



Accident to the JODEL - DR250 – 160 “Capitaine”
registered **HB-KFS**
on Saturday 8 April 2023
at Saulieu-Liernais aerodrome

Time	Around 16:30 ¹
Operator	Private
Type of flight	Cross country
Persons on board	Pilot and two passengers
Consequences and damage	A pedestrian seriously injured, pilot and two passengers injured, aeroplane destroyed
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.	

Runway veer-off during take-off, strike with pedestrian

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements and video recordings.

The pilot of the Cessna registered HB-COE was contacted by a friend who wanted to organise a flight day for his four grandchildren and himself. The pilot of HB-COE contacted the pilot of HB-KFS and invited him to take part in this day, with his aeroplane, so as to be able to carry the five passengers.

They decided to carry out a flight to Saulieu-Liernais where an acquaintance of the pilot of HB-COE would meet them. This person (the host) would organise lunch at the aerodrome for all the pilots and passengers.

The morning of the day of the occurrence, all of the pilots and passengers met up at La Côte aerodrome, situated at Prangins (Switzerland). They took off at around 09:45 for Dôle - Tavaux aerodrome to carry out the customs formalities. They then flew a second leg to Saulieu-Liernais aerodrome where they landed at 12:30.

Lunch was organised during which alcoholic beverages were served. A third person (the pedestrian) who had come to help the host organise the reception of the group and lunch, had lunch too.

At around 15:00, the pilot of HB-COE carried out a local flight with the pedestrian.

¹ Except where otherwise indicated, the times in this report are in local time.

At around 16:00, the passengers boarded HB-KFS and HB-COE for the return flight to Switzerland with a planned stop at Dijon-Darois. Two passengers boarded HB-KFS and the other three passengers boarded HB-COE.

The pilot of HB-COE took off first from runway 05.

The pedestrian took up position on the grass at the edge of the runway, at around 30 m from the taxiway². He filmed the take-off of HB-COE with his mobile phone.

The pilot of HB-KFS entered and backtracked runway 05.

The pilot of HB-COE carried out a low pass on the LH side of the runway as the pilot of HB-KFS started his take-off.



Figure 1: excerpt from video recorded by pedestrian when pilot of HB-KFS started the take-off (LH side) and four seconds later (RH side)

During the take-off run, after the tail wheel had left the ground, the pilot of HB-KFS perceived that the aeroplane was deviating to the LH side. He made an input on the RH pedal to return to the centreline but to no avail. The aeroplane approached the edge of the runway.

The pedestrian, who was still at the edge of the runway and filming the low pass by HB-COE and the take-off by HB-KFS, was struck by the LH wing of HB-KFS.

HB-KFS continued its run on the ground with a path that continued to deviate to the LH side. The aeroplane veered off the runway and then tipped forward on passing over a ditch parallel to and at 30 m from the runway's edge. The aeroplane came to a stop a few metres further on, on its back.

2 ADDITIONAL INFORMATION

2.1 Aerodrome information

Saulieu-Liernais aerodrome open to public air traffic, with an A/A frequency, has a paved runway 05-23 (730 m x 20 m).

A taxiway is used to join the runway from the apron.

² i.e. around 180 m from the start of runway 05.

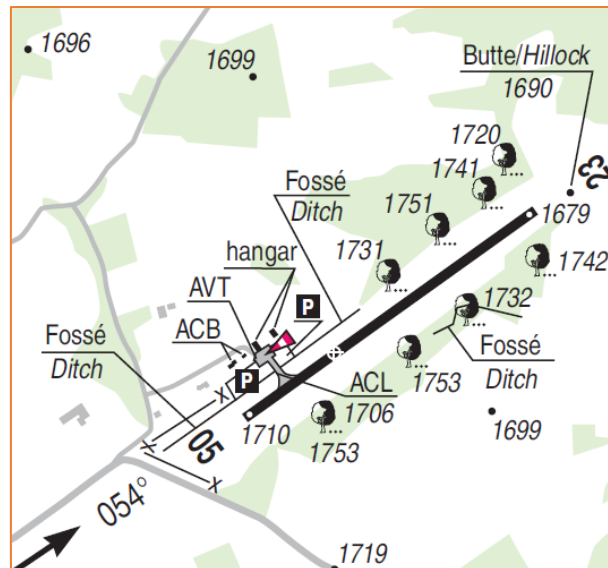


Figure 2: excerpt from VAC chart of Saulieu-Liernais aerodrome (Source: SIA)

