



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/7963	
Aircraft Registration	ZU-CGF	Date of Accident	22 May 2005		Time of Accident	1415Z
Type of Aircraft	Europa 2000 Amateur Kit Built Airplane		Type of Operation		Private Flight	
Pilot-in-command Licence Type		Commercial pilot	Age	43	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	441.8		Hours on Type	27.2
Last point of departure		Krugersdorp Aerodrome. (FAKR) Gauteng Province				
Next point of intended landing		Krugersdorp Aerodrome. (FAKR) Gauteng Province				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Dwarskloof smallholding area, approximately 10km west of Randfontein.						
Meteorological Information		Temperature: 19°C, Surface Wind: 330°03kt, Clouds: Scattered clouds 5000ft. AGL				
Number of people on board	1 + 1	No. of people injured	0	No. of people killed	1 + 1	
Synopsis						
<p>On 25 May 2005 at approximately 1400Z, the pilot, accompanied by a passenger, took off from Krugersdorp Aerodrome on a private flight in the local flying area.</p> <p>According to an eyewitness who was standing outside his house at a smallholding close to the accident site, the aircraft flew very low over his house and he could hear the engine spluttering. The aircraft then pitched up sharply and climbed for approximately 100 metres with the engine at full power, when the engine suddenly stopped and the aircraft pitched down at an angle of approximately 60 degrees. The eyewitness further stated that it sounded as though the pilot had attempted to restart the engine, but shortly thereafter the aircraft impacted with the ground, with the aircraft in a vertical nose-down attitude. He rushed to the scene in order to render assistance to the occupants, but found that they were fatally injured and the aircraft destroyed on impact.</p>						
Probable Cause						
<p>The aircraft stalled whilst the aircraft was climbing in a very high nose-up attitude. The aircraft was too low for the pilot to recover from the stall.</p>						
IARC Date		Francois		Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Amory S.M
Manufacturer : Europa Aviation Ltd.
Model : Europa Trigear
Nationality : South African
Registration Marks : ZU-CGF
Place : Dwarskloof Area (Smallholdings) near Randfontein
Date : 22 May 2005
Time : 1415Z

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.

SYNOPSIS:

1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 On 25 May 2005 at approximately 1400Z, the pilot accompanied by a passenger took off from Krugersdorp Aerodrome on a private flight in the local flying area.
- 1.1.2 According to an eyewitness who was standing outside his house at a smallholding close to the accident site, the aircraft flew very low over his house and he could hear the engine spluttering. The aircraft then pitched up sharply and climbed for approximately 100 metres with the engine at full power, when the engine suddenly stopped and the nose of the aircraft pitched down at an angle of approximately 60 degrees. The eyewitness further stated that it sounded as though the pilot had attempted to restart the engine, but shortly thereafter the aircraft impacted with the ground with the aircraft in a vertical nose-down attitude.
- 1.1.3 The witness rushed to the scene in order to render assistance to the occupants, but found that they were fatally injured and the aircraft destroyed on impact.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed on impact with the ground surface.



FIGURE 1: VIEW OF AIRCRAFT FUSELAGE/CABIN DESTROYED ON IMPACT

1.4 Other Damage

1.4.1 There was no other damage caused to property on the ground.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	43
License Number	-----	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Night Rating; Instrument Rating				
Medical Expiry Date	31 July 2005				
Restrictions	Lipid Protocol; M I Protocol.				
Previous Accidents	None				

Flying Experience:

- 1.5.1 The pilot started flying solo on the Europa Trigear Non Type Certificated Aircraft (NTCA) aircraft on 13 April 2005 after he had completed 1.5 and 1.0 flying hours conversion training on the aircraft on 13 April 2005 and 16 April 2005 respectively. At the time of the accident he had flown a total of approximately 27.2 flying hours on the accident aircraft.

