Flights of the Song Bird: Lessons for Learning from Air Accidents Involving Famous Musicians

An Online Continuing Education Course for Engineers

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Prologue

The first concern related to any incident or accident should be the care for people. People will be affected by the consequences of any adverse event. Serious incidents involving celebrities, athletes, and musicians are of particular interest to the public. Notoriety brings together a mix of fans, family, gawkers, business owners, and the morbidly curious to demand answers. These accidents impact every aspect of a community dealing with tragic and untimely deaths of talented artists, in most cases, lost in their prime years.

So, our quest with this course is to discover any trends or commonalities from these air incidents to see if we can learn from the failures of others instead of our own mistakes, errors, and omissions. Having financial ability does not preclude anyone from experiencing accidents. In fact, risk is often increased for these individuals due to the increases in travel and travel choices.

This course addresses whether these were self-inflicted accidents, engineering design issues, maintenance, acts of nature, or sabotage. The purpose for the Professional Engineering community is to know our limits as engineers. Many engineers have a proclivity towards aviation and have a pilot license as well as a Professional Engineering license. The hope from this course is that we can learn from the tragic and sudden loss of life from accidents involving Aaliyah, John Denver, Stevie Ray Vaughn, Ronnie Van Zandt (Lynyrd Skynyrd), Randy Rhodes (Ozzie Osbourne), Jim Croce, Otis Redding, Patsy Cline, Buddy Holly, and others.

Why Do We Study Past Incidents?

The costliest learning events derive from our past failures. This is not the ideal place to learn. However, we cannot ignore the potential learning value from past incidents. We study past incidents for the purposes of information sharing so that we do not repeat the same mistakes. However, the contextual structure of any incident investigation is important so that you can determine the learning value, as well as any limitations.

In just under a century, there have been over fifteen well known accidental deaths involving aircraft and musical artists. If we also include famous athletes and acting celebrities from America, this list balloons to over fifty additional untimely aviation-related fatalities. More recently, Kobe Bryant and members of his family were impacted by an incident that some are still emotionally reconciling. What can these accidents tell us about what we are not changing?

You may ask yourself, "Why do we keep having these incidents?" In this course, we review several of the most famous musical artist case studies/incidents and look for common themes. The course "***Introduction to Data Trending***" demonstrates how to take multiple data sets, such as incident data, and pull out common trends. "***Incident Investigation Principles & Techniques 101***" and "***Advanced Incident Investigation and Techniques 201***" both offer tools on how to conduct incident investigations. Understanding these processes aids the student in objectively reviewing not only the **What** and **Why** of past incidents but **How** causes are determined. Further, **Where** the focus of any improvements should center.

The study of past incidents for the Professional Engineer is not to entertain but to gain unknown knowledge and apply it in our daily practices. Lessons for Learning are an essential part of any Professional Engineering education. The pain of learning these lessons, again and again, is what we are trying to avoid. However, many times we fail to learn, or because situations and conditions are changed, we do not properly apply the lessons of the past. Let's proceed to discover what we can learn together from these tragic and untimely aviation incidents.

Case Studies

The goal of these courses is to introduce an area of Professional Engineering that you may not be familiar with. Additionally, they provide an entertaining subject that engages the mind. Lastly, they teach skills, verbiage, and technical review techniques you may not otherwise ever see. With these in mind, this course will teach some general concepts of aviation, licensing, and incident investigation techniques for these adverse events. Further, it will reinforce why learning from our past is crucial as an engineer to prevent future events of the same context.

We will begin by presenting the most interesting of the case studies to understand the **What** and **Why** of these adverse events. These thirteen events were chosen from the lot of hundreds of available aviation incidents. The author chose to avoid some incidents that are widely written and discussed, like John F. Kennedy Jr., Kobe Bryant, and others not in the music entertainment genres. However, any similarities within these incidents and our base data may be used to illustrate particular points.

It is important to note the context of the investigations reviewed. The National Transportation Safety Board (NTSB) and the Federal Aviation Administration (FAA) investigations, along with supplemental news stories, were utilized to form the important facts in these case studies. These regulatory based investigations oftentimes pursue a line of inquiry as it pertains to regulations. The deeper investigation into causation and determining **Why** they worked is sometimes not addressed. Curiously, this could be a factor in **Why** we continue to experience these catastrophic, life-altering events.

The case studies in this course are readily available on Wikipedia, NTSB, and FAA public webpages and through many other internet data search engines. As we continue through, you are encouraged to perform your own research. Only facts and data the author feels relevant are included. As with any internet sources, some of the data and the interpretations can vary or be misrepresented. Care has been taken to be as accurate as possible, but the student is reminded that this is not about a quality check on the internet sources as much as it is an opportunity to learn from the causes, consequences, and changes that were implemented after these adverse events.

The case studies are presented in no particular order, meaning that dates are not the driver. The driver is the degree to which the incident has a Professional Engineering interest.

John Denver, Monterey Bay, California

Incident Overview

On October 12, 1997, at 05:28 pm PT, John Denver was pronounced dead after suffering a plane crash. The experimental plane that he had purchased the day before was making test runs. The plane shown in the photograph below was a Rutan Long EZ.

The Rutan Long EZ is a homebuilt aircraft with a canard layout designed by Burt Rutan's Rutan Aircraft Factory. It is derived from the VariEze, which was first offered to homebuilders in 1976. The prototype, N79RA, of the Long-EZ first flew on June 12, 1979.

