CIAIAC
Comisión de Investigación
de Accidentes e Incidentes
de Aviación Civil

TECHNICAL REPORT
A-054/2002

Accident to aircraft
GROB G-103 «Twin Astir»,
registration D-8736,
at Aerodrome of Santa
Cilia de Jaca (Huesca),
on 18 August 2002

MINISTERIO
DE FOMENTO

Technical report

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SECRETARÍA GENERAL DE TRANSPORTES

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COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63
Fax: +34 91 463 55 35

E-mail: ciaiac@fomento.es
http://www.ciaiac.es

C/ Fruela, 6
28011 Madrid (España)

Foreword

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission (CIAIAC) regarding the circumstances of the accident and its causes and consequences.

In accordance with the provisions of Law 21/2003 and Annex 13 to the Convention on International Civil Aviation, the investigation has exclusively a technical nature, without having been targeted at the declaration or assignment of blame or liability. The investigation has been carried out without having necessarily used legal evidence procedures and with no other basic aim than preventing future accidents.

Consequently, any use of this report for purposes other than that of preventing future accidents may lead to erroneous conclusions or interpretations.

This report has originally been issued in Spanish language. This English translation is provided for information purposes only.

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Abbreviations

00°	Degree(s)
00° 00′ 00″	Degrees, minutes and seconds
cm	Centimeter(s)
dd-mm-aaaa	Date in day, month and year
h	Hour(s)
hh:mm:ss	Hour(s), minute(s) and seconds
HJ	Daylight time
kg	Kilogram(s)
km	Kilometre(s)
kt	Knot(s)
m	Metre(s)
m^2	Square meter
MHz	Megahertz
N	North
S	South
UTC	Coordinated universal time
VFR	Visual flight rules
VHF	Very high frequency
W	West

Synopsis

Owner and operator:	Club Navarra de Vuelo a Vela («Navarre Gliding Club»)
Aircraft:	Grob G-103 «Twin Astir»
Date and time of the accident:	18-08-2002; 17:45 h [1]
Place of the accident:	Aerodrome of Santa Cilia de Jaca, province of Huesca
Persons on board:	Two
Type of flight:	Sailplane training
Date of approval:	25 April 2006

Summary of the accident

Left wing stall produced during a turn from base to final leg in the landing pattern. The turn was very tight because the pilot was trying to avoid overshooting the runway threshold, which was unsuccessful, and with a cross wind. The stall caused the corresponding wing drop, which could not be recovered due to the low flying height.

[1] Since the flight was local and within the same time zone, all time references have been given in local time. UTC time is two hours less than local time.

1. FACTUAL INFORMATION

1.1. History of the flight

In the afternoon of 18th August 2002, the date of the accident, the Grob model G-103 «Twin Astir» sailplane, registration D-8736, was towed and released by aircraft registration F-GMKZ from the Aerodrome of Santa Cilia de Jaca in the province of Huesca, with a crew of two on board, in order to carry out a local training flight under VFR rules. Both crew members were pilots.

The flight commenced at 15:20 h and progressed normally, without any reported incidents.

At about 17:20 h, the aerodrome informed by radio to all the aircraft in flight at that moment that they should indicate their position and return to base due to worsening weather conditions, with a change to southerly winds and the risk of possible storms.

The aircraft gave its position at sierra de Leyre above the Yesa reservoir, approximately 30 km to the west of the aerodrome, and confirmed its return to the aerodrome.

Aerodrome staff indicated that when they saw the aircraft approaching, it was informed by radio of the existence of gusts of wind from the south, with a force of 15 to 25 kt, and possible atmospheric instability.

According to witnesses of the accident, the downwind approach leg, occurred at about 17:45 h and, when the aircraft was on the base leg of runway 27, with a speed estimated as sufficient, turning to the left with a nose down attitude, they saw that the aircraft did not correct its attitude and crashed into the ground.

