Technology to protect dry concrete from damage and extend life of concrete infrastructure

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The founder of a startup based on a Purdue University innovation says the company could help managers of state transportation departments and other large-scale consumers of concrete extend the lifetime of their concrete investments.

Paul Imbrock, founder and president of Environmental Concrete Products LLC, said the company's Fluid iSoylator product can be used to protect new and existing concrete. He said hardened concrete sustains damage when fluids on the surface are absorbed into its network of pores, similar to those in a sponge.

"When the fluid, which could be water that contains salts or other ions, saturates the pore network, it will expand inside the concrete and initiate damage upon freezing," he said. "If the fluids evaporate instead, the ions remain and crystallize in the pores, which also creates damage. New fractures caused by either method of damage allow for even more ingress of fluids, which repeats the cycle and creates further damage that will destroy the concrete over time."

Purdue researchers have developed a hydrophobic sealant that could prevent potentially damaging fluids from entering concrete pores. The technology was licensed to Environmental Concrete Products through the Purdue Research Foundation Office of Technology Commercialization. More than 20 startups based on Purdue intellectual

property were launched during the 2015 fiscal year. A video about Environmental Concrete Products is available at youtu.be/qx2GFde0fAk .

"Our product is absorbed into dry concrete's pore network to create a hydrophobic barrier that prevents potentially damaging fluids from entering," Imbrock said. "Along with protecting concrete from the elements, Fluid iSoylator is derived from soybean oil and is safe to handle and apply. Its physical properties also make it possible to be adapted for other potential uses, including a combination paint-and-sealing product."

Imbrock said traditional concrete sealants on the market create a film on the surface of concrete through a chemical reaction between components mixed together or with oxygen.

"Although this approach works well in ideal conditions, the film might be damaged by traffic or other abrasions. It becomes counterproductive, then, because fluids can enter the area where the film is damaged, but the film also prevents them from evaporating, leaving them susceptible to freezing," he said. "Fluid iSoylator is different because when it enters the concrete's pores, it remains fluid regardless of traffic or abrasions. The pores are filled with the material, which prevents other fluid from entering."

Imbrock said Environmental Concrete Products has launched the Fluid iSoylator product, developed relationships with investors and contracted a partnership with an Indiana-based soy biofuel producer that has provided the company with the means to manufacture the product.

"In conjunction with our partners, we are perpetually testing derivative products and methods to reduce production costs," he said. "Along with large-scale concrete consumers, we look to connect with landscapers and

construction companies to protect concrete that already exists, such as driveways, patios and sidewalks of their existing customers."

Provided by Purdue University