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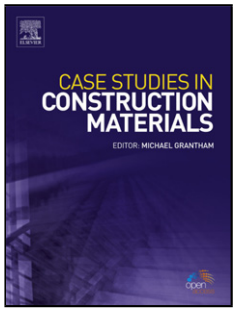

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Strain Distribution of Basalt FRP-Wrapped Concrete Cylinders

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ABSTRACT

This paper presents the results of an experimental study on the distribution of strain on a unidirectional basalt fiber-reinforced polymer (FRP) wrapped around concrete cylinders. A total of 12 cylinders (150 mm x 300 mm) were wrapped with 2, 4, and 6 layers of basalt FRP (BFRP) and the distribution of hoop strain under axial compression load was studied using multiple strain gauges. The new aspect of this study is the use of BFRPs as a new construction material for wrapping concrete elements with a focus on the distribution of hoop strain towards refining design strain of the wrap. Also, the effect of number of BFRP layers on the premature rupture of the wrap with respect to flat coupon test was evaluated in the form of a strain efficiency factor. It was concluded that the maximum hoop strain was not necessarily associated with the ruptured areas of the wrap. Also, an analysis of variances showed that the difference between hoop strains in the overlap and non-overlap regions was non-significant and an average hoop strain can represent the overall dilation of the specimens. The average strain efficiency factor was found ranging from 0.61 to 0.86. The test data was added to a large database of concrete cylinders wrapped with