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# Synergy in shear response of ultra-high-performance hybrid-fiber-reinforced concrete at high strain rates

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## Abstract

Synergistic effects on shear resistance of ultra-high-performance hybrid-fiber-reinforced concrete (UHP-HFRCs) at high strain rates was investigated using a new shear test setup. Two UHP-HFRCs: L05S10 (containing 0.5 vol.-% long and 1.0 vol.-% short fiber) or L10S05; and, two ultra-high-performance mono-fiber-reinforced concretes (UHP-MFRCs): L15S00 (containing 1.5 vol.-% long fiber) or L00S15, were tested. The L05S10 generated high synergy in shear resistance whereas the L10S05 did little.

Synergies were significant for shear strength, shear peak toughness, but not for shear strain capacity. Moreover, the L00S15 produced the highest rate-sensitivity although the shear response of both UHP-MFRCs and UHP-HFRCs was generally sensitive to the applied strain rates. The experimental shear strengths were well-matched with the theoretical calculations.

**Keywords:** UHP-HFRCs; UHP-MFRCs; Shear test method; Strain rate-sensitivity; Synergistic effect.

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