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Flexure-Compression Testing of Bridge Timber Piles Retrofitted with Fiber Reinforced Polymers

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Author(s)

Pablo Caiza, Moochul Shin, Bassem Andrawes

ABSTRACT

The adequacy of using Fiber Reinforced Polymer (FRP) retrofit technique to restore the flexure-compression behavior of deteriorated bridge timber piles is examined experimentally in this paper. Sixteen specimens are tested monotonically under eccentric compressive loading. The specimens are first tested in their unretrofitted condition to determine their elastic properties. Each specimen is then cut and connected (posted) using the proposed FRP retrofit technique, and retested. The results show that the retrofitted specimens are capable of reaching same or higher strengths than that of the unretrofitted specimens with minimal reduction in their stiffness. Based on the experimental results, a design equation is presented to compute the volumetric ratio of FRP needed for retrofitting bridge timber piles under eccentric load.

KEYWORDS

Bridges; Timber Piles; Eccentric Loading; Fiber-Reinforced Polymer (FRP)

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