The impact occurred (see Figure 1) to the right of the runway threshold, after it had been overshot in the direction of the flight. The figure includes a drawing of the aerodrome of Santa Cilia de Jaca, the estimated path of the last stage of the flight, reconstructed on the basis of the statements of witnesses and the injured crew member, and the aerodrome traffic circuit, with identification of the down wind, base and final legs.

The aircraft was destroyed, with the most important visible damage being to the nose and front cockpit, left outer wing and the rear part of the fuselage, which was broken at its centre.

When the rescue services arrived, rapidly mobilized because the accident occurred within the aerodrome's boundaries, they found that the pilot in the front cockpit had died and the pilot in the rear cockpit was seriously injured.

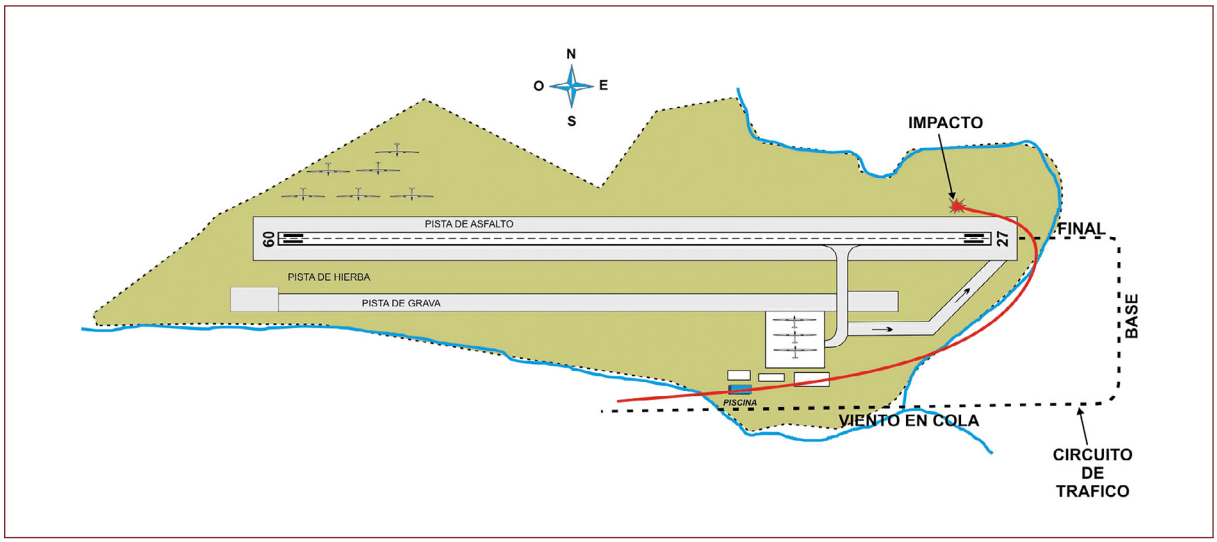

Figure 1. Map of aerodrome, estimated aircraft path and traffic circuit. «Pista de asfalto»: Asphalt runway. «Pista de hierba»: Grass runway. «Pista de grava»: Gravel runway.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	1			
Serious	1			
Minor				Not applicable
None				Not applicable
TOTAL	2			

1.3. Damage to aircraft

The aircraft was destroyed and unrecoverable for flying.

1.4. Other damage

None.

1.5. Personnel information

1.5.1. *Pilot in command (front cockpit)*

According to the surviving pilot's statement, before the flight the two pilots in the aircraft had agreed that the pilot in command would be the pilot in the front cockpit.

Age:	32 years
Nationality:	Spanish
License:	Glider pilot, number 9721
Ratings:	VFR-HJ (VFR daytime visual)
Renewal date:	14-06-2002
Expiry date:	06-07-2003
Flying experience:	The pilot's log book showed that he had logged 18 flights in the twelve months prior to the event. The last one, without a date recorded, was conducted after 13-07-2002. Twelve of these 18 flights were with the aircraft involved in the accident. Total flight time in these logs was 21:23 h, corresponding to the last year. Total flight time in aircraft type GROB G-103 was 16:35 h.

