SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Occurrence Investigation** Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8888		
Aircraft Registration	**ZS-KIL**	**Date of Accident**	27 January 2011		**Time of Accident**	0930Z	
Type of Aircraft	Schweizer Grumman G-164B		**Type of Operation**		Agricultural		
Pilot-in-command Licence Type		ATPL	**Age**	25	**Licence Valid**	Yes	
Pilot-in-command Flying Experience		Total Flying Hours	1983.0		Hours on Type	Unknown	
Last point of departure	Farm Teana between Nigel and Balfour, Mpumalanga Province						
Next point of intended landing	Farm Teana between Nigel and Balfour, Mpumalanga Province						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
On farm Hartebeesfontein near Balfour:(GPS co-ordinates S26° 32.287', E028° 36.973') Elevation 5424ft AMSL							
Meteorological Information	Surface Wind: 050º/10kt 010V090; Visibility: 10km Temperature: 23°C						
Number of people on board	1 + 0	**No. of people injured**	0	**No. of people killed**	1		

Synopsis

The pilot took from a private farm, Teana near Balfour in the Mpumalanga province in order to perform crop dusting on the farm Hartbeesfontein that was approximately 3km from where he took off.

According to available information, the pilot was busy with crop dusting a maize field on the farm with fertilizer pellets at the normal height of approximately 60ft above ground level (AGL). The pilot was busy with the 4th load of fertilizer and was flying for approximately 1 hour and 30 minutes since he started when the accident occurred.

The pilot executed a sharp turn at the end of the run in order to conduct the next crop dusting run when the aircraft suddenly pitched nose down and impacted with the ground next to the maize field being fertilized. The pilot was fatally injured during the impact sequence.

Probable Cause

The pilot entered into a steep turn manoeuvre which he was unable to recover from.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator **:** Neonbel AGT (PTY) Ltd/ Protek Air
Manufacturer **:** Schweizer Aircraft Corporation
Model **:** Grumman G-164B
Nationality **:** South African
Registration Marks **:** ZS-KIL
Place **:** On the farm, Hartebeesfontein, Balfour District
Date : 27 January 2011
Time **:** 0930Z

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 (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 given without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 The pilot took off from the private farm, Teana near Balfour in the Mpumalanga province in order to perform crop dusting on the farm Hartbeesfontein that was approximately 3km from the farm he took off.

1.1.2 According to available information, the pilot was busy with crop dusting a maize field on the farm Hartebeesfontein with fertilizer pellets at a height of approximately 60ft AGL. The pilot was busy with the 4th load of fertilizer and was flying for approximately 1 hour and 30 minutes since he started when the accident occurred.

1.1.3 The pilot executed a sharp turn at the end of the run in order to conduct the next crop dusting run when the aircraft suddenly pitched nose down and impacted the ground next to the maize field being fertilized.

1.1.4 The pilot was fatally injured in the accident and the aircraft destroyed on impact with the ground.

1.1.5 According to a witness at the farm, he saw the pilot performing crop dusting over the maize field. He then saw the pilot executing a turn at the end of the crop dusting run. At that moment his vision was obscured behind a row of trees, he then heard a loud bang. Farm workers then ran to him and told him that the aircraft had crashed.

1.1.6 The accident occurred during daylight conditions at a geographical position that was determined to be South 26º 32.287', East 028º 36.975' at elevation 5424ft AMSL.

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 destroyed in the accident.

