AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA/18/2/3/8491	
Aircraft Registration	ZU-JCR	**Date of Accident**	02 May 2008			**Time of Accident**	0655Z
Type of Aircraft	Jabiru SP		**Type of Operation**	Private			
Pilot-in-command Licence Type	Private		**Age**	57		**Licence Valid**	Yes
Pilot-in-command Flying Experience	Total Flying Hours		± 85.4 hours			Hours on Type	± 85.4
Last point of departure	Morning Star Aerodrome						
Next point of intended landing	Fisantekraal Aerodrome (FAFK) (GPS co-ordinates: S33°46'00˝ E018°43'00˝)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
On Buurmanskraal farm, north of Fisantekraal (GPS co-rodinates: S 33°45,568' E 018°44,262) at an elevation of 380 ft							
Meteorological Information	Fine, CAVOK						
Number of people on board	1 + 1	**No. of people injured**	1	**No. of people killed**	1		

Synopsis

The pilot and a passenger were on a private VFR flight when the accident occurred.

The pilot intended to land on runway 32 at Fisantekraal aerodrome (FAFK), but missed the approach due to changes in the wind direction. He decided to perform a go-around. During the climbing phase of the go-around, he broadcasted his intensions on frequency 131,1MHz, and declared a fuel emergency.

The engine subsequently stopped and the aircraft lost altitude. The aircraft touched down, bounced, and the spinner collided with an electrical power pole. The aircraft came to rest next to the pole in an inverted attitude. The aircraft was destroyed.

The pilot was fatally injured and the passenger sustained serious injuries.

Probable Cause

Fuel exhaustion during the go-around resulted in an engine failure and the aircraft subsequently collided with an electrical power pole.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : FGP Aviation CC
Manufacturer : Jabiru
Model : SP
Nationality : South African
Registration Marks : ZU-JCR
Place : Buurmanskraal farm
Date : 02 May 2008
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 two 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 the Flight

1.1.1. The pilot and a passenger were on a visual flight rules (VFR) private flight that took off at approximately 08h10 from Morning Star Aerodrome, destined for Fisantekraal Aerodrome (FAFK).

1.1.2. On final approach to FAFK, the pilot broadcasted his intention to land on runway 32 on frequency 131,1 Mhz.

1.1.3. He experienced a sudden change in wind direction, which led to him missing the approach, and he opted to initiate a go-around. During the go-around, the pilot called out on frequency 131,1MHz “Pan Pan Pan”, and broadcast that the aircraft had run out fuel.

1.1.4. A response came from another aircraft that was flying around the area at the time, namely ZS-KKC, confirming that it copied the distress. The ZS-KKC pilot advised the ZS-JCR pilot that he would monitor the situation.

1.1.5. The engine of ZS-JCR subsequently stopped and the aircraft started to loose altitude. The pilot then opted to land on an open, private farm north of FAFK.

1.1.6. During the forced landing attempt, the aircraft collided with an electrical power pole, and came to rest in an inverted attitude.

1.1.7. ZS-KKC notified Cape Town ATC that there has been an accident around FAFK.

1.1.8. The accident happened on a downward-sloping, grassy ground, on a private farm north of Fisantekraal Aerodrome, near Stellenbosch (GPS co-ordinates: S 33°45,568' E 018°44,262), at a surface elevation of 380 ft above sea level (ASL).

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1. The aircraft was substantially damaged.