1.5.2. *Second pilot (rear cockpit)*

Age:	56 years
Nationality:	Spanish
License:	Glider pilot
Ratings:	VFR-HJ (VFR daytime visual)
Renewal date:	03-07-2002
Expiry date:	03-07-2004
Total flying hours:	150:29 h

This pilot's log book logged 17 flights in the year prior to the accident, with the last flight being on 09-07-2002. Total flight time in these logs was 11:18 h, corresponding to the last year. Total flight time in aircraft type GROB G-103 was 9:30 h.

1.6. Aircraft information

The model G-103 «Twin Astir» is a high-performance two-seat tandem (one in front, one behind) glider, of fiberglass construction, used for training, aerobatics and high performance flights. The model is equipped with T-tail and upper surface airbrakes, located one on each wing.

Its main features are:

— Wingspan: 17.5 m.
— Length: 8.1 m.
— Height: 1.6 m.
— Aspect ratio: 17.1.
— Wing area: 17.8 m^2.
— Gross weight: 650 kg.
— Maximum wing loading: 36.5 kg/m^2.
— Maximum speed: 250 kph (NE: never exceeded).
— Approach speed: 55 kph (recommended minimum).

1.6.1. *Airframe*

Make:	Grob
Model:	G-103 «Twin Astir»
Serial number:	3275
Registration:	D-8736
MTOW:	650 kg
Owner:	Club Navarra de Vuelo a Vela
Operator:	Club Navarra de Vuelo a Vela

The aircraft kept the registration of its country of origin because, among other reasons indicated by the owner, the German authority establishes for this type of aircraft that maintenance should basically be based in calendar intervals. This authorization allows the owner/operator to optimize the aircraft's use on being able to schedule the inspections during the low activity season.

1.6.2. *Airworthiness certificate*

Number:	22093/L
Type:	For private operation
Date issued:	05-12-1979
Date of last renewal:	31-10-2001

1.6.3. *Maintenance log*

Total flight hours:	2,359:40 h
Last annnual inspection:	23-03-2002
Hours at last annual inspection:	2,183 h

1.7. Meteorological information

Although precise data on the weather conditions in the area are not available, the information gathered and the statements of witnesses, mainly aerodrome staff and other pilots operating in it, indicate that they were adequate for VFR flights and for soaring flights, with good visibility although with the risk of the possible development of local storms. This is typical during the summer in the region, particularly when temperatures are high.

The risk became more obvious during the afternoon. In addition, the wind rolled to a southerly direction and its strength increased from 15 to 25 kt. In view of these changes, all in-flight aircraft were warned by radio to return.

The specific weather conditions at the aerodrome were communicated to the accident glider before it commenced its approach, confirming the persistence of the wind and indicating the existence of possible atmospheric instability.

The risk of storm, announced previously, was substantiated later on, half an hour after the accident had occurred, because there was actually a storm, although less heavy than originally estimated. The aircraft involved in the accident was the last one to return to base.

The wind gradient (variation in wind speed with the height in the proximity from the ground) over the aerodrome platform had increased with the change of direction due to the orography of the surroundings and the wind intensity.

1.8. Aids to navigation

They do not affect the accident.

1.9. Communications

The aircraft was equipped with a VHF transceiver with which it was in contact during the flight in the aerodrome's frequency, 123.5 Mhz. It did not have a radio communications recorder.

There is evidence that through this equipment the aircraft received the communication which was sent at 17:20 h to all the gliders flying in the area on the worsening weather conditions, with a risk of storms, and the request to notify their position and to return to the aerodrome. The aircraft responded to this communication indicating that it was in the area of sierra de Leyre, over the Yesa reservoir, some 30 km to the west of the aerodrome and that it was returning to it.

Similarly, aerodrome staff have confirmed that when the aircraft was seen in its approach to the airfield there was a further radio contact in which it was informed of the existence of 15 to 25 kt gusts of wind from the south and possible instability over the field.