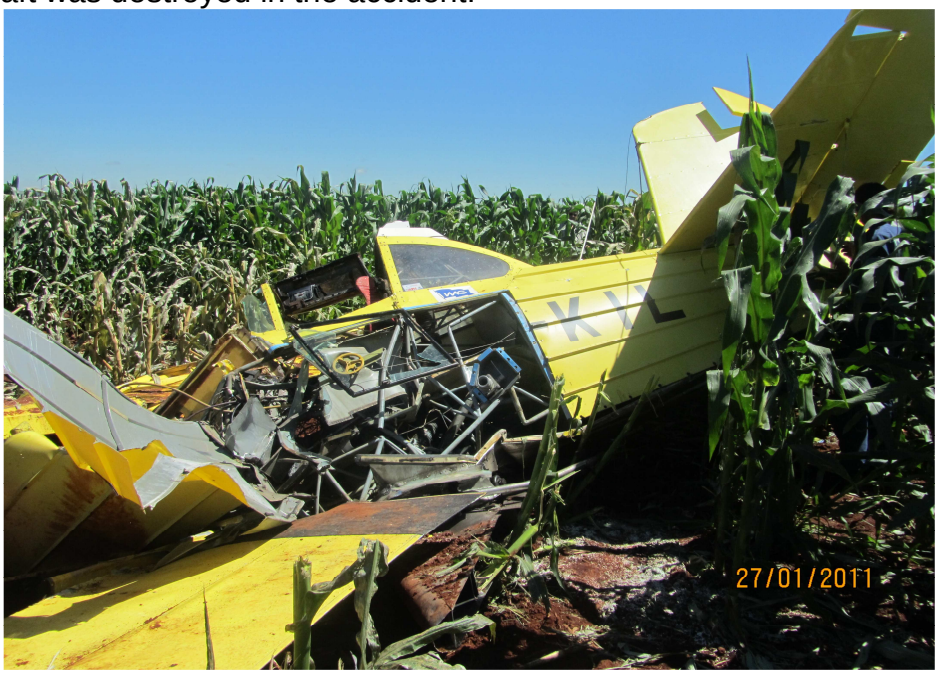

Photo 1: View of substantial damage caused to the aircraft fuselage, cockpit window frame and wings.

1.4 Other Damage

1.4.1 Damage was caused to some maize when the aircraft impacted into the maize field.

1.5 Personnel Information

1.5.1 Pilot-in-command:

Nationality	South African	Gender	Male	Age	25
Licence Number	0271061111	Licence Type	ATPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Aeroplane multi-engine land rating , instrument rating, pilot and instructor rating, agriculture rating.				
Medical Expiry Date	31 January 2011				
Restrictions	Nil				
Previous Accidents	On 19 Dec 2008: Engine failure on take-off. Overran runway, into ploughed field, nose gear separated from aircraft.				

1.5.2 Flying Experience:

Total Hours	1983.0
Total Past 90 Days	Unknown
Total on Type Past 90 Days	Unknown
Total on Type	Unknown

Note: The pilot's total flying hours were obtained from the SACAA pilot's file. The last documentation was dated on the 06 December 2010 for application for an Agricultural Rating. An Agricultural rating was endorsed in the pilot's license.

1.6 Aircraft Information

1.6.1 Airframe:

Type	Grumman G-164B	
Serial Number	333B	
Manufacturer	Schweizer Aircraft Corporation	
Year of Manufacture	1971	
Total Airframe Hours (At time of Accident)	4436.13	
Last MPI (Date & Hours)	13 May 2010	4351.64
Hours since Last MPI	84.99	
C of A (Issue Date)	21 November 2006	
C of R (Issue Date) (Present owner)	18 November 1998	
Operating Categories	Standard Part 137	

1.6.2 Engine:

Type	Pratt &Whitney R1340-ANI
Serial Number	16926
Hours since New	Unknown
Hours since Overhaul	367.45

1.6.3 Propeller:

Type	Hamilton Standard 12 D40
Serial Number	A997C
Hours since New	Unknown
Hours since Overhaul	95.62

Photo 2: Schweizer Grumman G164B crop spray type aircraft

1.6 Meteorological Information

1.6.1 The following information that was extracted from an official weather report obtained from the South African Weather Services:

Wind direction	050°	Wind speed	10 knots	Visibility	10km
Temperature	23℃	Cloud cover	Scattered	Cloud base	2600 ft.
Dew point	16℃				

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigational equipment certified for the aircraft type. There was no defects or malfunctions reported prior to or during the flight.

1.9 Communications

1.9.1 The aircraft was fitted with standard communication equipment certified for this type of aircraft. There was no recorded failure of communication equipment prior to or during the flight.

1.9.2 At the time of the accident, the aircraft was outside the boundaries of an aerodrome and the pilot subsequently not in contact with any air traffic control facilities.

