



Accident to the PILATUS PC-12
registered **OO-PCN**
on Saturday 17 February 2024
at Courchevel (Savoie)

Time	10:25 ¹
Operator	European Aircraft Private Club
Type of flight	Cross-country
Persons on board	Pilot-in-command and co-pilot
Consequences and damage	Aeroplane substantially damaged
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.	

**Bank strike before runway during landing, runway veer-off,
in mountain flight**

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on the CVFDR² flight recorder, videos taken a witness on the ground, statements, as well as radiocommunication recordings.

The crew, consisting of a pilot-in-command (PF) and a co-pilot (PM), took off at approximately 08:30 from Charleroi airport (Belgium), bound for Courchevel mountain airfield, where they planned to pick up seven passengers, co-owners of the aeroplane.

The co-pilot contacted the Courchevel AFIS officer at approximately 10:15. Two minutes later, the aeroplane flew over point W (Moutiers), the entry point for the runway circuit, in level flight at an altitude of around 7,500 ft. The co-pilot then extended the flaps to 15° at the pilot-in-command's request. The aeroplane passed north abeam point L, then overhead the mountain airfield. The crew checked the condition of the runway, the parking area and the two windsocks. During the outbound leg, the pilot-in-command asked the co-pilot to select an altitude of 7,000 ft. The co-pilot announced the approach checklist. The pilot-in-command made a wide turn-around, at the end of which he gave a briefing, defining the middle of the bank as the aiming point and the designation markings for runway 22 as the touchdown point.

The aeroplane was aligned with the runway centreline 2.4 NM from the runway threshold, in level flight at 7,000 ft (see **Figure 1** and **Figure 3**, point **1**), with a calibrated airspeed of 109 kt. The co-pilot announced to the AFIS officer that he was on final.

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

² The glossary of abbreviations and acronyms frequently used by the BEA can be found on its [web site](#).

At 10:25, the pilot-in-command started the descent 1.6 NM from the runway threshold (point 2), reducing engine power from maximum to idle. The aeroplane was above a 5% slope. The vertical speed was approximately -700 ft/min. The pilot-in-command extended the flaps to the landing position (40°) and adopted the recommended speed for landing in the absence of wind of 85 kt. The co-pilot read the landing checklist at the pilot-in-command's request.

At 1.3 NM from the runway threshold, while the flaps were being extended, the pilot-in-command increased power. At 0.75 NM from the threshold of runway 22, the aeroplane passed below the 5% slope in descent (point 3). The vertical speed gradually decreased to -300 ft/min.

At 0.13 NM from the threshold, the aeroplane passed below the runway threshold altitude (6,371 ft) and descended to an altitude of 6,354 ft at 0.1 NM from the threshold. The airspeed was 84 kt. The pilot-in-command then substantially increased the aeroplane's attitude by reducing engine power to idle (point 4). The main landing gears and the nose landing gear collided with the bank located below the runway threshold (point 5, also Figure 2). The left main landing gear partially failed during the impact. The aeroplane bounced several times on the runway and gradually veered to the left of the runway centreline. The left wing tip hit the snowdrift located next to the runway (see Figure 2, point 6). The aeroplane entered the snowdrift and spun 180° to the left before coming to a stop in the snow.