There is no evidence of any other communications with the aircraft although, given the lack of comments on the contrary, it can be assumed that normal usage of radio transmissions was made at earlier stages of the flight, i.e. rolling, towing, take-off and rope release.

1.10. Aerodrome information

The aerodrome where the accident occurred is located very close to the village of Santa Cilia de Jaca, 12 km to the west of Jaca in the province of Huesca. Its geographical position is 42° 34' 02" N/0° 43' 07" W with an altitude of 650 m.

The aerodrome is listed in the non-state field category and has three runways: one is asphalt paved and measures 850 × 30 m, another is made of gravel measuring 650 × 26 m and a third of grass, all parallel to each other and with same orientation 09/27. The runways' distribution and a view of the aerodrome layout is shown in Figure 1.

Although the aerodrome is of the uncontrolled type, all the aircraft flying in its vicinity must be equipped with an operative radio system capable of establishing two-way communications in the field frequency (123.5 Mhz) and must adhere to position reporting procedures. No services of control or manoeuvre authorization are provided, and separation of aircraft, only in VFR flights, is the responsibility of the pilot. Nevertheless, for safety reasons, all pilots must notify their landing intentions, indicating the runway they are going to use.

The aerodrome has been dedicated to private use and for recreational flying activities, particularly sport flying, gliding and parachuting, and it is extensively used by aircraft from Spain and other European countries.

Gliding activities are carried out in the aerodrome during the months of March to October only on those days with suitable weather conditions, with the activities commencing as a general rule at 13:00 h.

It is not permitted to fly over the Ordesa National Park, Monte Perdido or the «sensitive fauna» area of San Juan de la Peña.

1.11. Flight recorders

The aircraft was not equipped with flight data or sound recorders. The installation of this equipment is not mandatory in aircraft of this type.

1.12. Wreckage and impact information

The position and distribution of the wreckage, as it was found are shown in the photograph of Figure 2, which was taken looking forward in the direction of flight, from the position of the first impact. The dragging marks left by the aircraft can be identified.

The first marks can be seen in the foreground of the figure (small fragments and remains of paint), resulting from the aircraft scraping against the top of the side slope, approximately 1.5 m high, located to the right of the threshold of runway 27 and parallel to it. In the photograph this paved runway would be located behind the camera with which it was taken and would run practically from right to left, in the same direction as the lines which cross the figure.

Some fairings and other minor wreckage at the next raised edge, some 30 cm high, can be seen in the middle of the figure.

The main aircraft wreckage, which was some 12 m from the mentioned raised edge, can be identified in the background.

