

RWIS Automated Advisory System: Centralized advisory system for the control of Dynamic Message Signs

Alberta Highway #22 experiences dangerous wind gusts caused by local geography and Chinook winds, dubbed by locals as the “wind tunnel”. Alberta Transportation has witnessed an increase in Motor Vehicle Accidents (MVA’s) involving vehicles being blown-off Highway #22 due to these extreme cross-winds, even if they are parked. Vehicles are blown into on-coming traffic in the other lane causing injuries and damage. A high number of accidents occur over a specific 20 kilometer stretch of Alberta Highway #22. On one single occasion in 2011, 4 semi-trailer units, 1 pick-up with a utility trailer and one R.V. unit were blown over at this location. Over 20 such MVA’s have been recorded at this location over the previous years (Alberta Transportation, 2011).

To combat this issue, static signs and existing wind sensors were utilized to help warn the motorists of dangerous wind conditions but despite the best efforts, the procedures were manual and not fast enough. By the time preventative measures were implemented for each wind event, the wind likely had already subsided or had already claimed a couple of vehicles.

Alberta Transportation wanted to take a more proactive approach to try and reduce the number of wind-related accidents and improve safety for the motoring public. They requested to extend the Road Weather Information System (RWIS) delivered and maintained by Schneider Electric, with a means of automatically controlling Dynamic Message Signs (DMS) installed in this region. Collaboration between Alberta Transportation, district staff, the Alberta 511 group and Schneider Electric resulted in the development of the RWIS Automated Advisory System (RAAS). Through iterating through requirements, leaning on years of maintenance experience as the foundation of the project, combined with simulators to help explain complex concepts, a final design was agreed upon. An RWIS station installed specifically at the high wind location on Hwy 22 is monitored by the RAAS, which in turn controls 6 DMS signs installed at various diversion points North and South on the highway, covering a total distance of more than 90 kilometers. Three DMS are NTCIP compatible and display the current wind speed in the DMS and contain flashing beacons. Three other DMS are solar powered, Modbus based beacons.

By implementing a centralized rule engine, Alberta Transportation can control DMS across a wide geography, can apply various data smoothing techniques with removes the “chatter” in activating the DMS signs, can take inputs from a wide variety of sources (other observation stations, forecasted weather, etc.) and can reuse the technology in other locations using the same base technology.

During the fall of 2015, the wind season came early and the system has correctly controlled all six DMS signs through dozens of high wind events. These wind events are showing the value in having an RWIS at the exact trouble zone and applying data smoothing techniques to lessen the “chatter” with activating beacons during threshold-crossing events.

In the short-term, additional improvements are being implemented to the system to make it more resilient and include more monitoring. In the long-term, Alberta Transportation is expanding the system to a second location connecting a bridge-deck sensor to a 3-line 20 character DMS sign.