

UTC Project Information	
Project Title	High Performance Concrete with Post-Tensioning Shrinking Fibers
University	University of Vermont
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Funding Source(s) and Amounts Provided	TIDC \$110,000 UVM \$110,229
Total Project Cost	\$220,229
Agency ID or Contract Number	Project 2.7
Start and End Dates	Start 1/1/19 End 5/31/21
Brief Description of Research Project	<p>This research improves upon the technique of reinforcing concrete with dispersed fibers by having the fibers axially shrink after curing to produce a dispersed multi-axial post-tensioned state. Such reinforcing may increase the crack resistance and durability of the concrete. Preliminary benchtop testing with natural chitosan polymer fibers have confirmed the viability of the technique, where certain configurations show significant strengthening with the shrinking fibers. This research proposes to expand the knowledge base by examining larger scale chitosan samples, exploring steel and nitinol shape memory fibers that produce a similar effect, studying the underlying mechanical principles and exploring applicability to transportation structures.</p>

Laboratory tests indicate that chitosan-based active shrinking fibers may have the potential to extend durability of concrete by altering microstructure, for applications, such as freeze-thaw durability. soluble polymer slugs can pretension the concrete and provide some performance enhancement.



After 168 freeze-thaw cycles; 0.24 wt% active fiber specimen with minimal damage (left) and 2% passive fiber specimen with significant damage (right)

Implementation of Research Outcomes and Photos

Impacts/Benefits of Implementation (actual, not anticipated)

None yet

Web Links

- Reports
- Project website

None yet