WX Matters

"Forecasters sometimes get the aviation forecast wrong. However, a poor forecast never killed anybody. A forecast is just the forecaster's best efforts at predicting what you're likely to encounter on your route. Pilots who've crashed in bad weather usually made bad decisions related to that weather, usually decisions that were beyond their capability."
– Greg Reeve, Meteorologist

Weather is a huge topic, and it's difficult to encapsulate the 2015 AvKiwi Safety Seminars, "*WX Matters*", in just a few pages of text. The following is a summary. To get the full picture, check out the online course at, www.caa.govt.nz/avkiwi. The course includes extensive insight from meteorologists, local weather tips, and interviews with industry experts.

Lessons from ZK-SML

The fatal accident involving ZK-SML is a classic reminder of why a VFR pilot should never willingly enter cloud. Here, the pilot had multiple options available when confronted with poor weather. But he chose to continue with his original plan.

Although classified as a microlight, SML was a high performance aircraft. The Dyn'Aero MCR 01 Club microlight boasts a two-seat fibreglass carbon fibre composite construction, with a cruise speed of approximately 145 knots. SML was also fitted with long range fuel tanks (2000 NM range), and an advanced Electronic Flight Instrument System (EFIS) – though not certificated.

On the morning of 9 April 2011, the pilot of ZK-SML planned to depart from North Shore Aerodrome for a non-stop flight to Ashburton of approximately four hours.

Before leaving home, the pilot got an aviation weather briefing from MetFlight. For the first part of the route the forecast was fine, with 30 km visibility and scattered cloud clearing in the morning. However, the forecast for the Tasman area indicated cloud over the whole region, from 2500 ft with tops at 7000 ft. The Nelson aerodrome forecasts confirmed this.

The pilot departed at approximately 11 am after phoning a friend in Ashburton; who'd said the weather was fine.

At 1:20 pm the radar showed the aircraft tracking to the eastern side of D'Urville Island, northeast of Nelson, at 1200 ft. From here SML followed the inlet to French Pass, where radar data was temporarily lost.

We can assume that the pilot would have seen the cloud covering the Nelson Ranges at the top of the North Island. Pilot reports described the weather conditions as being extremely poor, with a low cloud base of approximately 1200 ft and light drizzle.

It's believed the intended route was to track over D'Urville Island to French Pass, keeping under Nelson controlled airspace, then on to the head of Queen Charlotte Sound, and from there to Wairau Valley township, avoiding the Woodbourne Control Zone.

When radar contact was re-established, it showed SML in the vicinity of Cape Soucis on a southerly heading at 2500 ft and climbing. Radar data was lost again as the aircraft approached the Bryant Range and Mt Duppa (3400 ft).

SML impacted Mt Duppa at approximately 1:45 pm.

