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Pothole-free roads? Yes, it’s possible with better asphalt, says Queen’s University professor

Others are skeptical of Simon Hesp's claims, but Kingston has adopted his methods with promising early results.

ANDREW FRANCIS WALLACE / TORONTO STAR

A pothole at Edenbridge Dr., one of untold thousands making life miserable for GTA drivers in the wake of the recent deep freeze and thaw. At least one researcher believes it's possible to build nearly indestructible roads.

By: Liam CaseyGTA, Published on Wed Jan 15 2014

There is a man in Kingston who says he can build roads that defy aging.

Imagine roads free of potholes and cracks. That would lead to fewer repairs, fewer traffic jams and maybe, just maybe, a significant reduction in road rage.

It sounds like utopia and Simon Hesp sounds like a man given to hyperbole — a rogue in the industry, as a chemical engineer in a field that belongs to civil engineers.

But the Queen’s University professor has the bona fides to back up his claims.

“We had potholes in Kingston the size of buses,” Hesp says. “That will never happen again, because they are listening 100 per cent and are nice guys.”

Hesp developed several tests that identify “garbage” asphalt. Kingston adopted those tests in 2009, and what they get, essentially, is more pure asphalt, largely free of cheap additives and modifiers.

Kingston now considers itself the leading municipality in road science in the country. The strict standards are mandatory for construction on arterial and collector roads and on some local roads.

"This is just the fifth winter with the new standards," says Mark Campbell, construction manager of the engineering department with the City of Kingston. "So it's early yet, but it's certainly standing up very well. No cracks at all."

Campbell says the new standards are more expensive than the old method, but "it's rather comparable and, if the research holds true, we will see significant repair savings in the years to come."

It's not that much more expensive, because the science behind it isn't groundbreaking, to use a Hesp pun.

"This was known in 1936. That is 80 years ago, yeah. It was published in the asphalt literature," says Hesp, a Dutch native. "We're not doing something revolutionary, more something evolutionary."

Pavement research is a huge deal. Ontario's Ministry of Transportation spends $2.2 billion on road repairs and construction annually. In Toronto, the city spent $155 million on repairing roads in 2013, which included fixing more than 188,000 potholes, a nearly four-fold increase since 2002. Toronto spends nearly $4 million annually on pothole repairs alone.

"You should make it clear in your article that I have gone to numerous municipalities, offering my services for free, and their jaws drop when I show them my research," he says, his voice rising.

"The key is — you should put in your article — road managers are all well intended, but no one follows through except Kingston."

The biggest problem with asphalt in Ontario is that it's adulterated with used engine oil and oil residue as additives.

"More than half the asphalt I've tested — and make sure you put in your article I've tested thousands of sites — have engine oil residue," Hesp says. "And that will crack in the first winter. After 10 years it will be rubble."

Kingston is believed to be the only place in Ontario where strict standards are placed on the materials used. Generally, most places base standards on road performance, including the Ministry of Transportation.

Contractors must be able to build a road for a given amount of traffic, load, climate and longevity, according to Pamela Marks, the head of the bituminous section at the ministry.

So long as they can meet those standards, Marks says, the contractors are free to choose their own material.

"We want to encourage innovation," Marks says.

Hesp says that approach is problematic. When the contract goes out for tender, he says, it's usually a low-bid approach, so contractors use cheaper materials. That equates to an initial cost saving, but substantially more in repair bills later on.

"It's very political," Hesp says. "You need someone with some guts to implement what we have developed for 10 years now, and the industry doesn't want that."

Hesp is currently working with the ministry as part of the Highway Infrastructure Innovation Program. He has 33 test sites scattered throughout the province, including a sweet ride on the southbound express lanes of Highway 427.

"Been there since 2008," Hesp says. "Not a single crack."

Marks says Hesp is working on other tests for the ministry to identify better-quality asphalt.

The Queen's University professor and thousands of other researchers have descended on Washington, D.C., over the past few days to talk road science at the annual Transportation Research Board meeting.

Susan Tighe, a Canada Research Chair and director of the University of Waterloo's Centre for Pavement and Transportation Technology, is skeptical.

"I actually don't think his method works, and although they have adopted it in Kingston, the MTO has not adopted it and it has come under a lot of criticism from others," she says.

Tighe says recycling research is hot right now. She is examining 25 different materials at the test track in Waterloo, which includes recycled asphalt rooftop shingles, and recycled concrete and asphalt, with promising results.

Roads are generally 95 per cent stone, and it's become "harder and harder to open new sources of aggregate," she says, referring to quarries.

"We can build pothole-free roads, absolutely," Hesp says. "The answers are there, free of charge — they're on my website."

City begins pothole blitzEND