Photo: Flickr

Flight 182

Are you a fearless flyer?

Or do you get butterflies (or bats) in the pit of your stomach while flying?

Be assured that air travel today is extremely safe. But there have been many errors and accidents along the way to safer skies, resulting in improved aircraft design and air travel regulations. San Diego was the site of one such accident leading the way to safer skies.

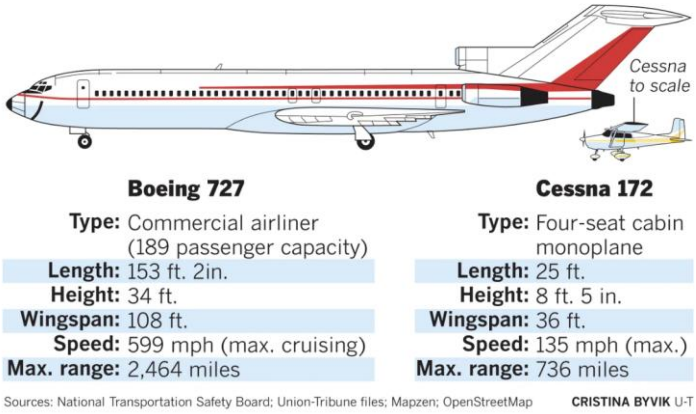
This week's talk by historian Alexander Bevil will take you back 40 years to a dark day in San Diego's past: the 1978 crash of PSA Flight 182. While Mr. Bevil will explain the details of this disaster, read on to learn about the bigger picture: the history of air safety, what causes planes to crash, and the government and airline industry's efforts to keep us safe.

What Happened: The Short Version

On a sunny morning in September 25, 1978, 2,600 feet above North Park, two planes collided. The smaller plane, a Cessna 172, was on a flight lesson operated by two experienced pilots.

The PSA plane was also flown by two pilots with extensive flying experience, and the plane was carrying 135 passengers (37 were PSA staff traveling on their days off), including 4 crew. In total, 144 people died in the disaster, including 7 on the ground. Many additional people on the ground were injured, and 22 houses were destroyed.

With the growing air travel industry and continuous improvements in technology, it's hard to believe that such a terrible accident could happen. But it did.



Click here and listen to a 1978 News Briefing

A Quick History of Air Safety in the United States

Air travel has advanced tremendously since the launch of the Wright Flyer in 1903. In the early 20th century, humans were fascinated by airplanes, although taking even a short flight was risky business. Aviation technology developed in the 1920s and 1930s as we continued to build more competent and safe aircrafts (Harris,). Airplane engine design advanced, as well as development of propellers, effective fueling, and instrumentation (History of Flight 2018.)

Interestingly, it was mail delivery that led to the first initiative to expand and improve air travel. Airmail service from coast-to-coast was possible by 1924, shortening a mail run from New York to California five (by train) to two days. Private airlines were contracted to deliver mail through the Air Mail Act of 1925 (History of Flight).

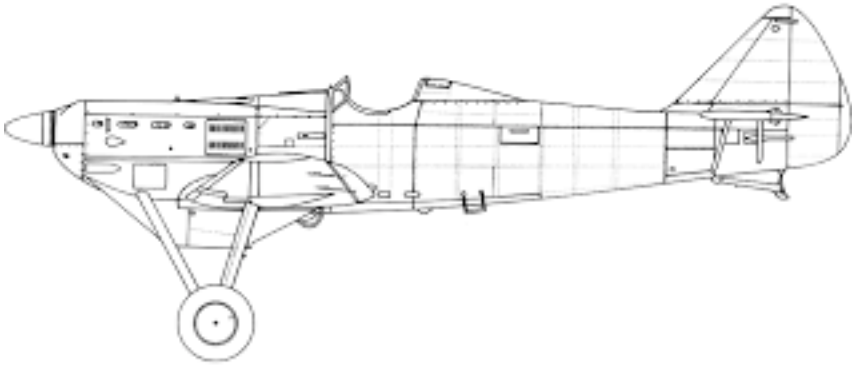


Image: Pixabay

The Air Commerce Act of 1926 was another early boon to improve air travel and enhance its safety. Under this act, a bureau was established to create procedures for licensing aircrafts and pilots, as well as making sure that aircraft engines were up to snuff. This was also the start of the air traffic control system.

