An Airports Perspective on Aviation Meteorology

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At the MET Symposium last year Lochie Thurston presented a very thorough briefing on the aspects of Aviation Meteorology that have a direct impact on the operations of airports.

Rather than present the same material, this year I will provide a brief summary of what Lochie had to say and then touch on some current issues.

Airports are commercial operations with a strong focus on customer experience and efficiency – as far as possible making optimum use of the investment in infrastructure.

Apart from the direct effects of weather on the operation of an aircraft itself, weather is a disruptor of the smooth flow of airport operations that airports and airlines strive for in the interests of that passenger experience.

Visibility
Visibility directly affects runway capacity at any point in time (mostly from conditions causing a need for increased separation of aircraft and thus reduced throughput of aircraft - sometimes as low as being unusable in fog).

Wind
Wind affects airports significantly – from dictating the runway in use (with consequential noise effects for neighbouring communities) – to safety of staff and equipment operating on the apron and the consequences of disrupts.

Rain/Temperatures/snow
Winter operations can produce ice, snow, slush and water as "contaminants" on a runway and affect aircraft take-off and landing performance – potential again for disruption

Lightning
There are safety issues for airside stakeholders operating the airport apron in lightning conditions

Forewarning and preparation to minimise the impact of weather helps achieve both safety and service outcomes.

The aviation industry in its short life has developed many tools to help manage the impact of weather, including –

(i)   Low visibility operations
(ii)   Runway Visual Range procedures
(iii)   Resource planning for responding to snow and ice
(iv)   Collaborative decision-making to ensure all parties share in understanding on-time performance issues
(v)   Communication of conditions (I'm referring here to TAF, METAR, NOTAM and ATIS reports – including conditions conveyed by air traffic controllers)

Interestingly, the regulator takes a keen interest ensuring both the quality of Met data, and the means by which it is communicated to the operator of an aircraft.

For example an Aviation Met Service Organisation is certificated under CAR 174, the Aeronautical Information Service is certificated under CAR 175, and any telecommunication service in support of Instrument Flights (amongst other things) is under CAR 171.

Although volcanic ash is not strictly "weather" the means of communicating volcanic ash conditions to aircraft are established through the same systems as weather.

In 2015 a rule was introduced requiring CAR 139 certificated airports to provide "real-time runway condition reporting" to enable aircraft that are suitably equipped for Take Off and Landing Performance Assessment (or TALPA) – to come into effect on 31 July 2018.

Where the aircraft's flight management system provides for it (most of the modern jet airliners) – the crew of an aircraft can reassess the landing performance of the aircraft en-route based on the runway condition being reported at the time. This more precise assessment based on up to date data has the potential to reduce disruptions such as diversions that otherwise would occur with less precise information being available.

The runway condition in this case is directly related to weather – the presence of contaminants on the runway as a result of weather – snow, slush, ice, water.

The airports are aviation certificated organisations, so there should be no problem ensuring the quality of the runway condition data – an AC will help sort that out (although we question whether there is any practical need for every certificated airport to be doing such onerous reporting – but that is another matter and not relevant today).

The challenge for airports is what to do with that data – how does it get to the cockpit of an aircraft in real-time?

If it were fog on the runway – that gets to the aircraft as weather data conveyed through the traditional channels. But the ICAO spec for the data about snow, slush and ice on the runway, and the timeliness of that data doesn't lend itself easily to current communication channels without those channels being adapted.

The integrity of runway condition data is every bit as important from a safety perspective as any weather data. The same level of robustness needs to be applied to communicating runway condition data to the aircraft as has traditionally occurred with weather data.

From an airport perspective, the aviation weather data systems (both the role undertaken by the regulator and the role undertaken in service delivery of aeronautical weather information to the aircraft) should be expanded and updated to incorporate real-time runway condition reporting.

In the meantime airports are operating in a small window of relief from the Rule requirement – all 26 certificated airports have been/or are being granted exemptions from the rule until November 2020. However those exemptions are subject to conditions that can only be met by the involvement of other parties – the same parties that handle aeronautical information about aviation meteorological conditions.

To conclude on a positive note – the airports most affected by winter conditions - Christchurch, Dunedin and Queenstown airports have for almost a decade now voluntarily provided a limited (but effective) form of real-time runway condition reporting via operational arrangements with the main airlines operating into those airports during winter months and only when contaminants are present.

Wellington is progressing implementation of automated runway condition reporting and keen to take advantage of the technology. So there is support for this reporting where it is needed, but the aviation systems to give proper effect to it need to be stepped up.

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