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Determination of dominant degradation mechanisms of RC bridge deck slabs under cyclic moving loads

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ABSTRACT

In this paper, fatigue behaviors of RC bridge deck slabs which fail in an unexpected but widely observed punching shear failure mode under cyclic moving loads is analyzed following a fracture mechanics based theoretical method. This method is developed focusing on the propagation and failure along the critical punching shear cracks. From analysis, some key indicators of structural fatigue performances, including the fatigue crack growth of critical punching shear crack, stress evolutions of all materials and sectional forces, moments and crack mouth opening displacements (CMODs) due to all components along the critical punching shear crack cross sections and fatigue life, are obtained. These information are then based on to identify the dominant degradation mechanisms of RC bridge deck slabs subjected to cyclic loads, which provides meaningful and reliable references for the development of an efficient and accurate numerical method.

KEYWORDS