



Accident to the KUBICEK Balloons BB45Z registered F-HAOK on 31 August 2021 at Saint-Germain-Laval (Loire)

⁽¹⁾ Except where otherwise indicated, times in this report are local.

Time	Around 09:30 ⁽¹⁾
Operator	Wing Over ULM
Type of flight	Sightseeing, commercial
Persons on board	Pilot and six passengers
Consequences and damage	One passenger injured
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.	

Hard landing, bounce, basket upset, injury to a passenger, during a sightseeing flight

1 - HISTORY OF THE FLIGHT

Note: the following information is principally based on statements.

The pilot, accompanied by six passengers, took off at around 08:00 from Roanne airport (Loire) for a sightseeing flight over the Loire river.

After approximately one hour of flight, when flying over the gorges of the Loire, the pilot considered that the wind was too strong to make a landing and decided to continue the flight and head towards a flat area where he thought that the aerological conditions would be calmer.

He chose a large field bordered by a line of trees (between five and ten metres tall) for the landing, which he approached from the north. He informed the passengers of the risk of a hard landing and asked them to adopt the safety position that he had demonstrated at the start of the flight. During the landing, after flying over the trees, the basket hit the ground hard and bounced. The basket fell onto its side on making the second contact with the ground and was dragged for about 30 m before coming to a halt approximately 80 m after the line of trees. One passenger fractured her leg.



Source: GTA

Figure 1: photo of the accident site

2 - ADDITIONAL INFORMATION

2.1 Operator information

The company, Wing Over ULM offered commercial sightseeing flights in microlights since 2008. It set up base at Roanne aerodrome in 2014, and started to offer balloon flights after the purchase of F-HAOK in November 2020. The manager of the company did not hold a balloon pilot licence. Only one pilot was employed on a self-employed basis. Twelve flights had been made since the start of the commercial activity in April 2021.

At the time of the accident, the commercial balloon activity had not been declared to the French civil aviation safety directorate (DSAC), as required by the European regulations⁽²⁾. The company did however have an operations manual. The DSAC considered that this manual did not show that the operations complied with all of the regulatory requirements. In particular, the flight preparation and passenger briefing process, the process for managing risks related to operations, and the qualification and recurrent training requirements for commercial pilots were not described. The DSAC therefore made the decision to suspend the operator's commercial activity pending the implementation of corrective actions.

2.2 Pilot information

The pilot held a Balloon Pilot Licence (BPL) issued in 2008, along with free hot air balloon, tethered flight and commercial flight ratings. He was also an instructor since 2011. At the time of the accident, he had logged 524 ascents. He had made 14 ascents in the three months preceding the accident including those with F-HAOK indicated above. He had the necessary recent experience required to operate a balloon engaged in commercial activity⁽³⁾.

He carried out commercial balloon flights for another company based at Roanne airport before Wing Over ULM took over the activity. He was also a microlight pilot for commercial sightseeing flights organised by Wing Over ULM since 2008.

2.3 Balloon information

The balloon was equipped with an envelope of 4,500 m³ and a basket with space for up to eight occupants.

The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.

⁽²⁾ Commission Regulation (EU) No 2018/395 of 13 March 2018 laying down detailed rules for the operation of balloons as well as for the flight crew licensing for balloons ([Version in force on the day of the accident](#)).

⁽³⁾ See FCL.060 a) of Regulation (UE) No 1178/2011 concerning technical requirements related to civil aviation aircrew ([Version in force on the day of the accident](#)).

2.3.1 Basket configuration

The rectangular basket was divided into two compartments, one with space for the pilot and one passenger, and the other for the remaining six passengers. It was equipped with handles under the upper edge for the passengers to hold on to, as well as with safety belts to keep the passengers on the floor.

During the accident flight, the six passengers and the pilot were positioned as shown in Figure 2 below. The passengers were facing the basket walls. Three of them, including the injured passenger, were therefore positioned facing the direction of landing, and the other three were positioned with their backs to the direction of landing. This configuration was that recommended in the flight manual.

