

Safety Investigation Report

ACCIDENT TO THE SCHLEICHER Ka6CR SAILPLANE IN EBSH ON 13 AUGUST 2010

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FOREWORD

This report is a technical document that reflects the views of the investigation team on the circumstances that led to the accident.

In accordance with Annex 13 of the Convention on International Civil Aviation, it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the determination of the causes, and define recommendations in order to prevent future accidents and incidents.

In particular, Art. 17.3 of EU Regulation 996/2010 stipulates that a safety recommendation shall in no case create a presumption of blame or liability for an accident, serious incident or incident.

Safety recommendations and Safety messages

When AAIU(Be) issues a **safety recommendation** to a person, organization, agency or Regulatory Authority, the concerned person, organization, agency or Regulatory Authority must provide a written response within 90 days.

That response must indicate whether the recommendation is accepted, or must state any reasons for not accepting part or all of the recommendation, and must detail any proposed safety action to give effect to the recommendation.

AAIU(Be) can also issue a **safety message** to a community (of pilots, instructors, examiners, ATC controllers), an organization or an industry sector for it to consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to a safety message, although AAIU(Be) will publish any response it receives.

The investigation was conducted by L. Blendeman and H. Metillon.
The report was compiled by L. Blendeman

NOTE:

1. For the purpose of this report, time will be indicated in UTC, unless otherwise specified.
2. ICAO doc. 9859 was used for the identification of the hazard and the consequence.

Synopsis.

Date and hour of the accident

13 August 2010 at 10:30 UTC

Aircraft

Alexander Schleicher GmbH Ka 6 CR, msn 6228/Si

Accident location

Off EBSH, Saint-Hubert airfield

Aircraft operator

Private

Type of flight

Flight Instruction

Persons on board

1

Abstract.

The student pilot was performing a solo flight around the Saint-Hubert airfield. For an unknown cause, the sailplane lost altitude, and went under the “safety cone” assigned to each student.

The pilot tried to reach the airfield, but the sailplane stalled, was recovered, then stalled a second time, crashing vertically to the ground. The pilot was brought to the hospital in critical condition, where she died shortly after.

Cause(s)

The accident was caused by a loss of control during the approach to the airfield.

Hazards¹ identified during the investigation.

Limited scope of flight experience.

Consequences²

Loss of control.

¹ Hazard – Condition or object with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

² Consequence – Potential outcome(s) of the hazard

1. Factual Information

1.1. History of flight.

The student pilot had started a new flying season on 10 August. She got a new instructor, with whom she flew 2 flights on the 10th and 5 flights on the 12th (the day before the accident). On the 12th, she flew solo for a 10-minutes flight.

The student pilot came back on the airfield on the day of the accident, and was getting prepared for her first flight of the day, a solo on a Ka6, the sailplane on which she flew solo the day before.

The student pilot took off from EBSH at 11.30 LT, aerotowed.

After 45 minutes flying, the sailplane came back to land in EBSH.

A witness saw the sailplane, rather low, in a tight turn, towards the airfield. To his view, the sailplane was already too low in order to land on the field.

The sailplane went in a spin, that was successfully recovered after 1 turn, but a witness saw, at that moment the nose of the sailplane raising, and the sailplane went into a second spin.

The sailplane crashed vertically in a prairie, not far from EBSH.

The pilot was seriously wounded upon impact, and was brought to the nearest hospital by helicopter. The pilot deceased shortly after admission in the hospital.

1.2. Injuries to persons.

Injuries	Pilot	Passenger	Others	Total
Fatal	1	0	0	1
Serious	0	0	0	0
Minor	0	0	0	0
None	0	0	0	0
Total	1	0	0	1

1.3. Damage to aircraft.

The sailplane was totally destroyed.

1.4. Other damage.

There were no other damage.

1.5. Personnel information.

Student Pilot

Female

Age: 17 years old

Glider Pilot Training Licence, first issued 03 August 2009, valid until 02 August 2011.

Medical Certificate: Class 2, issued 30 July 2009, valid until 30 July 2014.

Training and Flight Experience.

At the time of the crash, the pilot had accumulated a total of 39 Flights, for a total of 23:06 Flight hours, including 12 solo flights and 11:43 solo Flight hours.