1.10 Aerodrome Information

1.10.1 The accident occurred outside the boundaries of an aerodrome.

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a flight data recorder (FDR) or a cockpit voice recorder (CVR) nor was either required by Regulations to be installed on the aircraft type.

1.12 Wreckage and Impact Information

1.12.1 The aircraft was destroyed during the accident sequence. Due to the steep angle that the aircraft impacted the ground, the wreckage was not scattered.

Photo 3: showing the main wreckage including the wings.

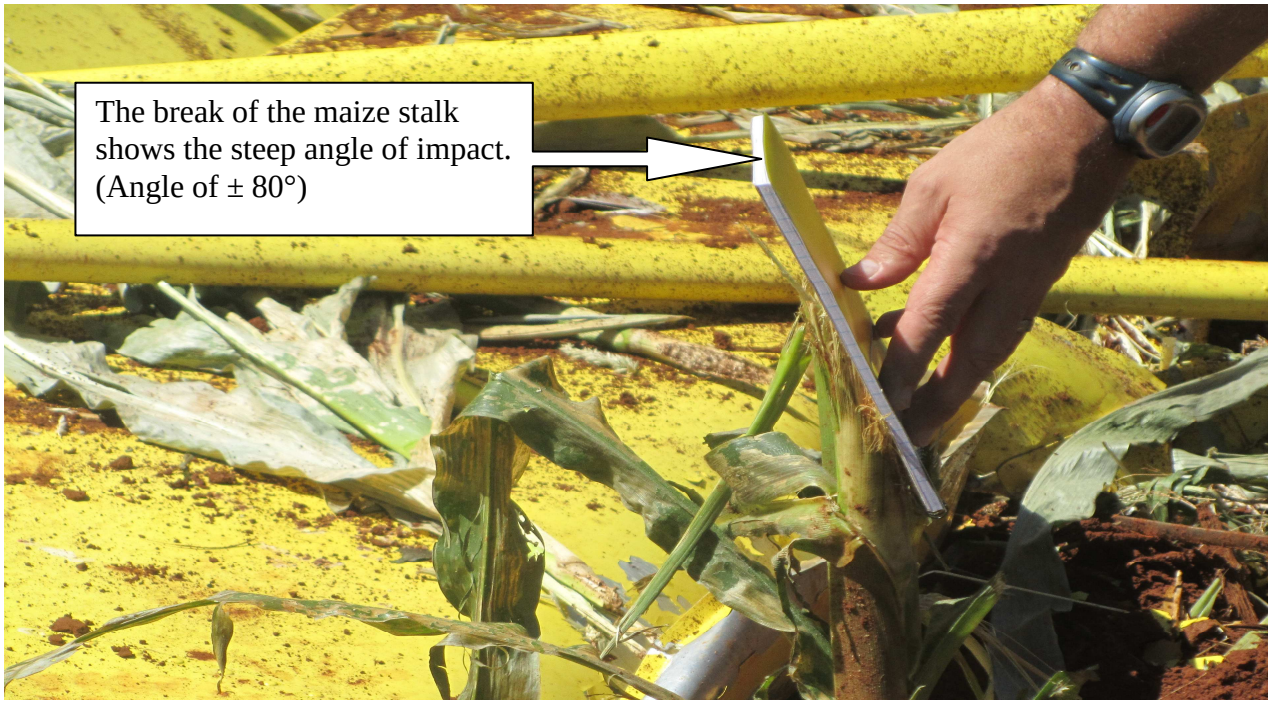

Photo 4: Showing the steep angle at impact.

1.12.2 There was no evidence of airframe failure or system malfunction prior to the accident. All control surfaces were accounted for, and all damage to the aircraft was attributed to the severe impact forces and the post-impact fire that ensued.

1.13 Medical and Pathological Information

1.13.1 The pilot was fatally injured in the accident.

1.13.2 The post-mortem report indicated that the cause of death was due to head injuries.

1.13.1 Blood samples were taken for toxicology examination, but at the time of compiling this report, the results were not available. In the event that the results becomes available that could have contributed to the cause of the accident, the accident investigation will be re-opened.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered not survivable due the high impact forces and the extensive damage sustained to the cockpit area.

