraft. The camera operators alerted the safety officer that something was wrong because ZS-LJT was taking longer to come back.</p> <p>The safety officer took the other aircraft and flew to the spray site. He found that ZS-LJT had crashed and was engulfed by fire. He rushed back to Ugie Aerodrome and landed, then proceeded by vehicle to the crash site. The safety officer and forest employees were surprised to find that the pilot had been ejected out of the aircraft during the accident sequence. The pilot managed to tell the safety officer that he had stalled the aircraft during a low-level turn.</p> <p>The pilot had sustained severe injuries to his chest and neck. He was sent to a local hospital but later transferred to Durban. He succumbed to his injuries after 5 days in hospital. The investigation found that the pilot stalled and impacted the top of the cliff before the aircraft fell down the cliff. The aircraft was destroyed and engulfed by post-impact fire.</p>						
Probable Cause						
Stalling during a low-level turn. Failed to maintain flying speed/stall						
Contributing factor:						
Steep mountains near the spray site. Improper flight planning						
SRP Date	17 January 2017		Release Date	02 February 2017		
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CIVIL AVIATION
AUTHORITY

Section/division

Accident and Incident Investigation Division

Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT

Name of Owner : Natal Aerial Spray (Pty) Ltd
Name of Operator : Natal Aerial Spray (Pty) Ltd
Manufacturer : Rockwell International
Model : S2R-T34
Nationality : South African
Registration Marks : ZS-LJT
Place : Ugie, Eastern Cape Province
Date : 9 December 2014
Time : 0655Z

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 interests of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish legal liability**.*

Disclaimer:

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1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 Two (Thrush) aircraft from an aerial spraying company were contracted to do aerial spraying of herbicide on a PG Bison pine tree plantation. The personnel from Natal Aerial Spraying Company included two pilots, two aircraft (ZS-LJT and ZS-IJM) and a safety/loading officer. Each aircraft would carry 1 200 L of herbicide, which can spray 40 ha (400 000 m²). They were supposed to spray a total area of 1 500 ha (15 km²) over the next few days. This investigation focuses on ZS-LJT, which was to spray the Glen Cullen Plantation. Camera operators were also present, situated 3.45 nm north-east of Ugie Aerodrome, monitoring the two aircraft spraying the blocks identified in Figure 1.

1.1.2 The contracted personnel arrived at Ugie Aerodrome on the 8th December 2014 for aerial spraying preparation. They spent that afternoon discussing maps, danger areas and patterns to follow in the blocks to be sprayed on Figure 1. The following morning at 0605Z, ZS-LJT took off from Ugie Aerodrome after waiting for 2 hours for the weather to clear. Ugie Aerodrome is 8.5 nm south-east of the intended demarcated area. According to the Aerial Spraying Company's Manual Operating Procedure (MOP), aircraft carrying loads should climb to maintain 500 ft. above ground level (AGL) until they reach their intended spraying area, wherein they can descend to a safe level and start spraying. ZS-LJT followed the MOP and when finished, climbed back to 500 ft. AGL and routed back for reload.

