Aeronautical Decision Making Case Study

April 2025

Outline

- Video
- Discussion
- ADM Takeaway

“Learn from the mistakes of others. You can't live long enough to make them all yourself.”

-- Eleanor Roosevelt

“More than 80% of the accidents that occurred in IMC were fatal, compared to 15% of those that occurred within VMC…flying VFR into IMC is still one of the most lethal causal factors for GA mishaps…

What stands out is that, unlike most of the other mishap causal factors, this particular rate of occurrence has remained stubbornly fixed — drifting between a 79 to 92% fatal accident rate for VFR into IMC over the last several decades.”

--FAA Safety Briefing, May/June 2024

As you watch the video:

- Try not to judge the pilot and watch your own hazardous attitudes ("that would never happen to me"). We have all done dumb things and sometimes don't have the guts to admit them.
- Take note of what the pilot did wrong.
- Take note of what the pilot did right.
- https://www.youtube.com/watch?v=rjhdlhPbx8E

A Note on Spins vs. Spiral Dives

- The pilot in the video refers to the spiral dive (or “graveyard spiral”) he experiences as a “spin” which is discussed in some detail in the 6 minutes of the video that I skipped.

- Key points:
  - A spin is a controlled maneuver with stable airspeed.
  - A spiral dive is an uncontrolled maneuver with increasing airspeed, often caused by spatial disorientation in IMC.
  - The recovery procedures are different. Described in the video is a spiral dive recovery: Trust your instruments (the G5), reduce power, level the wings then pull out of the dive. You may have practiced this in your training for recovery from unusual attitudes.

- Please do not try this at home without a proper aircraft and instruction!
  - Spins are prohibited in most of our aircraft and require instruction to do safely.
  - Spiral dives can quickly lead to excessive and dangerous g loads that most planes can’t handle.

Discussion

- Reactions?
- Things done wrong?
- Things done right?

Video Timeline

- “Over and around some clouds” 3,300’ – 3,900’
- “Big open hole” down to 1,700
  - METAR 1,700’ 10 minutes prior
- “Doesn’t look like 1,700’”
  - METAR 800’ “this ain’t good…we have to climb…building so fast”
- Initiated climb and entered the clouds
- “Very quickly gained icing and couldn’t maintain altitude”
- Climbed to 5,500’; flew west toward mountain
- First stall and recovery ~4,000’
- Second stall and LOC…“got into death spiral” (160mph, -2,000 fpm)
- “‘Spin’ recovery and pulled out”
- Exited the bottom of the clouds and “saw the mountain”; turned away.
- 1-2 stalls…“knew…this plane is crashing”
- Picked a spot in the trees
- “Stalled into the trees”

Wrong

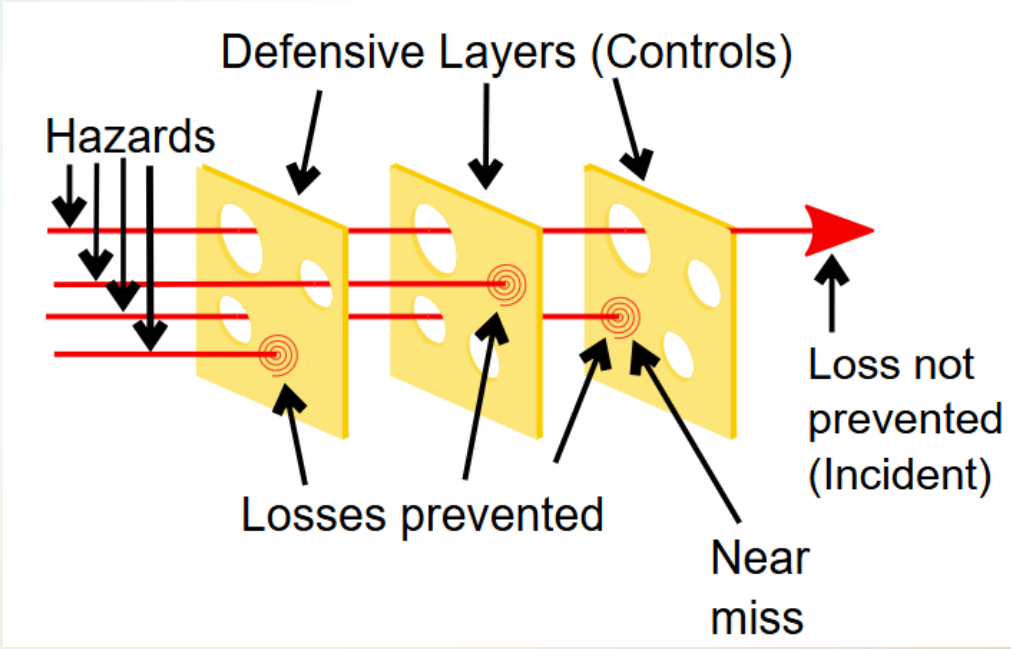
- No flight plan (according to NTSB prelim report). Unknown if talking to ATC.
- Depended on METARs, which can and do change frequently and only apply within 5 miles of the reporting station.
  - (No information was provided or researched on weather forecasts)
  - Believe your eyes, not your forecast
- Should have turned-around rather than scud-running.
  - Did not perceive building risk of flying “over and around” increasing clouds.
- Turned west toward higher terrain.