Total Hours	441.8
Total Past 90 Days	35.1
Total on Type Past 90 Days	27.2
Total on Type	27.2

1.6 Aircraft Information

Airframe :

Type	Europa Tri-Gear Amateur Built (Kit)	
Serial Number	441	
Manufacturer	Europa Aviation Ltd.	
Date of Manufacture	2000	
Type of Aircraft	Non Type Certificated Aircraft	
Total Airframe Hours (At time of Accident)	134.00	
Last Annual Inspection (Date & Hours)	07 April 2005	108.0
Hours since Last Annual Inspection	26.0	
Authority to Fly (Issue Date)	11 April 2005	
Authority to Fly (Expiry Date)	12 April 2006	
C of R (Issue Date) (Present owner)	11 April 2005	
Operating Categories	Private	

Engine :

Type	Rotax 912 ULS
Serial Number	4425528
Hours since New	134.00
Hours since Overhaul	Not reached

Propeller :

Type	Woodcomp (Czech Republic)
Serial Number	PA029922917013
Hours since New	134.0
Hours since Overhaul	Not reached

- 1.6.1 The last annual inspection on the Non Type Certificated Aircraft (NTCA) was certified on 07 April 2005 at 108.0 airframe hours by an Approved Person (AP) No. 52 of the Aero Club of South Africa (MISASA).

- 1.6.2 The Europa Tri-gear type aircraft is a low-wing, cantilever aircraft of composite and fibreglass construction with the flaps electrically driven. The undercarriage is a fixed tricycle type with a nose wheel and the control surfaces operated through push-pull rods.
- 1.6.3 According to the owner manual, the aircraft is a modern two-seater, high performance home-built, low wing aircraft which uses the latest aerodynamic design in wing sections and composite construction techniques. The Europa was designed to be an efficient touring aircraft with safe handling characteristics for grass field operations. The climb speed for the aircraft is approximately 60-75 knots with the flaps retracted and the cruise speed for the aircraft is approximately 90-100kts.
- 1.6.4 Power on stalls
Warning: Power on stalls can more easily lead to a spin entry. Give yourself plenty of recovery height. The Europa is a very clean aircraft and will pick up speed very quickly in a dive. Power is not usually necessary to aid in the recovery from a stall unless you don't want to lose altitude, as on the approach to landing.
- 1.6.5 According to the Europa Trigear, Owners Manual, Section 2, the Limitations and Placards details for the aircraft are as follows:

Limitations:

>	Never exceed speed (V_{ne})	165kts (305 kph)
>	Manoeuvring speed:	105kts (194 kph)
>	Max Structural Cruise Speed (V_{no})	131kts (243 kph)
>	Max Flap/gear extension speed (V_{fe})	83kts (154 kph)
>	Approach Speed	60kts (111 kph)
>	Best Rate of Climb Speed (V_y)	75kts (139 kph)
>	Best Angle of Climb Speed (V_x)	61kts (113 kph)
>	Recommended Glide Speed (Eng off)	75kts (139 kph)
>	Stall Speed Clean (V_{sl})	49kts (91 kph)
>	Flaps Down (V_{s0})	44kts (81 kph)
>	Structural Limit Loads (1300 lbs)	+4.0g (-1.5g)

Placards:

- Intentional Spinning is prohibited
- No Smoking in or near aircraft
- Flight in icing conditions prohibited.
- Canopy warning: Do not open in flight.