The Student Pilot had started the pilot training in July 2009, after 3 initiation flights in April 2009.

During the July 2009 training period, she had accumulated 27 flights spread over 8 days, and flew a total of 6:51 FH in double controls and 10:33 FH in solo.

The first solo flight was performed after 20 flights in double controls. The flights were performed on a Schleicher ASK 21. The longest solo flights included a flight of 5:15 FH and another of 2:20 FH. All flight starts were done by aerotow.

The training in 2009 was done under the supervision of an instructor.

After this period, the student pilot did not fly until 10 August 2010, when she flew 6 Flights in double controls with the Instructor (another individual than the instructor in 2009) on a Schleicher ASK 13, before making her first solo flight on the Schleicher Ka 6, the day before the accident. The accident occurred during the second solo flight performed in 2010.

The student pilot was preparing for the theoretical examination.

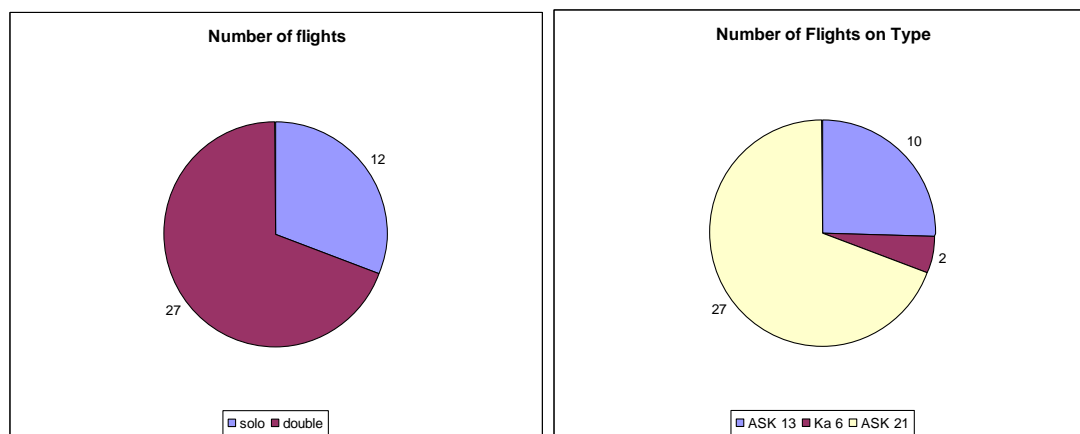


Fig.1 Pilot experience

The training of the pilot was done by a qualified instructor, using the logistics of an aeroclub. The training was performed in accordance with the flight training organization manual, issued by the Royal Aeroclub of Belgium “Manuel d’organisation pour la délivrance des licences de pilote de planeur et des qualifications attenantes”. There are no recording of the training made other than the entries in the student pilot’s flight log.

Flight instructor

Male

Age: 66 years old

Glider Pilot Licence, first issued 23 June 1962, last issued on 05 February 2009, valid until 15 April 2011.

Rating:

Flight examiner / Flight Instructor.

Aerotow.

1.6. Aircraft information.

The Schleicher Ka 6 is a single seat sailplane designed by Rudolf Kaiser, built by Alexander Schleicher GmbH & Co, Germany and is constructed of Spruce and plywood with fabric covering.

The Ka 6 CR variant uses a wheel as the main undercarriage instead of a skid, and features a conventional tailplane and elevator.

The Type Certificate – Kennblatt reference is N° 205 Revision 14 of 15/11/96.

Specifications

- Span 15.0 m./ 49.2 ft
- Area 12.45 sq. m. / 134 sq.ft.
- Aspect ratio 18.1
- Airfoil NACA 63-618/63-615
- Empty weight 190 kg. / 420 lb.
- Payload 114 kg. / 250 lb.
- Gross weight 304 kg. / 670 lb.
- Wing loading 24.41 kg. / sq. m. / 5.0 lb. / sq. ft.
- Structure all-wood with some fabric cover

Performance

- Stalling speed at 260 kg: 58 km/h
- Lowest sinking speed in straight flight: 68 km/h; Min. sink 0.61 m/s
- Best gliding angle at 80km/h; L/D max. 31
- In turns the lowest sinking speed is
 - 30° : 68km/h
 - 45° : 80km/h
 - 60° : 95km/h

The flight manual indicates that: just below these speed stalling begins; the sinking speed will increase rapidly. For the beginning it will be advisable to take 80km/h as the normal speed for straight flight, as well as for moderate turns.

