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Smart Road Can De-ice Itself: Pavement Overlay Releases Chemical In Bad Weather

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A new pavement overlay has been developed that is capable of keeping itself virtually ice-free by slowly releasing chemicals when the weather turns sour—an application intended primarily for accident-prone areas such as bridges and ramps.

Cargill—a U.S.-based company best known for its agricultural products—has developed a combination of limestone aggregate and epoxy that acts like a rock-hard sponge, trapping liquid de-icing agents.

“The chemicals will stay in the surface four to 10 times longer than what it would stay on the traditional concrete or asphalt surface,” said Bob Persichetti, product manager for SafeLane overlay at Cargill Deicing Technology.

“Increased traction helps reduce costly accidents. There is also a diminished need to have trucks out in inclement weather, which means call-outs and overtime can be managed more efficiently. And, as total chemical use is decreased, that cost goes down and there is less run-off into the local environment.”

Depending on the state of the structure or roadway, the product can be installed and reopened to traffic later the same a day.

He said the surface has an expected life of about 15 years and a material cost in the range of \$5 to \$6 US per square foot.

Scientists and entrepreneurs have been pounding the pavement for decades searching for a better way to keep roads ice-free in winter.

Figures compiled for CanWest News Service by Transport Canada list snow and freezing road conditions as responsible, at least in part, for 1,147 driving deaths from 1999–2003, while 81,404 people were injured during those weather conditions over the same time.

The Transportation Association of Canada (TAC) estimates the cost of national salting operations is about \$1 billion.

Lynne Cowe Falls, a professor with the University of Calgary’s Schulich School of Engineering, said a number of universities have tested roads across Canada, but she points out they generally test pavement composition, not safety.

“The biggest challenge for us in the pavement world is pavement rutting,” said Cowe Falls. “When it snows, the plows just basically strike off the top of the snow, but leave melted ice in the wheelpath,” she said, adding the type of de-icing solutions being explored would work best in confined areas.

“That could be a very good approach for a bridge deck, where you also have freezing from underneath,” said Cowe Falls, who explained how pavement works with raw enthusiasm.

“Asphalt is a Rice Krispie square, a thin layer of goop and aggregate to hold it together. If you have too much goop, it falls apart. If you have too little, it’s too brittle. It is also very temperature sensitive.”

She said one of the concerns in finding safety solutions for de-icing is that what works in Ottawa won’t work in Windsor or Regina because of varying climates.

Other technologies being tested to improve winter safety include using microwaves from a truck-mounted system to bombard a special aggregate composed of iron taconite tailings.