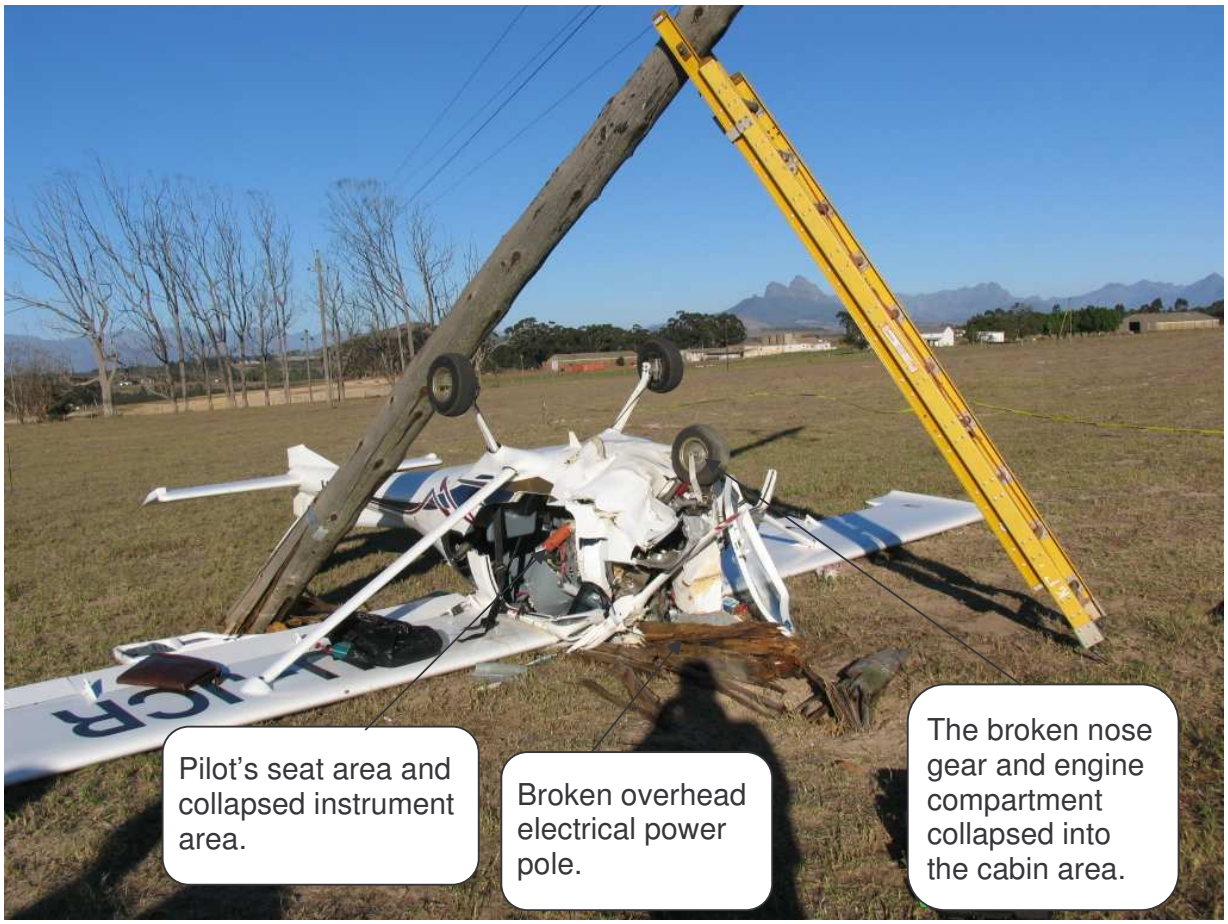

Figure 1: The extent of the damages to the aircraft

1.4 Other Damage

1.4.1. Other damages were limited to the electrical power pole only, which was broken and had to be replaced.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	57
Licence Number	**********	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 April 2008				
Restrictions	None				
Previous Accidents	None				

1.5.1. Flying Experience:

Total Hours	Approximately 85.4 hours
Total Past 90 Days	Approximately 36 hours
Total on Type Past 90 Days	Approximately 36 hours
Total on Type	Approximately 85.4 hours

1.5.2. According to available records, the pilot last logged his flight hours on 27 April 2009.

1.6 Aircraft Information

1.6.1. Airframe:

Type	Jabiru SP	
Serial Number	535	
Manufacturer	Jabiru Aircraft South Africa	
Year of Manufacture	2002	
Total Airframe Hours (At Time of Accident)	± 1 316.4	
Last Annual Inspection (Date & Hours)	28 January 2008	1 289.9
Hours Since Last Annual Inspection	26.5	
Authority to Fly (Issue Date)	02 February 2008	
C of R (Issue Date) (Present Owner)	04 February 2008	
Operating Categories	Standard operating categories	

1.6.2. The aircraft was fitted with an electronic Hobbs meter, which was destroyed in the accident sequence, and therefore no exact airframe hours could be obtained.

1.6.3. The aircraft was fitted with an extended capacity fuel tank, with a total capacity of 85 litres.

1.6.4. Engine:

Type	Jabiru 2200
Serial Number	22A 1251
Hours Since New	1 320
Hours Since Overhaul	320

1.7 Meteorological Information

1.7.1. The information given below was obtained from an official weather report given by the South African Weather Services.

Wind Direction	090° TN	Wind Speed	10 kts	Visibility	10 km or more
Temperature	15°C	Cloud Cover	None	Cloud Base	None
Dew Point	8°C				

1.7.2. According to the FAFK Aerodrome management, there was a constant change of surface wind direction around FAFK on the day the accident occurred.

1.8 Aids to Navigation

1.8.1. The aircraft was fitted with standard navigation equipment as approved at the time of certification by the regulator, and no defects were entered against this equipment prior to the accident or during the accident flight.

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1.9 Communications

1.9.1. The aircraft was fitted with standard communication equipment as approved at the time of certification by the regulator, and no defects were entered against this equipment prior to the accident or during the accident flight.

