NZ TRANSPORT AGENCY WAKA KOTAHI

29 Weather activated variable speed limits

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Weather-activated signs improving road safety over the Kaimai Ranges

The Weather Activated Variable Speed Limit (WAVSL) system on State Highway 29 (SH29) over the Kaimai Range has been operating for 15 months.

The weather-activated signs with adjustable speed limits are part of a two year trial aiming to encourage people to drive at safe speeds when rain, ice and fog hit the Kaimai Range, which links the Waikato and the Bay of Plenty.

The project, which went live in November 2015, is part of the Government's Safer Journeys road safety strategy. The initiative reminds drivers to slow down during adverse weather and has the potential to significantly reduce crashes and casualties on both sides of the Kaimai Range.

The system includes two variable speed limit (VSL) zones on the eastern (80km/h) and western flanks (60km/h), as well as variable message signs (VMS) at the start of the WAVSL route in each direction.

A MetService weather station near the summit detects inclement weather conditions, alerts an operator who confirms the weather conditions via webcams, and activates (and deactivates) the VSL and VMS signs as required.

Variable speed limit sign on the eastern flank

Initial results

In the year since the installation of the WAVSL system it has shown to be effective at reducing speeds and raising driver awareness of inclement weather conditions.

Compliance with lower speed limits has been good, even during the winter months when the system is activated more frequently.

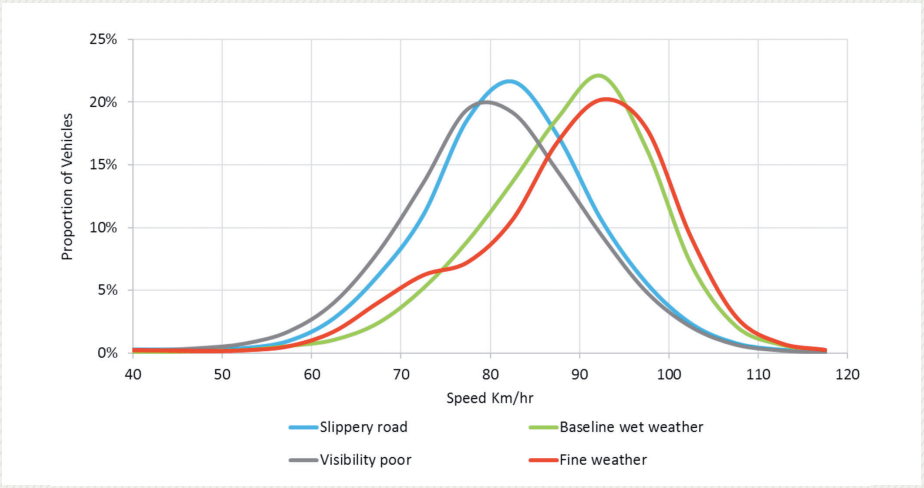
In some cases, rain, cloud, or mist can be present on the summit, but not further downhill. To combat these uneven weather conditions, and following feedback from drivers, traffic operators, and from data analysis, two more VSL were introduced in a new summit zone in October 2016. This ensures that drivers are more effectively warned about the conditions in their immediate location on the road and they have better confidence in the accuracy of the signs.