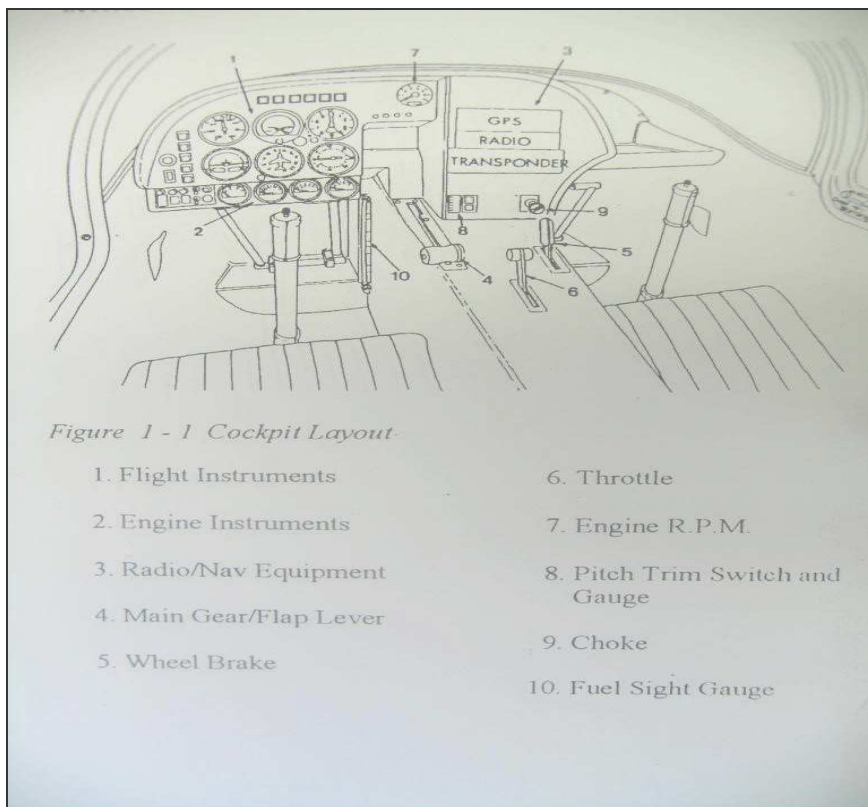


FIGURE 2: COCKPIT LAYOUT OF EUROPA AIRCRAFT FROM OWNERS MANUAL

1.7 Meteorological Information

1.7.1 The Meteorological Information provided by the South African Weather Services concluded that the weather observations at Dwarskloof near Randfontein were as follows:

1.7.1.1 Weather Conditions at time of accident

Surface Analysis at 1500Z on 22 May 2005:

A cold front was west of Cape Town with a high pressure system over the interior. A low pressure system was busy forming over the southern interior.

1.7.1.2 Upper Air Analysis

A trough of low pressure was present west of Cape Town.

1.7.1.3 Satellite Imagery

The satellite imagery shows partly cloudy conditions in the Randfontein Area.

1.7.1.4 Weather Conditions in the Vicinity of the Accident

No official weather observations are available at the time and place of the accident. The most likely weather conditions at the place of the accident were:

Time:	14:15Z
Temperature:	19.0°C
Dew Point:	08.0°C
Visibility:	10km+
Wind Direction	330°
Wind Speed:	03kt
Cloud:	SCT cloud at 5000ft AGL.

1.8 Aids to Navigation

1.8.1 According to the Aircraft Equipment List, a Geographical Positioning System (GPS) and Airpath Compass were installed in the aircraft that were serviceable at the time prior to the accident.

1.9 Communications

1.9.1 The aircraft was equipped with a radio Micro-air VHF 760 Transceiver that was serviceable at the time of the accident.

1.9.2 There is no evidence of any communication between the pilot and persons on the ground at the time of the accident.

1.10 Flight Recorders

1.10.1 The aircraft was not equipped with a Flight Data Recorder (FDR) or Cockpit Voice Recorder (CVR), nor was it required by regulation.

1.11 Wreckage and Impact Information

1.11.1 The aircraft flew low over his house at a smallholding as stated by the eyewitness when the aircraft pitched up sharply and the aircraft climbed for approximately 100 metres with the engine at full power. The engine stopped and aircraft then stalled and impacted with the ground at a nose- down attitude of approximately 60 degrees. The aircraft was destroyed on impact with the rocky terrain. There was no indication that the engine was running or/and that the propeller was turning on impact with the rocky ground surface.



PHOTO 2: VIEW OF FRONT SECTION & ENGINE AFTER IMPACT WITH THE GROUND



PHOTO 3: VIEW OF MAIN WRECKAGE AFTER IMPACT IN A NOSE-DOWN ATTITUDE IN ROCKY TERRAIN.

1.12 Medical and Pathological Information

1.12.1 A Medico-Legal Autopsy was performed on the deceased pilot and passenger after the accident. The results of the post-mortem report and toxicology tests were not available at the time when the report was compiled. If any results received later indicate that medical aspects may have affected the performance of the pilot, this will be considered as new evidence and the investigation re-opened.

1.13 Fire

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

1.14 Survival Aspects

1.14.1 Although the pilot and passenger were restrained with safety belts, the accident was not survivable due to the high impact forces and the destruction of the cockpit area.

1.15 Tests and Research

1.15.1 None considered necessary.

1.16 Organisational and Management Information

1.16.1 This was a private flight flown by the pilot, who was also the owner of the aircraft.

1.17 Additional Information

1.17.1 Stalls and Spins

Not all stall accidents are the same. They don't all have the same causes and they don't have the same consequences. For instance, some stall accidents occur when the wing exceeds its critical angle of attack and the coefficient of lift (C_L) falls while the coefficient of drag (C_d) increases. The lift decreases to the point where the airplane cannot maintain level flight and drag increases to the point where the aircraft cannot accelerate. The aircraft maintains a roughly wings-level attitude while it "mushes" into the ground. This type of accident is however, often survivable.