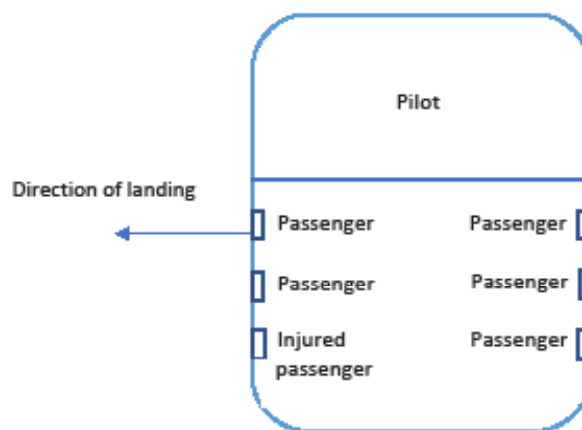


Figure 2: diagram showing the basket configuration during the accident flight

In 2018, the French civil aviation authority (DGAC) published [safety instructions regarding the implementation and the operation of hot air balloons](#). These instructions include a figure that shows the guidelines for landing with a non-partitioned basket. They stipulate turning your back to the direction of landing if there is enough room, otherwise to adopt a sideways position, facing the path. The DGAC intends to contact the French Aerostation Federation (FFAé) to ask for its opinion on the best safety practice and to modify the guide, as necessary.

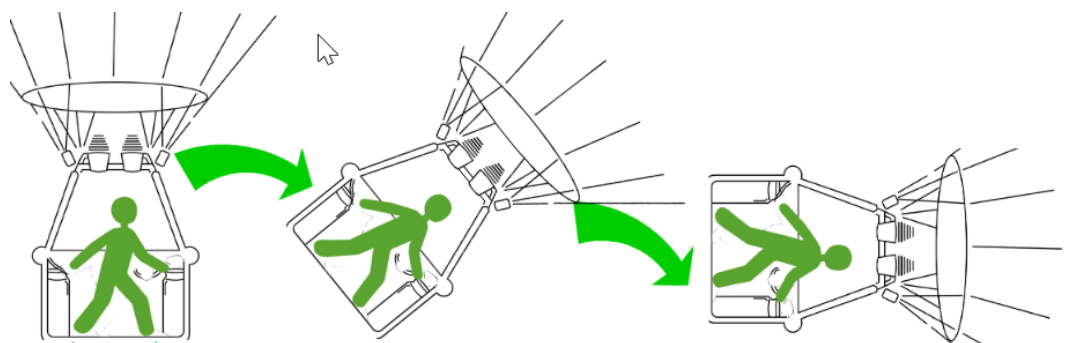


Figure 3: illustration of the position to adopt in a non-partitioned basket, as specified in the safety instructions published by the DGAC

In the case of a partitioned basket, the instructions recommend turning your back to the direction of landing (see Figure 4).

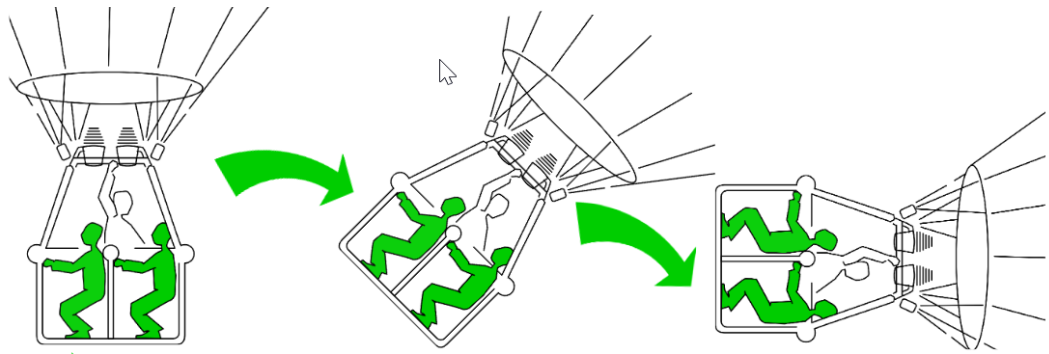


Figure 4: illustration of the position to adopt in a partitioned basket, as specified in the safety instructions published by the DGAC

2.3.2 Operating limits

The balloon flight manual specifies that the maximum wind speed for take-off and landing is 14.6 kt (7.5 m/s). This value is also given in the Wing Over ULM's operations manual as the maximum speed of gusts of wind on the ground permitting free hot air balloon take-off. The operations manual also specifies that when carrying novice passengers, it is recommended to limit the speed to half of these speeds for the average wind speed, i.e. 7 kt for free flight.