Airframe

- Manufacturer: Alexander Schleicher.
- Type: Alexander Schleicher Ka 6 CR
- Serial Number: 6228/Si
- Total Flight Time: 1537:25 FH
- Built year: 1964
- Registration: OO-Z**
- Certificate of Registration: Nr 2658, first issued by the BCAA on 20 September 1976, last issued on 09 March 2009
- Certificate of Airworthiness: Issued by the BCAA on 12 March 2009
- Airworthiness Review Certificate: Last issued on 04 April 2010, valid until 03 April 2011

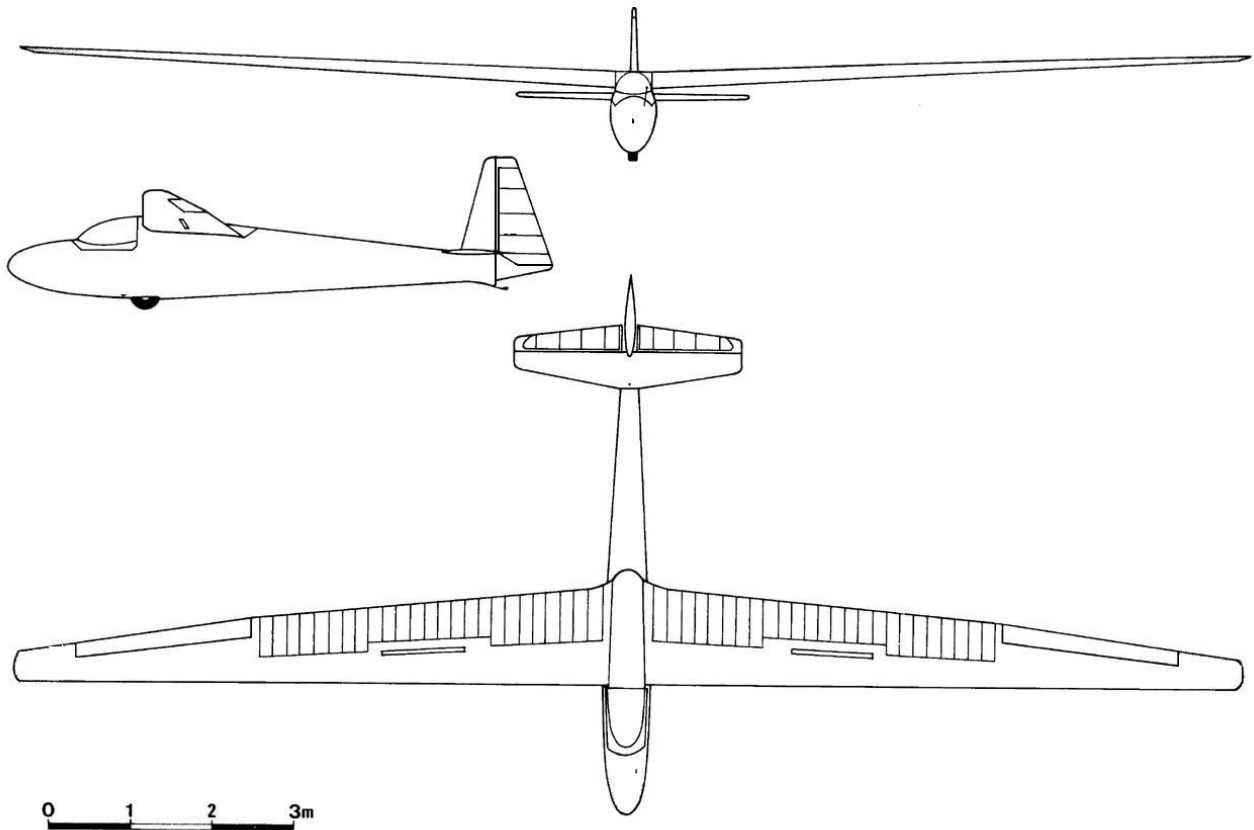


Fig.2 3-view

Weight and balance.