Commercial airlines took off in the 20s (pun intended), including Ford Transport System, Western Air Express, and Pan American. By the late 20s, American, United, and others entered the friendly skies.

To give you an idea of early airplane speeds, in 1933 a Boeing 247 could cruise at 180 miles per hour (History of Flight). Today's commercial jets can fly at upwards of 500 miles per hour, in comparison.

A Call for Change

An early accident that resulted in changing airplane design was the 1931 crash that killed football coach Knute Rockne. Rockne had been travelling in a Fokker F.10 Trimoter when it crashed after a thunderstorm. Investigations after the crash raised questions about the wood laminate construction of the wings. The public was scared and shaken by the death of a beloved hero. Some claim that one of the results of the accident was the establishment of the Civil Aeronautics Board, predecessor of the National Transportation Safety Board. This was a pivotal point in the history of aircraft safety (History of Flight).

Since the tragic crash that killed Rockne, a combination of government and private entities have been established. They work together to create and enforce safety policies that make airline travel safer. They also investigate accidents and make recommendations to improve plane or equipment design, staffing or staff training, and regulations.

Here is a translation of the "alphabet soup" of acronyms:

- **Air Transport Association (ATA)**: An airline trade association that represents many large airlines in the U.S.
- **National Transportation Safety Board (NTSB)**: the main authority on aircraft accident investigations
- **Federal Aviation Administration (FAA)** is part of the U.S. Department of Transportation: They are the regulators: they determine if a law was broken. They determine whether a plane should fly.
- **Federal Bureau of Investigation (FBI)**: if a security breach or terrorism is suspected (Houston, 2018)

First, Some Safety Statistics

Click here watch an informative safety video.

First, let's consider some positive statistics.

According to some in the aviation field, a person could fly every day for 3,859 years without being involved in an aircraft accident. CNN reports rate of one accident for every 1.4 million flights (Houston, 2018).

U.S. News and World Report states that air travel is actually one of the safest modes of transportation—even with high-profiles accidents in recent years (Weiss, 2016)

Air travel in the United States is considered to be among the safest in the world. An article in USA Today attributes this to the strength of our country's regulatory system.

Safety advancements include:

- Improved design and construction of planes. Aircrafts are constructed with many back-up systems to control the engine.
- New pilot protocols. The FAA has established new rules that regulate the number of hours a pilot can spend in the cockpit. There are also new cockpit door locking mechanisms and cockpit resource management.
- Satellite technology and air traffic control enhancements. There is new global satellite positioning technology that helps pilots plan their routes and avoid bad weather.
- Heightened industry awareness and resources. With improved technology, data-driven programs boost safety. Airlines have enhanced funding for aircraft maintenance (Weiss, 2016).

So Why do Planes Crash?

It's complicated.

Planes crash due to a combination of factors. Flight Deck Friend is a website written by commercial pilots and geared towards educating the public about careers in flying as well as aviation safety and other topics. This website lists the following statistics as causes for plane crashes:

- 55% Pilot Error
- 17% Aircraft Mechanical Error
- 13% Weather
- 8% Sabotage
- 7% Other (Air Traffic Control, Ground Handling, Unknown)

If you are wondering which phase of flight is the riskiest, consider these statistics: Percentages of fatal accidents based on phase of flight:

- 13% Take-off
- 8% Climb
- 27% Cruise
- 17% Decent Initial Approach
- 38% Final Approach / Landing

In other words, the landing is the most risky part of a flight.

Photo: Milos Prelevic, Unsplash

After the Crash: Figuring Out What Happened

What happens immediately after a plane crash?

First, local police or military must secure the crash site until the team of investigators arrives.