On Further Analysis

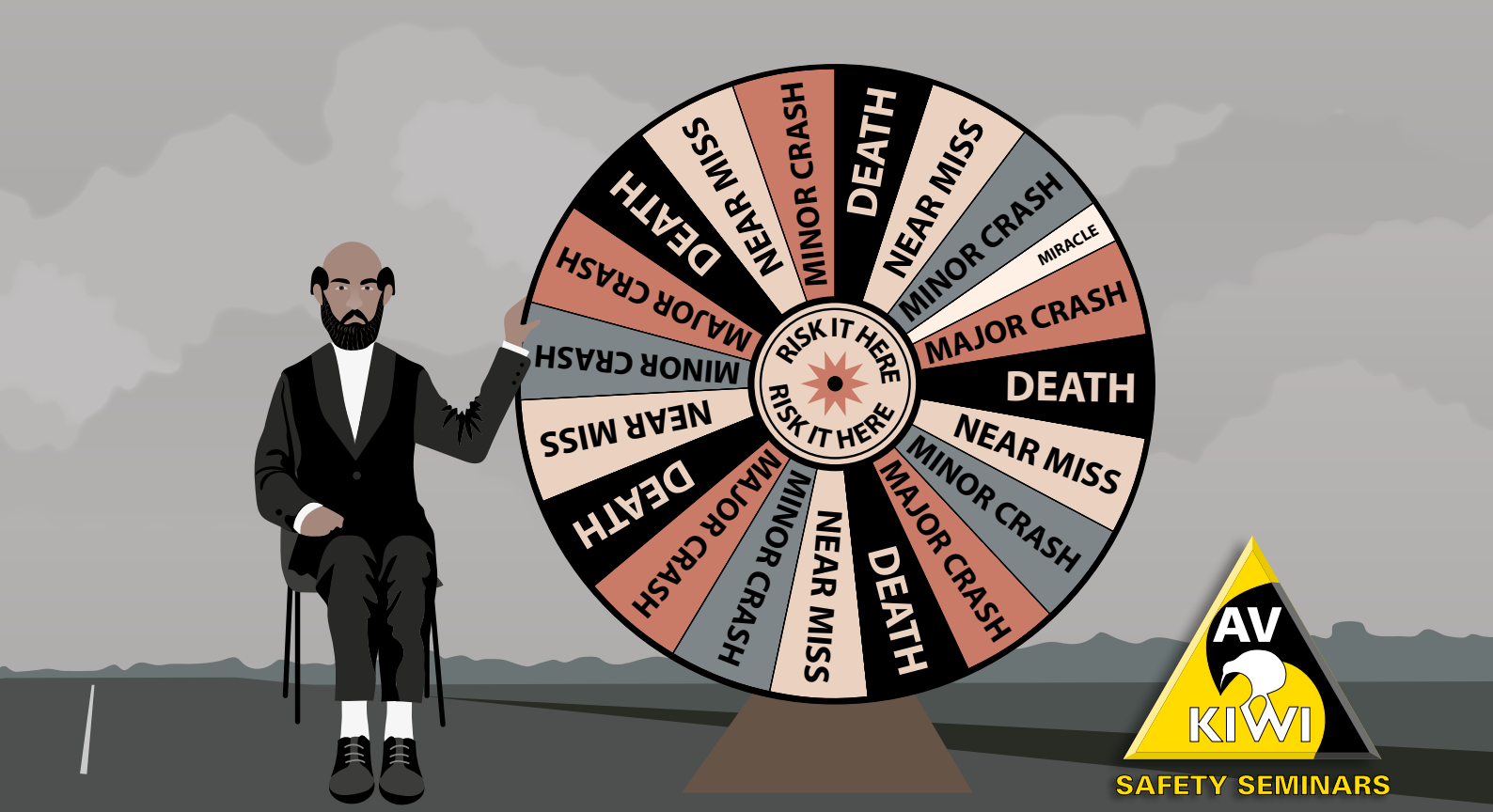
The CAA accident report states, "The pilot had flown this route previously in SML with other experienced pilots. However, this was the first time he had attempted the flight on his own. It's possible he'd never encountered similar weather conditions on previous flights and was therefore lacking experience in dealing with such conditions."

It's believed the pilot had an aversion to flying in controlled airspace and speaking with air traffic control. It's also evident he placed a lot of faith in his EFIS equipment. However, apart from the very unwise decision to enter cloud, the terrain information on the EFIS was flawed.

At some point near the end of the flight, the pilot chose to put blind faith in his equipment, leaving his survival to chance.

Numbers Paint the Picture

According to the US National Safety Transportation Board, the total number of general aviation (GA) accidents per year has declined over the past two decades. However, the relative proportion of GA accidents occurring during instrument



meteorological conditions (IMC) has remained fairly stable, ranging from five to nine per cent of annual GA accident totals. Additionally, about two-thirds of IMC accidents have resulted in at least one fatality. That's three times higher than the fatality rate of all GA accidents!

Since 2000, New Zealand has witnessed 20 fatal accidents, with 36 associated fatalities, where met conditions have been identified as a contributing factor. Those accidents account for 17 per cent of total fatal accidents.

Controlled flight into terrain is the most common accident type. Wind shift plays a role in almost 60 per cent of all weather-related accidents, with more than 60 per cent of those accidents occurring during landing. Questions were posed; are these accidents a result of not getting the weather, not understanding it, or not being trained to manage it?

Many *Vector* accident briefs contain words similar to "experienced an unexpected wind gust, or unexpected sink" – but this begs the question, do the pilots involved in those occurrences really understand the weather?

Inexperience Kills

Pilots involved in a weather-related accident are generally less experienced than pilots involved in accidents where weather is not a factor.

The following figures compare the median total flight hours for pilots involved in the 'weather-related accidents' group, with the median flight hours for pilots in all other accidents (excluding large and medium airlines).