An **experimental aircraft** is an aircraft that has not yet been fully proven in flight. Often, this implies that new aerospace technologies are being tested on the aircraft, though the label is much broader.

The term "experimental aircraft" is used to refer to aircraft flown with an experimental category airworthiness certificate. In the United States, this also includes most homebuilt aircraft, many of which are based on conventional designs and hence are in the experimental category in name only because of certain restrictions in operation. The term *research aircraft* or *testbed aircraft*, by contrast, generally denotes aircraft modified to perform scientific studies, such as weather research or geophysical surveying, similar to a research vessel.

General characteristics

- **Crew:** 1 Pilot
- **Capacity:** 1 Passenger
- **Length:** 16 ft 10 in (5.12 m)
- **Wingspan:** 26 ft 1 in (7.96 m)
- **Height:** 7 ft 10 in (2.40 m)
- **Wing area:** 81.99 sq ft (7.617 m^2)
- **Empty weight:** 710 lb (322 kg)
- **Max takeoff weight:** 1,325 lb (601 kg)
- **Fuel capacity:** 52 US Gal (197 L)
- **Powerplant:** 1 × Lycoming O-235 air-cooled flat-four engine, 115 hp (86 kW)

Performance

- **Maximum speed:** 185 mph (298 km/h, 161 kn) (max cruise)
- **Cruise speed:** 144 mph (232 km/h, 125 kn) (40% power)
- **Range:** 2,010 mi (3,230 km, 1,750 nmi)
- **Service ceiling:** 27,000 ft (8,200 m)
- **Rate of climb:** 1,750 ft/min (8.9 m/s

The various definitions of *experimental* were provided to remove any doubt that the Rutan was not a proven aircraft. The designation for this plane is more of a label for FAA regulations.

On the day of the incident, several eyewitnesses, who mostly agreed to what happened, gave the following general account. John was testing the plane by flying to the Monterey airport and performing touch and go landings. This is a common practice to log and stay current on flight hours. It is also used to prove a plane, and John was still becoming familiar with the aircraft.

John, an avid pilot, had over 2,700 hours of flying in multiple different aircraft. John was trained in both Visual Flight Rules (VFR) and Instrumentation Flight Rules (IFR). This is all to say that he was no novice pilot. John had also flown small multi-passenger planes that seated 6-10 passengers. In addition, he held certification as a Jet pilot for his Learjet.

John grew up in Roswell, New Mexico, with his father, also an avid pilot for the U.S. Airforce. John had a talent for music and singing at an early age and quickly moved into the music industry, then back to his true love flying. His father instilled the thrill having taken John up in some of the Airforce's latest fighter planes during his formative years.

On the last morning of John's life, he and a local airfield worker prepped the plane, and John left. The plane is equipped with two tanks, as most planes are with the tanks in the wings. Each tank on the Rutan holds about 26 gallons of fuel. Because these are experimental and made from kits, some items can be modified or moved.

Most small aircraft have the fuel switch below the pilot's seat in the forward position. This plane had the switch behind the pilot's seat near the right shoulder. Further, the fuel gauge was directly behind the seat. To reach the fuel switch or view the fuel level, a mirror would be required, and the pilot would have had to unbuckle and completely turn 180 degrees to switch the fuel tanks.

It could only be speculated, but John most likely heard the engine sputtering as verified by eyewitnesses on the ground. John then unbuckled and turned to switch the tanks. In doing so, he inadvertently hit the Rutter pedal controls. This caused the plane to nose dive, also corroborated by eyewitness statements. The plane was only about 500 feet above sea level. This only provides a few seconds to recover control of the plane, and with failing power, it would have been impossible.

The impact of the crash with no seatbelt made identification by fingerprinting the main methodology. John died from blunt force trauma to the head and neck. In short, he died from the impact, and even if there had been people close by, he would not have survived the crash.

Shortly after the crash, the vultures descended on the songbird and began to pick apart his character. Speculations of suicide, alcohol, and drug abuse all made the news. In the end, John tested clean, and science demonstrated with little doubt that this was an accident. It was deemed pilot error, as many aircraft incidents are. Let's look a little deeper into the conclusions.

With each of these case studies, we will review Maintenance, Engineering, Weather, and Human Factors. Let's go into our review from the deep dive shown later in this report.

John Denver Accident Conclusions

Maintenance did play a factor in this incident. The plane was found in good working order from a reputable company and builder. Maintenance and maintenance logs are the responsibility of the owner. Unlike commercial aircraft, the rules of maintenance are self-administered. As a private pilot, you must act and be as disciplined as a commercial pilot even though you have no co-pilot or airport and flight crews looking after you. The FAA or NTSB could not possibly monitor private aircraft at the same level as commercial companies. However, the FAA publishes a guide for small plane ownership called "Plane Sense."

Plane Sense, section 14 CFR part 91, section 91.403, places primary responsibility upon the owner for maintaining the aircraft in an airworthy condition. Logs for all maintenance, repairs, and modifications are to be kept in case of an inspection by th The U.S. has about 12,000 private jets and tens of thousands of ligh pections by regulatory agencies rarely occur ed. Unfortunately, these inspections normally t considered an issue in this crash.

Engineering design dic rs, our job is to ensure that the application and y are built for the end-user to operate without er controls and instrumentation.

This plane was hand-bui e design. This type of modification is called im nce (NOD) or accepting a lower standa al. John, being unfamiliar with this layou

It was found during the in hat the fuel switch access and fuel gauge wer do other things to make it easier to switch th d that they would need to move this switch to below the pilot's ate location in order to see the fuel level and tank switch.