

## Training for an Emergency, vs Real Life Emergency; Not Quite the Same Thing

On 11 July 2023, the crew of SWISS flight LX18 discovered an uncomfortable truth about emergency training; people can do exactly what they have been taught to do, yet still be badly prepared for the real thing.

The Airbus A330 had left Zurich for Newark with 223 passengers and 12 crew. Before take-off, the pilots noticed an odd smell, which they associated with the exceptionally hot 38 °C outside temperature. After departure, the smell returned, stronger this time, and was described as of “dirty socks or damp cellar”. Although the smell soon disappeared again, the cabin crew reported burning eyes, irritation and headaches. These developments prompted the pilots to don oxygen masks, declare an urgency, and return to departure airport. In the cabin, seven crew members began putting on the protective breathing equipment [PBE] smoke hoods provided for emergencies.

Several crew members struggled simply to get the hoods out of their packaging, such that two had to resort to using scissors or a knife. A strap broke on one hood. One crew member needed three minutes to get another working. Once the hoods were worn, the crew reported intense pressure around the nose, heavy sweating and difficulty breathing. Communication between two people wearing the hoods was described as “almost impossible”.

The subsequent investigation by the Swiss Transportation Safety Investigation Board found that, although the crew had been adequately trained, what they had been trained on was problematic.

Their practice hoods were already unpacked and unfolded. They could simply be put over the head. The real hoods were sealed inside packaging that first had to be opened, after which the folded hood had to be pulled apart. These were precisely the stages that caused serious difficulty during the emergency.

***“The PBE units used during the practical exercises were reusable dummies [...] already unpacked and opened and only had to be placed on the head and tightened by the trainee before firefighting could begin. The cabin crew members therefore did not have to remove the PBE from the storage box, nor did they have to open the vacuum-sealed packaging.”***

The training equipment also failed to reproduce some of the most disturbing sensations of the real hood; the heat, the resistance to breathing and the difficulty of speaking. As the investigators put it, “the dummy PBE does not simulate the strong heat development after activation or the difficult breathing”.

This distinction matters because emergency training is partly about creating memory under pressure. In an aircraft cabin filling with smoke, or possibly even toxic fumes, a crew

member does not have the luxury of calmly working out how unfamiliar equipment behaves.

The report records that people who had faced real emergencies described a “startle moment” when they actually had to use the hood. Yet even the instructors giving the emergency training generally had no experience of operating the real equipment since, happily, they were never faced with such an eventuality. The investigators observed that trainers, therefore, could not draw on own experience to prepare trainees for foreseeable difficulties.

The investigation tested the equipment with trained and qualified cabin crew. The results were striking. The rules required the hood to be removed from its packaging, unfolded, put on and activated, within 15 seconds. In the tests, the average was 78 seconds. The fastest attempt took 41 seconds. The slowest took 121.

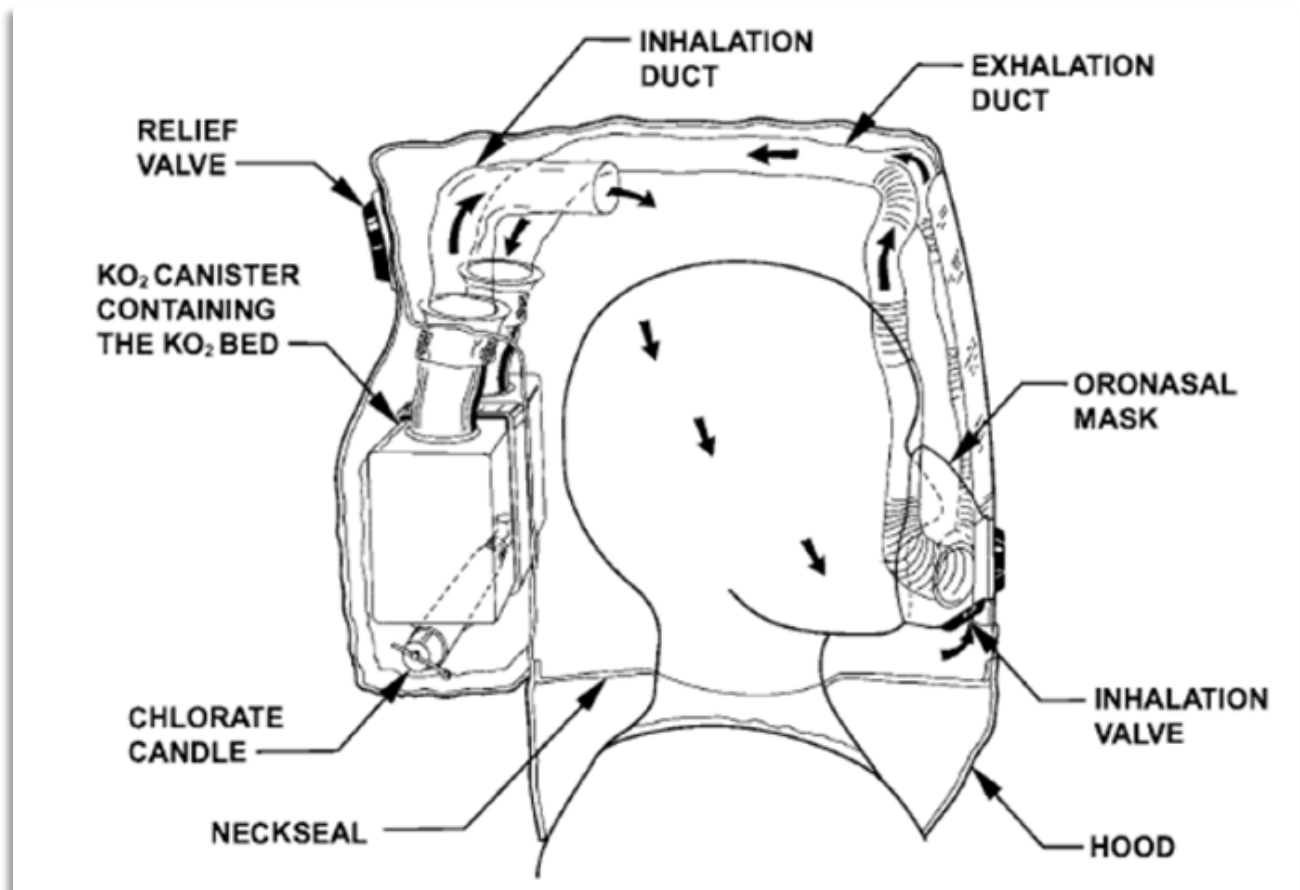
The problem had also survived maintenance. Seven of 18 hoods used during the incident and subsequent investigation failed to work as intended. Some had cracked or broken windows. Others did not activate