The weight and balance was verified by the instructor, together with the pilot; no additional ballast weight was required.

The weighing sheet gives:
Empty Weight: 212 kg
Arm: 570 mm

Student Pilot's weight (as reported by the instructor): 65 kg
Parachute weight: 7 kg
Arm: 520 mm (forward of datum).

Therefore:

Operating weight: 284 kg (< Max weight – 300 kg)
CG position = 294 mm (between Fwd CG limit (175 mm) and Aft CG limit (352 m m))

The flight manual indicates a minimum weight of 60kg with parachute, and 65kg without parachute, under which ballast weights have to be carried.

Maintenance

The sailplane was maintained in accordance with a Maintenance Program approved by the BCAA on January 20, 2010.

The sailplane was inspected for the renewal of the Airworthiness Review Certificate on May 4, 2010 and found compliant with the prevailing requirements.
All applicable Airworthiness Directives were applied: the last being the inspection of the central support of the elevator (TM25).

Modifications

As stated by the instructor, the sailplane had been modified in the past, before it was bought by its current owner. The modification consisted in a slight raise of the canopy level, in order to accommodate a tall pilot. This modification was not registered.

As a consequence, the pilot had to put several pillows on the seat.

1.7. Meteorological conditions

The general conditions were
 Generally cloudy to very cloudy with the risk of a light shower during the whole period.
 Temporary with the occlusion with showers, moderate at times, and the risk of a local
 thunderstorm.

Taken by the automated Meteo station on the EBSH airfield.

METAR EBSH 130950Z AUTO 23006KT 190V280 9999 SCT025/// BKN029///
 BKN036/// 16/09 Q1018=
 METAR EBSH 131020Z AUTO 22006KT 160V270 9999 FEW041/// 15/09 Q1018=
 METAR EBSH 131050Z AUTO 26008KT 230V290 9999 FEW029/// 15/09 Q1018=

The conditions in Saint-Hubert, as reported by the automated weather station around
 the time of the crash (10:20 UTC) were:

Wind

Direction: 220 Degrees, variable between 160 and 270 Degrees
 Speed: 6 kts

Temperature: 15 °C

QNH: 1018

Clouds

Few at 4100 ft

In the surrounding areas, the conditions were:

	Wind direction	Wind speed	QNH
Spa	270 °	5 kts	1018
Luxemburg	250 °	7 kts	1017
Florennes	250	9 kts	1017

1.8. Aids to navigation.

Not applicable.

1.9. Communication.

The pilot had a portable radio ICOM II, set on the frequency 119.70 (Saint-Hubert radio). No radio communication was received by Saint-Hubert during flight. The purpose of the radio was to listen to possible messages sent from Saint-Hubert, no so much to sending a message. Reportedly, the radio traffic is quite intense during the summer period.

1.10. Aerodrome information

Runway 23 was in service

The Saint-Hubert airfield (ICAO: EBSH) is an airfield located at 1.35 NM of the city of Saint-Hubert.

Coordinates: 50°02'09"N - 005°24'15"E
Elevation: 563m (1847 ft)