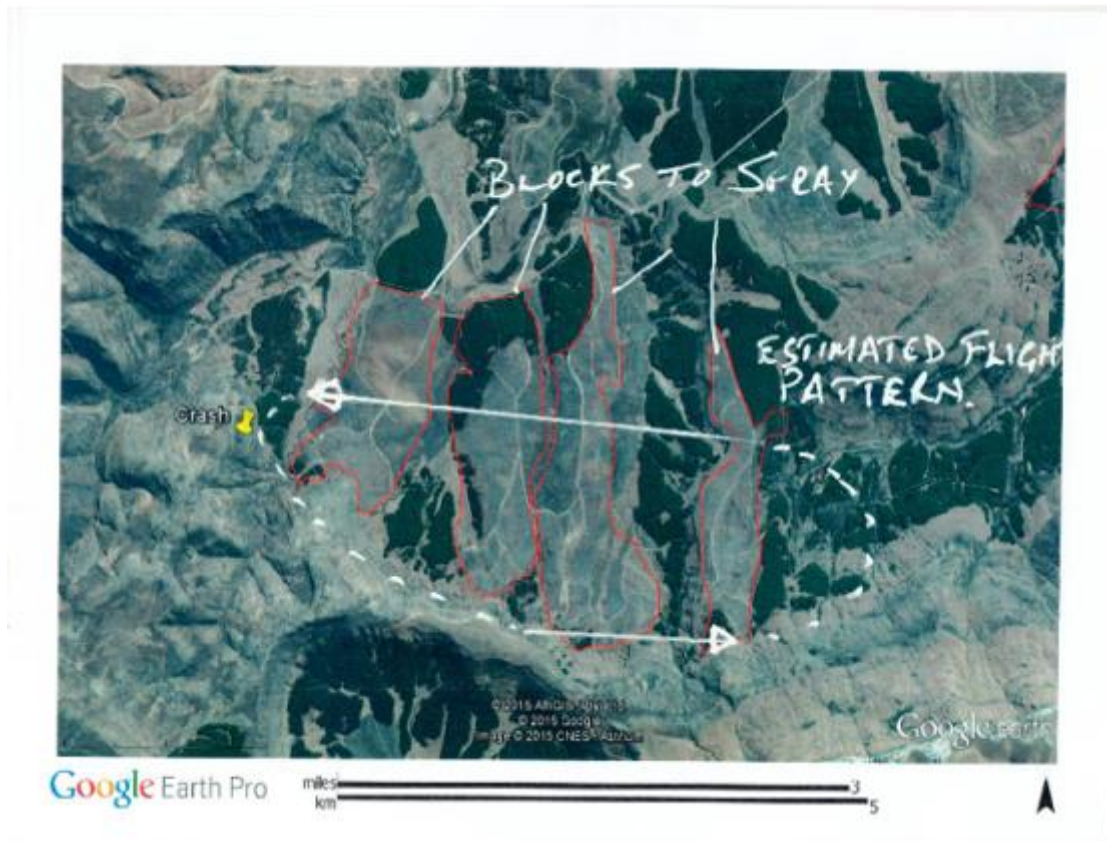


Figure 1: The blocks to be sprayed (map supplied by aircraft owner)

- 1.1.3 On his way back after finishing the load, the pilot of ZS-LJT spoke to the safety officer at Ugie Aerodrome over the radio and indicated everything was fine but terrain was not level. At 0650Z ZS-LJT was airborne again with his second load for the same area. Soon thereafter, the camera operators, who were monitoring the aircraft from the client's offices, realised that ZS-LJT was not returning or appearing as expected. They became apprehensive and decided to inform their supervisor to alert the safety officer of the situation. The safety officer climbed into ZS-IJM, which was loading its third load, and flew to the affected spray site. He located ZS-LJT, which had just crashed and was burning on the mountains to the west of the spraying site.
- 1.1.4 He flew back to Ugie Aerodrome and landed thinking the worst might have happened. The safety officer requested the company's supervisor to accompany him to the crash site by road. On arrival at the crash site, they were surprised to find the pilot outside the aircraft and a distance away from the burning wreckage. The pilot told the safety officer that the cause of the crash was that he stalled the aircraft in a turn and impacted the vertical hillside not far from his spray site.
- 1.1.5 On inspection of the accident site, one can see debris on the top of the mountain with yellow markings; the aircraft was yellow in colour. As can be seen in figure 2, the yellow parts are spread over a distance apart. The shiny marking starts from the top to the bottom. It could have been the herbicide that was supposed to be sprayed or the Jet A1 fuel. It is not clear how long the aircraft held on to the cliff but the time was long enough to see that something did leak from the aircraft.



Figure 2: Some aircraft body parts and shiny markings

1.1.6 The aircraft was hanging on the cliff but it was an unstable position and it eventually came down and impacted the rocky area below and broke in half along the wings' leading edge and was destroyed in the crash. It is unclear how the pilot was freed from the wreckage. The pilot suffered serious multiple injuries to his head, chest and neck. He was transported to Maclear Hospital, a local hospital, for medical attention. Later on the same day, he was transferred by aircraft to Albert Luthuli Hospital in Durban due to his worsening condition. On 14 December the pilot was declared dead due to injuries suffered in the aircraft crash.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft was completely destroyed by post-impact fire.