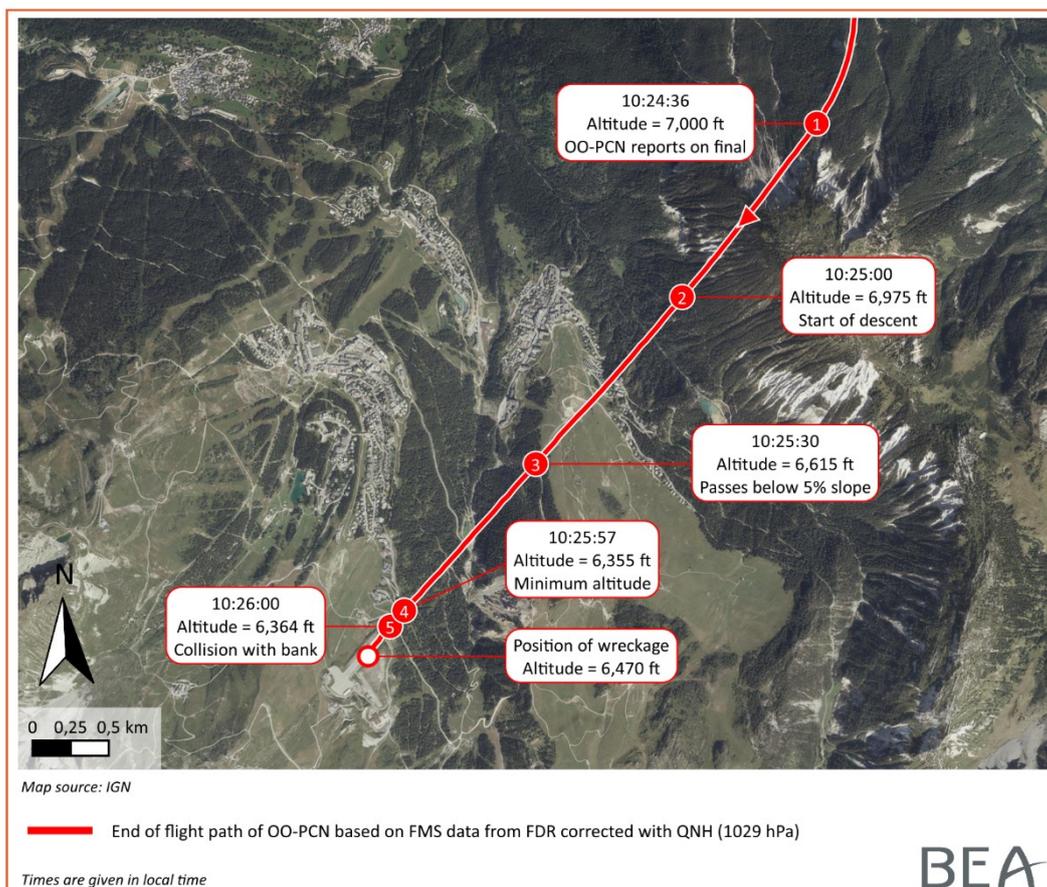


Figure 1: final approach path (Source: BEA)

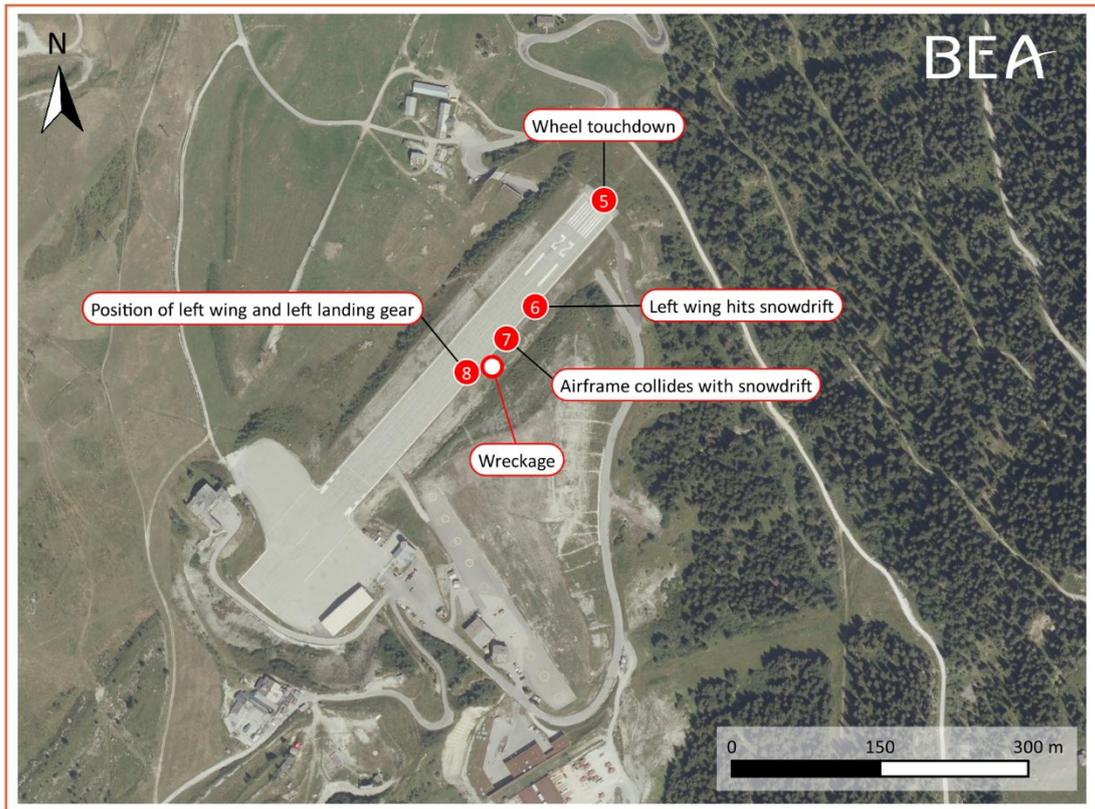


Figure 2: end of the accident flight (Source: BEA)