The NTSB is immediately notified, and mobilizes a response team (Chan, 2013).
Each investigation begins with a "Go Team"—a qualified staff of 3 or more field experts. Team members share a duty rotation and must be available 24 hours a day. They keep their suitcases packed and ready to go at a moment's notice. Their traveling equipment includes tools, tape recorders, and flashlights.

When the team arrives on the scene, in particular they search for the two most important features: the cockpit voice recorder, and the flight data recorder or "black box." These devices are designed to withstand crash conditions.

Each investigator on the team has a particular responsibility in relation to the accident, and one member is assigned to be the chief in charge. There is a media briefing daily, led by the team's spokesperson. A team remains on the scene of an accident as long as is necessary—even up to several weeks. After the initial investigation, they continue working from the NTSB's Washington headquarters as they prepare their final report and safety recommendations (NTSB: The Investigation Process, 2019).

The team's specialties include:

- **Operations**: the history of the crew and crewmembers' duties leading up to the accident.
- **Structures**: documenting the wreckage and the accident scene
- **Powerplants**: examining the engines, propellers, and accessories
- **Systems**: examining the plane's hydraulic, electrical, pneutmatic, systems as well as the instruments and flight control system.
- **Air traffic control**: They reconstruct the air traffic scenario
- **Weather:** they gather information from the National Weather Service and local TV stations
- **Human performance**: they study the crew's performance, aware of the possibility of human error, fatigue, medication, drugs, alcohol, and more
- **Survival factors**: they document the impact forces and injuries, evacuation, emergency planning, and crash-fire-rescue efforts (NTSB: The Investigation Process, 2019).

Back to Flight 182

Alexander Bevil's account provides a thorough documentation of the accident and its aftermath. Click here to access a pdf version.

In the end, the team that investigated the crash of PSA Flight 182 had to sort through many possible causes for the accident. Some of these possible explanations might have occurred in combination with others.

- Weather-related glare hindered visibility

- Pilots are supposed to track other planes and maintain a safe distance. This is called “see and avoid.” The PSA pilots somehow did not see and avoid the Cessna.
- A conflict alarm warning went off at Miramar Naval Air Station before the collision, but neither aircraft received it.
- The Cessna strayed from its approved course.
- A minute before the collision, an unclear message came from the PSA flight deck to air traffic control.
- The Cessna was yellow, and hard to see
- The PSA crew might have been distracted as they prepared for landing (Rowe, 2018).

A year after the investigation was concluded, the NTSB’s final report suggested that PSA 182’s cabin crew was at fault for the mid-air collision that led to the crash because they failed to tell Lindbergh Control that they (PSA 182) couldn’t see the Cessna. Many in the aviation community thought this was an unfair accusation; the NTSB’s report was later amended to exonerate the crew.

Summary: The Legacy

Survivors and witnesses of PSA Flight 182 will never forget what they experienced. Nothing can bring back lost loved ones.

But the legacy of the accident lives on in improvements to Lindbergh Field, as well as changes in air traffic control and other regulatory agencies (Bevil, 2017).

One change was the immediate implementation of a Terminal Radar Service Area around Lindbergh Field. Air traffic controllers had to use ground-based radar to detect and direct departing and arriving flights.

Several years after the accident, the airspace over Lindbergh Field was designated Class B by the FAA. This designation requires that all aircraft have to be equipped with an on-board responder, ensuring the plane is visible on the ground controller’s radar screens.

In addition, some smaller planes are banned in Class B airspace, specifically those with Instrument Landing Systems (ILS) that don’t comply with FAA requirements.
These smaller planes must now use one of San Diego’s several smaller airfields.

The crash also led to development of anti-collision technology for cars. Vehicle On-Board Radar emits low microwave signals that detect obstacles ahead. This technology is now a safety component in all automobiles.

Summary

The next time you take off or land at Lindbergh Field, you might remember the story of PSA Flight 182 and Mr. Bevil's talk. Appreciate all we've learned from this particular moment in San Diego's history!

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