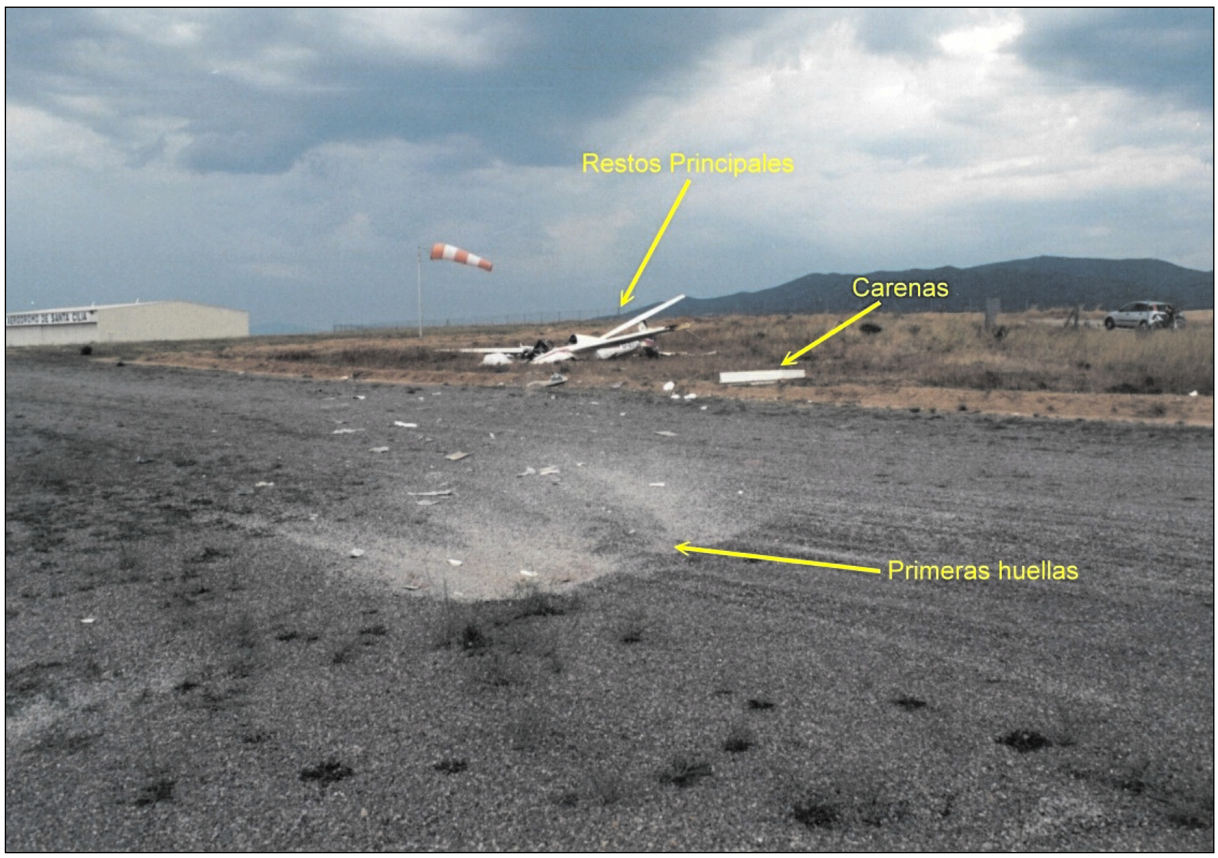

Figure 2. Position and distribution of the wreckage. «Primeras huellas»: First marks. «Carenas»: Fairings. «Restos principales»: Main wreckage.

Figure 3 is a photograph showing the wreckage seen from the rear part of the fuselage and in a direction approximately perpendicular to the trajectory. As can be seen in the figure, in the accident the aircraft dragged laterally towards the outside of the turn it was making. It came to a stop pointing to the aerodrome's buildings and hangars, that is, with a heading perpendicular to its final course.

In this figure, the final position of the left outer wing and the fuselage breakage can be identified. The mentioned outer wing broke and shifted in a counter-clockwise direction, whereas the fuselage breakage appeared as though it occurred in the opposite sense, i.e. in a clockwise direction. Figure 4 shows details of this breakage.

The most damaged part of the aircraft in the accident was the front fuselage (see Figure 5), particularly the front cockpit, occupied by the deceased pilot. The impact angle was estimated at more than 20°.

A visual inspection of the wreckage and its distribution showed that the first part of the aircraft to scrape the ground was the left wingtip (remains of paint, minor wreckage and fragments shown in Figure 2), which was destroyed. The glider rate of descent caused it to crash resulting in the breakage of the left outer wing and, almost simultaneously, the impact of the nose with the ground, with a slight inclination towards the left.

Figure 3. Main wreckage

Figure 4. Detail of fuselage breakage

Figure 5. Front fuselage and cockpit wreckage

1.13. Medical and pathological information

According to the autopsy report, the pilot in command's death was caused by multiple injuries associated with numerous fractures, compatible with an air accident. The injuries included front thorax trauma with cardiac injury and fracture of the cranial base.

The second pilot, who was in the rear cockpit, was seriously injured, with the breakage of his two legs, several ribs and a finger on his right hand and various injuries to the face.

1.14. Fire

There was no fire.