1.9.2. The pilot broadcast blindly on frequency 131.1 MHz to indicate his intention to land, and again later during the go-around, stating that he had run out of fuel and was in distress.

1.9.3. The pilot also received a response from another aircraft that was flying around the area at the time, namely ZS-KKC, confirming that it copied the distress and that it would monitor the situation. Cape Town ATC was also notified by the pilot of the aircraft ZS-KKC that there had been an accident around FAFK.

1.10 Aerodrome Information

1.10.1. The accident happened on a downward-sloping, grassy ground, on a private farm north of Fisantekraal Aerodrome, near Stellenbosch (GPS co-ordinates: S 33°45,568' E 018°44,262), at a surface elevation of 380 ft ASL.

1.10.2. The pilot initiated a go-around after attempting to land on runway 32 at FAFK. As FAFK is an unmanned aerodrome, the management at FAFK had installed on the aerodrome a security monitoring system that allowed them to have available audio and visual recordings of certain events as they happened on the aerodrome. The audio of the pilot stating that he had run out fuel and of him making a distress call was obtained from this system.

1.11 Flight Recorders

1.11.1. No flight data recorder (FDR) nor cockpit voice recorder (CVR) was fitted on this aircraft, and neither were required by the regulations.

1.12 Wreckage and Impact Information

1.12.1. The aircraft lost altitude after the engine stopped. It started descending and touched down with the main landing gears approximately 3 m before the electrical pole. The aircraft bounced once and touched down again before its spinner collided with the pole.

1.12.2. The pole broke at the bottom, up to approximately 1 m from where the pole enters the ground surface. The aircraft nosed over, coming to rest in an inverted attitude.

1.12.3. The damage to the pole and the aircraft suggested that the aircraft impacted the pole at a relatively high speed.

1.12.4. The investigators on the scene found no fuel in the tank, nor any traces or signs of any fuel spillages or leaks.

1.13 Medical and Pathological Information

1.13.1. The pilot was fatally injured and the passenger sustained serious injuries.

1.13.2. According to the post-mortem report, the pilot suffered multiple injuries, which were established as the cause of his death. There was no evidence that physiological factors or incapacitation affected the performance of the pilot.

1.13.3. The passenger suffered a crushed left foot and broke her left leg in two places as a result of the accident, and was airlifted by an emergency services helicopter from the accident scene to a private clinic where she was hospitalised for approximately 14 days.

1.13.4. A toxicology report was not available at the time of compilation of this report. Should the results from this report have a bearing to this report, they will be attached to this report as and when obtained.

1.14 Fire

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

1.15 Survival Aspects

1.15.1. The accident was considered not survivable because of the extent of the damages to the airframe, particularly the cabin. The nose landing gear and the engine compartment collapsed and crumpled into the cabin, and this posed a danger to the occupants, namely being crushed and trapped in the wreckage.

1.15.2. The occupants of the aircraft were wearing their safety restraint harnesses.

1.15.3. The passenger was assisted out of the wreckage by the emergency medical rescue services.

1.16 Tests and Research

1.16.1. According to the manufacturer of the aircraft and engine, the 2 200 cc engine consumes 15 l of fuel per hour.

1.16.2. Below are the specifications as obtained from the manufacturer's website (website address: http://www.jabiru.co.za/2200engine.htm):

Aircraft Engine	Jabiru 2200 cc 85 hp
Displacement	2 200 cc (134 cu.in.)
Bore	97.5 mm
Stroke	74 mm
Compression Ratio	8:1
Power Rating	64 kW (85 hp) @ 3 300 revolutions per minute (RPM)
Fuel Consumption at 75% power*	15 l/hr (4 US gal/hr)
Fuel	AVGAS 100/130 or MOGAS - must be above 95 OCTANE RON

*Fuel consumption will vary depending on installation, propeller and power settings.

Fuel Consumption: 21 l/hr @ take-off / max. continuous rating
Fuel Consumption: 13-15 l/hr @ 75% nominal power setting
Fuel Pressure to Carburettor Maximum: 20 kPa (3 psi)
Fuel Pressure to Carburettor Minimum: 5 kPa (0.75 psi)
Recommended Fuel Grade: Avgas 100LL & Avgas 100/130

1.17 Organisational and Management Information

1.17.1. The aircraft had a valid authority to fly, which was issued on 02 February 2008, and was valid until 28 January 2009.

1.17.2. The last annual inspection carried out on the aircraft prior to the accident was certified on 28 January 2008, at 1 291 airframe hours. The certification was carried out by aircraft maintenance organisation (AMO) no. 909.