Figure 3: Mangled and burnt ZS-LJT airframe

1.4 Other Damage

- 1.4.1 There was no other damage. The aircraft impacted rocky mountain, which remained intact. The vegetation around the aircraft was not dry as there was some drizzle. The post-impact fire that engulfed the aircraft was localised.

1.5 Personnel Information

- 1.5.1 Pilot-in-command:

Nationality	South African	Gender	Male	Age	50
Licence Number	027 017 9095	Licence Type	CPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instrument				
Medical Expiry Date	31 March 2015				
Restrictions	Corrective Lenses				
Previous Accidents	None				

- 1.5.2 Flying Experience:

Total Hours	5 420
Total Past 90 Days	4.9
Total on Type Past 90 Days	4.9
Total on Type	2 002

- 1.5.3 In June 2014, the pilot completed Crew Resource Management (CRM) training, comprising two modules:

- Situational awareness / Visual illusions
- Low-level operation

1.5.4 On 15 September 2014 the pilot completed currency training ,as required by the company's Operational Manual. All results were satisfactory.

1.6 Aircraft Information

1.6.1 Airframe:

Type	Fixed-wing tail-dragger	
Serial Number	T34-1816	
Manufacturer	Rockwell International	
Date of Manufacture	1974	
Total Airframe Hours (At time of Accident)	8 014.9	
Last MPI (Date & Hours)	18 March 2014	7 957.4
Hours since Last MPI	57.5	
C of A (Date of expiry)	2 March 2015	
C of R (Issue Date) (Present owner)	6 June 2006	
Operating Categories	Agricultural, Part 137	

1.6.2 Engine:

Type	Turboprop, Walter Engines
Serial Number	PCE PH0215
Hours since New	5 321.9
Hours since Overhaul	878.9

1.6.3 Propeller:

Type	3-blade variable pitch, Avid Propeller Ltd
Serial Number	BUA29196
Hours since New	3 165.4
Hours since Overhaul	950.2

1.6.4 The aircraft had enough JET A1 fuel. The safety officer indicated that the aircraft uplifted enough fuel for 3 hours' endurance. The accident happened within the first hour of flight.

1.7 Meteorological Information

Wind direction	290°	Wind speed	Variable	Visibility	10 km
Temperature	22°C	Cloud cover	Clear sky	Cloud base	None
Dew point	13°C				

1.7.1 Ugie does not have a weather station. The Metar data above is taken from the nearest weather reporting station, Umtata (Annexure A).

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigational equipment as approved at the time of certification by the regulator. No defects were recorded or reported prior to or during the accident flight.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication systems and none were reported unserviceable prior to the accident.

1.10 Aerodrome Information

1.10.1 The aircraft was on a cliff near the spray site where the pilot was aerially applying herbicide on a pine tree plantation. The accident site co-ordinates were GPS S31°06'55" E028°06'21" and elevation was 5 198 ft. above mean sea level (AMSL).

1.11 Flight Recorders

1.11.1 The aircraft was not required by regulations to have flight recorders fitted.

1.12 Wreckage and Impact Information

1.12.1 According to the pilot, after spraying the forest he had to turn left for the next application, which is when he stalled the aircraft. The aircraft lost control and impacted the ridge of a cliff. This was relayed by the safety officer who had rushed to the accident site.

1.12.2 On the face of the cliff, one can notice dark marks left by JET 1A fuel or the herbicide, which must have been leaking from the aircraft while it was hanging on the cliff. It is not clear how long the aircraft hung on the cliff; it eventually came down, crashing approximately 45ft below the vertical cliff as shown in Figure 2. The aircraft broke in half along the wings' leading edge.

1.12.3 The aircraft was engulfed by post-impact fire and was completely destroyed. The propeller hub and one of the main landing gears were severed from the aircraft and were found 8 m and 10 m, respectively, from the main wreckage, without any traces of fire. The pilot was not inside when the fire started; he must have been flung out during the accident sequence.

