

UTC Project Information	
Project Title	MPC-564 – Quantifying the Range of Variability in the Flexural Strength of Fiber Reinforced Concrete using Monte Carlo Simulation
University	South Dakota State University
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Funding Source(s) and Amounts Provided (by each agency or organization)	<p>USDOT, Research and Innovative Technology Administration \$24,017</p> <p>South Dakota State University \$25,724</p>
Total Project Cost	\$49,741
Agency ID or Contract Number	69A3551747108
Start and End Dates	March 9, 2018 to July 31, 2022
Brief Description of Research Project	<p>Many laboratory studies have shown erratic results in flexural strength among replicate specimens of Fiber reinforced concrete (FRC). As a result, repeatability of results was very challenging. Given this issue, it would be very difficult for design engineers to make reliable claims about the performance of a certain FRC element in the field. The objective of this project is to provide a better tool for FRC designers to be able to make more robust claims about the performance of an FRC element in transportation infrastructures. This will be carried out through statistically quantifying the range of variability in the flexural strength of FRC using Monte Carlo Simulation. The power of the obtained range of variability prediction tool will be examined through conducting flexural experiments on 8 concrete mixes. These mixes will have randomly selected fiber types, fiber dosages, and other concrete properties in order to examine the power of the developed tool for a wide range of mixes. Ranges of variability associated with several confidence levels will be tested.</p>

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>This research serves as a first step towards attempting to solve the issue. Consequently, further studies are needed before any implementation takes place.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>While not a perfect prediction tool, the MC tool developed in this study can still be used to get an idea about the ARS value of FRC members reinforced with steel fibers. This study will serve as a first step towards better understanding the flexural behavior of FRC structural members. Consequently, it will aid in predicting its performance in the field.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<p>https://www.ugpti.org/resources/reports/details.php?id=931</p>