1.17.3. AMO no. 909 was in possession of a valid AMO Approval, with an expiry date of 01 August 2008.

1.17.4. The aircraft was mostly refuelled at FAFK aerodrome.

1.18. Additional Information

1.18.1. The aircraft was in a serviceable condition prior to the accident.

1.18.2. All the partner members of FGP Aviation were qualified pilots. They would alternately fly the aircraft, at different intervals, when it was available. According to one of the partners, the aircraft would at times consume approximately 10 l an hour.

1.18.3. According to available records, the aircraft was last refuelled on 23 April 2008 and the fuel uplift was 60 l of AVGAS.

1.18.4. The deceased pilot was the last to fly the aircraft, on Monday 28 April 2008, four days prior to the day on which the accident occurred.

1.18.5. The aircraft did six flight legs (six landings), which equalled a total of 6.1 hours after the last fuel uplift, and was on the seventh leg of flight when the accident occurred. The duration of the seventh flight leg was estimated to be approximately 45 minutes.

1.18.6. According to available evidence, the engine did stop during the go-around phase of the flight.

1.18.7. According to the passenger, it seemed to her that the pilot was not completely aware of how fast the aircraft was loosing altitude.

1.18.8. The SA CATS-OPS Part 91, Sub-part 91.07.12.1 (1)(e)(i) states that:

1. Planning criteria for aeroplanes

An owner or operator must base the fuel policy, including calculation of the amount of fuel to be carried, by an aeroplane on the following planning criteria:

(1) The amount of –

(e) final reserve fuel, which must be –

(i) for aeroplanes with reciprocating engines, fuel to fly for 45 minutes.

1.19. Useful or Effective Investigation Techniques

1.19.1. None.

2. ANALYSIS

2.1 The aircraft was in a serviceable condition prior to the accident.

2.2 The pilot initiated a go-around after missing the approach due to a change in surface wind direction. The engine stopped during the go-around phase.

2.3 Although the aircraft had an extended capacity tank of 85 l, the last fuel uplift was 60 l. The last leg of the flight was approximately 45 minutes and the aircraft had flown 6.1 hours prior to the last leg, which adds up to approximately 6.8 hours of total flight hours. If the aircraft had to consume between 10 and 15 l of fuel an hour during cruise, it would have needed between 68 and 102 l of fuel to complete 6.8 hours of flight.

1. 10 l per hour x 6.8 hours = 68 l

2. 15 l per hour x 6.8 hours = 102 l

2.4 The type of engine fitted on this aircraft consumes 21 l per hour of fuel (more fuel) during take-off or climb phases (maximum continuous rating) due to higher power settings. This would have reduced the available fuel for normal cruising and increased the need for more fuel on board. Assuming that 48 minutes (0.8 hours) of the total 6.8 hours was attributed to maximum continuous rating operations and the rest of the hours to nominal power settings at 15 l per hour as per the manufacturer's specifications, this aircraft would have required a minimum of 106.8 l of fuel to complete the number of hours.

The calculation are as follows:

1. 21 l per hour x 0.8 hours = 16.8 l

2. 15 l per hour x 6 = 90 l

3. Therefore, 16.8 l + 90 l = 106.8 l

Therefore, the fuel required would have been more than the tank capacity.

2.5 Fuel exhaustion to the engine was imminent because of the fuel available on the aircraft and the number of hours that the aircraft had already flown.

2.6 After the engine stopped due to fuel exhaustion, the aircraft started loosing altitude. The pilot might have been concentrating on maintaining control of the aircraft and also avoiding flying into the overhead electrical wires, which could have distracted him from seeing the electrical pole with which the aircraft subsequently collided.

3. CONCLUSION

3.1 Findings

3.1.1. The aircraft had been serviceable prior to the accident.

3.1.2. The pilot had a valid licence and his medical was valid

3.1.3. The visibility was fine at the time of the accident, and could not have been a contributing factor to this accident.

3.1.4. The aircraft had a valid authority to fly, which was issued on 02 February 2008, and was valid until 28 January 2009.

3.1.5. The last annual inspection carried out on the aircraft prior to the accident was certified on 28 January 2008, at 1 291 airframe hours, and was certified by aircraft maintenance organisation (AMO) no. 909.

3.1.6. AMO no. 909 was in possession of a valid AMO Approval, with an expiry date of 01 August 2008.

3.1.7. According to available records, the aircraft was last fuelled on 23 April 2008 and the fuel uplift was 60 l of AVGAS.

3.1.8. The aircraft was fitted with an extended capacity fuel tank, with a total capacity of 85 l.

3.2 Probable Cause/s

3.2.3. Fuel exhaustion during the go-around resulted in an engine failure and the aircraft subsequently collided with an electrical power pole.

4. SAFETY RECOMMENDATIONS

4.1. None

5. APPENDICES

5.1. None

Report reviewed and amended by the Advisory Safety Panel 30 October 2009

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