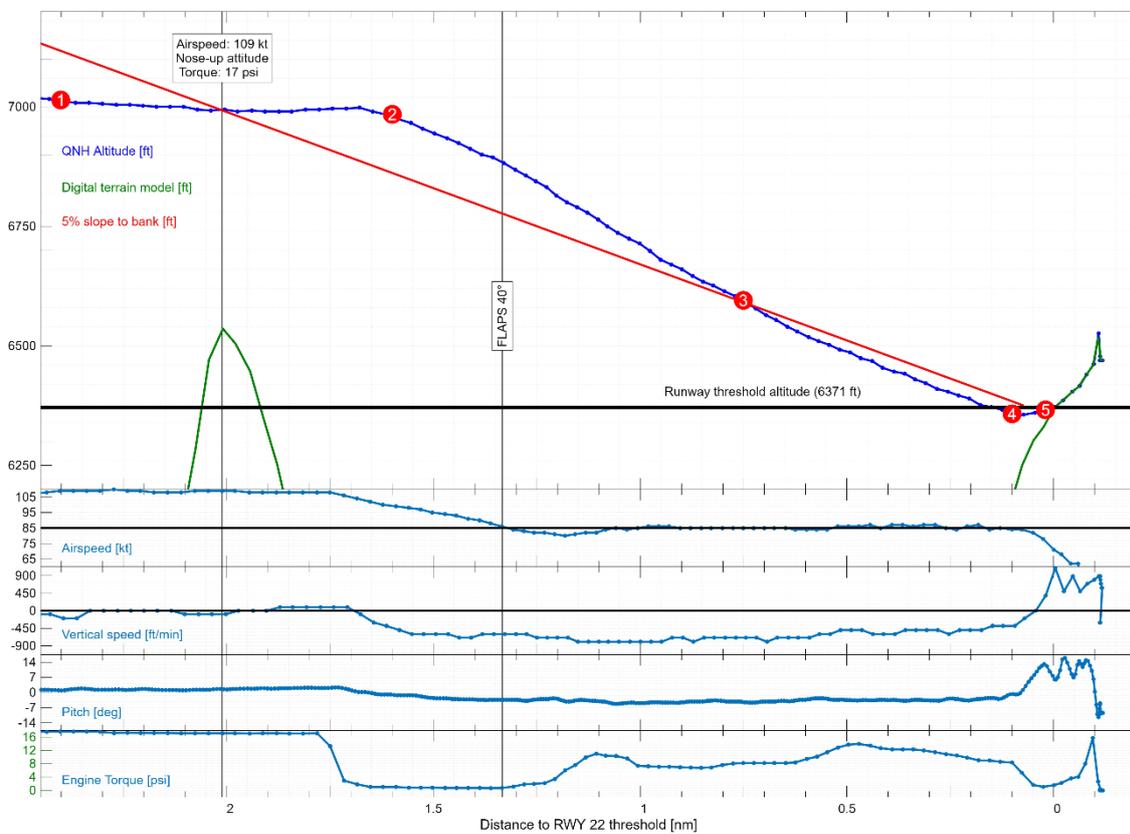


Figure 3: final approach of the accident flight (Source: BEA)

2 ADDITIONAL INFORMATION

2.1 Site and wreckage information

The wreckage was moved before the BEA investigators arrived at the site. Based on the information retrieved by the BEA, the aeroplane came to a stop around 200 m from the threshold of runway 22.



Figure 4: photograph of OO-PCN after the accident (Source: mountain airfield operator)

Examination of the site found that the wheels of the main landing gears and nose landing gear made contact with the bank 1 m before the runway threshold. The left wing was detached from the rest of the airframe at its root and the left landing gear was detached from the wing, as a result of the impact with the snow bank on the left side of the runway and the aeroplane's spin in the snow. The left wing and landing gear were found further down the runway. The five blades of the propeller failed when they hit the snow bank and were thrown several tens of metres away.

