

Reason to be grateful

The best place I've worked in the 33 years since I left the Navy was the BP Kwinana Refinery, and I'd still be there had it not closed in 2021. The darkest day in the 66 years of the Refinery's operation was December 10th, 1965, when a fire and explosion killed two men. The inquest focused on what happened immediately leading up to the accident, with no focus on root causes such as design of the plant, training or risk assessment procedures. It found "no evidence of negligence", and it made no recommendations. Such an outcome would be unimaginable today, because accident investigation has come so far in the last 50 years.

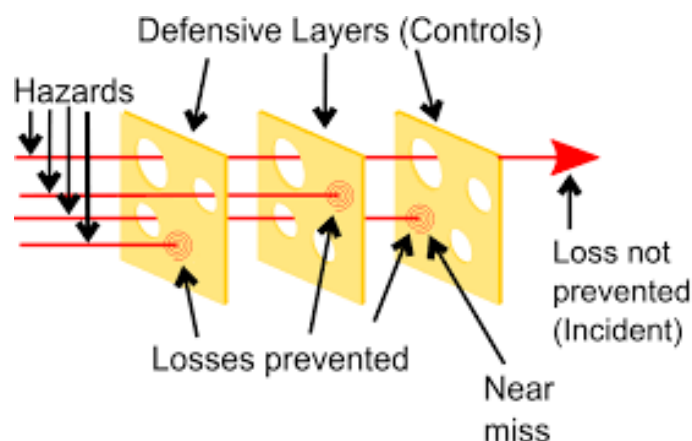
One of the reasons accident investigation is so much better nowadays is an English gentleman who died earlier this year – Professor James Reason.

James Reason told a story of the beginnings of his research into the systems that lead to accidents, as opposed to errors by individuals.

One afternoon in the early 1970s, I was boiling a kettle of tea. The teapot was waiting open-topped on the kitchen surface. At that moment, the cat – a very noisy Burmese – turned up at the nearby kitchen door, howling to be fed. I opened a tin of cat food, dug in a spoon and dolloped a large spoonful of cat food into the teapot.

Reflecting on his "spoonerism", he realised his mistake was not intentional but neither was it random. From this insight he developed a theory of accident causation that examined the interaction between human actions, preconditions, and defences, or barriers that stop accidents happening. In aviation these barriers include maintenance systems, standard operating procedures, checklists, pilot licensing, ATC, and airspace design.

Australian safety pioneer Rob Lee coined the term Swiss cheese to describe Reason's model. Each layer of defence is like a slice of Swiss cheese, and each slice of cheese has holes that represent weaknesses in that defence. The holes in the defences open and close, and sometimes line up to allow an accident.



The worst ever aviation accident was a classic example of the holes lining up. Other than the fog, every other factor was human. Some of the slices of Swiss cheese, and the holes, were:

- The airport at Tenerife was suitable for 747s (slice of cheese) but was not suitable for the amount of traffic that was diverted there due to a bomb threat at Las Palmas, meaning Pan Am had to backtrack on the runway (hole in slice of cheese).
- The KLM crew had very strict flight and duty time limits (slice of cheese). They were on the verge of exceeding them, which would have meant staying in Tenerife overnight and organising accommodation for all the passengers, which made the captain impatient to get going (hole).
- The Spanish controller was speaking to the Dutch crew using standard phraseology (slice of cheese) in the international language of ATC, which of course is neither Spanish nor Dutch (hole).
- KLM, like all airlines, had published crew coordination procedures (slice of cheese). The captain was the most senior 747 checkie in KLM, and the FO had 95 hours on type, meaning a very steep “don’t question the boss” authority gradient (hole).

James Reason acknowledged that his Swiss cheese model wasn’t a detailed theory of what causes accidents, but it was invaluable as a means of communication. One factor that made his work so influential was that he was good at communicating complex ideas simply, whether it was to astronauts, surgeons, aircraft mechanics or nuclear power plant operators.

Another area where the Swiss cheese model was extremely valuable was in health care, Reason’s primary area of research since 2000. Using his model improved outcomes and reduced the tendency to punish workers for mistakes made under pressure or in poorly designed systems. James Reason examined the idea of a “just culture”, meaning a safety culture that encourages people to report mistakes and incidents without fear of punishment. Considering accidents are generally not caused just by one factor, it’s important to focus on and learn from systemic issues and to find and fix root causes of problems, rather than blaming individuals. A just culture still holds individuals accountable for reckless behaviour, but the emphasis is on understanding how systemic failings can lead to errors. All of that applies very well, and is in fact probably better used, in aviation. Medical stuff-ups almost never make headlines because they only kill one person at a time, whereas a major flying accident is guaranteed to meet the typical media “If it bleeds, it leads” criterion.

As Reason’s early work was being published, a series of catastrophic accidents captured world attention: Three Mile Island (1979), Bhopal (1984), Chernobyl (1986), the Space Shuttle Challenger explosion (1986), and Piper Alpha (1988). Like the BP tragedy in 1965, each was initially blamed on “human error,” but Professor Reason’s deeper analysis revealed the complex organisational and systemic factors that made such tragedies almost inevitable.

He was one of those people whose legacy can't be measured, because you can't measure what didn't happen. How many accidents have been prevented, and how many lives have been saved, because of James Reason's work? Considering how relevant his work was to aviation, everyone who flies has reason to be grateful.

A personal reflection

As those who were at the recent memorial service heard, Claude was always very keen for Northam Aero Club to be a flying school. Because of that, he was always appreciative of my involvement with the club. He was also a big fan of my regular FlyAbout articles, and it was his idea to create a page on the club website specifically for them.

To be held in high esteem by Claude – someone who spent his nine decades on earth so well, and who did so much for the club – was an honour, and a memory to treasure. And be assured, the esteem was mutual.

Merci beaucoup, et au revoir mon ami.