Runway 05/23:
QFU: 055°/235°
Dimension: 600 m x 190 m
Surface: Grass

Runway 14/32:
QFU: 140°/320°
Dimension: 845m x 150m
Surface: Grass

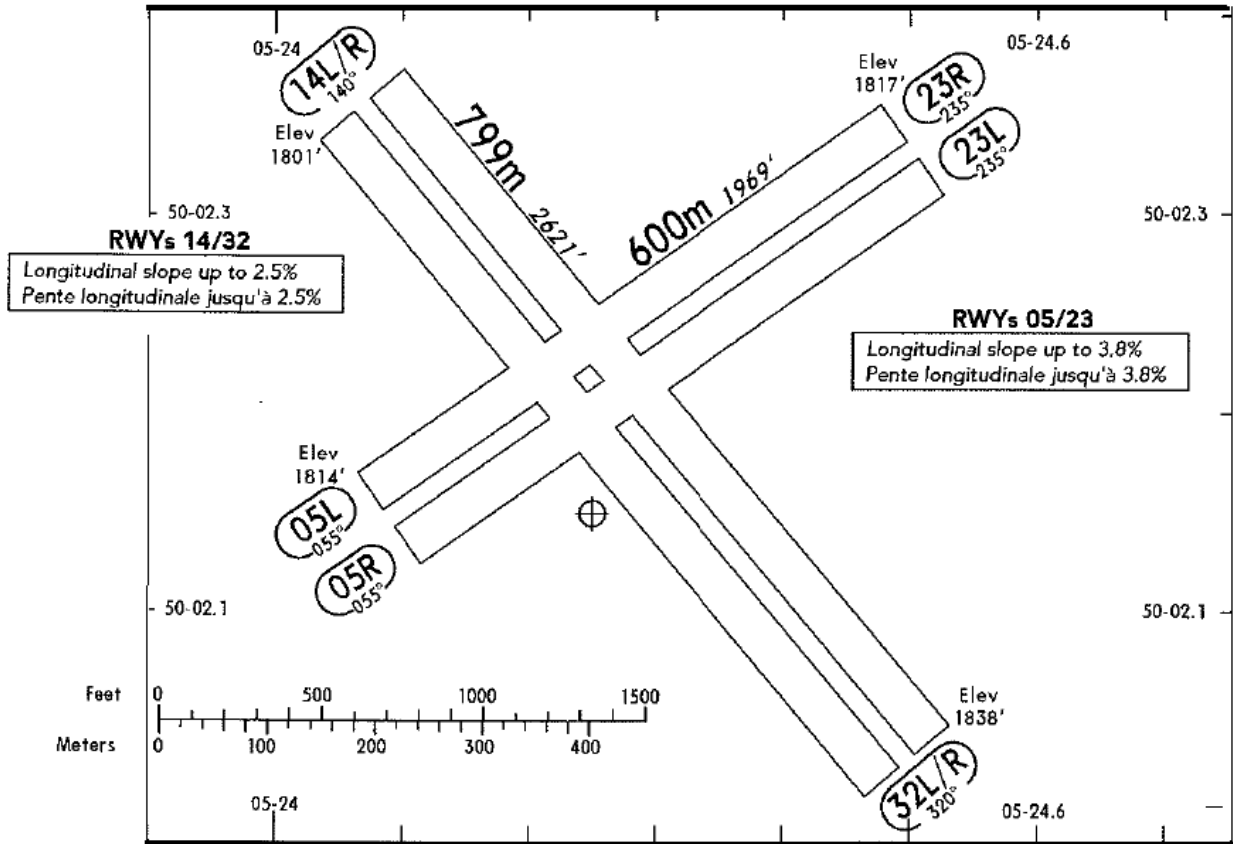


Fig.3 The airfield

1.11. Flight Recorder

Not Applicable.

1.12. Wreckage and impact information:

The sailplane was seen coming down quite vertically in a field next to a former pool of the neighboring detention center.

The open field is 300m x 300m, bordered by trees, with a slope. The field has an elevation of 460-480m.

The crash area is located at a distance of 1km of the airfield (1200 m of the intersection of Runways 14/32 and 23/05);

The damage to the vegetation shows the sailplane fell vertically.

The sailplane nose is shattered, and RH wing is broken to pieces. The LH wing was stopped by the branches of a tree.

The aft section (rudder and aft fuselage) is intact.

The flight control cables are still attached.

The altimeter shows an altitude of 350m.



