BLAST RESPONSE OF RC SLABS WITH EXTERNALLY BONDED REINFORCMENT UNDER TWO INDEPENDENT EXPLOSIONS

A. Maazoun [1, 2], B. Belkassem [2], S. Matthys [1], D. Lecompte [2], J. Vantomme [2]

[1]Ghent University, Magnel Laboratory for Concrete Research, Technologiepark-Zwijnaarde 904, 9052 Gent, Belgium;
[2]Royal Miliatry Academy, Protective & Military Eng Dept, Avenue de la Renaissance 30, 1000 Brussels, Belgium

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Abstract

This paper aims to investigate the blast response of reinforced concrete (RC) slabs retrofitted with carbon fiber reinforced polymer (CFRP) as externally bonded reinforcement (EBR) under two independent explosions. In order to achieve this objective, four simply supported slabs were tested using an explosive driven shock tube (EDST) to generate a reflected pressure equal to 3 MPa in the first explosion and a reflected pressure equal to 6 MPa in the second explosion. Digital image correlation (DIC) is used to measure the strain evolution in the concrete and the CFRP strips during the first explosion. The slabs retrofitted with increasing the quantity of fibers show a reduction in the residual deflection after two independent explosions. The results show that for the first explosion, EBR increases the flexural response and the stiffness of the RC slabs. In the second explosion, a total debonding of the CFRP strips occurs and initiates from the midspan of the slabs toward the supports.