

The Living Bridge

Portsmouth, New Hampshire



The Living Bridge is an interdisciplinary smart infrastructure research project, converting the Memorial Bridge into a demonstration "smart bridge." To do this, the bridge has been outfitted with structural health monitoring sensors as well as environmental sensors on its structural elements and in the Piscataqua River. To power these sensors and offset energy usage on the bridge, as well as to demonstrate an emerging renewable energy technology, the team has installed a tidal turbine beneath the bridge.

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The Memorial Bridge over the Piscataqua River, which links Portsmouth, New Hampshire to Kittery, Maine, has been outfitted with data sensors that have transformed it into a self-diagnosing, self-reporting "smart" bridge that captures a range of information from the health of the span to the environment around it. It will also provide unique and innovative information to help create the next generation of bridges with maximum safety, reliability and efficiency to bridge design engineers.

Engineers and graduate students from the University of New Hampshire in collaboration with the New Hampshire Department of Transportation, the National Science Foundation, and the U.S. Department of Energy designed and implemented a floating platform that is secured to the pier underneath the bridge. Designed to rise and fall with the changing tide, the tidal turbine installed on the platform is serving as a tool to test the viability of a renewable energy source different from the more traditional solar panels.



Because the river is one of the fastest navigable waterways on the Eastern seaboard, it made sense to try and explore the use of the river's tidal waters. However, the river is considered a harsh marine environment and the team was concerned the corrosive environment would ultimately destroy the steel platform. When the local galvanizer heard of their concerns, they met with the Project Manager to explain how hot-dip galvanizing would protect the steel and offered to donate the galvanizing services to ensure the research project would survive the conditions. ■

Galvanizer
Duncan Galvanizing Corp.

Fabricator
Santini Iron Works