

What Can We Learn from Safety Incidents?

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It was the early morning of 28 February 2019. An Embraer 195 aircraft was scheduled to take off from Exeter Airport in England for Spain. However, during the take-off roll, the flight crew detected an unusual odour and observed smoke entering the cockpit. In response, they aborted the take-off. The cabin crew also reported smoke and fumes in the cabin. The commander initiated an emergency evacuation during which some passengers were injured.

Several key takeaways can be gleaned from the UK Air Accidents Investigation Branch (AAIB) report¹ on this incident.



Lesson 1: Importance of Proper Maintenance

What Happened

The investigation identified issues pertaining to a lack of maintenance planning, training and control of resources. The smoke and fumes were attributed to an incorrectly performed engine compressor wash procedure carried out by an unqualified maintenance engineer the night before the occurrence. Compressor wash rigs in poor condition; missing records of prior detergent type, concentration and replenishment details; and the non-performance of a key “recommended” step in the engine drying procedure resulted in residual cleaning solution remaining within the aircraft’s Environmental Control System, which caused smoke and fumes.

Corrective Actions Taken

The following changes were made to maintenance procedures and the Engine Service Manual after the accident.

- The tracking of calibration expiry dates of ground support equipment was improved.
- A maintenance planning procedure for resource allocation was introduced prior to start of maintenance.
- Besides identifying training needs of maintenance personnel and providing engineers with additional simulator training on engine ground run, the currency of their skills is actively tracked.
- Before commencing a maintenance task, engineers are given access to correct procedures, records, equipment and tooling, replacement parts and information.
- The engine manufacturer updated its Engine Service Manual to require, rather than only recommend, that a high-power engine dry-out run is conducted after every compressor wash.





Lesson 2: How to Ensure Smooth and Safe Emergency Egress

What Happened

Pre-flight Emergency Briefing

- Although passengers seated next to overwing exits were briefed by the cabin crew on how to operate the exit prior to departure, the briefing did not include instructions on how passengers should get off the wing. It was also unclear from the passenger safety information cards that passengers would need to slide off the wing.

Overwing Exits

- During the evacuation, passengers who had exited the aircraft via the overwing exits were unsure of how to get down from the wing to the ground. As a result, some of them re-entered the cabin and exited via one of the escape slides. Others jumped down from the wing as they did not know they had to slide off the wing via the trailing edge.
- The flight crew selected flap 5 to allow evacuees to slide down the flap to the ground after they decided to evacuate the aircraft. However, engines were shut down before the flaps travelled to the flap 5 position. This was unanticipated because the flight crew's simulator training for evacuation was based on a rejected take-off where flaps were already set at flap 5 position.

Escape Slides

- The rear slides did not round out at the bottom like the front slides. This caused passengers to slide down very fast onto the ground. This, and attempts by passengers to slow themselves down on the slides, were the main causes of injury.

Corrective Actions Taken

Pre-flight Emergency Briefing

- The operator revised its briefing to passengers seated next to overwing exits. Apart from simplifying the terminology used, these passengers are instructed to be out on the wing first to help direct other passengers. They are also informed that there is no escape slide attached to the overwing exits.

Aircraft Certification Requirements

- The UK AAIB recommended to the U.S. Federal Aviation Administration (FAA) and the European Union Aviation Safety Agency (EASA) to review their aircraft certification standards for large transport aircraft, which require the provision of evacuation slides when the emergency egress and escape routes, overwing or otherwise, are 1.8 metres (6 feet) or more above the ground. For lesser heights, passengers are expected to jump down to the ground. However, past safety studies suggested that such jumping can cause injury.



¹ For full report, see AAIB investigation to ERJ 190-200 LR (Embraer 195), G-FBEJ