The aerodrome has no radio communication recording system.

2.2 Aircraft information

2.2.1 General

HB-KFS belonged to the pilot who was flying it on the day of the accident. It was a four-seater aeroplane with a conventional landing gear. The tail wheel was mechanically linked to the rudder.

2.2.2 Examination of wreckage

The examination focused mainly on the rudder controls and the landing gear.

The rudder control cables were continuous and transmitted pedal movement to the rudder and tail wheel.

The tail wheel was in good condition. There was no visible damage to its tyre.

The RH landing gear appeared visually to be in good condition and the wheel rotated freely in its fairing. There was no particular damage to the RH tyre.

The fairing of the LH landing gear was damaged and prevented the LH wheel from turning. However, when the fairing was pulled away from the wheel, it was observed that the LH wheel turned freely, which suggests that the wheel was turning freely before the fairing was damaged by the impact with the bank when the aeroplane veered off the runway. There was no particular damage to the LH tyre.

The examination of the wreckage of HB-KFS revealed nothing to explain the aeroplane's deviation to the LH side during the take-off.

2.3 Video recording information

Video recordings were downloaded from the pedestrian's telephone.

Based on the examination of these recordings, it was possible to estimate the position of the pedestrian, who was on the grass in the immediate vicinity of the runway edge.

After HB-COE had taken off, one of the videos shows HB-KFS entering the runway from the taxiway and making a RH turn to backtrack runway 05. The aeroplane remained on the RH side of the runway, which suggests that it was going to line up from a LH turn at the threshold of runway 05 (this turn was not filmed).

The perspective shows that the aeroplane, when lined up on runway 05 before take-off, was relatively close to the runway centreline.

During power-up and at the start of the take-off run, the video shows the start of a movement to the left, which is then quickly corrected.

This observation, together with the aeroplane's forward movement during the taxiing phase on the ground, tends to support the hypothesis of HB-KFS having yaw manoeuvrability at the time of take-off.

The view of HB-KFS is then lost as the camera follows HB-COE making the low pass.

Another video file shows HB-KFS on its take-off run, abeam the taxiway, with the tailwheel raised. The aeroplane was already off-centre at this point on the runway, with the RH gear almost two metres to the LH side of the runway centreline.

The aeroplane continued to the left and approached the runway edge. The last images before the collision with the pedestrian show that the rudder was pointing towards the RH side of the aircraft.



Figure 3: excerpt from video recorded by pedestrian, just before impact

No reduction in power before the collision is perceived on the audio part of the recording.

2.4 Persons information

Preliminary note: The pedestrian filed a complaint for injuries. The interviews conducted by the judicial authorities of the people involved revealed sometimes contradictory versions. In view of the legal context and the difficulties encountered in gathering impartial statements in this context, it was decided to limit the information to only those elements, when there was a contradiction, that could be verified. In particular, it was not possible to establish what awareness each person had of the position and actions of the other persons during the event.³

2.4.1 Pilot of HB-KFS

The 56-year-old pilot of HB-KFS held an LAPL licence issued in 2014 by converting an RPPL licence⁴. The pilot declared to the gendarmerie that he had totalled 335 flight hours.

