

mystery illness

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Investigators can't determine why five crewmembers and a number of passengers on an A319 became ill.

The Irish Air Accident Investigation Unit (AAIU) says its investigators were unable to pinpoint the cause of a May 2008 incident in which five crewmembers and an undetermined number of passengers on an Airbus A319-132 became ill, with symptoms ranging from drowsiness to a loss of sensation in their limbs.

In its final report on the incident, the AAIU ruled out one hypothetical cause after another, saying there was no evidence of air contamination, poor air quality or

inadequate air supply in the cabin or on the flight deck. There also was no indication of depressurization.

The incident occurred around 1245 local time on May 27, 2008, about 12 minutes after departure from Dublin for a flight to Cologne, Germany.¹ Six crewmembers and 119 passengers were aboard.

The first indication of a problem occurred as the airplane climbed through 10,000 ft, the report said.



“The purser called the cockpit on the intercom and reported that something was wrong — that almost all the passengers had fallen asleep and that the [cabin crewmember] near her appeared unresponsive,” the report added. She later told investigators that it was unusual for so many passengers to be sleeping so early in the flight.

As the flight crew discussed the purser’s comments, the captain said that he felt “somewhat unwell.” The report said that later, he “recalled a tingling sensation in his right arm, comparable with the arm ‘falling asleep.’”

The flight crew at first suspected a pressurization problem, but the electronic centralized aircraft monitor (ECAM) showed no warnings or failures and the cabin altitude indication was 1,700 ft. Nevertheless, the flight crew donned oxygen masks, declared an emergency and began a descent, telling air traffic control (ATC) that they wanted to return to Dublin. They declared an emergency with Dublin ATC at 1243, and the captain directed the cabin crew to use portable oxygen cylinders. The airplane was landed in Dublin at 1257.

After the flight crew donned oxygen masks, the captain’s symptoms disappeared.

Airport emergency personnel met the airplane, the Irish national police were notified, and “a decision was made to hold the aircraft at a remote ramp position,” the report said. After about one hour, the A319 was towed to a terminal stand (gate), and at 1308, AAIU investigators arrived at the scene.

Police and airport authorities talked with the crew and agreed to allow the passengers to leave the airplane. After disembarking, everyone who had been in the airplane was offered medical attention, but no one accepted the offer, the report said.

At the time of the incident, there was no medical practitioner at the airport, and the only medical services available were from first-response medical personnel, the report said.

Crew Interviews

Investigators interviewed crewmembers, including the purser, who said that she had begun to feel “unwell” after takeoff.



The three other cabin crewmembers said that after takeoff, they felt tired. One said that he might have been “unable to perform his cabin service task,” another complained of dizziness, and the third — who had only three weeks of experience on the job — said she was tired and “somewhat unwell,” the report said. The report did not discuss the first officer’s condition.

Investigators also talked with passengers seated in different parts of the cabin and found that some passengers, most of whom were described as “at the older end of the age spectrum,” felt drowsy. Others said that they “had not noticed anything unusual or any feeling of drowsiness or lack of well-being,” the report said. “Many said their first indication of anything unusual was when they noticed that the aircraft was descending.”

The cockpit voice recorder (CVR) recorded the entire event, as well as part of the previous flight, and showed that the flight deck environment during both flights was “very relaxed and jovial before the purser expressed her concerns” — so jovial, in fact, that investigators initially were concerned that the pilots might have been “affected by a contaminated atmosphere.” After the flight crew declared the emergency, however, they were “focused completely on the task in hand,” the report said.

Inconclusive Tests

A series of tests failed to determine the cause of the event.

An air composition check in the flight deck, cabin and baggage hold found no unusual levels of methane, hydrogen sulfide, carbon monoxide or oxygen.

Examination of baggage in the baggage hold revealed nothing suspicious, nor did a thorough examination of the cabin.

The next day, after the airplane was moved to a maintenance facility, a series of tests were conducted to determine whether oil from the engines or the auxiliary power unit (APU) had gotten into the cabin air supply. The tests involved running the engines, the APU and other equipment, and taking swabs from several locations on the airplane, especially near air outlets. No evidence was found to indicate any problem with oil contamination.

“At one point during these tests, two members of the inspecting team, which

The report said the most toxic substance found in the analysis was nicotine, also in very low concentrations.

numbered up to 15 people, reported a strong smell in the cabin,” the report said. “However, the other members of the team reported nothing unusual.”

The tests were repeated with special test equipment, and again, no problems were found.

“After three days of testing, it was decided, in consultation with the operator and the aircraft manufacturer, that the aircraft be flown to the manufacturer’s facility at Toulouse [France] for further tests,” the report said. “The flight to Toulouse was flown, unpressurized, at 10,000 ft, operated by two pilots from the operator and an AAIU inspector in the jump seat. The handling pilot remained on portable oxygen for the entire flight. Toward

the end of the flight, the pilot monitoring started to feel slightly unwell and went on oxygen briefly. His feeling of being unwell disappeared. . . . The AAIU inspector, who was not on oxygen, reported no ill effects.”

