



In my 56 years in aviation, I have been privileged to meet a lot of people in our business. Sadly, in **my seven years as a Transportation Safety Board** of Canada accident investigator, many of them were dead. However, even in death they had a story to tell and some we can learn from.

I'd like to tell a few of these stories.

In my 7 years I investigated 146 accidents. Of those, 3 were undetermined. Although I had a pretty

good idea of what likely happened, unless you can prove it, it must be recorded as undetermined. 35 (24%) were fatal, and 36 (24%) were maintenance related.

Remember that my background is maintenance, so I received more of the suspected maintenance accidents to investigate. I would say that about 10% are directly maintenance related and about 25% had a maintenance contribution. For example, maintenance leaves a fuel line loose on one engine of a twin engine aircraft. The pilot then shuts down the wrong engine. Cause? No, but, contribute, yes.

I have 12 accidents with stories that I hope you will find interesting as well as useful

Each will have a picture or two so they will be over four issues.

#1 The Report That Was Never Published

Not long after the Challenger disaster in 1986 the office received a call that a DC8 was on fire at an airport about 60 miles away.

An aircraft of that size emptied the office in two vehicles like keystone cops racing to the scene of the disaster. On arriving, we found a derrick aircraft with windows and doors missing and in



the process of being scrapped. As I had just joined, they told me to gather some information and left.

I dug out the report guide and began interviewing witnesses. I photographed it from all angles and having got the names of the persons working on it, went to the hospital and interviewed the AME who was on top of the wing when it blew. He was fairly badly burned and under medication, but here was the story. They were under a two week contract to strip the aircraft of as many useful parts before it was

to be reduced to scrap. It was slow going so they rented two big gas powered cutting wheels to speed their entry into places that were difficult to get into. The burned one was on top of the wing cutting aluminum over one of the fuel tanks that turned out to be about ¼ full. Murphy was waiting for that as the wheel found a steel screw and the sparks made an ideal source of ignition. He and the saw were blown up into the air and missed the concrete taxiway by about 5 ft to land in wet grass. That explained the picture of the cutting wheel that I thought belonged to the firemen. The guy on the other side had not found a screw yet. The moral of the story is when under pressure, take a moment for Safety, perhaps your life and try to figure out just what could go wrong with your time-saving idea. He was actually more worried about being fired for burning up their scrap metal. I learned that when you photograph an object, to never assume you know why **it's** there until you prove it. Had there been no survivors or witnesses, that saw held the answer to the fire. Everyone got a good laugh at the “official report” that I submitted, but it never left the office.



#2 Never turn back.

The aircraft had just come out of maintenance that included resealing a leaking fuel tank. The aircraft belonged to a check pilot for a major airline and had been bought so that his son could build up his flying experience. It was to be flown back to a major airport, so the father and son flipped as to who would get to fly and who had to drive. The

father won and the son watched as he took off. At about 150 ft in the air, just past the end of the runway, the engine quit and the aircraft began a steep turn in order to turn back. The aircraft stalled and descended from about 100 ft straight into the ground. The son was the first to arrive and told me that he realized that his Dad was hurt real bad and wanted to give him artificial respiration but he had no face. The accident was unsurvivable with g forces in excess of 200. If you look at the empennage you can see that the metal is crumpled from the sudden stop in spite the impact creating a 18 inch hole in the soft ground. My job was to answer the son's whys. Why did the engine fail and why did Dad turn back? Fortunately, the wreckage did not burn and a teardown of the engine revealed that water in the fuel was the reason for the engine stoppage.

The fuel leak repair called for the top of the integral tank to be removed, sealant be applied along the bottom of the wing ribs where the leak was and the top sealed and replaced. Removing the crumpled tank cover revealed a few drops of water

still hiding along the ribs. A pre-flight fuel/water test had consisted of opening the tank drains directly onto the ground without checking for water. Vibration from the engine running had enabled the water behind the ribs to flow down in sufficient quantities to cause the engine to fail at a critical moment. Maintenance contributed to the accident, but not the fatality. Why did the father attempt the impossible? The simple answer was – he was not “mentally prepared” for the failure and reacted by trying to get back to where he was Safe that was so very close behind him. Had he been flying a 727 he would have known what to do and had the son won the coin toss he would have done as he had recently been trained to do – land straight ahead in the field below. That would have resulted in minimal damage to all.



#3 Danger Zone - BD5J

The aircraft had a story to tell as well. It's registration was **N177RB** with the **RB** standing for Richard Bach whose name was also on the data-plate as the builder. For those who may be too young to know who Richard Bach is, he is an aviator first and a writer second. He bought into Jim Bede's dream and bought

a BD5J powered by a 220 lb thrust jet engine. Jim had established a quasi-factory that built the aircraft with the owner coming to turn the last bolt and claim to be the homebuilder. This aircraft was the 10th and last Bede built aircraft before the FAA caught wind of it and shut it down. On one of its first flights, Bach got into a flat spin that he couldn't get out of. As the canopy disappeared and he stood up to bail out, he shifted the c of g forward and the tiny aircraft dove out of the spin. Shortly after, an engine failure convinced him to wisely donate it to a museum with written instructions that it was never to be sold.

A very strong willed 12,500 hr. 737 captain saw the aircraft and wanted to buy it. The museum could not legally sell the aircraft but they were persuaded to trade it for two other aircraft. The pilot then persuaded his friend, the DOM of the airline to get the aircraft ready for the air show circuit. The DOM had heard about the engine failure and wanted to send the engine to be tested. The persuasive pilot was convinced the failure was due to dirty fuel like he had experienced once. The DOM reluctantly agreed as he didn't have to sign it out as airworthy or even serviceable. The engine soon developed a history of flame outs in flight. It occurred so often that the pilot incorporated a dead stick landing into his air show routine. The DOM thought that the electronic fuel control might be starving the

engine of fuel so the pilot devised an electronic override box that would “ramp up the voltage” and deliver more fuel.

On the final flight, the engine failed as he taxied out and when queried by the tower he said that he had accidentally hit the guarded “kill” switch. While in a steep climbing right turn at the end of the runway, the engine was heard to spool down. The pilot immediately leveled the wings and lowered the nose. Witnesses saw a 4 foot flame out the exhaust increasing to a 15 foot flame before the plane struck the tops of trees and the lowest of 3 power lines before coming to rest inverted.

The pilot was killed instantly. Examination of a meticulous diary the pilot kept revealed that this was the 24th engine flame out. The cause? The ground wire to the electric fuel pump had never been secured (pushed all the way in) in the cannon plug to the fuel pump making it progressively more intermittent.



The DOM felt responsible for his friend’s death as he had not been assertive when he knew he should have been. He will live with that the rest of his life, but would you have done any different?

For a more detailed case study; go to our website at www.system-safety.com and click on “Safety Videos,” “Danger Zone” and Case Study #3.

Stay tuned for more to come.