Fig.4 The wreckage



Fig 5. The altimeter



Fig. 6 crash area

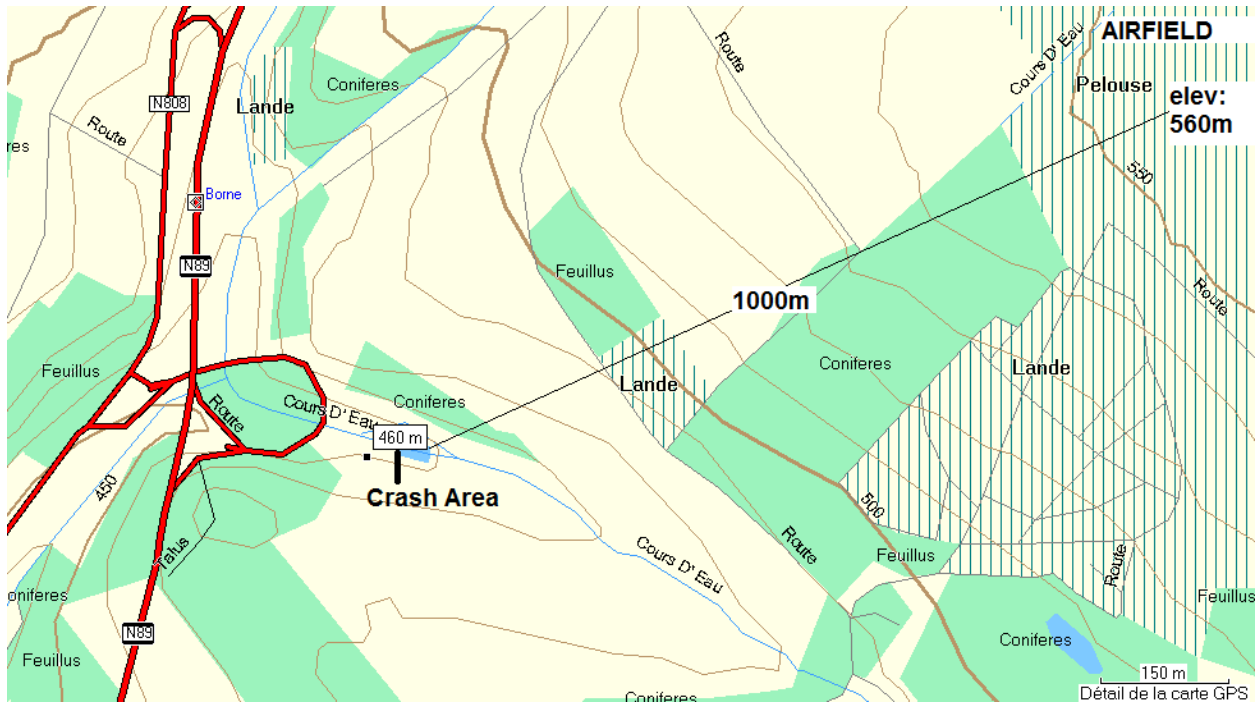


Fig. 7 Topographical map of the surroundings



Fig.8 Crash site location

1.13. Medical and pathological information.

The accident occurred prior to the EU Regulation 996/2010; therefore the investigation team had no access to the medical information of the student pilot.

1.14. Fire.

There was no fire.

1.15. Survival aspects

The student pilot wore a parachute and was strapped in the cockpit.

1.16. Test and Research

Not Applicable

1.17. Regulation

The requirements for holding a glider pilot licence are defined in the international standards and recommended practices of ICAO, the Belgian law and the procedures applied by the Royal Belgian Aeroclub and the Gliders Federations.

Before holding a glider pilot licence, the trainee must comply with the minimum requirements laid down for the issue of a training licence.

1. ICAO Annex. 1.

Chapter 2.9. defines the requirements for the issue of a Glider Pilot License.

Among others:

2.9.1.1. Age

The applicant shall be not less than 16 years of age.

2.9.1.2. Knowledge

The applicant shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of a glider pilot licence, in at least the following subjects:

- *Air law*
- *Aircraft general knowledge*
- *Flight performance, planning and loading*
- *Human performance*
- *Meteorology*
- *Navigation*
- *Operational procedures*
- *Principles of flight*

2.9.1.3. Experience

- 2.9.1.3.1. The applicant shall have completed not less than six hours of flight time as a pilot of gliders including two hours of solo flight time during which not less than 20 launches and landings have been performed.
- 2.9.1.3.2. The applicant shall have gained, under appropriate supervision, operational experience in gliders in at least the following areas:
- a) Pre-flight operations, including glider assembly and inspection;
 - b) Techniques and procedures for the launching method used, including appropriate airspeed limitations, emergency procedures and signals used;
 - c) Traffic pattern operations, collision avoidance precautions and procedures;
 - d) Control of the glider by external visual reference;
 - e) Flight throughout the flight envelope;
 - f) Recognition of, and recovery from, incipient and full stalls and spiral dives;
 - g) Normal and crosswind launches, approaches and landings;
 - h) Cross-country flying using visual reference and dead reckoning;
 - i) Emergency procedures.

