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US DOT and Solidia in CRADA on Solidia reduced CO₂ Concrete and Cement for highway infrastructure

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[Solidia Technologies](#) and the US Department of Transportation's Federal Highway Administration (FHWA) are [engaged](#) in a Cooperative Research and Development Agreement (CRADA) to investigate and develop a durable, sustainable and cost-effective highway construction material for potential use in transportation infrastructure applications. Solidia Technologies has invented and patented new technologies for the production of cement and concrete that, combined, reduce carbon dioxide (CO₂) emissions up to 70% while using less water, less curing time and lower kiln temperatures.

Solidia uses a patented process for bonding together and hardening a collection of loosely packed particles. This process—"reactive hydrothermal liquid phase densification (rHLPD)"—uses a liquid solution to 1) penetrate into the pores between the particles; 2) react with the particles; and 3) create "bridges" between the particles to lock them into place. This last step is what happens when Ordinary Portland Cement (OPC) reacts with water to bond together the sand and aggregate particles that constitute conventional concrete.

rHLPD can work in a wide variety of chemical systems. One system involves a reaction between a water-CO₂ solution and a family of calcium-silicate minerals similar in chemistry to OPC. The reaction, which spontaneously occurs at near-ambient conditions, creates "bridges" composed of silica and calcium carbonate. These compounds, and the unique bridging structures formed by them, are more stable and intrinsically stronger than the bonds formed in conventional concrete, according to Solidia.

- Solidia Cement is a sustainable replacement for Ordinary Portland Cement (OPC), leveraging the same manufacturing process, equipment and raw materials used by the cement industry while consuming less energy and generating 30% less greenhouse gases and other pollutants than OPC.
- Solidia Concrete is a durable replacement for conventional concrete that sequesters CO₂ equal to 5% of its weight during curing and can be designed for compressive strength, abrasion resistance and freeze-thaw cycling resilience that are equal to, or better than, that of conventional concrete.
- Combined, the amount of CO₂ avoided in the production of Solidia Cement plus the CO₂ sequestered during the curing of Solidia Concrete can reduce the carbon footprint of concrete-based construction products by up to 70%.

The CRADA is a mechanism for the Turner-Fairbank Highway Research Center, a Federal laboratory of the FHWA, to provide

resources (other than funds) for the purpose of collaborating with Solidia Technologies on specific research or development efforts which are consistent with the mission of the laboratory.

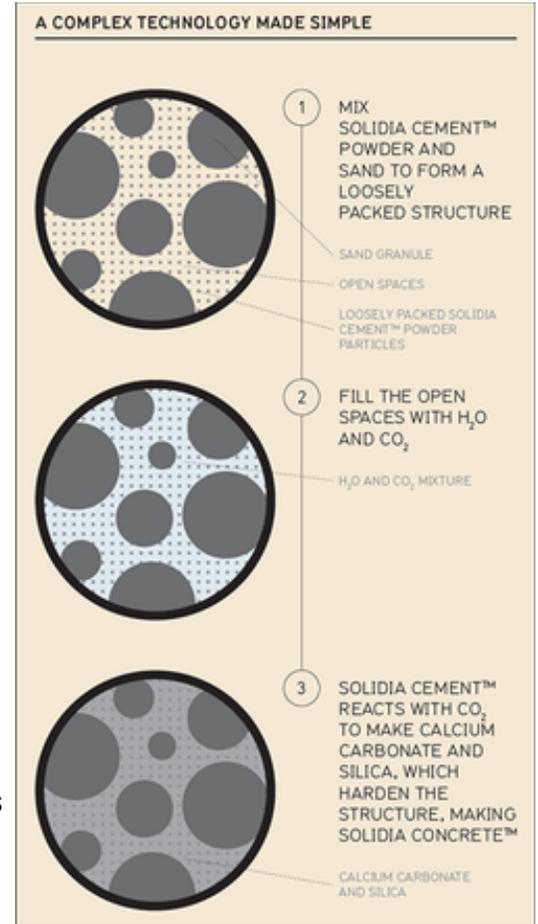
The first phase of this agreement, performed at the FHWA's Turner-Fairbank Highway Research Center in McLean, Va., will document the compressive strength, flexural strength, freeze-thaw durability, and other basic properties of Solidia Concrete. Results on this phase of the research are expected in early 2014.

Focused primarily on the properties and performance of Solidia Concrete and more limited analysis of Solidia Cement, the CRADA will ultimately address the use of Solidia Concrete in specific transportation infrastructure such as culverts, sound barriers, traffic barriers, pavement and bridge components.

The agreement with the FHWA accelerates the testing process for our new, sustainable cement and concrete and its application in the transportation infrastructure sector. We are grateful for the opportunity to work with the FHWA as we strive to bring our innovation to market.

—Tom Schuler, CEO of Solidia Technologies

Investors in Solidia include Kleiner Perkins Caufield & Byers, Bright Capital, BASF, and BP.



Source: Solidia. [Click to enlarge.](#)

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