The BEA was not given access to the pilot's logbook and was therefore not able to check the validity of the LAPL which depends on certain recent experience conditions (refresher or supervision flight with instructor).⁵

The pilot had an expired class LAPL medical certificate which had been issued in October 2018 and was valid up to October 2020. The Swiss Federal Office of Civil Aviation (FOCA) were not aware of there being an updated medical certificate.

After the accident, when the judicial authorities arrived at the aerodrome, the pilot underwent a breathalyser test, which came back positive. At 19:40, after being taken to hospital for a medical examination, a blood sample was taken. The ethanol level in the sample taken approximately three hours after the accident was 0.32 g/L (see paragraph 2.8).

2.4.2 Pedestrian

The pedestrian was 62 years old. He had flown between 2010 and 2015, from Saulieu-Liernais aerodrome as a student pilot, but no longer flew.

He explained that he had taken up position on the grass at what he considered a sufficient distance from the runway.

He mentioned that he had only had one glass of wine during the lunch. No test for alcohol was carried out on the pedestrian.

2.4.3 Pilot of HB-COE

The pilot held an LAPL. He also held an aeroplane commercial pilot licence issued by the American authorities in 2011 along with the multi-engine and instruction flight ratings. The pilot declared to the gendarmerie that he had totalled around 2,200 flight hours. He had organised this flight day at his friend's request.

³ The absence of a radio recording at the aerodrome meant that certain aspects could not be confirmed or refuted.

⁴ The RPPL is a national restricted private pilot licence issued by the FOCA. As the requirements for obtaining an LAPL are higher than those for obtaining an RPPL, converting an RPPL into an LAPL required additional training.

⁵ As per article FCL.140.A LAPL(A) — Recency requirements of [Part-FCL](#).

It had been agreed that the latter would reimburse the fuel costs arising from these flights (the friend confirmed this to the gendarmes).

The pilot of HB-COE declared to the gendarmes that he had had two glasses of wine during the lunch. No test for alcohol was carried out on this pilot.

2.5 Meteorological information

Saulieu-Liernais aerodrome does not have a weather station. The closest station is located five kilometres north-west of the aerodrome.

The wind measured at this station had been relatively stable between 16:00 and 17:00, from 010° to 040° of 6 to 10 kts with gusts of 11 and 16 kt.

According to Météo-France, given the proximity of the measurement station to the aerodrome and the largely homogeneous situation for all of the area, it can be considered that the wind at the aerodrome was very probably similar to that measured by the station over the period.

On one of the videos retrieved, the wind sock can be seen during the low pass of HB-COE. Its position was consistent with that of a north-north-easterly wind of around 5 kt.

2.6 Taking off on an aeroplane with a conventional landing gear

Spiralling slipstream and yaw effects tend to cause a propeller-driven aeroplane, with clockwise engine rotation, to veer to the left during the take-off acceleration.

An aeroplane with a conventional landing gear is also subject to:

- the gyroscope effect when the tailwheel leaves the ground;
- the windvane effect in crosswind conditions, which tends to make the aeroplane turn around its yaw axis and bring it back into line with the relative wind.

When taking off in daylight conditions, in order to hold the runway centreline, the pilot must act mainly on the right rudder pedal to counter the aeroplane's natural tendency to move to the left.

The pilot of HB-KFS was the owner of his aeroplane. He therefore probably had sufficient knowledge of the aeroplane's behaviour on take-off. In addition, the wind conditions on the day were moderate and probably did not represent a particular difficulty in themselves.

2.7 Wake turbulence of HB-COE

Studies of aircraft wake turbulence have focused mainly on large aeroplanes. They have made it possible to establish the distance and time separations between aircraft. For these studies, the wake turbulence of a light, single-engine aeroplane was considered negligible.

However, all aircraft generate wake turbulence, mainly due to their airfoil. In the case of a propeller-driven aircraft, the spiralling slipstream generates additional turbulence.

