

**Accident on 24 March 2015 at Prads-Haute-Bléone (Alpes-de-Haute-Provence, France)
to the Airbus A320-211 registered D-AIPX operated by Germanwings,
scheduled flight 4U9525 between Barcelona (Spain) and Düsseldorf (Germany).**

► **ORGANISATION OF THE SAFETY INVESTIGATION**

On 24 March 2015, at around 10 h 15 UTC (local time 11 h 15), the Marseille en-route control centre informed the BEA of the accident to an Airbus A320, registered D-AIPX that had occurred at 9 h 41 UTC (local time 10 h 41) while overflying the French Alps. Six crew members (2 flight crew and 4 cabin crew) and 144 passengers were on board.

In accordance with the provisions of European regulation (EU) n°996/2010 of the European Parliament and Council of the 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation, a Safety Investigation was immediately initiated by the BEA.

A team of seven investigators from the BEA travelled to the accident site on the afternoon of 24 March. In coordination with the authorities in charge of the judicial investigation, and with helicopter transport provided by the Gendarmerie, the safety investigators were able to access the site the following day.

The Cockpit Voice Recorder (CVR) was found on the afternoon of 24 March 2015 and transferred the following day to the BEA for readout. After reading out the data, it appeared to the BEA that an act of unlawful interference was probably involved in the accident. European Regulation (EU) n°996/2010 and the advance arrangement relating to Safety Investigations between the French ministry of Justice and the BEA of 16 September 2014, specify that, in such a situation, the relevant elements gathered during the Safety Investigation must be communicated immediately to the judicial authorities, and the BEA can decide to continue the Safety Investigation, which it did.

The BEA associated the following foreign counterparts with the Safety Investigation, which then appointed Accredited Representatives:

- ❑ the BFU (Germany), the aeroplane being registered in Germany and operated by a German airline. This made it possible to obtain the assistance of technical advisers from Germanwings;
- ❑ the CIAIAC (Spain). This made it possible to obtain information relating to the aeroplane's stop at Barcelona and data from the Spanish Air Traffic Control (ATC) service;
- ❑ the AAIB (UK). This made it possible to obtain information on the aeromedical certification in the UK;
- ❑ the NTSB (USA). This made it possible to obtain information on the aeromedical certification in the USA and aerospace medical expertise from Aerospace Medical Association (AsMA).

The BEA also associated:

- ❑ technical advisers from European Aviation Safety Agency (EASA), French general civil aviation directorate (DGAC), the manufacturer of the engines Snecma (on behalf of CFM) and Airbus;
- ❑ experts in medical certification from the Civil Aviation Authorities of Israel, Canada, Norway, and Spain as well as from EDF (French electricity supplier) and SNCF (French national railways);
- ❑ medical experts, including psychiatrists.

Australia, Israel and Japan appointed experts to follow the Safety Investigation, in accordance with standards and recommended practices in International Civil Aviation Organisation (ICAO) Annex 13, since some of the victims came from these countries.

On 6 May 2015, the BEA published a preliminary report prepared on the basis of the initial information gathered in the course of the investigation.

► SYNOPSIS OF THE FINAL REPORT

The co-pilot had been flying for Germanwings since June 2014 and was the holder a class 1 medical certificate that was first issued in April 2008 and had been revalidated or renewed every year. Since July 2009, this medical certificate had contained a waiver because of a severe depressive episode without psychotic symptoms that had lasted from August 2008 until July 2009. This waiver stated that it would become invalid if there was a relapse into depression.

In December 2014, approximately five months after the last revalidation of his class 1 medical certificate, the co-pilot started to show symptoms that could be consistent with a psychotic depressive episode. He consulted several doctors, including a psychiatrist on at least two occasions, who prescribed anti-depressant medication. The co-pilot did not contact any Aero-Medical Examiners (AME) between the beginning of his decrease in medical fitness in December 2014 and the day of the accident.

In February 2015, a private physician diagnosed that the vision and sleep problems which the co-pilot was suffering from were related to a psychosomatic disorder and an anxiety disorder and referred the co-pilot to a psychotherapist and psychiatrist. On 10 March 2015, the same physician diagnosed a possible psychosis and recommended psychiatric hospital treatment. A psychiatrist prescribed anti-depressant and sleeping aid medication in February and March 2015. Neither of those health care providers informed any aviation authority, nor any other authority about the co-pilot's mental state. Several sick leave certificates were issued by these physicians, but not all of them were forwarded to Germanwings.

