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## Rheology of SFRC beams Strengthened with GFRP Laminates under Low Cycle Compressive Loads

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**Abstract:** Engineering structures are inevitably witnessing cyclic loads in the form of seismic loads. Due to this pulsating action, structural elements and frames undergo deformations resulting in stiffness reduction; formation of cracks followed by failure in the structural integrity of the elements itself. Hence efforts are made by researchers in all possible quarters to understand the behaviour of structural elements subjected to fatigue conditions. This paper presents an explicit experimental investigation on Steel Fibre Reinforced Concrete (SFRC) beams strengthened with Glass Fibre Reinforced Plastic (GFRP) laminates subjected to cyclic loading. The experimental program consists of six strengthened beams with steel fibre and one control beam without fibre and strengthening. The beams are tested under low cycle repeated compressive loading. The test results showed an enhanced performance of beams in terms of strength, deformation, ductility characteristics and crack resistance. The load-deflection and crack patterns are analyzed for loading-unloading-reloading nature of repeated compressive loads and the maximum number of loading cycle obtained is 14. The experimental results are validated with multi-linear regression equations. To substantiate this, fitness values and root mean square error for the predicted regression results are well within the limits.

**Keywords:** Cyclic loads, Stiffness, Energy absorption, SFRC, GFRP laminate, Regression, Fitness, RMS error.

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