The experimental study carried out by Thierry M Faure⁶ of the turbulent wake of a self-propelled rotationally symmetrical body highlights an initial region of close wake characterised by strong variations in speed profiles marked by the influence of the propeller up to a longitudinal distance of five times the diameter of the propeller⁷, and an intermediate region for distances between five and twenty times the diameter of the propeller. The study also shows a radial evolution of the overspeed zone, which tends to widen as the distance from the propeller increases, without quantifying this dispersion.

At the time of the occurrence, as HB-COE was flying on the windward side, the wind had the effect of pushing this turbulent wake (combination of blast from airfoil and propeller) towards the runway.

2.8 Effects of alcohol

According to [Order No 2022-830 of 1 June 2022 on alcohol and drug testing in civil aviation](#), applicable on French soil, pilots are prohibited from carrying out their duties during an actual flight while under the influence of alcohol with a blood alcohol concentration equal to or greater than 0.20 grams per litre or a breath alcohol concentration equal to or greater than 0.10 milligrams per litre.

An EASA safety information bulletin⁸ deals with the blood alcohol concentration limits for general aviation pilots. This bulletin recalls certain adverse effects arising from the ingestion of alcohol, such as impaired reaction time, reasoning and judgement.

The BEA has published several accident reports in which alcohol consumption has been cited as a probable contributing factor. The most recent reports include:

- [Accidents to the Scheibe - SF28 - A registered F-CFJB on 19 December 2021 at Vinon-sur-Verdon and Eyguières aerodromes](#);
- [Accident to the Mooney - M20J registered F-OIAT on 4 January 2020 at Lifou - Ouanaham aerodrome \(New Calendonia\)](#).

In the report on the [accident to the Fournier RF 6B 100 registered F-GANE at Royan in 2003](#), it was pointed out that even a low blood alcohol level can lead to a poor assessment of risks, impaired alertness and a reduced ability to react to danger.

⁶ [Thierry M. Faure. Étude expérimentale de sillage turbulent d'un corps à symétrie de révolution autopropulsé par hélice. Mécanique des fluides \[physics.class-ph\]. Ecole Centrale de Lyon, 1995. Français. NNT : . tel-00911048.](#)

⁷ The BEA does not know what propeller model equipped HB-COE. According to type certificate No 5A6 issued by the FAA for the Cessna 180, this aeroplane can be fitted with propellers of diameters of between 80 and 88 in, i.e. between 2 and 2.23 m.

⁸ [Blood Alcohol Concentration Limits for General Aviation Pilots.](#)

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation.

Scenario

As HB-KFS was taking off, the pilot of HB-COE carried out a low pass close to and on the windward side of the runway.

During the take-off run, HB-KFS started to deviate to the LH side of the runway centreline without the pilot being able to counter this excursion despite his inputs on the pedal. The aeroplane's LH wing struck a pedestrian who was standing in the manoeuvring area, in the immediate vicinity of the edge of the runway and filming the low pass being carried out by HB-COE and the take-off by HB-KFS.

It was not possible to determine if the pilot of HB-KFS knew of the presence of the pedestrian next to the runway at the time of take-off or if he had been able to detect this presence during the take-off run.

No technical malfunction which could have caused the aeroplane to deviate to the LH side during its take-off run was found.

It is probable that the deviation of the aeroplane's path during the take-off run was due to the combination of the aeroplane's own effects during the take-off phase, the windvane effect due to the crosswind and the effects induced by the blast of the aeroplane which was carrying out a low pass next to and on the windward side of the runway. The pilot's actions were not able to control the deviation of the path.

Contributing factors

The effects of alcohol may have contributed to:

- the loss of control of the flight path due to the possible impairment of the reaction time and judgement;
- the low perception of danger;
- no decision to reject the take-off due to the possible impairment of reasoning and judgement.

The effects of alcohol very probably contributed to a poor assessment of the risk on the part of the various parties involved, whether it was the pilot of HB-COE who made the low pass close to HB-KFS that was taking off, or the pedestrian who positioned himself in the immediate vicinity of the runway.

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