

Human Performance in Maintenance

A CASE STUDY

"Danger Zone"

BD5J

Although the aircraft in the case study is a homebuilt, the cause of the accident could relate to any aircraft type. It is easy to figure out "what caused the accident", but the "why" and how to prevent it are a lot more complex.

The AMT(Aircraft Maintenance Technician), a person not too unlike you or I, lives with the guilt to this day and lays more blame on himself than he deserves. Put yourself in his shoes and decide what would **you** have done?

Analyse this accident and determine the chain of events. Determine which ones the AMT had control of and devise some safety nets which might have prevented this tragedy.

“Let us learn from the mistakes of others as we’ll never live long enough to make them all ourselves.”

Copies of this may be made to support this video or to receive an original copy contact

The following case study is part of the video “Danger Zone” produced and distributed by the

System Safety Services

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Danger Zone (Continued)

SYNOPSIS

Not long after the aircraft took off on a test flight from the Vanfoot Airport, the engine flamed out. During the pilot's attempted forced landing, the aircraft struck a power line and crashed. The pilot was fatally injured.

The Transportation Safety Board of Canada determined that an unsecured ground socket contact in the aircraft cannon plug to the electric engine fuel pump receptacle momentarily broke contact, causing an interruption in electrical power to the pump and a subsequent engine flame-out.

PERTINENT INFORMATION

The Aircraft Factory

The aircraft bore serial number 10 and was the last to be built in the quasifactory. The aircraft were assembled by unskilled workers with minimal training. Joe, an AMT, paid by the factory, was responsible for the work but the buyer of the aircraft was listed as the builder.

As Rob struggled to fabricate the electric fuel pump cannon plug, he was interrupted by Donna, one of his fellow workers to go for coffee. He hurriedly completed the plug while discussing his concern about the rummored shutdown of the factory. He was reluctant to ask Joe, his supervisor, for help because they were not on good speaking terms at the time.

The Pilot

The pilot was a Boeing 737 captain with over 12,500 flying hours. He was known as a very strong willed individual who almost always got his way. He was very personable, an excellent pilot and was known for his thrill of the dangerous.

He had seen the BD5 jet in a museum where it had sat since it had been donated after it had almost killed its first owner following an engine failure. The pilot, who wouldn't take no for an answer, traded an aircraft to the museum for the tiny jet.

Danger Zone (Continued)

The Aircraft Maintenance Technican

The pilot engaged his close friend, an Aircraft Maintenance Technican (AMT), who was also the Director of Maintenance for the large airline the pilot worked for, to look the aircraft over and make it serviceable. The AMT was known as a no-nonsense, by the book, type of person who took great pride in ensuring that things were done right. While he was not comfortable working on the homebuilt, due in part to his limited knowledge of the aircraft, he agreed in order to help a friend.

Events Leading to the Accident

Money was no object but time was and the aircraft was totally refurbished and repainted. The aircraft flew beautifully but with a vicious stall speed of 115 mph, it took a top notch pilot to fly it.

The engine soon developed a history of unexplained flameouts in flight. This began to occur so often during his airshow routine, that the pilot made it part of the show to shut the engine down and deadstick in for a landing.

The pilot was convinced that the problem was dirty fuel and would add the fuel, one gallon at a time after examining it in a pickle jar. The AMT thought that the electronic fuel control might be starving the engine of fuel and wanted the engine removed and sent to the manufacturer for testing. Instead the pilot devised an electronic override box that could "ramp up the voltage" and increase the fuel flow from the fuel servo valve.

As the aircraft was taxiied out on the final flight, the engine failed. The pilot when quired by the tower about the engine shutdown, commented that he had accidentally hit the guarded engine "kill" switch. The aircraft was restarted and the pilot took off with a steep climbing right turn at the end of the runway. Shortly after the engine was heard to spool down and the pilot immediately leveled the aircraft and lowered the nose. Witnesses saw first a four foot flame out the exhaust followed by a 15 foot jet of flame as the aircraft descended. The aircraft struck trees and then a power line which flipped the tiny aircraft inverted. The aircraft slid for 107 feet before coming to rest. The pilot was killed instantly on impact with the power line.

Danger Zone (Continued)

After the Accident

It was discovered that the last flame out was the 24th failure. The pilot had recorded the others in a meticulous diary he kept of each flight.

The flames shooting out the back on the final flight were likely the result of the pilot using the override box to "ramp up the voltage" and increase the fuel flow. The extra fuel prevented the engine from restarting due to an excessively rich mixture.

The AMT felt personally responsible for this accident. While he didn't realize that the engine had failed that often, he knew there was a problem and he had not insisted on it being rectified before the aircraft flew again. He knew about the override box and admitted that he had grudgingly agreed to it, thinking that it could help trouble shoot the problem and would only be used at altitude within gliding distance of the runway.

Instead it helped result in the death of a very close friend.

He will live with that the rest of his life.

WORKSHEET

Complete as a team *FIRST*

CHAIN OF EVENTS

A link in the Chain of Events is any event, which is a contributing factor, and which if broken or removed, might prevent the occurrence



SAFETY NETS

A Safety Net is a regulation, policy, procedure or practice which, if in place might break a link or prevent a link from forming