1.15. Survival aspects

The accident's characteristics, impact with the ground at high speed, mean that the possibilities of survival depend to a very large extent on the occupant's position at the moment of the accident, the protection being worn, the aircraft's attitude and the characteristics of the terrain into which it crashes, in addition to the possibility of being knocked by a protruding or broken part of the aircraft during the crash.

In this case, the front cockpit was completely destroyed whereas the rear cockpit was only severely deformed, with their occupants suffering the injuries already indicated.

1.16. Tests and research

1.16.1. *Second pilot's statement*

The second pilot was occupying the rear cockpit and was injured in the accident. His statements on the accident, made three days later in the hospital to which he was transferred, are outlined below:

— Prior to the flight both pilots agreed that the first pilot and pilot in command of the aircraft would be the front cockpit's occupant, that takeoff would be carried out by the pilot who made the statement and that the pilot in command would carry out the landing. During the flight they would take turns as agreed.
— When they received the warning of worsening weather conditions at the aerodrome they were above sierra de Leyre, exactly at the cross-roads of the A-137 in the Roncal-Sigües section, and decided to return immediately. They made the return above the centre of the valley, practically without losing height or needing to thermal spiralling and without envisaging problems of altitude for entering the runway. Field

entry and the downwind leg were made converging with the runway and this leg was started approximately at an altitude of 300 m and with a speed of 120 km/h.
— He indicated that when they were at the beginning of the last part of the downwind leg, approximately at the vertical of the aerodrome's pool, some 300 m from threshold 27, a gust of wind entered from the right making the sailplane turn to the left with an almost 90° roll and forcing the aircraft towards the runway. He considers that at that moment there could have been a temporary loss of control.
— Then the pilot recovered part of the roll but he believes that, being already inbound and as they were at the transition from base leg to final leg, he continued turning to the left so as to complete the traffic pattern and heading the aircraft in the direction of the runway. However, the pattern was not completed and the ground was approaching fast, shifting from right to left. He recalls the impact as a gentle, not very hard impact, perhaps because he was wearing the safety harness fastened and well tightened, as was his custom when commencing the downwind manoeuvre. He was not wearing a helmet on his head, just a cap.
— He confirmed that at no time did he take or try to take control of the aircraft and that he trusted his colleague.
— During the operation, the pilot in command extended the air brakes, he believes that this occurred after losing control and after the start of the initial turn and the second pilot warned him and helped to retract the air brakes after a few moments of being extended.
— During the turn the aircraft had an attitude of 15 to 20° nose down but without gaining speed.

1.16.2. *Statements of witnesses*

The statements of three witnesses who observed the glider approach operation are available, one of whom is a person linked to the aerodrome and considered to be qualified.

According to this witness:

— The sailplane was on base leg, turning to the left, and tried to complete the turn tightening it towards final.
— Its speed was sufficient to reach the runway without difficulty.
— It continued to turn without changing its attitude, with nose down 15 to 20° and, when it seemed that it was in the direction and lined up with the runway and he expected the nose down attitude to be corrected, it continued with the same attitude into the ground.
— It did not seem as though the gliding angle was larger than usual customary, coherent with an air brake descent.
— There was a S-SW wind of approximately 15 to 25 kt, with gusts of 5 to 10 kt. This circumstance was notified to the sailplane by radio.

The statements of the other two witnesses, also linked to the aerodrome or to operations carried out in it, coincide as regards the time of the accident and that the sailplane turned or was turning to the left to enter base leg, that it was a bit low but with sufficient speed and that, inexplicably, it finished the turn against the ground without trying to lift the nose.

1.17. Organizational and management information

Not applicable.

1.18. Additional information

Not considered necessary.

1.19. Useful or effective investigation techniques

Not considered necessary.