2.9.1.4. Skills

The applicant shall have demonstrated the ability to perform as pilot-in-command of a glider, the procedures and manoeuvres described in 2.9.1.3.2. with a degree of competency appropriate to the privileges granted to the holder of a glider pilot licence, and to:

- a) Recognize and manage threats and errors;
- b) Operate the glider within its limitations;
- c) Complete all manoeuvres with smoothness and accuracy;
- d) Exercise good judgment and airmanship;
- e) Apply aeronautical knowledge, and
- f) Maintain control of the glider at all times in a manner such that the successful outcome of a procedure or manoeuvre is assured.

2.9.1.5 Medical fitness

The applicant shall hold a current Class 2 Medical Assessment.

2. **Belgian Law**

The Royal Decree of 15 March 1954 is issued in order to incorporate the standards and recommended practices of the ICAO Annexes into the Belgian Law.

However, article 57 states:

Para 1. The requirements laid down in art 2 to 42 (covering among others the standards of Annex 1 of ICAO) are not applicable to the gliders used only in air navigation above the territory of the Kingdom.

3. **Royal Belgian Aeroclub.**

The Royal Belgian Aeroclub was founded In 1901 as a society aiming to encourage aerial locomotion in all its forms and applications, sporting, scientific or military.

The Aeroclub issued the first licenses of airmen in Belgium, a privilege that was taken over by the Belgian Civil Aviation Authority, at the exception of the glider pilot qualifications.

The Royal Belgian Aeroclub is issuing the following licenses:

- Glider Pilot Training License,
- Glider Pilot License,
- Gliding Instructor Aid Rating,
- Gliding Instructor Rating,
- Gliding Examiner Rating.

The requirements for the issue of the licenses are in compliance with the ICAO Annex 1, and are expressed in a dedicated document; reference REG/VV, issue 7 dated 2006-04-10 for the French version, and REG/ZW, issue 7 dated 2006-04-10 for the Dutch version.

The Royal Belgian Aeroclub has approved an organization manual for the administration of Glider qualification licenses, under the reference MDO/VV for the French version and OHB/ZW for the Dutch version.

The Glider pilot licences are issued by the Glider Federations, members of the Royal Belgian Aeroclub.

4. **Gliding Federation**

The Belgian Gliding Federation is a member of the Belgian Royal Aeroclub, and groups the gliding organizations in the country,

- the Association of Flemish Gliding Clubs (Liga van Vlaamse Zweefvliegclubs)
- the Walloon soaring association (Fédération des Clubs Francophones de Vol à Voile)
- the Belgian Air Cadets, the gliding association of the Belgian Defense

The Belgian Gliding Federation is a member of international gliding organizations such as the FAI, and its International Gliding Commission, the European Gliding Union, etc.

5. **Glider Pilot training licence**

According to the standard issued by the Royal Belgian Aeroclub, the holder of a training licence is entitled to:

1. Perform training flight with an instructor on board,
2. Perform solo local (*) flights, under the supervision of an instructor, provided he reached the age of 16 years, or will reach this age before the 31st December of the current year.

(*) A local flight is one that allows the glider to safely return to the airfield, whatever the conditions. The glider must remain at a minimum height that is computed from the distance between the glider and the airfield and a glide ratio of 10. A glider located at 10km from the airfield must fly 1000 m above the elevation of the airfield (zero wind).

2. Analysis.

The student pilot.

The student pilot was described by the instructors as a particularly gifted individual, eager to learn, and a quick study. During the 15-days training period of 2009 (between 30 July and 15 August), she flew solo after 17 flights (3 initiation flights in April not counted), and she achieved two long solo flights (2 hours 20 minutes on the 5th August and 5 hours 15 minutes on the 6th).

She never performed nor was she trained to perform an “outlanding”.

The student pilot’s actual state of mind during the flight will remain a mystery, but we can state that she liked flying. Also, she took her MP3 player along, although there are no indication she actually used it in flight.