The examinations carried out on the aeroplane did not reveal any technical malfunction. The flight controls linkages were operational without any friction points found, the engine was delivering power at the time of the accident, and all the failures observed were of a sudden nature and a result of the accident.

2.2 Aerodrome information

2.2.1 General

Courchevel mountain airfield is a restricted-use aerodrome. It has one runway oriented 22/04 measuring 536 m long; the threshold of runway 22 is situated at 6,371 ft. The profile of the runway is shown below:

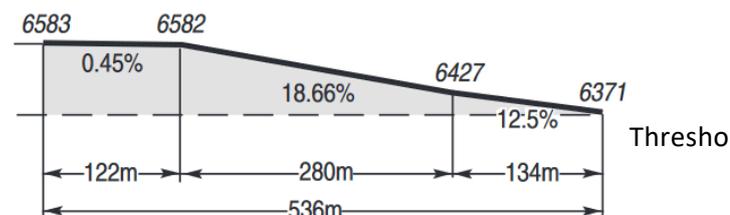


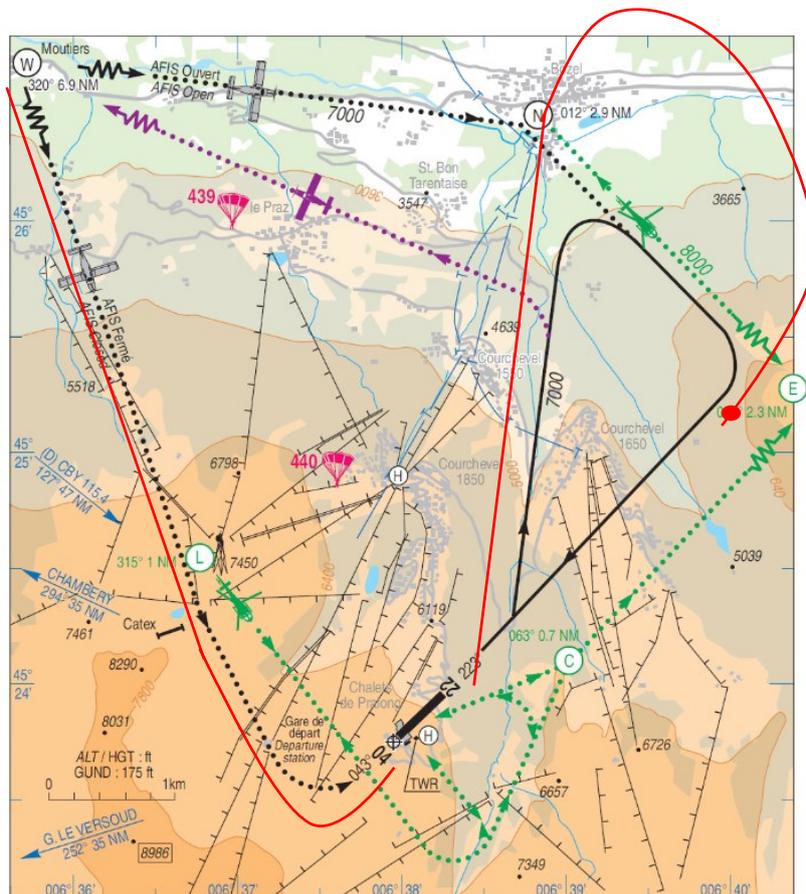
Figure 5: lengthwise profile of runway 04/22 at Courchevel, taken from VAC chart (Source: AIS)

The mountain airfield has an AFIS, which was open at the time of the accident.

2.2.2 Mountain airfield circuit and management of the approach

According to the VAC chart, when the AFIS is open, the QNH is provided by the AFIS officer to set the altimeter reference. It is then possible to arrive via point N, or via the same route as when the AFIS is closed, i.e. by passing north abeam point L and then flying overhead the mountain airfield at 7,100 ft before joining the base leg.³

The BEA contacted two instructors who train pilots for obtaining access authorisation on PC-12s at Courchevel, including the instructor who trained the accident pilot. They explained that they teach a systematic pass overhead the mountain airfield to assess the condition of the runway, the availability of the parking area and the strength and direction of the wind. The approach continues with an outbound leg beyond the area indicated by the VAC chart, with a widened turn for joining the circuit in distant final (see **Figure 6**). This method gives the pilot more time to stabilise the aeroplane before starting the descent. In calm wind conditions, the pilot follows a 5% glide slope, with an aiming point at the middle of the bank, allowing touchdown at the runway designation markings (see **Figure 7**). These references are indicated in the instructor's theoretical briefing and in the operator's OM ("Airport Briefing Courchevel LFLJ", version dated 1 December 2021).