No action could have been taken by the authorities and/or his employer to prevent him from flying on the day of the accident, because they were informed by neither the co-pilot himself, nor by anybody else, such as a physician, a colleague, or family member. In addition, the mental state of the co-pilot did not generate any concerns reported by the pilots who flew with him.

In the cruise phase of the accident flight, the co-pilot waited until he was alone in the cockpit. He then intentionally modified the autopilot settings to order the aeroplane to descend to the ground. He had practiced these autopilot settings during the preceding flight, when he was alone in the cockpit. During the accident flight, he kept the cockpit door locked during the descent, despite requests for access made via the keypad and the cabin interphone. He did not respond to the calls from the civil or military air traffic controllers, nor to knocks on the door. Security requirements that led to cockpit doors designed to resist forcible intrusion by unauthorized persons made it impossible to enter the flight compartment before the aircraft impacted the terrain in the French Alps.

The BEA investigation concluded that the process for medical certification of pilots, in particular self-reporting in case of decrease in medical fitness between two periodic medical evaluations, did not succeed in preventing the co-pilot, who was experiencing mental disorder with psychotic symptoms, from exercising the privilege of his licence. The following factors may have contributed to the failure of this principle:

- ❑ the co-pilot's probable fear of losing his right to fly as a professional pilot if he had reported his decrease in medical fitness to an AME;
- ❑ the potential financial consequences generated by the lack of specific insurance covering the risks of loss of income in case of unfitness to fly;
- ❑ the lack of clear guidelines in German regulations on when a threat to public safety outweighs the requirements of medical confidentiality.

The investigation showed that information on previous similar events was limited and difficult to obtain, and that currently available data do not provide accurate awareness of in-flight risks related to mental issues or incapacitation.

Therefore the BEA has issued **two recommendations** to European Aviation Safety Agency (EASA) and EU Member States to perform routine analysis of in-flight incapacitation, in particular on psychological and psychiatric issues, and to encourage data collection to validate the effectiveness of medical assessment criteria.

Aeromedical experts consulted by the BEA considered that routine in-depth psychological testing of all pilots to detect serious mental illness would be neither productive nor cost effective.

However, it might be useful to regularly evaluate the mental health of pilots with an identified history of mental illness.

This is why BEA issued **one recommendation** to EASA to require that conditions for the follow-up of pilots with a history of psychological trouble be defined when they are declared fit to fly.

The BEA investigation showed that the legal and institutional framework regarding the possibility for a treating doctor to transmit confidential medical information about a pilot to authorities, when there is a risk to public safety, varies between countries. In some countries it is even compulsory to do so. This could help reduce risks.

However, the reluctance of pilots to declare their problems and seek medical assistance, for fear of losing their licence, with economic and social consequences, needs to be addressed at the same time. These issues are particularly relevant for pilots, because of the higher financial investment and attractiveness linked to their profession, and are already partially taken into account in some countries. Similar issues may exist for safety personnel working in other industrial domains, and the BEA found that the French nuclear and railway industries did address, to some extent, these issues.

This is why the BEA has addressed **eight safety recommendations** to the World Health Organisation (WHO), International Air Transport Association (IATA), European Commission, European Aviation Safety Agency (EASA), Federal Ministry of Transport and Digital Infrastructure (BMVI) and Bundesärztekammer (BÄK) to:

- ❑ define rules to require health care providers to inform appropriate authorities when a patient's health is very likely to impact public safety, while still protecting patients private data from unnecessary disclosure (addressed to WHO, EU Commission, BMVI and BÄK);
- ❑ define modalities under which EU regulations would allow pilots to be declared fit to fly while taking antidepressant medication (addressed to EASA);
- ❑ encourage operators to implement measures to mitigate the socio-economic risks related to pilot's loss of licence for medical reasons under medical supervision (addressed to EASA and IATA);
- ❑ promote the implementation of peer support groups to provide a process for pilots, their families and peers to report and discuss personal and mental health issues, with the assurance that pilots will be supported, guided, and provided help (addressed to EASA).