



In-flight uncontained engine failure Airbus A380-842, VH-OQA

overhead Batam Island, Indonesia on 4 November 2010

What happened and why

Shortly after taking off from Changi Airport, Singapore, the No. 2 engine on a Qantas Airbus A380 failed about 7,000 ft above Batam Island, Indonesia. The failure sent engine fragments through the left wing and damaged some of the aircraft's systems.

The engine failure was a result of an oil feed stub pipe that was incorrectly manufactured with a thin wall that resulted in fatigue cracking of the pipe. This crack released oil into the engine during the flight, which caused an internal fire. That fire led to one of the engine's turbine discs fracturing and then rapidly over speeding before it burst, broke free of the engine casing, and impacted the A380's airframe.

What happened to the aircraft?

The damage to the aircraft from the disc fragments resulted in the aircraft's hydraulic, electrical and other systems being degraded.

Despite the damage, the flight crew managed the multitude of system failures before safely returning the aircraft and landing at Changi Airport without any injuries to the crew and passengers.

What's been done to prevent this from happening again?

The ATSB, Rolls-Royce, aviation regulators, and operators of Trent 900-powered A380s took a range of steps to ensure that engines with incorrectly manufactured oil feed stub pipes were removed from service or managed to enable the aircraft to continue to operate safely.

Rolls-Royce also introduced software that would automatically shut down a Trent 900 engine before its turbine disc over speeds, in the unlikely event of a similar occurrence. As well, Rolls-Royce had improved their quality management system and management of non-conforming parts.

Lessons for future safety

The damage to the aircraft's airframe by the disc fragments highlighted a safety issue with the existing airframe certification standards. The ATSB has issued a safety recommendation to the United States Federal Aviation Administration and the European Aviation Safety Agency to review and incorporate any lessons learned from this accident into their aircraft certification advisory material regarding the minimisation of the hazards from uncontained engine rotor failures.



Media Release

27 June 2013

ATSB releases report into Qantas A380 engine failure

The ATSB today released the final report of its investigation into the uncontained engine failure involving a Qantas Airbus A380 over Batam Island, Indonesia on 4 November 2010.

The accident occurred shortly after the aircraft took off from Singapore. At about 7,000 ft above Batam Island, one of the aircraft's Rolls-Royce Trent 900 engines failed, sending debris into the aircraft's left wing and fuselage, and onto Batam Island. There was significant damage to the aircraft's electrical, hydraulic and other systems. The crew managed the multitude of system failures before safely returning and landing the aircraft.

The ATSB found that the engine failure was the result of a fatigue crack in an oil feed pipe. The crack allowed the release of oil that resulted in an internal oil fire. The oil fire led to one of the engine's turbine discs separating from the drive shaft. The disc then over-accelerated and broke apart, bursting through the engine casing and releasing other high energy debris.

The ATSB also found that the oil pipe, together with a number of similar pipes in other engines, had been made with a thin wall section and did not comply with the design specifications. The thin wall substantially increased the likelihood of fatigue cracking.

This investigation has been one of the more complex undertaken by the ATSB in recent years and has involved a large commitment of resources. As well as understanding how the engine failed, the investigation had to review why quality assurance did not adequately manage the oil pipe problem and what were the implications of the damage to the aircraft.

The ATSB worked closely with international regulators, Rolls-Royce and Airbus to ensure the continued safety of Trent 900-powered A380s. Early in the investigation, the ATSB issued a recommendation to Rolls-Royce about the manufacture of the oil feed stub pipes. As part of its final report, the ATSB issued recommendations to the European and US regulators so that lessons learned from this accident would be incorporated into aircraft certification advisory material designed to minimise hazards from uncontained engine failures.

As a result of the ATSB's investigation, regulatory authorities and operators around the world took steps to ensure that engines with non-conforming oil feed stub pipes were identified and managed appropriately. Rolls-Royce also made changes to their quality assurance system to improve the way they manage non-conforming parts.

The investigation report (AO-2010-089) is available on the ATSB website at www.atsb.gov.au.

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