Source : SIA

Figure 6: excerpt from Courchevel mountain airfield VAC chart and path taught during the training for obtaining access authorisation (in red) (Source: AIS)

³ According to amendment 09/24 of the VAC chart. On the date of the event, arrival via point N was recommended.

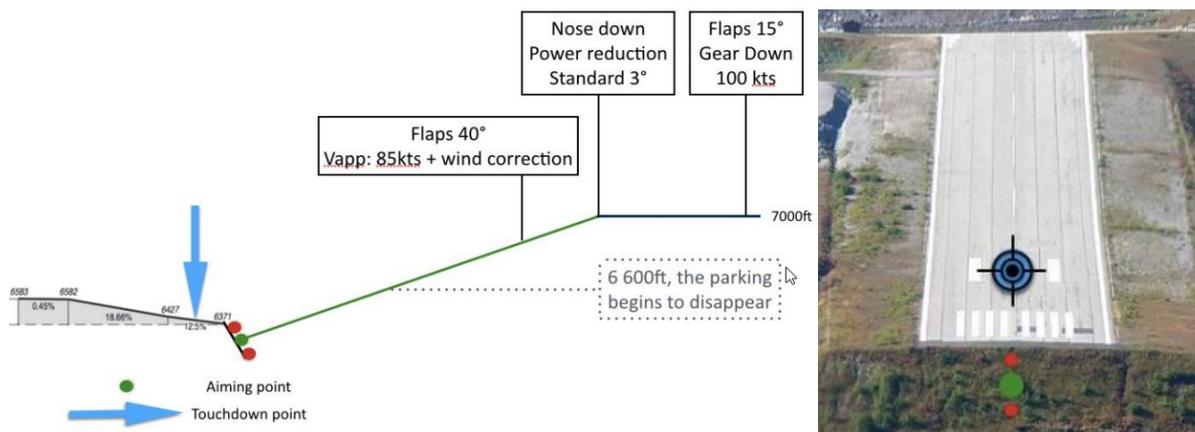


Figure 7: diagram and photo taken from EAPC OM and the instructor's theoretical briefing.

The stall speed of the PC-12 in final with no wind is 85 kt. The pilot's instructor explained that when this speed is stabilised and the aeroplane is on the slope, no input is required on the power control during the descent performed before crossing the runway threshold (about 100 m before touchdown) (see **Figure 7**). It is possible to reduce power after crossing the runway threshold. At no time on final must the aeroplane drop below the runway threshold altitude.

2.3 Operator information

European Aircraft Private Club (EAPC) is a limited liability cooperative company registered in Belgium which operates nine PC-12s and two PC-24s. EAPC provides a service solely to its members, who are the only shareholders. They are approximately 100, who benefit from a large network of destinations and a customised service. EAPC currently has around 50 pilots, approximately 30 of whom act as pilots-in-command. Fourteen of these hold access authorisation to Courchevel mountain airfield. In five years, EAPC has operated around 800 flights to Courchevel, mainly during the winter period. In 2017, another EAPC's PC-12 also struck the bank before the threshold of runway 22 (see para. 2.7).

The operator's activities come within the scope of the regulation pertaining to non-commercial operations - i.e., for non-complex aircraft, Part-NCO of the European Regulation known as "Air OPS"⁴ - the associated requirements of which are more flexible than those of Part-CAT pertaining to commercial transport, particularly with regard to the implementation of a management system, the documentation of operational procedures, and crew rating.

The oversight by the Belgian civil aviation authority concerns the continuing airworthiness of aircraft, pilot licences and training. It is down to the operator to implement the measures it deems appropriate to ensure flight safety.

EAPC is not obliged to have an Operations Manual (OM), but has written one nonetheless. The OM implemented by EAPC describes the Standard Operating Procedures (SOPs) to fly PC-12 aeroplanes in single-pilot or multi-pilot operations:

⁴ Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations ([Version in force on the day of the accident](#)).