On the other hand, during another accident, one wing might stall before the other with the resulting asymmetric lift causing the airplane to roll rapidly towards the stalled wing. If the airplane is too close to the ground to recover from this "out of control" condition, it will crash into the ground at an extreme bank and perhaps pitch-attitude. This is normally a non-survivable crash. If the aircraft is at a higher altitude it might transition into a spin, rolling and yawing into the most deeply stalled wing. Here, inertia and aerodynamic forces are balanced, maintaining the airplane in a downward spiralling helix. If recovery is not completed at sufficient altitude, the aircraft will impact the ground in a nose-low attitude with very little or no forward speed.

Yet another type of stall accident involves a more complex interaction between all of the airplane surfaces which produces aerodynamic forces and pitching moments. In this "deep stall" condition, nose-up pitching moments developed at extreme angles of attack cannot be overcome by full nose-down flight control commands, preventing the pilot from reducing the angle-of-attack and breaking the stall. The resulting high sink-rate can result in a non-survivable crash. All of these examples involve stalls, but all involve different causes, sequences and consequences.

Source: Aircraft Accident Investigation Book by authors: Richard H. Wood & Robert W. Sweginnes.

1.17.2 According to the Air Safety Foundation (AOPA) by Bruce Landsberg, Kirsten Hummel and Kevin Murphy, the following study of Stalls & Spins were noted:

- It was found that only 7.1 percent of the aircraft involved in stall & spin accidents definitely started the stall/spin manoeuvres from an altitude of greater than 1000ft above ground level (1000ft agl). Just over 13 percent of the aircraft were reported at an "unknown" altitude at the beginning of the accident, and so were given the benefit of the doubt by ASF.
- The maximum altitude loss during a stall for different types of aircraft was found to be between 350ft and 140ft.

1.18 Useful or Effective Investigation Techniques

1.18.1 None

2. ANALYSIS

- 2.1 The pilot was the holder of a Commercial Pilot's licence. The pilot started flying solo on the Europa Trigear Non Type Certificated Aircraft (NTCA) on 13 April 2005 after he had completed 1.5 and 1.0 flying hour's conversion training on the aircraft on 13 April 2005 and 16 April 2005 respectively. At the time of the accident, he had flown a total of approximately 27.2 flying hours on the accident aircraft.
- 2.2 According to available evidence, the aircraft flew very low over a house at a smallholding when the aircraft then pitched up sharply and climbed for approximately 100 metres with the engine at full power, when the engine suddenly stopped and the aircraft pitched down at an angle of approximately 60 degrees. Shortly thereafter the aircraft impacted with the ground, with the aircraft in a vertical nose-down attitude.
- 2.3 For the pilot to perform this type of manoeuvre, It is reasonable to suggest that he had attempted to execute an aerobatic manoeuvre, whereafter the aircraft was to low above the ground level to recover in time.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot was the holder of a valid Commercial Pilot's Licence and was type-rated on the aircraft type with the following restrictions on his Medical Certificate:
Lipid Protocol & M.I. Protocol
- 3.1.2 The Authority to Fly for the aircraft was valid at the time of the accident. The Authority to Fly Certificate was issued on 11 April 2005 and the expiry date was 12 April 2006.
- 3.1.3 The last annual inspection was carried out by an Approved Person (AP) of the Aero Club of South Africa on 07 April 2005 at 108.0 hours. The aircraft had flown 26.0 hours since the annual inspection was certified.
- 3.1.4 The pilot and passenger were fatally injured in the accident.
- 3.1.5 The aircraft was destroyed on impact with the rock-covered terrain.
- 3.1.6 The weather conditions were fine at the time of the accident.
- 3.1.7 This was a private flight conducted by the pilot, who was also the owner of the aircraft.
- 3.1.8 The aircraft flew low above the ground before it climbed steeply at full power, stalled and impacted with the ground.

3.2 Probable Cause/s

- 3.2.1 The aircraft stalled whilst the aircraft was climbing in a very high nose-up attitude. The aircraft was too low for the pilot to recover from the stall.

4. SAFETY RECOMMENDATIONS

- 4.1 In the interests of air safety, it is recommended that an article be placed in the Safety Link and/or flying magazines to warn pilots of the potential dangers when executing manoeuvres for which the type of aircraft and engine are not designed.

5. APPENDICES

- 5.1 None

Submitted through the office of the SM.