1.15.2 According to the available information, the pilot was not wearing a suitable helmet but a soft material type helmet.

1.16 Tests and Research

1.16.1 The engine was recovered to an engine overhaul facility to check the engine for signs of any pre- impact damage. No pre-impact damage was found except for the broken gears in the engine turbo. The manufacturer was consulted and confirmed that the damage is consistent with the sudden stoppage of the engine during the impact sequence and subsequent damage to the engine turbo. According to the manufacturer this type of damage is common with the type of accident that occurred.

1.16.2 There was no evidence of airframe failure or system malfunction prior to the accident. All control surfaces were accounted for, and all damage to the aircraft was attributed to the severe impact forces and the post-impact fire that ensued.

1.17 Organizational and Management Information

1.17.1 The aircraft was operated under the provisions of the CAR's Part 137 The establishment owners of the aircraft held a Class G certificate in accordance with the Civil Aviation Regulations.

1.17.2 The aircraft had been maintained by an approved maintenance organisation (AMO) in accordance with the Civil Aviation Regulations. The last mandatory periodic inspection (MPI) that was carried out on the aircraft prior to the accident flight was certified on the 13 October 2010 at 4351.64 airframe hours.

1.17.3 The pilot was registered for the pest control operations with the department of agriculture in South Africa, which was valid until 30 June 2013.

1.17.4 The aircraft was listed in the Operator's Air Operating Certificate (AOC).

1.18 Additional Information

1.18.1 Aerial Application Operations:

"The flight profile of an agricultural applicator is typically a day of short flights from a small, uncontrolled airfield where the aircraft's tanks are filled. The flight then proceeds to the target track and several passes are made at a low level of three to five feet above the crop, at a typical speed of 110 miles per hour. The agricultural applicator pilot must have inspected the field prior to flight and be aware of obstructions to flight, such as power lines and poles and trees, the relative flatness of the field, and adjoining fields, and must be extremely knowledgeable of the weather and wind conditions. Wind drift must be taken into account to avoid having the spray contaminate adjacent fields. A typical run will be straight downfield. At the end of the field a "P" turn is executed, using a bank angle of 45° to 60° and approximately 2-4 g of force on the aircraft. This increases the aircraft's stalling speed by over 40%. The P turn completed, the aircraft flies back down the field and sprays the next lane.

One applicator estimated that he performed over 9,000 P turns in one summer. Since crop dusting is often done in summer under high temperature conditions, thermal stress may be an added problem. Repetitive turns at even these modest G loads coupled with dehydration can lead to g-induced loss of consciousness (G-LOC)."

Source: FAA: Section II 4.3 AERIAL APPLICATION OPERATIONS (Crop Dusting, Fire Fighting)

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS:

2.1 The pilot was busy with the 4th load of fertilizer pellets at approximately 60ft AGL during a crop dusting detail over the maize when the pilot executed a sharp turn at the end of the run in order to conduct the next run when the aircraft suddenly pitched nose down and impacted the ground next to the maize field.

2.2 The atmospheric temperature at the time of the accident was recorded at 23℃ but due to the design of the glass canopy, this translates to a higher temperature in the cockpit and can cause a loss of awareness by the pilot.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot's licence was valid at the time of the accident and was rated on type.

3.1.2 The pilot was registered for the pest control operations with the department of agriculture in South Africa, which was valid until 30 June 2013.

3.1.3 The aircraft was operated under Part 137, of the CAR's.

3.1.4 The aircraft had a valid Certificate of Registration and Certificate of Airworthiness.

3.1.5 The aircraft was listed in the operator's Air Operators Certificate (AOC).

3.2 Probable Cause/s

3.2.1 The pilot entered into a steep turn manoeuvre which he was unable to recover from.

4. SAFETY RECOMMENDATIONS

4.1 None

5. APPENDICES

5.1 None

Compiled by:

Date: ……..

For: Director of Civil Aviation

Investigator-in-charge: Percy V. Mnggibisa Date: ……..

Co-Investigator: Chris Williams Date: …….