1.13 Medical and Pathological Information

1.13.1 The rescue team found the pilot alive at a lower position than the aircraft, approximately 20 m away, but they had no idea how he got there. It is not clear whether he was wearing the seatbelt or not during impact. When he related the story, he only concentrated on the last stages of the flight and that he had chest pains. He was rushed to Maclear Hospital initially, and then later that same day, he was airlifted to Albert Luthuli Hospital in Durban for further emergency treatment. He succumbed to his injuries on the 14 December 2014.

1.13.2 The post-mortem and blood toxicology reports were still outstanding at the time of compiling this report. Should any of the results have a bearing on the circumstances leading to this accident, they will be treated as new evidence that will necessitate reopening this investigation.

1.14 Fire

1.14.1 After the aircraft fell off the cliff face and impacted the ground it burst into fire. The pilot was not in the aircraft and was unable to do anything about the raging fire. The aircraft's wingtips were the only parts not consumed by the fire.

1.15 Survival Aspects

1.15.1 The accident was considered not survivable because it is not clear if the safety harnesses were intact after the accident due to the extent of the post-impact fire.

1.16 Tests and Research

1.16.1 None.

1.17 Organizational and Management Information

1.17.1 The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.

1.17.2 The last mandatory periodic inspection (MPI) was certified on 18 March 2014 by aircraft maintenance organisation (AMO) No. 149 at 7 957.4 airframe hours. The aircraft had flown a further 57.5 hours before the accident.

1.17.3 The Aerial Spraying Company was approved by the Regulator to conduct agricultural spraying, seeding and dusting flights under the Air Operating Certificate, FO 09464, valid until 19 October 2015. ZS-LJT appeared as one of the aircraft listed for these operations.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2 ANALYSIS

2.1 The pilot held a correct and current rating for the crop spraying aircraft, and his medical was up to date.

- 2.2 The aircraft's maintenance logbooks indicated that the MPI was up to date and that the aircraft had 42.5 hours to fly before the next one.
- 2.3 According to the safety officer, they should have started at 0400Z that morning but had to wait due to adverse weather conditions. The weather improved 2 hours later, whereupon they started, therefore weather has no bearing on this accident.
- 2.4 The aircraft's first load of herbicide was successfully sprayed at the designated blocks. The aircraft returned to the airfield for the second load. The aircraft was loaded and got airborne at 0650Z and routed to the spray site. The camera operators who were located east of the airfield took note of the aircraft as it passed the first time around. According to the safety officer, the camera operators saw the aircraft with the second load flying past, but after some time, they realised that the aircraft was taking longer than before to come back, and they decided to alert the safety officer.
- 2.5 The safety officer flew straight to the spray site and found that the aircraft had crashed, and fire had started to engulf it. The safety officer was convinced that the pilot was inside. He flew back to the airfield where he was joined by a mobile search party put together by the client. Upon reaching the aircraft, the search party was surprised to find the pilot outside his aircraft.
- 2.6 The safety officer said that they found the pilot on a steep mountain about 30 m below the spot where the aircraft had come to rest. It is unclear whether the pilot was somehow ejected or he freed himself from the aircraft. The aircraft broke in half along the wings' leading edge. The pilot indicated to the safety officer that on his second arrival at the spray site, he made a left turn near the mountain cliff and stalled the aircraft. On investigation, it became evident that the aircraft had impacted the mountain top at least twice before falling down a vertical cliff.
- 2.7 The pilot, who suffered multiple upper body and head injuries, was taken by an ambulance to Maclear Hospital in Ugie. The pilot only spent hours in that hospital because his injuries were so severe. He was later transferred to Albert Luthuli Hospital in Durban. He succumbed to his injuries 5 days later.
- 2.8 It is the opinion of this investigation that the pilot must have realised that he was too close to the cliff and made a steep left turn, trying to get out of that situation. The steep turn increased the aircraft's stall speed and drag, which resulted in the aircraft being too low for recovery.