2. ANALYSIS

2.1. Progress of the flight

On 18 August 2002, at 15:20 h, the glider Grob model G-103 «Twin Astir», registration D-8736, was towed to carry out a gliding flight from the Aerodrome of Santa Cilia de Jaca in Huesca, where it had its base, with a crew of two pilots. According to an agreement reached between them before the flight, the aircraft's pilot in command would be the one seated in the front cockpit and would carry out the landing whilst the second pilot, in the rear cockpit, would carry out the takeoff and that during the flight they would take turns to control the aircraft, as they agreed.

The weather conditions in the area were normal for the summer season, adequate for soaring flying under VFR, with good visibility, but with high temperatures and, consequently, with the risk of a storm developing. At that moment, there were several aircraft gliding within the vicinity of the aerodrome.

The flight progressed normally and, at 17:20 h, it was informed by radio, over the aerodrome's frequency, 123.5 MHz, of the worsening of the weather conditions due to changes in the wind's strength and direction and prediction of storm development. All aircraft were required by the aerodrome to report their position and to return to base.

Sailplane D-8736 received the communication and responded that it was above sierra de Leyre, 30 km to the west of the aerodrome, and that it was returning to base.

The return was uneventful, virtually without loss of height and without needing to look for thermals, being the last of the gliders to arrive at the aerodrome. At the start of the approach it received confirmation from the aerodrome, via radio, of the existence of 15 to 25 kt gusts of wind from the south. The aerodrome circuit was commenced at a height of some 300 m and a speed of 120 km/h on a path which converged with the aerodrome's runway 27. The last part of the downwind leg practically passed over the aerodrome's pool.

Whilst carrying out the procedure turn to the left for base/final leg, a little low according to the statement of experienced witnesses but with sufficient airspeed to reach the field, from the point of view of these witnesses the aircraft appeared to continue the turn with a 15 to 20° nose down attitude, until it crashed into the ground. The impact occurred at approximately 17:45 h to the right of the runway 27 threshold.

As a result of the impact the aircraft was destroyed and when the rescue teams arrived, which they did immediately because the accident occurred within the aerodrome, they found that the front cockpit crew member was dead and the rear cockpit crew member was seriously injured.

2.2. Analysis and cause of the accident

As noted during the inspection of the wreckage and from the statements of all the witnesses and the surviving pilot, the accident occurred during the turn to the left between the base and final legs of the landing manoeuvre.

In principle, it is reasonable to eliminate the possibility of a failure of the aircraft, which had functioned correctly throughout the flight. The second pilot stated that the pilot in control during landing extended the air brakes for a short period of time during the manoeuvre that led up to the accident and that himself helped to retract the air brakes, without any abnormalities in their function.

After discarding an aircraft failure, the only remaining possibilities are either that the pilot who was carrying out the maneuver suffered a sudden incapacitation which prevented him from correcting the aircraft and warning the other pilot, also a very unlikely situation, or that during the mentioned turn, some of the following factors and situations may have coincided:

— The accident occurred on the right-hand side of the head of runway 27 meaning that, according to the manoeuvre and the turns it was making, this was the runway on which the aircraft intended to land. However, during the operation the crew members were unable to avoid the aircraft oveshooting the runway.
— According to the statements of witnesses and the injured pilot, the accident occurred in the leftward turn between the base and final legs of the landing operation. This turn must have been so tight, possibly to avoid overshooting the runway that, according to the injured pilot's statement, during the operation he saw the land coming close and shifting from right to left. This means that in the turn the centrifugal force was so great that it opened the path very noticeably.
— The visual inspection and analysis of the wreckage show that, apart from some scratches and minor bumps, the first point of impact with the ground was the outer left wing, which broke. This impact destabilized the aircraft which, in its fall, slid towards the outside of the turn. In this displacement, the fuselage was perpendicular to the runway. In addition, the aircraft must have had such a descent rate that resulted, on the one hand, in the impact of the nose against the ground, completely destroying the front cockpit and partially damaging the rear cockpit and, on the other, in the breakage of the rear part of the fuselage. In the aircraft's outward shift, the rear fuselage/tail assembly appeared to have made a clockwise turn.
— At the moment of its approach, as notified by radio to the aircraft, there was a certain amount of atmospheric instability in the aerodrome but above all a southerly wind of 15 to 25 kt with gusts of up to 10 kt. A wind of these characteristics, particularly a 90° crosswind on runway 27, which the sailplane was intending to use, limits the movements of aircraft with a large aspect ratio, such as the one involved in the accident.