Median flying hours of small aircraft pilots in accidents:

Weather related	All other
580	1328

Median flying hours of helicopter pilots in accidents:

Weather related	All other
1573	1950

Median flying hours of microlight pilots in accidents:

Weather related	All other
252	132

The microlight flight hours could reflect the tendency for microlight pilots to stay closer to home for longer when compared with other pilots, before setting off on their cross-countries.

2015 AvKiwi Safety Seminars

Weather was the topic of the AvKiwi Safety Seminars in 2009 and Rose Wood, Team Leader Safety Promotion, says that demand prompted the team to talk about weather again in 2015.

"Feedback suggests many pilots struggle with weather and want to know more about it. Our role is to raise awareness, so this year we looked at weather with emphasis on what pilots do with the information – they need to understand what the information means.

"We've also developed apps and have a course on the CAA web site. I encourage all pilots to have a look. There are practical tools there, and we already hear that instructors are using the resources.

"Students can use the online course to test their knowledge, providing valuable feedback on their understanding," says Rose.

The 2015 AvKiwi Safety Seminars were attended by more than 2000 people, and were presented in 31 locations throughout the country.

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2014's Spike in Dual Training Accidents

The CAA is conducting an investigation into the 2014 spike in dual flight training accidents.

After researching the degree of instructor training, common factors began to emerge.

A common theme was the lack of logbook evidence of dual, or solo cross wind landing, or takeoff training. Some logbooks even failed to show evidence throughout prescribed training periods. Naturally, that raised concerns about the standard, or lack thereof, of cross wind training being provided. It's also fair to assume there's plenty of scope to improve New Zealand's record of wind-shift accidents.

Avoid Becoming an Accident Brief

As the adage says, it's better to be on the ground wishing you were in the air, than the other way around.

Carlton Campbell, CAA Aviation Safety Adviser, presented 31 *WX Matters* AvKiwi Safety Seminars in which he urged pilots not to overestimate their abilities.

"As the stats show, a limited level of knowledge or experience greatly increases risk. If you fall into this category, it's all the more important to make sound decisions early. When in doubt, err on the side of caution.

"Most importantly, you need to get some GUTS," Carlton says with a smile.

The acronym, 'GUTS' was coined during the 2013 AvKiwi Safety Seminar *Get the Mental Picture*. It stands for:

Gather

Always use the most up-to-date weather info available. Gather as much information as you can so you're well prepared for your flight, and don't stop gathering information after departure.

Understand

Having all the information you can get your hands on, won't do you any good if you don't digest it, or can't filter what's relevant.

"This is particularly important with Met information, because it is rarely clear-cut," says Carlton.

Think Ahead

Once you've processed the information, you need to use it to form predictions, so you can start preparing for possible eventualities.

"You need to be sufficiently able to make prudent decisions, avoiding the threats clearly evidenced in the statistics," Carlton says.

Self-Review

How did your prediction compare with the actual conditions?

"Identify the areas that need investigation. Get in the routine of figuring out why expected and actual conditions differ. This will ensure you're continually improving your Met knowledge," says Carlton

There's Information All Around You

You should aim to get your head in the clouds before you go flying. This is especially important if you don't fly very often.

Here are a few of the information sources available to you.

MetFlight GA – It's Free!

MetFlight GA, www.metflight.metra.co.nz, is the MetService web site that provides aviation Met for non-commercial use. If you haven't heard already, the cost of MetService providing this web service is now met by the government. See page 3, "Free MetFlight GA".

Internet Flight Information Service (IFIS)

IFIS, www.ifis.airways.co.nz, is provided by Airways . Here you can file flight plans, obtain NOTAMs, and access current ATIS (automatic terminal information service) reports for attended aerodromes.

Webcams

There are a large number of public webcams available on the internet that, when used carefully, can help VFR pilots form an overall 'weather picture'.

When using webcams, always check imagery times to make sure they are current. If there are webcams on the routes or aerodromes you use regularly, look at the imagery frequently (even on days you're not flying) so that you become familiar with hills and other landmarks you may want to use to assess

Understand Every Cloud

Weather can be a puzzle – you've got all the pieces, but you need to fit them together to create the right picture.

Ask yourself: Why is there visible moisture? How did it form? And what hints does it give me about the flight conditions?

Here are a few to get you started:

Altocumulus Lenticularis

The lenticularis cloud alone suggests a very strong wind aloft – at least 20 knots at ridge top level – but given the apparent displacement of the waves in relation to the mountains, it's probably much stronger. The hints of rotor cloud confirm the presence of severe turbulence.