3. CONCLUSION

3.1 Findings

- 3.1.1 The aircraft was certified, equipped and maintained in accordance with existing regulations
- 3.1.2 The aircraft was airworthy when it dispatched for the flight.
- 3.1.3 The aircraft was under power when it impacted the mountain.
- 3.1.4 Due to the destruction of the aircraft by impact and fire it could not be determined

whether any pre-impact failure of system malfunction contributed to this accident

- 3.1.5 The pilot completed Crew Resource Management (CRM) training in June 2014 and underwent 6 monthly competency check on 15 September 2014.
- 3.1.6 The pilot was licenced and qualified for the flight in accordance with existing regulations
- 3.1.7 The pilot was admitted to Maclear hospital and later transferred to Albert Luthuli Hospital in Durban. The pilot succumbed to his injuries 5 days later.

3.2 Probable Cause/s

- 3.2.1 Stalling during a low-level turn. Failed to maintain flying speed/stall

3.3 Contributing factor

- 3.3.1 Steep mountains near the spray site. Improper flight planning

4. SAFETY RECOMMENDATIONS

- 4.1 None

5. ANNEXURES

- 5.1 Annexure A: Weather report
- 5.2 Annexure B: S2R-T34 AFM normal procedures

Annexure A: Weather report

Report: Aircraft accident

ATTACHMENT C: Observed surface conditions at a nearby aerodromes closer to the estimated time of occurrence of the aircraft accident on the 9 December 2014.



The screenshot shows a web browser window displaying the Aviation Weather Centre website. The page title is "Searching for historic data between 2014-12-09 and 2014-12-09". The results section is titled "Results for Meteorological Aerodrome Report(s)" and lists several reports for station FAUT on 2014-12-09. The reports include time, wind speed, visibility, and other meteorological data.

Station: FAUT

Date: 2014-12-09

FAUT 091000Z 16008KT 9999 FEW025 16/14 Q1025=
 COR FAUT 091000Z AUTO /////KT //// // ///// //// Q////-
 FAUT 091000Z AUTO /////KT //// // ///// //// Q////-
 FAUT 090900Z 09002KT 9999 FEW030 ///// Q1014=
 FAUT 090800Z 08003KT 9999 FEW025 ///// Q1014=
 FAUT 090700Z 29001KT CAVOK 22/13 Q1014=
 FAUT 090600Z 28003KT 9999 SCT018 20/14 Q1015=-

Results for Special Meteorological Aerodrome Report(s)

No data

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Annexure B: S2R-T34 AFM normal procedures**Thrush Aircraft Inc Model S2R-T34 SECTION II
Albany, GA AIRPLANE FLIGHT MANUAL NORMAL PROCEDURES**

FAA APPROVED: Apr. 10, 2007 Revision 3, SECTION II-8

3. After breaking ground, allow airspeed to build up to best-rate-of-climb speed of 85 MPH.

CLIMB:

1. Establish the best-rate-of-climb speed, 85 MPH.
2. Maintain maximum continuous power (RPM may be reduced to 2000 to reduce propeller noise.)
3. Flaps – RETRACT.
4. Fuel Auxiliary Pump – OFF
5. Ignition Switch – OFF

GLIDE AND APPROACH:

1. Fuel Condition Lever – SET HIGH / FLIGHT IDLE
2. Prop Control – SET full high RPM
3. Fuel Auxiliary Pump – ON
4. Ignition Switch – ON
5. Flaps – SET as required
6. Rear Seat Occupant – CONFIRM ready (Dual Cockpit Only)

GO AROUND:

1. Power – Increase to the take-off setting.
2. Flaps – Retract slowly while maintaining altitude.
3. Airspeed – Maintain best-rate-of-climb speed of 85 MPH.

LANDING:

1. Airspeed on Final – 130% of Power Off, stall speed (80 to 92 MPH).
2. Wing Flaps – As required.
3. Touchdown – Main Wheels.
4. Landing Roll - Lower Tail Smoothly, Close the throttle.
5. Reverse Propeller – Reverse may be used after the tail is on the ground. Depress button on power lever to use reverse thrust. Keep tailwheel locked during all reverse operation.

...END...