2.3.3 Emergency procedures

The flight manual describes a landing as "fast" when the wind speed is greater than 14.5 kt. This value is also specified in the operations manual. The latter recommends that the persons on board remain standing with their knees flexible, with their backs to the direction of travel, hold onto the handles inside the basket and to secure objects. It is preferable to opt for a large landing surface or surface protected behind a hill, to descend gently, and to fully open the smart vent⁽⁴⁾ at 2 m maximum from the ground.

In the event of a risk of a hard landing, corresponding, according to the manuals, to a descent rate greater than 4 m/s, the operations manual recommends holding the handles inside the basket with both hands, keeping knees together and slightly bent, closing the fuel valves on the cylinders, venting the fuel lines, informing the retrieve crew of the imminence of a hard landing, securing objects or throwing them overboard near the ground, and preventing anyone from leaving the basket until it has come to a complete stop.

2.4 Meteorological information

On 31 August 2022 at Saint-Germain-Laval, sunrise was at 07:04.

In the summer months, the FFAé recommends flying in the two hours following sunrise to avoid turbulence caused by thermal convection.

2.4.1 Meteorological information gathered during flight preparation

The pilot stated that he had consulted the weather forecasts during the afternoon the day before the accident flight. The wind forecasts on the "Ventusky" website were as follows:

	08:00	09:00	10:00
	Roanne	Saint-Germain-Laval	Saint-Germain-Laval
Average wind speed	6 km/h – 3 kt	14 km/h – 7.5 kt	16 km/h – 9 kt
Gusts	Undetermined	22 km/h – 12 kt	26 km/h – 14 kt

The forecasts consulted were compatible with the balloon's operating limits but stronger,

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⁽⁴⁾ Fast deflation system.

after 09:00, than the recommendations specified in the operations manual for commercial flights with novice passengers.

2.4.2 Estimated meteorological conditions at time of accident

The weather station at Roanne, which is the nearest station to the accident site located around 20 km away, indicated an average wind speed of 6 kt at 09:00, and a maximum spot wind recorded the hour before of 8 kt, as well as an outside air temperature of 14 °C.

The Ventusky website retrospectively indicated at Saint-Germain-Laval⁽⁵⁾:

- at 07:00, an average wind speed of 5 kt with gusts up to 9 kt;
- at 10:00, an average wind speed of 8 kt with gusts up to 18 kt.

This data shows that it was likely that the gusts occurring at the time of the accident were stronger than the forecasts consulted by the pilot the day before the accident.

2.5 Pilot's statement

The pilot stated that, as was his habit for morning flights, he consulted the weather forecasts during the afternoon the day before the flight. On the morning of the flight, estimating that the conditions were as forecast when checking the windsock at the airport, he decided to make the flight. The ease with which the balloon inflated and the balloon's stability in the air enabled him to confirm take-off. He confirmed the weather forecasts during the flight based on the information provided by his GPS⁽⁶⁾. After approximately one flight hour, due to the strength of the wind, he considered it impossible to make a safe landing due to the venturi effect caused by high terrain located near the commune of Bully. He decided to continue towards la Plaine de Forez where, based on his experience, he thought that the conditions would be more favourable.

He stated that the passengers were present during the preparation of the balloon on the ground, except for the passenger injured during the accident, who waited in a car. The pilot only saw this passenger for the first time at boarding.

Before take-off, the pilot gave a safety briefing in the basket to the passengers, demonstrating the safety position to be adopted for landing (position described in para. [2.3.3](#)). He did not check whether each passenger was physically able to adopt this position. None of the passengers reported any difficulties.

Considering the risk of a hard landing, he stated that he applied the emergency procedures for landing as described in the flight manual (see para. [2.3.2](#)), keeping the passengers informed. He thought that the wind would drop at ground level due to the line of trees at the beginning of the field. The descent rate seemed normal to him until he passed behind the line of trees (approximately five metres tall) at which point he felt the balloon experience a downdraft. He stated that the floor of the basket made flat contact with the ground during the first impact, in theory subjecting all of the passengers to an identical impact force.

2.6 Medical aspects

The 90-year-old passenger suffered a double tibia-fibula fracture caused by the basket's

⁽⁵⁾ These are the only times for which information is available.