Reduction in traffic speed

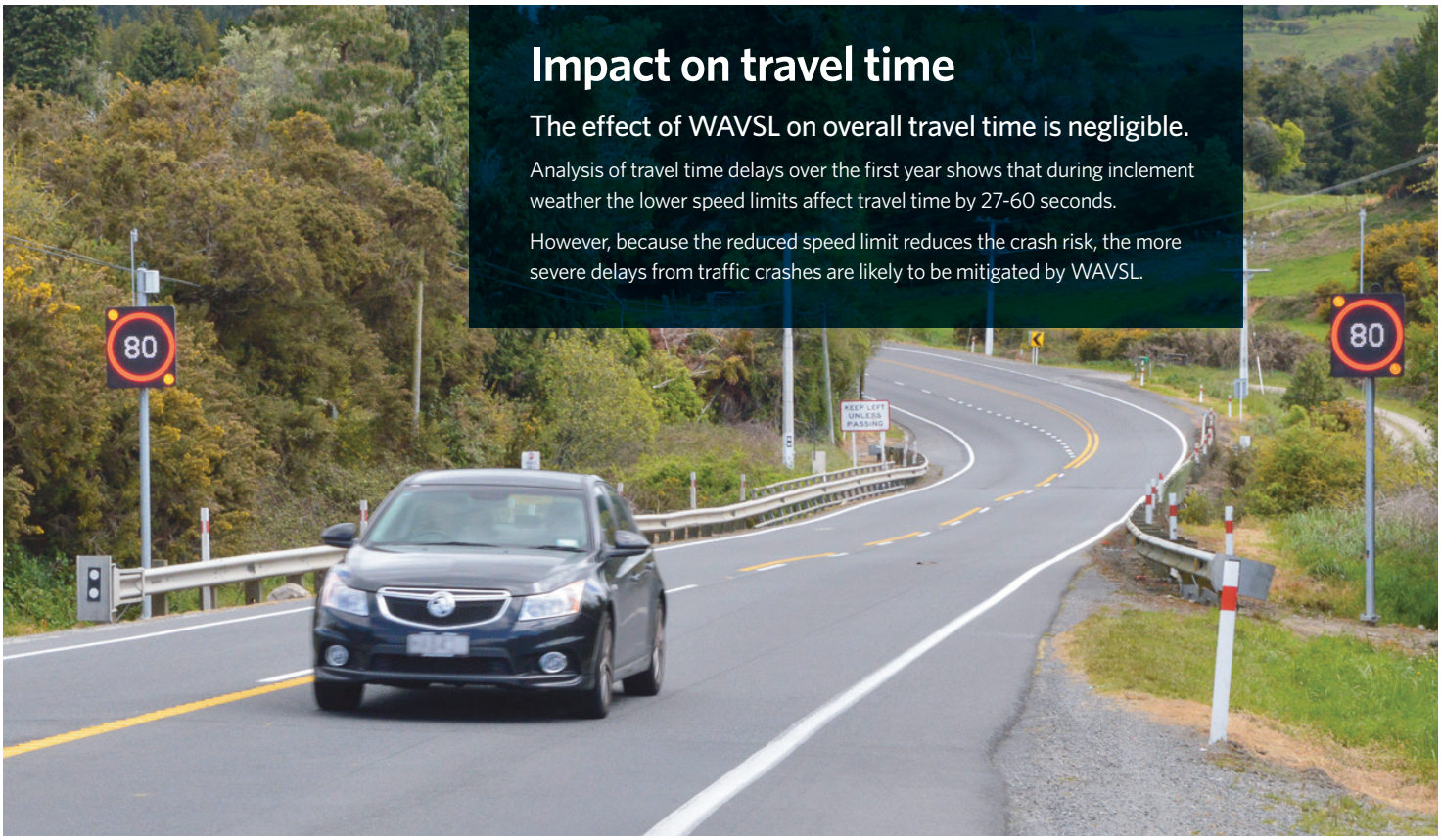
The WAVSL system has shown to have an effect on speed reduction. Reducing driver speed in poor weather conditions can mitigate the occurrence or severity of a crash.

The medium-term speed outcomes for the downhill section of the eastern (BOP) flank are shown below. The baseline speeds in wet weather show that drivers do not modify their behaviour significantly in response to rain, which may help to explain the high crash rate in wet weather, and reinforces the justification for WAVSL.

Medium-term mean speeds under WAVSL activation (80km/h limit) are around 10km/h slower than baseline speed in poor weather. Those drivers at most risk of losing control in the wet are those driving at higher speeds and there is a 15% reduction in drivers travelling over 100km/h when WAVSL is activated.



WAVSL activation effects on travel speed (blue and grey lines)



Impact on travel time

The effect of WAVSL on overall travel time is negligible.

Analysis of travel time delays over the first year shows that during inclement weather the lower speed limits affect travel time by 27-60 seconds.

However, because the reduced speed limit reduces the crash risk, the more severe delays from traffic crashes are likely to be mitigated by WAVSL.

Crashes

Initial analysis of crashes shows a 33% reduction in total crashes per month, with a reduction in fatal/serious crashes and a shift towards minor and non-injury crashes. Crash histories take time to emerge so more accurate statistics will be available after the second year of the trial.

These statistics represent success under the Safe System approach which aims to reduce deaths and serious injuries. Other areas where variable speed limits have been applied, such as rural intersections, schools and school bus points, shows early speed limit compliance resulting in safer performance long term.

33% reduction in the total crashes per month

a reduction in fatal/serious crashes

Summary and next steps

Weather activated speed limits can manage travel speed in poor weather conditions over the Kaimai Range, with negligible travel time effects. Further use of this new technology therefore appears warranted.

On-going assessment of the WAVSL operation is being carried out to ensure the activation and deactivation makes sense to motorists. Matching the WAVSL operation with weather changes can be difficult in some circumstances.

Long-term monitoring of the system will provide a stronger assessment of the crash reduction performance of WAVSL.

Any questions relating to the project please do not hesitate to get in touch:

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