properly. More than a third were unusable, or only partly usable. Yet the regular inspection process had allowed these weaknesses to lie dormant. The monthly maintenance inspection amounted to essentially the same external visual check performed by cabin crew before a flight. The investigators called this “particularly surprising”. Actually opening the storage box, and taking out the sealed hood, could have revealed damage that could not reliably be detected from outside.

There was another institutional blind spot. At the end of their working lives, the hoods were simply discarded without a systematic check to establish whether they would actually have worked. The report noted that defects in equipment used only in rare emergencies could consequently remain undiscovered “for a long time or even forever”.

Investigators tested another commonly used type of hood, and found that it too took far longer than the required 15 seconds to deploy. Their conclusion was unusually stark, “It is difficult to understand how two common PBE models were approved despite having such an obvious deficit”. They went further, suggesting “fundamental deficits” in the approval process itself.

This is where the distinction between human error and institutional error becomes important. The pilots did make an initial judgement that proved optimistic. When they first smelled something unusual while taxiing, they attributed it to the hot surface outside. The STSB considered that conclusion reasonable, and the decision to take off “comprehensible”. When symptoms later appeared among cabin crew, the pilots treated the situation seriously, turned back and followed the laid down emergency procedures. The investigators described their response as “appropriate to the situation”.



The more consequential errors had accumulated elsewhere and much earlier. Someone had approved training equipment that removed the hardest parts of the task. The maintenance regime in place could not reliably expose hidden deterioration. Emergency equipment had remained in service despite defects. An approval system had certified equipment against a deployment standard that trained people could not approach in realistic trials.

None of those decisions alone created the incident. Together they created the conditions confronting the crew over the English Channel. While the STSB formally cautions that its findings do not assign legal or personal blame, its conclusion about the system is difficult to misunderstand. “The recurring maintenance measures were inadequate,” it found, while crew members had been trained exclusively on dummy equipment that “differs considerably from the real PBE used in an emergency”.

The aircraft landed safely in Paris, and nobody was injured. But the importance of LX18 lies precisely in the fact that nothing worse happened. It provided the rare opportunity to see what supposedly emergency-ready people and equipment did when an emergency stopped being an exercise.

The crew encountered equipment they had technically been trained to use, but had never truly been trained to experience. Maintenance personnel had been checking equipment without being required to inspect it deeply enough to find important defects. Regulators had approved equipment that trained users could not deploy within anything close to the stated time.

The individual at the sharp end was faced with a situation far removed from what the offered training had promised. When push comes to shove, dormant flaws come to bear. At a moment in time when least expected, or appreciated.

Read the whole STSB report here:

[https://www.sust-stsb.admin.ch/media/publications/aviation/reports/AV\\_20230711\\_04/3107-en.pdf](https://www.sust-stsb.admin.ch/media/publications/aviation/reports/AV_20230711_04/3107-en.pdf)