

JET ENGINE PROBLEMS

Jet engines in use on today's commercial airliners are quite reliable. It is not uncommon for engines to operate for tens of thousands of hours without difficulty before being removed from service for scheduled inspection. However, engine malfunctions or failures occasionally occur that require an engine to be shut down in flight. Since multi-engine airplanes are designed to fly with one engine inoperative and flight crews are trained to fly with one engine inoperative, the in-flight shutdown of an engine typically does not constitute a safety of flight issue. In fact, these events are generally not reportable to the NTSB. Following an engine shutdown, a precautionary landing is performed with airport fire and rescue equipment positioned near the runway. Once the airplane lands, fire department personnel assist with inspecting the airplane to ensure it is safe before it taxis to the gate.

Most in-flight shutdowns are benign and likely to go unnoticed by passengers. For example, it may be prudent for the flight crew to shut down an engine and perform a precautionary landing in the event of a low oil pressure or high oil temperature warning in the cockpit. However, passengers may become quite alarmed by other engine events such as a compressor surge-- a malfunction that is typified by loud bangs and even flames from the engine's inlet and tailpipe. A compressor surge is a disruption of the airflow through a gas turbine engine that can be caused by engine deterioration, a crosswind over the engine's inlet, ingestion of foreign material, or an internal component failure such as a broken blade. While this situation can be alarming, the condition is momentary and not dangerous.

Other events such as a fuel control fault can result in excess fuel in the engine's combustor. This additional fuel can result in flames extending from the engine's exhaust pipe. As alarming as this would appear, at no time is the engine itself actually on fire. Also, the failure of certain components in the engine may result in a release of oil that can cause an odor or oily mist in the cabin. Despite these observations, such occurrences do not necessarily indicate an unsafe condition that must be investigated by the National Transportation Safety Board.

Two terms are helpful in describing the nature of engine failures. A "contained" engine failure is one in which components might separate inside the engine but either remain within the engine's cases or exit the engine through the tail pipe. This is a design feature of all engines and generally should not pose an immediate flight risk. An "uncontained" engine failure can be more serious because pieces from the engine exit the engine at high speeds in other directions, posing potential danger to the aircraft structure and persons within the plane. The Board will likely investigate any uncontained engine failure involving a transport category aircraft.