- in Single-Pilot Operations (SPO), during flights with passengers, the crew is made up of one pilot-in-command and one pilot assisting them (known as the safety pilot). The latter is not type-rated. The pilot-in-command can assign tasks to the safety pilot or can decide to perform the tasks in person, depending on the experience of the safety pilot. This “safety pilot” notion does not exist in the regulation;
- in Multi-Pilot Operations (MPO), the crew is made up of one pilot-in-command and one co-pilot. The Pilot Flying (PF) is responsible for controlling the vertical and horizontal flight path, as well as managing the aircraft’s energy. The PM⁵ is responsible for tasks related to the systems and for monitoring the PF, as well as for performing the actions requested by the PF. In particular, they must monitor the actions/lack of actions by the PF to ensure effective cross-checking and support, followed by appropriate communication and response, where necessary.

EAPC informed the BEA that the PC-12 is flown in SPO or MPO for flights to and from Courchevel, depending on the ratings of the pilots making up the crew. The accident flight was flown in MPO. EAPC specified to the BEA that the co-pilot (or safety pilot when the flight is carried out in SPO) is not required to have access authorisation to the mountain airfield.

2.4 Crew information

2.4.1 Pilot-in-command

The pilot-in-command was the PF. On the date of the accident, this 31-year-old pilot held a Commercial Pilot Licence - Aeroplanes (CPL(A)) issued in 2017, along with Multi-Engine Piston (MEP) and Single-Engine Piston (SEP) class ratings, as well as a PC-12 Pilatus Single-Engine Turbine (SET) class rating. The latter was issued in October 2022. He had logged around 2,400 flight hours, 800 hours of which on PC-12s as pilot-in-command. He held access authorisation to Courchevel mountain airfield issued on 12 January 2024 following training courses on PC-12s completed on 19 and 20 November 2023 and on 10 and 11 January 2024. He did not hold a mountain flight rating. The accident flight was his third flight to Courchevel since he had obtained the authorisation. He made the first of these flights as co-pilot on 28 January and the second as pilot-in-command on 2 February. He had no other landing experience at mountain airfields.

He had been working for EAPC since April 2022.

The communications recorded by the CVFDR did not show any difficulties or doubts on the part of the crew during the accident flight up to the landing. In particular, the pilot-in-command did not comment on the aeroplane’s position in relation to the glide slope. Interaction between the pilot-in-command and the co-pilot is limited to announcements of flight parameters and checklists and communications with the AFIS officer.

The pilot-in-command did not remember reducing power to idle before the runway threshold and stated that he was not taught to do so. He also stated that he was rather surprised by the duration of the training for obtaining the access authorisation, which he considered to be short.

⁵ Pilot Monitoring.

2.4.2 Copilot

The co-pilot was the PM. On the date of the accident, this 35-year-old pilot held a CPL(A) issued in 2013, along with MEP and SEP class ratings, as well as a Pilatus PC-12 SET class rating, issued on 31 December 2023. He had logged 645 flight hours, 411 of which as a pilot-in-command. His experience on PC-12s was 97 flight hours as a co-pilot.

He had also logged 597 flight hours as a safety pilot (not counted in the flight hours described above).

He did not hold access authorisation for Courchevel mountain airfield or a mountain flight rating.

2.5 Training to obtain authorisation to access a mountain airfield

2.5.1 Regulatory requirements

At European level, there is no requirement regarding the conditions to access mountains airfields.

At national level, French Order of 21 June 2019 specifies the conditions for obtaining authorisations to access mountain airfields⁶. Therefore, pilots who wish to land at a given snow-free mountain airfield (out of a training context) must hold:

- the “wheel” mountain flight rating, or
- a “wheel” access authorisation, issued by a mountain instructor (MI) after receiving theoretical and practical training.

Since the Order has been amended, in 2023:

- this training must be delivered either by an Approved Training Organisation (ATO) or by a Declared Training Organisation (DTO);
- the access authorisation is indicated in the pilot’s logbook or issued in the form of a certificate by the instructor who ratified the training, and is limited to a class or type of aeroplane or motor glider showing performance similar to that of the aeroplane or motor glider on which the training was delivered and ratified. Pilots must undergo additional training if they wish to use an aeroplane of a class, type or showing performance which are substantially different;
- after assessing the applicant’s skills (abilities, knowledge and behaviour), the instructor must deliver appropriate training, based on the programme set out in the appendix to the Order.

