

POTHOLE



A byproduct of iron mining is in the pipeline to fill a pothole near you

Curse springtime's potholes as you may; the Coleraine Mineral Research Lab considers them an opportunity.

The lab has developed a pavement-patching compound built around the plentiful rock byproducts of Minnesota's iron mines. After three years of work, researchers believe their product is ready for market, and they've applied for patent protections.

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An offshoot of the Natural Resources Research Institute, the Coleraine lab has come up with a product that could become the pothole solution of choice for road crews around the nation.

Donald Fosnacht, director of the NRRRI's Center of Applied Research and Technology Development, rattled through some of the patching compound's advantages. He claims it's more pleasant to work with than smelly asphalt and can be used year-round, regardless of weather conditions.

"When mixed, it generates its own heat, which makes it work even in the winter," said Dave Hendrickson, director of the Coleraine lab.

The fast-setting mining mix also typically hardens in about 30 minutes. Furthermore, Fosnacht said the compound readily binds to surrounding surfaces and is about 20 percent to 30 percent more dense than traditional asphalt patching products, producing a longer-lasting patch.

"It stays put, in the hole," he said.

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Another plus stems from the mining mix's stability. It doesn't noticeably shrink over time, making it unnecessary to crown patches. Dick Kiesel, a research scientist at the lab, said any high point on a pothole patch can cause it to catch on a passing snowplow blade and potentially dislodge.

Anna Davey, an engineering specialist for the Wisconsin Department of Transportation, said she has been impressed with what she has seen of the new patching material. More than two years ago, the NRRI used its material to fill a couple of potholes near Davey's office in Superior.

"Their product is still in the ground, even though new potholes have formed in the surrounding area," she said, noting that several of those adjacent new potholes have been patched repeatedly by city crews.

Davey said she isn't directly involved in procuring patching materials for the Wisconsin Department of Transportation but directed an NRRI representative to colleagues in Madison. She said it also would be nice to see the patching material used locally.

"Personally, I would love to see the city of Superior or Duluth use this compound, because their potholes are enormous, and the product they've been using doesn't have the ability to withstand use and weather," Davey said.

In light of the new compound's advantages, Fasnacht believes there's tremendous market opportunity for it.

"Everyone is looking for a better road-patching product,"

he said. "Every state, county and city says: Please give us something that does a better job of fixing potholes."

The city of Duluth alone used about 4,100 tons of hot mixed asphalt patching last year.

The mine-derived compound from Coleraine begins as a dry, gravelly mix. A liquid activator then is stirred into it to reach the desired consistency. The material can then be shoveled into a pothole and troweled to produce a smooth surface.

With their patent application still in the pipeline, members of the Coleraine lab team that developed the compound will say little about the ingredients or chemistry behind their product.

However, Hendrickson explained that by adjusting the ratio of ingredients in the mix, crews can bring out certain desired traits.

"You can tailor it to the situation," he said.

Fasnacht said the mining products incorporated into the mix will come exclusively from the west end of the Range. Because of the potential health risk of asbestos-like fibers found in ore deposits on the east end of the Range, the state of Minnesota has banned the use of waste rock from that region as aggregate.

The NRRI has been searching for a suitable private partner to help commercialize the Coleraine lab's work. Fasnacht said several companies have expressed interest.

He believes the patching compound will be attractive not only from a performance standpoint but from a cost standpoint

as well. He contends the mining mix will outlast most other materials, reducing long-term maintenance costs.

But even up front, he expects the new compound to be cost-competitive.

"We're using inorganic materials that are relatively inexpensive, especially considering the price of petroleum right now," Fasnacht said.

The Coleraine lab also is looking at other applications to put waste rock from Minnesota's iron mines to productive use.

Fasnacht said researchers are developing a tailing/epoxy coating for bridge decks that could offer improved traction. They also continue to push the development of an aggregate/concrete mix that could be used for road construction.

"Our basic thesis is that if we can find other ways to profitably use their waste rock, our mines will be able to better compete," Fasnacht said.

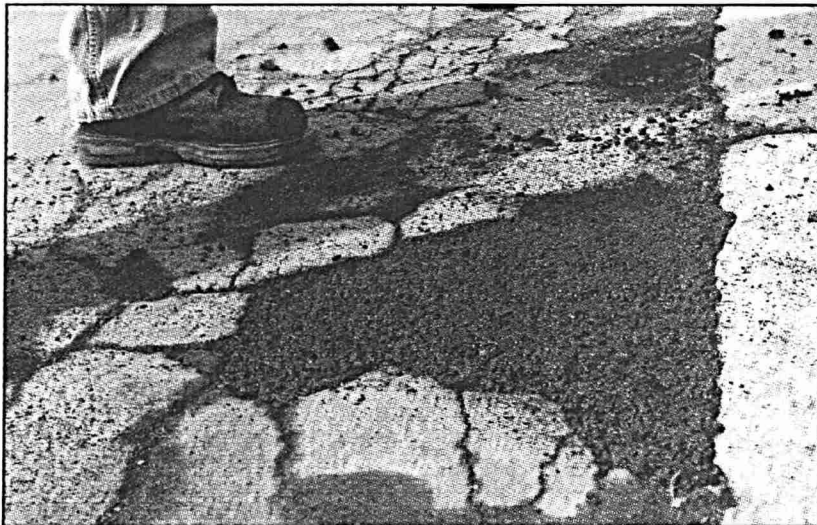
"These are routine byproducts of mining, so why not take advantage of them?" Hendrickson asked.

"We view this as a green product, because the energy to make it was already expended in the mining process," he said, pointing out that supplies of mining aggregate are plentiful on the Range.

About 75 percent of rock blasted at area taconite mines typically remains as waste after its iron content has been removed, Hendrickson said.



NRRI Coleraine Minerals Research Laboratory technicians Tim Kemp (left) and Greg Gargano, both of Hibbing, fill a pothole in Coleraine with a mixture containing tailings from the taconite mining industry. The pothole mixture is much more dense and durable than conventional asphalt products.



NRRI Coleraine Minerals Research Laboratory technicians Tim Kemp and Greg Gargano, both of Hibbing, filled this pothole in Coleraine with a mixture containing tailings from the taconite mining industry. The pothole mixture is much more dense and durable than asphalt mixtures.

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