From the contacts with her instructors, and other people who knew her, we can assume she was fairly confident about her abilities as pilot, and maybe over-confident, as she did not complete all the training programme.

Training flight safety

The safety of training flights is ensured by the following factors;

- a) The basic competence of the trainee, as assessed by the instructor, who decides whether the trainee is able to handle the sailplane, and perform a safe landing.
- b) The flight occurs within a “safety cone”, as defined by the instructor.

In theory, the minimum altitude to be kept by the pilot is determined by the distance to the airfield, assuming a fixed lift-to-drag ratio (10-15 for initial training), and a fixed altitude for the circuit, also taking the wind. (As an example, - Assuming a lift-to-drag ratio of 10 and a circuit altitude of 200m - , a sailplane flying at 25 km from the airfield must keep a minimum altitude of $2500m + 200m = 2700m$). When reaching the minimum altitude, the pilot must return to the airfield, or climbing to higher altitude when flying towards the airfield.

As it might be difficult for a pilot to determine with a certain degree of accuracy how far the sailplane is from the airfield, the instructors identified a geographical zone, identified by recognizable landmarks (city of Saint-Hubert, Fourneau St Michel, Converserie, etc..), and a minimum altitude to maintain at these locations.

- c) The surveillance of the instructor, keeping an eye on the sailplane and who can advise the pilot on the radio, or take appropriate action when needed. The amount of attention dedicated by the instructor on a trainee usually depends on his confidence of the abilities of the training pilot.

The flight.

The student pilot took-off for a local flight. The thermal activity was adequate, and the sailplane came back after one hour. Owing to the wind direction, the flight occurred in a zone located South West of the airfield.

The sailplane was seen by witnesses flying at a “too low” altitude before stalling, so we can state that, at a given point, the sailplane went under the minimum altitude of the safety cone. This could have been caused either by a late decision to turn back, or encountering a meteorological condition, such as a “downdraft”, sucking the sailplane down, or a faulty indication of the altimeter. The review of the altimeter could not determine whether its condition (indication of 350m after the crash, at an elevation of 100m below the airfield elevation – QFE setting) was due to a malfunction prior to the crash, or the result of the violent shock at impact.

The pilot had a portable radio on board (and its working was checked upon departure), but no communication reached Saint-Hubert radio (119.70; 123.50). The instructor did not see the loss of altitude happening, nor did he spot the sailplane returning.

When reaching the outskirts of the airfield, the terrain elevation is moving up (the elevation at the crash area is 460m, while the airfield elevation is 560m), this would require the sailplane to climb, reducing its speed.

The options offered to the pilot would have been to either:

- Trying to reach the airfield,
- Perform an outlanding, or
- Gaining altitude

The fields overflown by the sailplane, and in particular the zone surrounding the crash area could have been adequate for an outlanding, but the pilot was never trained for that event, (and it was not without risk). The pilot probably never envisaged the possibility, focusing on returning to the airfield.

A witness saw the sailplane, rather low, in a tight turn, towards the airfield. To his view, the sailplane was already too low in order to land on the field. We can only speculate on what could have been the reason behind the tight turn; was it to turn the sailplane towards the entry point of the airfield, or was it because the pilot felt a possible thermal activity?

The tight turn of the sailplane was witnessed by several persons, it implies a high load factor, an increase of the angle of attack, and a decrease of the airspeed.

The sailplane stalled once and was successfully recovered, but the same witness saw the nose of the sailplane raising, and the sailplane stalling again, and go for an incipient spin.

The sailplane crashed almost vertically, wings horizontal; the trees hit by the falling sailplane do not show a lateral displacement.

3. Causes

Findings:

- The sailplane was airworthy
- The student pilot was qualified to perform local flights under supervision of an instructor
- The student pilot was not trained to perform an outlanding.
- The student pilot had a portable radio on board.

Cause

The accident was caused by a loss of control during the attempt of the student pilot to reach the airfield. The actual cause of the loss of height could not be determined.

4. Recommendation

Recommendation 2012-3 to EASA

AAIU(Be) recommends EASA to support the development of a warning system based on the "safety cone" theory and using GPS and altimeter data to be used on training sailplanes, to warn student glider pilots when the sailplane drops below a minimum safety altitude.



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