Arcing on 777 traced back to manufacturing defect

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A short circuit that sparked a fire on-board an Etihad Airways Boeing 777-300ER last October has been traced back to incorrect routing of a wiring bundle during the manufacture of the aircraft four years earlier.

The aircraft, registered A6-ETR, was enroute from Abu Dhabi to Sydney on 14 October 2017 when the flight crew noticed a burning smell coming from an air vent, the Australian Transport Safety Bureau states in its final report on the incident.

After determining that the smell was not present in the forward galley, an aural fire bell activated and the master warning light illuminated, while a 'fire cargo FWD' message displayed on the engine-indicating and crew-alerting system.

The flight crew actioned the non-normal checklist, which included arming the forward cargo fire switches. They then discharged the two fire extinguisher bottles in the forward cargo bay, and declared a 'mayday' and stated to air traffic control their intention to divert to Adelaide, around 500km away.

After completing a scheduled change of flight crew, the aircraft made a rapid descent to 25,000ft before diverting to Adelaide where it landed safely. While firefighters did not observe any signs of fire in the forward compartment, the crew decided to evacuate the aircraft using stairs while parked on a taxiway as a precaution. No injuries were reported.

An initial engineering inspection on the forward cargo bay found soot in the cargo ceiling area. The ceiling panels were then removed, revealing heat damage to floor beams, webs and wiring – including chafing of a 115v wiring loom.

In consultation with Boeing, a temporary repair was made and the aircraft ferried back to Abu Dhabi for a thorough engineering inspection.

That found that a wiring bundle had been incorrectly routed, causing it to come into contact with screws and nutplates, chafing through the insulation and allowing the wires to short-circuit.

Boeing determined that the incorrect routing was likely made during the manufacture of the aircraft. It was the fifth reported incident involving wire chafing and arcing on 777s caused by incorrect installation. It was, however, the first one to trigger the fire warning system.

The manufacturer subsequently issued notices to all 777 operators to inspect the wire bundles to ensure that they have the correct clearance to screws and nutplates. It also issued a service bulletin requiring inspections and corrective action on 777s with line numbers 1-1527 onwards, while it is considering design changes on new aircraft to prevent a re-occurrence.