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# Evaluation and Prediction of Tensile Strength of Steel Fiber Concrete

**Srilakshmi Lolla[1], Romanbabu Meetei Oinam[2]**

[1]M.S. Research Scholar, Dept. of Civil & Environmental Engineering, IIT Tirupati
[2]Assistant Professor, Dept. of Civil Engineering, IIT Guwahati

## Abstract

The random orientation of steel fibers in steel fiber concrete (SFC) improves crack bridging, significantly enhances ductility and tensile strength of concrete. Several studies have shown an improvement in these mechanical properties of SFC. Unlike in plain concrete, the SFC exhibit high toughness. As a result of which, they try to yield even before being pulled out from the concrete matrix before complete failure. Over the two decades, extensive research has been carried out in this field and certain empirical relations were developed to understand and evaluate the tensile behavior of SFC through direct and indirect tensile test methods. However, existing equations may not be able to account for a wider range of input datasets considering various fiber contents and also validating the tensile strength through direct tensile test. Considering this issue, the current research focuses on carrying out an experimental study on notched beams tested under three-point loading. A total of 54 beams were cast with fiber contents varying from 0% to 2% (varied at an interval of 0.25%). Based on these experimental results and data from the literature, 457 data points were obtained, and an empirical relationship has been proposed for the tensile strength of SFC.

**Keywords:** Steel fiber concrete, Tensile strength, Volume fraction