Six days of tests at Toulouse revealed no anomalies and found only traces of toluene, ethylbenzene and styrene that typically are found in aircraft exhaust, and traces of volatile organic compounds — all well below the exposure limits. The report said the most toxic substance found in the analysis was nicotine, also in very low concentrations. In addition, a laboratory analysis of the cabin air failed to find any trace of the oil used in the engines and the APU.

Authorities agreed to return the aircraft to service. In the ensuing months, there was no recurrence of the problem, the report said.

‘An Ongoing Issue’

The continuing investigation determined that passenger baggage was the only cargo on the aircraft and that, “in particular, dry ice (a solid form of carbon dioxide) was not carried on the aircraft,” the report said.

All six crewmembers had started their duty day between 0315 and 0345, and all had worked the previous day until between 1300 and 1700. Fatigue-monitoring software used by the operator showed that the flight crew had no “exposure to excessive fatigue” during the month before the incident; two cabin crewmembers had “slightly elevated fatigue exposure” for one day about two weeks earlier.

The AAIU said that poor cabin air quality “has been an ongoing issue in commercial air transport operations. A number of recurring faults and defects have [been] found to be the cause in many cases.”

Air quality typically has not been a problem in A319s or related airplanes, however, the report said.

In this case, investigators ruled out the “faults and defects” that have typically been cited in the past. There was no evidence of a leak in the engine or APU oil seals, a gaseous discharge from the air conditioning system or from a fire extinguisher, or smoldering electrical wires, the report said. The galley ovens were not being used, and the aircraft did not undergo preflight maintenance or heavy cleaning. In addition, no problems were reported on the previous flight.

“During the exhaustive and prolonged tests undergone by this aircraft, no re-occurrence of the problem was found,” the report said. “Furthermore, the aircraft has subsequently returned to service for an extended period, and no re-occurrence of the problem has been reported during this time.

“The investigation noted that, in the months that followed this event, three further cabin air quality events, relating to fumes in the cabin, cabin crew reporting feeling unwell, unusual smells, etc., were reported to the AAIU. In each case, different operators and aircraft types built by different manufacturers were involved. In none of these cases was a definite source of the problem identified.”

Possible Contaminants

The report said that, in most cases, poor cabin air quality results from contamination associated either with solid or liquid particles such as oil and fuel, which produce gaseous byproducts with residues that can be detected, or with highly volatile substances that are dispersed through an airplane’s air conditioning system and outflow valve and leave little, if any, residue.

“In the environment of a modern passenger aircraft, the list of potential cabin air contaminants is large ... [and] the task of detecting possible contaminants is daunting,” the report said. “Volatile organic compounds (VOCs) are [particularly] challenging contaminants from the point of view of detection. These compounds evaporate and are pumped overboard by the aircraft’s air conditioning system and so disappear, without leaving a trace, in a relatively short period of time. The investigation of this event demonstrated the difficulties of finding evidence of contamination after a reported event, in spite of significant resources available to, and utilized by, the investigation.”

The report praised the purser for being “positive and proactive” in promptly notifying the flight crew of the conditions she had observed in the cabin, enabling their quick response.

On the ground, however, the delay in deciding how to handle the situation prolonged the time spent by the passengers and crew in the airplane — and prolonged their exposure to the potentially contaminated air supply, the report said.

The report added that investigators could not explain what caused the problem or “why only some of the passengers complained of any symptoms and [why] the symptoms of the affected passengers were limited to drowsiness (i.e., no passengers reported feeling unwell). The fact that those who reported the symptoms recovered rapidly after landing would indicate the absence of any toxic contaminant. The failure to detect any abnormal residues within the aircraft after the event would also suggest the absence of toxic contaminants.”

Recommendations

The AAIU recommended that the Irish Aviation Authority (IAA) review its licensing requirements for the country’s major airports to ensure that they comply with International Civil Aviation Organization (ICAO) guidelines, specifically with guidelines calling for major airports to maintain adequate medical services.

The IAA *Manual of Aerodrome Licensing* says that airports should be equipped with medical supplies appropriate to the size of the airport, but it does not require that they be staffed with medical personnel.

ICAO says, however, that a medical clinic should be established at any airport with at least 1,000 employees. ICAO also calls for airports to be staffed during their busiest hours with “at least one person trained to deal with ... basic measures for treatment and protection of spills or leaks of radioactive materials, toxic or poisonous substances.” The AAIU report said that this event “could have been dealt with more effectively if such expertise was available at the scene.”

The AAIU also recommended that the Dublin Airport Authority review the medical services that it provides at the airport, as well as the “response procedures to ensure that passengers and crew are not unduly detained in a potentially toxic environment following cabin air quality events.”

This article is based on AAIU accident report 2010-008, published July 15, 2010.

Note

1. The accident report did not name the operator but identified the airplane by using its registration number, which is that of an A319 operated by Germanwings, a low-cost carrier based in Cologne/Bonn, Germany.