2.5.2 DSAC oversight of DTOs

The DSAC indicated that there is no obligation for a DTO to declare access authorisation training to the DSAC (this declaration is made via a form). As a consequence, the training programme set up by a DTO based on the items listed in the appendix to the Order of 2019 does not need to be declared to, and approved by, the DSAC. Furthermore, no standard training programme, derived from the items listed in the appendix to the Order of 2019, has been approved by the DSAC, as is the case, for example, for mountain rating training.

⁶ [Version in force on the day of the accident.](#)

DSAC is informed of the implementation of access authorisation training during the inspections it periodically carries out at DTOs. During these inspections, it checks, via sampling, compliance of the training sessions delivered. These may thus include access authorisation training sessions. Compliance of the training programme with the requirements of the Order is then checked.

2.5.3 SET training delivered by a DTO

According to the European regulation known as “Air Crew”⁷, and in particular, requirement DTO.GEN.110, “A DTO shall be entitled to provide the following training, provided that the DTO has submitted a declaration” to the competent authority:

“(1) for aeroplanes:

[...]

(c) training towards class rating for SEP(land), SEP(sea) and TMG;

(d) training towards additional ratings: night, aerobatics, mountain, sailplane and banner towing”.

For the DSAC, the requirement of Aircrew DTO.GEN.110 (c) implies that a DTO is not authorised to provide training with SET class aeroplanes, even though training is not towards class rating. However, this position is not formally set out in a document.

2.5.4 Courchevel Mountain Flight Training information

The pilot-in-command completed his training at the DTO Courchevel Mountain Flight Training. The instructor, who is the DTO training manager and accountable manager, is an MI. He has also been a PC-12 pilot at an airline for eight years and has logged around 4,000 flight hours. He has been practising mountain flying on PC-12s at this company for six years. He is an instructor at the company’s ATO. He has been training pilots towards their mountain flight rating on Jodel D140s for two years. He has been training these pilots to then use PC-12s at Megève and Courchevel mountain airfields for five years. He has been an instructor at the Aéroclub des 3 Vallées (DTO) for several years, as well as a freelance instructor, in particular for the delivery of access authorisation training for external companies or individuals (EAPC, for example), until the entry into force of the new regulatory requirements.

Training on PC-12s within the DTO has been suspended by the DSAC since the accident for the reasons explained in paragraph 2.5.3.

2.5.5 Training completed by the pilot-in-command

The pilot-in-command completed the following site authorisation training on PC-12s:

- On 18 and 19 November 2023:
 - a theoretical part lasting two hours, including a briefing on mountain flying, Courchevel mountain airfield, the reconnaissance pass overhead the mountain airfield, departure and approach procedures, in particular how to manage the final approach based on the wind and its effects,
 - participation in take-offs and landings at the mountain airfield as an observing passenger during the training flights of another EAPC pilot (14 landings),

⁷ Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew ([Version in force on the day of the accident](#)).

- a practical part with two flights from Courchevel to Annecy, one of which included two landings at Courchevel, as a student pilot;
- on 10 and 11 January: a practical part including (according to the aeroplane's logbook and the pilot's logbook) 21 landings, for a total of 3 flight hours.

The pilot and instructor reported that the weather conditions were good during the last two days, with calm wind.

The pilot stated that he was confident at the end of the training, although he considered it to be short. In his opinion, it would have been interesting to fly in other weather conditions.

2.6 Meteorological information

According to the information provided by Météo-France, there was a 280° wind of 2 kt, the visibility was greater than 10 km, the sky was clear at the time of the accident and the outside air temperature was 3°C.

2.7 Previous occurrences at Courchevel

In 2017, the EAPC's PC-12 registered OO-PCI also struck the bank below the threshold of runway 22 following a non-stabilised approach. The investigation brought to light that the short duration of the pilot's training (one day for theory and practice) for obtaining site authorisation probably contributed to the difficulties encountered in stabilising the approach and assessing the position of the aeroplane in relation to the approach slope. The pilot's lack of experience since obtaining the site authorisation, combined with the lack of experience of the safety pilot, who did not have the PC-12 type rating and had not been trained in the use of Courchevel mountain airfield, was also identified as a contributing factor. The BEA also pointed out that the presence of a second pilot with a PC-12 rating and with mountain flying experience would certainly have enabled a more precise management of the approach slope.

In 2019, the PA-46 registered F-GUYZ operated by Bluewings overran the runway. The pilot had performed fewer than 10 landings during the training for obtaining access authorisation and had no recent experience since it had been issued.