⁽⁶⁾ The path was not recorded.

impact with the ground. She had osteoporosis. The pilot and the company had no knowledge of her condition before the accident. When passengers book a flight, the company only asks for their weight in order to distribute them in the basket.

3 - CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Scenario

The pilot decided to make a commercial flight based on the weather forecasts consulted the day before and his observations in the morning. These forecasts indicated strengthening winds throughout the morning, which increased the risk of a fast landing. The conditions estimated at the time of the accident showed that it is likely that the gusts of wind during the flight were stronger than the forecasts consulted the day before. The aerological conditions during the landing may have led to the hard landing and the basket being dragged, causing the injury of an elderly passenger with reduced physical capacities.

Contributing factors

The following factors may have contributed to the hard landing and to the basket upset:

- the late take-off time, which may have contributed to the flight encountering adverse aerological conditions common in the summer months. The forecasts consulted by the pilot effectively showed the wind picking up throughout the course of the morning;
- the pilot not consulting the weather forecasts again on the morning of the accident flight;
- the lack of flight preparation procedures in the operator's operations manual.

The following factors may have contributed to the injury of the passenger during the hard landing:

- the impossibility for some of the passengers to adopt the safety position recommended by the DGAC, back to landing, due to the basket configuration (non-partitioned);
- the age of the passenger, which the pilot had not known before the take-off, and which made her more vulnerable. She had also not told the pilot about her osteoporosis.

Safety lessons

This event serves as a reminder of the vulnerability of passengers during balloon landings, in particular those who are unfamiliar with this activity or who are not in good physical health.

As reiterated by the BEA in the [Safety lessons 2020 for balloons](#), passengers "may not be aware that the landing can sometimes be dynamic. Touchdown can prove rough, in particular when there is a strong wind or during an emergency descent with a high vertical speed. In these conditions, passengers may be surprised and their physical capabilities may be exceeded."

The FFAé has sent its members a self-assessment form to enable passengers to assess their physical capabilities before taking a balloon flight. This form will soon be available on [the FFAé website](#).

J'évalue mes capacités physiques et psychiques pour effectuer un vol en montgolfière	
Je n'ai pas de suivi médical	
1 Suis-je en mesure d'enjamber seul(e) une nacelle d'une hauteur de 1, 20 m disposant d'un marchepied ou de 2 marchepieds espacés de 40 cm ?	oui / non*
2 Suis-je en mesure de rester debout sans aide pendant au moins une 1h30 ?	oui / non*
3 Suis-je en mesure de me maintenir, les genoux pliés pendant une ou deux minutes ?	oui / non*
4 Suis-je capable de sauter sans problème d'un muret de 50 cm de haut ?	oui / non*
5 Je suis exempt(e) de problème psychologique, ou de phobie ?	oui / non*
J'ai un suivi médical *	
6 Suis-je exposé(e) à des fragilités articulaires à répétition ?	oui / non
7 Ai-je eu récemment une entorse, une fracture ou une luxation ?	oui / non
8 Suis-je porteur d'une (de) prothèse(s) ?	oui / non
9 M'expose(nt)-t-elle(s) à des restrictions ? Ma mobilité et ma force sont-elles affectées ?	oui* / non
10 Est-ce que je suis enceinte ?	oui* / non
11 Ai-je été opéré(e) récemment ? Si oui, la consolidation est-elle confirmée par le médecin ?	oui / non
12 Suis-je concerné(e) par un problème respiratoire déconseillant peut-être un vol en altitude ?	oui / non
13 Suis-je concerné(e) par un problème cardiaque déconseillant un vol ou un effort prolongé ?	oui / non
14 Est-ce que je prends un traitement anticoagulant ?	oui / non
15 Si je suis diabétique, aurais-je pris, le jour du vol, une collation suffisante ?	oui / non
16 Est-ce que je me connais d'autres pathologies non-précisées dans ce questionnaire ?	oui / non
17 Ai-je correctement compris l'énoncé de toutes les questions ?	oui / non
Je suis prêt(e) à vivre une expérience magique et conviviale !	
<i>*Je n'engage pas ma sécurité sans prendre conseil auprès de mon médecin traitant et je lui soumetts ce questionnaire</i>	

Dr Claude CHAUVREAU, AEROMED, vice-présidente FF.Aé

Figure 5: self-assessment form to take a balloon flight.