— Moreover, the aforementioned aircraft movement limitation occurred in a flight manned by a crew with limited and above all sporadic experience. As indicated, the pilot in the front cockpit, who according to an agreement between both pilots was the pilot in command of the aircraft, had made 18 flights during the year preceding the accident, with a total of a little over 21:23 h. The second pilot had flown a total of 11:18 h in the same period. This undoubtedly had an influence on the crew's skill and expertise.
— Lastly, although the pilots had flown together on a few occasions, co-ordination between them was based only on a verbal agreement which did not contemplate such critical situations as those which occurred during the flight, immediately prior to the accident. Although it is not felt that this was a determining factor, it must undoubtedly have had an influence at some moment (e.g. opening and closing of air brakes).

The factors and situations described above allow a reconstruction of the events which led up to the accident.

Alerted by the aerodrome warning of the risk of a possible storm, the aircraft was returning from its flight commencing the downwind leg on a path which converged with runway 27, which it had decided to use, and in which it practically passed over the vertical of the aerodrome's pool in the last part of this leg (see estimated path in Figure 1).

It is possible that the strong 15 to 25 kt gusty wind from the south made this convergence even greater and when the pilot turned to base he found himself closer to the runway threshold than he expected. Then he momentarily activated the air brakes and then he proceeded direct with the turn to final. Lastly, on realizing that he was still going to overrun the runway threshold, possibly because of the wind or gusts of wind, he probably tightened the turn as much as he could.

This combination of factors, mainly the almost pure tailwind in the base leg and a very tight turn and, secondly, aircraft limitations in crosswind and the effect of the wind gradient, caused the lower wing, i.e. the left wing, to stall with the result that this wing dropped and, owing to the low flying height at which this occurred, the aircraft could not be recovered.

3. CONCLUSIONS

3.1. Findings

— The aircraft had two pilots on board, each one of whom was in possession of the corresponding valid license for the type of flight (gliding) being carried out.
— According to an agreement between them, the aircraft's pilot in command was the pilot seated in the front cockpit, who was the pilot flying at the landing. This pilot's total number of flying hours is unknown but in the year prior to the accident he had carried out 18 flights with a total of 21:23 h.
— According to the same agreement, the second pilot was the one in the rear cockpit and he was the pilot flying during the takeoff. This pilot had a total of 150:29 h, of which 11:8 h were in the year prior to the accident.
— The aircraft had been issued an Airworthiness Certificate, it was being operated within the authorized limits and had satisfactorily passed the annual inspection within the validity period. As indicated, the aircraft maintained the registration number of its country of origin so as to be able to carry out calendar-based maintenance and thus to optimize its use.
— The flight was being conducted within the zone allocated for gliding flights within the vicinity of the Aerodrome of Santa Cilia de Jaca in Huesca, the aircraft's base, under VFR rules.
— Initially the weather conditions in the zone indicated were adequate for the type of flight defined above, with good visibility. The temperature was high, involving a risk of possible formation of storms.
— Precisely because of a radio warning in the aerodrome's frequency of the risk of storms, the aircraft brought forward its return, with the accident occurring during the leftward turn from base to leg to final leg in the approach-landing pattern.
— The aircraft was destroyed, the pilot in command occupying the front cockpit died and the second pilot, in the rear cockpit, was seriously injured.

3.2. Causes

The cause of the accident is considered to be the stalling of the left wing as a result of a very tight leftward turn from base leg to final leg to avoid overshooting the runway. The aircraft could not be recovered from the stall due to the low flying height.

4. SAFETY RECOMMENDATIONS

None.