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Flexural Behavior of Voided Slabs Reinforced With Basalt Bars

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Abstract : Concrete slabs are considered to be very ductile structural members. Openings in reinforced slabs are necessary so as to install the mechanical, electrical and pumping (MEP) conduits and ducts. However, these openings reduce the load-carrying capacity, stiffness, energy, and ductility of the slabs. To resolve the undesirable effects of openings in the slab behavior, it is significant to achieve the desired strength against the loads acting on it. The use of Basalt Fiber Reinforcement Polymers (BFRP) as reinforcement has become a valid sustainable option as they produce less greenhouse gases, resist corrosion and have higher tensile strength. In this paper, five slab models are analyzed using non-linear static analysis in ANSYS Workbench to study the effect of openings on slabs reinforced with basalt bars. A parametric numerical study on the loading condition and the shape and size of the opening is conducted, and their load and displacement values are compared. One of the models is validated experimentally.

Keywords : concrete slabs, openings, BFRP, sustainable, corrosion resistant, non-linear static analysis, ANSYS
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