Following these occurrences and the recommendations issued by the BEA, in 2023 the DGAC amended the Order regarding the conditions to access mountain airfields (see paragraph 2.5.1).

In 2021, the PA-46 registered F-HYGA also struck the bank below the runway threshold, causing the death of one passenger, as part of the pilot's first flight since obtaining his access authorisation six months before. The report brought to light the short duration of the pilot's training, during which he performed six landings at the mountain airfield.

2.8 Actions taken by the operator

Following the accident, EAPC decided to take the following actions:

- Limit the use of mountain airfields to pilots-in-command holding a mountain flight rating. In 2024, five pilots-in-command at the company completed the specific training and obtained the rating. The weather conditions encountered in the second half of the year prevented two other pilots-in-command from completing this training.
- Provide in-house training on PC-12s for pilots holding the mountain flight rating. This additional training includes the use of Courchevel and Megève mountain airfields.

EAPC also:

- updated the theoretical briefing included in the Operations Manual for Courchevel mountain airfield, in particular the approach circuit and details of the actions to be taken on approach, with a warning to never descend below the touchdown zone before crossing the runway threshold;
- updated the distribution of crew for flights to Courchevel, based on the pilots' ratings and experience: in particular, a pilot-in-command who has recently obtained the mountain flight rating for Courchevel and has completed the additional training on PC-12s at Courchevel, must be accompanied, for their first flights, by another pilot-in-command holding the mountain flight rating for Courchevel, and for subsequent flights during their first season, by a pilot (co-pilot or pilot-in-command) holding the PC-12 type rating and briefed on operations at Courchevel.

3 CONCLUSIONS

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

Scenario

The pilot-in-command, accompanied by a co-pilot, lined up for final approach to land at Courchevel mountain airfield, where he planned to pick up passengers. All along the final approach, the speed was stabilised at 85 kt, corresponding to the reference speed for the PC-12 at Courchevel in the absence of wind. The pilot started the descent late. This forced him to adopt a steeper slope than the 5% slope recommended in the absence of wind with an aiming point corresponding to the middle of the bank located below the runway threshold. At 0.75 NM from the runway threshold, the aeroplane passed below the slope. The pilot then reduced the aeroplane's vertical speed and continued the approach below the slope. At 0.13 NM, the aeroplane passed below the runway threshold altitude. As the aeroplane approached the threshold, the pilot simultaneously substantially increased the aeroplane's attitude and reduced the engine power to idle. The landing gears collided with the bank.

Contributing factors

The following factors may have contributed to a non-stabilised approach and to the collision with the bank:

- the pilot-in-command's lack of experience in mountain flight and at Courchevel mountain airfield;
- the duration of the pilot's practical training to obtain access authorisation, which seems short given his lack of previous experience of landing at a mountain airfield;
- the co-pilot's lack of mountain flight experience, which did not allow him to perform his role in monitoring the path followed by the PF during the approach.

Safety lessons

Mountain flight learning

This accident and past accidents at Courchevel mountain airfield show how specific are the skills required to approach mountain airfields (use of visual references, approach slope and power management, flying accuracy, aiming point selection, etc.). For pilots not used to flying in mountainous environments, several flights in different conditions are necessary to acquire such skills and perform safe landings and take-offs.

Although French regulations now set the topics addressed as part of the training to obtain authorisation to access a mountain airfield, the instructors define themselves the exact content of the training for each pilot, as well as the duration and number of landings required. In the absence of regulatory requirements, these items are not subject to prior approval or monitoring by the DSAC. As mentioned in the Order of 21 June 2019, it is therefore essential for instructors to assess, prior to training, the duration required depending on the pilot's profile (general and mountain experience, abilities, knowledge, behaviour) and to consider extended training if skills are not acquired. In any case, a practical training lasting a few hours seems insufficient for a comprehensive learning.

The training to mountain flight rating provides a foundation of essential skills to manage the specific characteristics of flying and landing in mountainous environments. This is particularly important for pilots of aeroplanes used for passenger transport flight, whether revenue or non-revenue flights. This training is very often delivered on light piston aeroplanes (for example, the Jodel D140 Mousquetaire). As a consequence, and despite the fact that no regulatory requirement to do so currently exists, it is generally necessary for pilots to perform additional training on the type of aeroplane that will be used in operation, if its performance substantially differs from that of the aeroplane used in training.

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