EXPERIMENTAL FREQUENCY DOMAIN ASSESSMENT OF DIRECT SHEAR IN UHPC

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ABSTRACT

Direct shear is recognized as a possible response mechanism in structural concrete systems subjected to highly impulsive loads, and it can lead to catastrophic failure. Behavioral models for direct shear in normal strength concrete (NSC) were introduced in the 1970s and their adaptation for the analysis of structural response under blast and ground shock effects was presented in the 1980s. The introduction of ultra-high performance concrete (UHPC) for protected facilities has created the need to re-evaluate direct shear in UHPC in order to characterize this response mechanism more accurately. Therefore, direct shear impact tests were conducted on UHPC specimens with three varying reinforcement ratios and the results were analyzed in both the time and frequency domains. This paper is focused on the assessment of direct shear in the frequency domain to identify the relationships between parameters of the direct shear resistance function for UHPC and the power spectral density of the captured data from impact tests.