Rotor Cloud

The chaotic nature of the cloud in this image confirms the strong turbulence present. However, even without moisture, but in similar wind conditions, the rotor will still exist – it just won't be visible.

visibility and cloud base. If you're unfamiliar with the aerodrome or route, the images may also help you build a picture of local terrain and aerodrome layout.

When using airport webcams, always verify cloud bases with those reported in AUTO METAR reports (where available).

Identify your Knowledge Gaps – Then Fill Them

Feedback from *WX Matters* highlighted the need for pilots to refresh their Met knowledge from time to time. One pilot who attended the seminar said, "It's amazing how little I remember about weather – it's been 20 years since I studied Met."

When it comes to interpreting Met information, make sure you know which reports and forecasts use degrees true, and which use magnetic to report wind direction. As a general rule, anything provided directly by an air traffic controller will be in magnetic.

TAF Test

Here are a few questions to test your knowledge – you can find the answers at the bottom of this page.

(a) TAF times are in: UTC / GMT

(b) TAF winds are in: True / Magnetic

(c) TAF cloud heights are in: AGL / AMSL

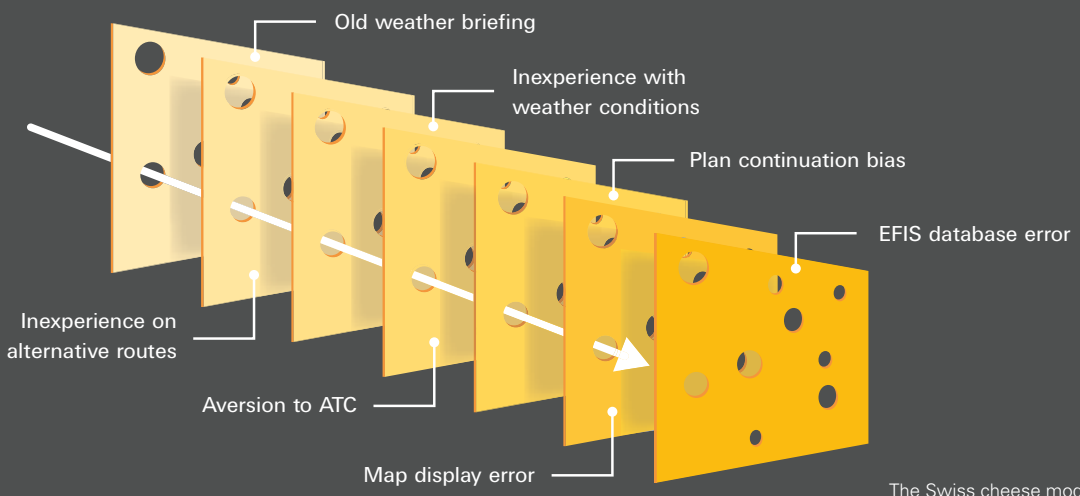
Our Apps Can Help

WX Matters introduced a new way to look at your weather brief. With a bit of electronic wizardry you can now turn it into a picture.

See page 18 for a rundown of iPhone and Android apps created by the CAA to assist you. ■

SML's Swiss Cheese

The slices of cheese represent various factors that make up your safety framework. The holes represent the holes in that safety framework. In SML's case, those holes lined up, making the pilot defenceless.



The Swiss cheese model of safety incidents, Prof James Reason, 2000.

Roll Cloud

Roll cloud on the leading edge of a travelling cumulonimbus. A gust front will precede the roll. In New Zealand, the associated low-level wind shear may be as much as 50 knots. Studies have shown a 35 knot wind shear is enough for most pilots to lose control.

Cumulonimbus

This is an extreme manifestation of visible moisture. Cb clouds can be accompanied by severe turbulence, severe icing, electrical phenomena, hail, microbursts, gust front, tornado, and poor visibility.

Asperatus

Asperatus is an enhanced form of lenticular cloud, where the terrain-induced turbulence below has developed to such a great depth that it's having an affect on the wave cloud above. The turbulent nature of the lower atmosphere is clearly reflected in the bizarre shapes.

Photos: istockphoto.com/DWalker44, istockphoto.com/StephenBonk

TAF test answers: (a) Times are in UTC (b) Winds are in true (c) Clouds are in AGL.