

VAISALA / SUCCESS STORY

ROADS

Real time weather alerting protects motorists

How can more accidents occur when the weather is good? In Snowmass Canyon motorists driving on dry roads needed notification for a potential icy curve ahead. Non-intrusive sensors and a variable message sign answered the call.



Improvements Created a Problem

In September of 2000, the Colorado Department of Transportation (CDOT) undertook a project to widen a three and half mile stretch of State highway 82 through Snowmass Canyon, a narrow valley located in the heart of the Rocky Mountains connecting the town of Aspen, Colorado with Interstate 70. Like similar projects in a mountain region the project required building two roadways one virtually on top of the other along a steep grade. In addition, geologically unstable slopes meant using a terraced system of retaining walls to minimize environmental impacts. These improvements inadvertently caused a winter time problem producing numerous crashes, and finally requests from the community for CDOT to improve the situation.

The Hidden Problem

Near mile marker 30 of highway 82 there are several blind curves with the newer concrete barriers along one side of the roadway. During winter time snow removal operations CDOT would plow snow along the concrete barriers, and because the curves are super elevated, the water from melting snow would drain across the road. After 2:00 pm, the canyon road would become shaded, and thus pavement temperatures that were once above freezing would fall below freezing, and the running water would freeze to the road surface. To make matters worse because the water was in a liquid state first before freezing, it froze clear, creating a black



Challenge

- Snow melt from winter maintenance activities was running across the road and refreezing at a blind curve
- Drivers were traveling at or above the speed limit due to good conditions before the curve
- Area produced a higher amount of crashes

Solution

- Road Weather Station with non-intrusive pavement temperature and road condition sensors
- Weather Station activates VMS sign based on wet or icy road condition
- Data is also available as part of the statewide system for road maintenance decisions

Benefits

- Crash rates are reduced from as high as 15 in 2005 to 3 in 2012
- Automated system allows drivers to build trust in roadside highway information
- Highway maintenance are alerted to icy conditions and can respond only when necessary

ice situation for approaching vehicles. The situation was made worse because the road just before this problem area was safe and dry, so drivers were typically traveling at a safe or even a high rate of speed as they entered the turns, thus the problem was worse when the weather was nice. On snowy days everyone was driving at the appropriate speed and winter maintenance activities were underway, so crashes were less likely. Crash occurrences on this stretch of highway 82 were 5 in 2005; 15 in 2006; 5 in 2006; 14 in 2008; 5 in 2009; and 5 in 2010.

The Solution was in Technology

In determining how to best solve this problem, CDOT Engineers first looked at the drainage of the roadway and determined that the roadway was draining properly and no ponding was occurring on the surface. CDOT Engineers and Maintenance personnel reviewed snow plowing operations and determined that because of the barriers the snow could not be pushed back any further. It was decided the best solution to the problem was to inform motorists of road conditions just before they entered the dangerous section of roadway. “We wanted to install something that gave us and the approaching vehicle real-time information about the curve,” said Mike Curtis, PE and Project Manager with CDOT Region 3. Colorado Department of Transportation selected Vaisala Road Weather Information Systems (RWIS) with the latest road sensors Road Surface Temperature Sensor DST111 and Road Surface Condition Sensor DSC111. The DSC111 and DST111 are non-intrusive sensors, which use lasers and infrared technologies to detect and measure

road information. “CDOT chose the non-intrusive sensors because they are easier to maintain and less expensive in the long run,” Mr. Curtis stated. The road weather data is communicated via wireless cellular modem for supervisors to view and use in maintenance decision making. The valuable data is also analyzed by the weather station itself, and when certain criteria are detected, the weather station sends a signal via wireless spread spectrum radio to a Variable Message Sign about a half of a mile upstream of the curve. The sign then displays, in real-time, either “Wet Road Ahead” or “Icy Road Ahead” giving vehicles a chance to adjust driving behaviors and slow down.

Positive Outcome

The system became operational during the winter of 2011 and since then there has been less incidents - four crashes in 2011 and three for the entire winter season of 2012. When asked how the system has been performing Curtis said, “The maintenance folks believe the road weather station and the sensors are depicting the road condition at that location.” CDOT also likes the fact that the system is automated, “an automated solution is nice because it is quicker to activate and there are fewer chances for human error, like a manual sign,” Curtis concludes.



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