

# Inexplicable

No-one will ever know why two experienced pilots made decisions leading to a Cessna hitting an unidentified spur deep in the hills south-east of Wanaka, killing the four occupants. But with the safety investigation complete, it now appears it was a classic 'Swiss cheese model' tragedy.



In March of 2015, a Cessna 185B Skywagon flew out of Wanaka aerodrome on a VFR flight to The Branches high country station near Coronet Peak.

On board were two pilots with almost 10,000 hours between them, both trained and experienced in mountain flying.

About 90 minutes later, the wreckage of their aircraft was spotted in the peaks above the Motatapu River North Branch, not far from its destination.

So what had gone so terribly wrong?

Weather was the major factor. The CAA's safety investigation found that before their flight, the pilots had discussed the weather with friends, and their likely route through to The Branches. Although they noted that Roys Peak (5177 ft AMSL) and its ridge above the Motatapu River were shrouded in cloud, they did not get a MetService weather briefing.

The pilot who first spotted the aircraft wreckage reported that flying conditions were marginal. The CAA's report notes that, "As the aircraft continued flying toward the head of the Motatapu valley, the flyable airspace between the terrain and the cloud base would have been reducing".

Examination of the aircraft at the accident site discovered "the aircraft's flaps were found extended 10 degrees consistent with the aircraft being configured to operate in reduced visibility".

When it seemed to become apparent that cloud was completely blocking their path, the pilot tried a 180-degree turn.

The investigation found the aircraft was probably not positioned optimally for such a reversal turn. As it approached the right-hand bend in the Motatapu valley, the best place to turn would have been from the southern side of the valley which would have allowed the aircraft to turn away to the right if needed.


But the report found the pilot had tried a descending left reversal turn. That's when the aircraft hit the spur, possibly seen by the pilots only in the last few seconds before impact, because of drizzle markedly reducing visibility and the visual definition of the terrain towards which they were flying.

## The Swiss cheese model of accident causation

Professor James Reason of the University of Manchester maintains the threat of an accident materialises only when all possible defences against that fail. He likened those defences to slices of Swiss cheese, with the holes in the cheese representing the weakness in each defence. If the holes align, the threat of an accident gets through those holes and the result is an accident.

Equally, if just one slice of Swiss cheese – a single defence – remains robust, and its holes do not line up with the others, the accident is avoided.

The first defence available to the Cessna pilots was a MetService briefing. It would have provided them with important weather information, as the CAA's safety report notes.



“The amended Clyde area forecast issued at 1019 hours indicated a lower broken cloud base of 3000 feet AMSL with visibility reducing to 4000 metres in moderate rain or drizzle.”

A second defence would have been the decision to turn back when they encountered the combination of low cloud and rising terrain.

In such circumstances, they were no longer complying with the requirements of rule 91.301 *Meteorological Minima*. “Aircraft operating above 3000 feet AMSL or 1000 feet above terrain whichever is the higher must maintain a minimum distance from cloud of two kilometres horizontally and 1000 feet vertically. A minimum flight visibility of five kilometres is also required.”

The CAA safety report concludes that given how close the accident was to the pilots’ destination, it was also likely the result of ‘get-there-itis’.

Research by the Australian Transport Safety Bureau<sup>1</sup> into weather-related decision-making behaviours, concludes that the chances of a VFR into IMC encounter increase as the flight progresses, until those chances reach a maximum during the final 20 percent of the flight distance. This result highlights the danger of pilots ‘pressing on’ to reach their destination.

The CAA safety report notes, as they flew along the valley, the pilots were nearing the maximum chance of such a ‘VFR into IMC’ encounter.

The decision to turn back therefore was made too late, and possibly hurriedly, because the turn began from a geographical point in the valley that left little or no margin for error.

Defences against the inevitability of an accident included the aircraft having a valid Certificate of Airworthiness and having been maintained in accordance with the rules. There were no pre-accident aircraft defects, nor weight and balance issues.

More possible defences were the pilots’ high number of flying hours, their experience flying in mountains, and their knowledge of the route they were flying. One of them had recently attended an AvKiwi Safety Seminar on weather decision-making.

CAA Safety Investigator Colin Grounsell examined the causes of the accident. After his report was published on the CAA website, he told *Vector*, “We (the safety investigation team) talked a lot about what more we could have done that would have made a difference: were there any gaps that we could fill to help avoid such a catastrophe in the future?

“But in the end we decided that you can establish rules and educate for best practice, but ultimately pilots are free to make their own choice.” ■

1 ATSB (2005) General Aviation Pilot Behaviours in the Face of Adverse Weather.