

عنوان مقاله:

Numerical Simulation of Cracked Reinforced Concrete Slabs Subjected to Blast Loading

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خلاصه مقاله:

Crack is one of the most common defects observed in reinforced concrete (RC) structures. An initial crack will lead to severe changes in the stress state when the structure subjected to blast loadings. Target on acquiring the dynamic data, a finite element method is applied to simulate the response of cracked RC slab subjected to blast loading. The theoretical results of damage distribution and mid-span deflection of normal specimens are first compared with experimental test, which indicates that the dynamic behaviour of RC slab under blast loading can be well predicted by the finite element model. Then blast responses of cracked RC slabs with varied crack parameters (e.g. orientation, width and depth) are systematically studied. Results show that damage of the cracked slab initiates from the initial crack tip of the bottom surface, and then it propagates quickly with cracks found in the support areas on the top surface. In addition, the existence of initial cracks in the RC slab make it subject to more serious damages than the normal RC slab under the same explosive loads, as well as a short reacted failure time. Moreover, variations of crack parameters have slight influences on the distributions of cracked RC slab.

کلمات کلیدی:

Blast Loading; Cracked RC Slab; Dynamic Behaviour; Damage Distribution; Mid-span Deflection

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