

Construction & Steel Structure

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Blast resistance on a composite panel with infilled nano-composite

Min-Jae Park

Korea University, Korea

As the threat of terrorist attacks or explosive accidents increases, interest in designing and construction of blast resistant structures has increased. Recently, the blast reinforcement for existing buildings which were not designed to resist blast loading has been issued, and the demands for blast protective materials are continually growing. In this study, a new blast resistant panel consisting of top and bottom steel plates with infilled nano-composite was proposed and blast resistant performance of the composite panels was investigated using explicit dynamic finite element analysis program, LS-DYNA. Since blast loading causes dynamic response of the structure, dynamic properties of the materials used in the analysis are required to conduct the blast analysis. Johnson-Cook constitutive models were introduced to simulate the dynamic response of the steel plates, and the results of several uniaxial tension experiments were used to determine the dynamic properties of nano-composite. Variables of the analysis are the thickness of steel plates and nano-composite. From the analysis result, the effect of the thickness of steel plates and nano-composite for blast resistance was verified, and a method for assessing the blast resistance of the composite panels was derived.

Biography

Min Jae, Park is a student for intergrated master-doctoral course of Korea University. His department is the School of Civil, Environmental and Architectural Engineering. He is studying a composite structure composed of steel and nano-composite and disasters like fire and blast using experiments and finite element analysis.

qtpz@naver.com

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