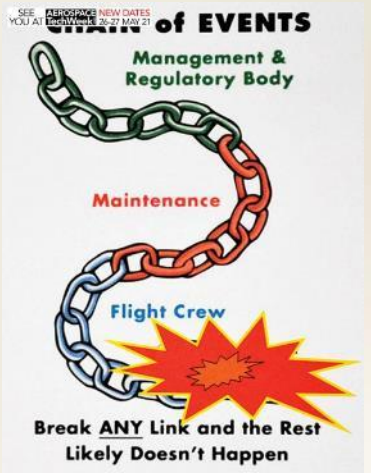
Right

- Climbed to avoid CFIT, albeit into IMC/icing, when scud running didn't work out.
- Didn't just reflexively turn 180° when IMC/icing started due to risk of CFIT.
- Knew plane should climb at 106 mph.
- Had enough IFR experience to understand (and trust) instrument indications and recover from the spiral dive (and/or he was just damn lucky).
- Proper recovery from descending/accelerating unusual attitude: leveled wings first before recovering from the dive.
- **Didn't give up.**
- "Flew the plane all the way into the crash" as Bob Hoover said.
  - Slowed down to reduce energy.
  - Picked a crash spot to dissipate energy.

Accident Chains and Swiss Cheese

- It is easy to recognize the steps in the accident chain, or how the holes lined up in the stack of Swiss cheese, after an accident…it is rarely only one thing that causes an accident.
- The key is to recognize the steps in the accident chain <u>while they are happening</u> to prevent or mitigate them.
- We do this all the time while flying:
  - Plan our flights, looking for hazards such as weather; go/no-go decisions
  - Pre-flight inspection
  - Follow regulations and procedures
  - Use checklists
  - …
  - ADM: Make good decisions based on judgement and experience (watch out for hazardous attitudes)





ADM Models

3P Model

- Perceive
- Process
- Perform

5P Checklist

- Plan
- Plane
- Pilot
- Passengers
- Programming

LMNOP…

(fill in your own favorite mnemonic here)

My ADM Takeaway?

- How Many Go/No-Go Decisions do you make for each flight?
- Not ONE, MANY!

- So, who really cares how many Ps in the model??

- The point is to remember to do it constantly as you fly: risks change throughout a flight, and you have to *recognize* these changes and *apply* some sort of conscious ADM process to:
  - Perceive the risk – what has changed? How might that impact my current plan?
  - Process the risk – what are my options and the consequences of those options
  - Do something about it! (Perform)

Resources

- NTSB Safety Spotlight: VFR into IMC https://www.aopa.org/training-and-safety/air-safety-institute/accident-analysis/vfr-into-imc/ntsb
- FAA Safety Briefing, May/June 2024 https://www.faa.gov/sites/faa.gov/files/MayJun2024.pdf
- VFR into IMC leads to in-flight breakup https://www.aopa.org/training-and-safety/air-safety-institute/accident-analysis/featured-accidents/vfr-into-imc-leads-to-in-flight-breakup
- Graveyard Spiral: What is it and How Can You Avoid It? https://www.pilotmall.com/blogs/news/graveyard-spiral-what-is-it-and-how-can-you-avoid-it?srsltid=AfmBOooCPH-m6cJk1UTXhOPAUJW198DDS-l4SIP7yXJeWkD96f_MB95g

Hazardous Attitudes

- Anti-Authority (“Don’t tell me.”) → Follow the rules. They are usually right.
- Impulsivity (“Do it quickly.”) → Not so fast, think first.
- Invulnerability (“It won’t happen to me.) → “It could happen to me.”
- Macho (“I can do it.) → Taking chances is foolish.
- Resignation (What’s the use?) → **“I’m not helpless. I can make a difference.”**